KoSFoP 47th International Symposium and Annual Meeting

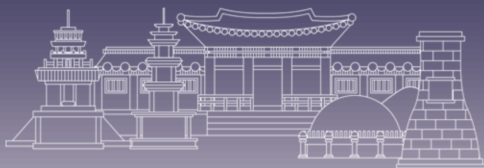
Future Food Systems:

AI-Driven Innovation Across the Value Chain

JULY 22-24, 2026

HICO (Hwabaek International Convention Center)

Gyeongju, Korea



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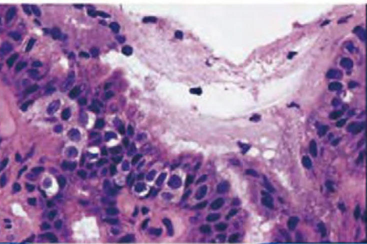

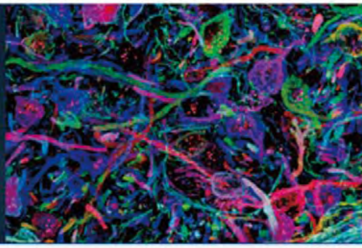

S. YOUNG

주식회사 신영플랜트산업

회 사 개 요

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Call for Papers and Publication Notice for FSP 2026 Special Topic

Special Topic

Data-Driven and Intelligent Approaches in Food Science

Journal: Food Science and Preservation (pISSN 3022-5477; eISSN 3022-5485)

Guest Editors

Mi Jeong Kim (Changwon National University, Korea) mjkim@changwon.ac.kr
Dong-Shin Kim (Gyeongsang National University, Korea) dskim3309@gnu.ac.kr

Information

This special topic focuses on AI- and data-driven approaches for understanding, evaluating, and improving food systems. We welcome original research articles and reviews on predictive modeling, database construction, non-destructive analysis, digital monitoring, process optimization, and quality and safety evaluation in food science.

Scope and Topics

- AI-based food quality and shelf-life prediction
- Machine learning and deep learning in food science
- Non-destructive analysis using spectroscopy, imaging, and sensors
- Data-driven evaluation of functional and bioactive food components
- Food databases, digital monitoring, and decision-support systems

Submission Guidelines

https://submission.ekosfop.or.kr/

Submit online via the journal submission system for the Special Topic.
All submissions will undergo peer review.

Submission Deadline	October 30, 2026
Expected Publication	October/December 2026 issues

Best regards,
Jeung-Hee Lee & Dong Uk Ahn
Editor-in-Chief
Food Science and Preservation

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The Korean Society of Food Preservation

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Welcome Message

Dear Distinguished Members of the Korean Society of Food Preservation,

With the arrival of a vibrant season full of life, I sincerely wish all members continued success and outstanding academic achievements.

Since its establishment in 1992, the Korean Society of Food Preservation has contributed significantly to the advancement of Korea's food industry by strengthening the academic foundation in the fields of food processing, preservation, distribution, and convergence technologies. Our official journal, Food Science and Preservation, has been indexed in SCOPUS, and we are making continuous efforts toward SCI(E) indexing. In addition, our industry journal, Food Preservation and Processing Industry, is currently being promoted for KCI indexing, reflecting the growing stature of our Society. The remarkable progress we have achieved in becoming a truly internationally recognized academic organization would not have been possible without the dedicated efforts and passion of our former presidents, executive members, and all of you.

Building upon this strong foundation, we are pleased to announce the 47th International Symposium and Annual General Meeting, a truly global academic gathering of our Society. The conference will be held under the theme "Future Food Systems: AI-Driven Innovation Across the Value Chain" from July 22–24, 2026, at the Hwabaek International Convention Center (HICO) in Gyeongju. In the face of the climate crisis and rapid changes in global supply chains, this conference will provide a valuable opportunity to explore in depth how artificial intelligence—one of the core technologies of the Fourth Industrial Revolution—across the entire food processing and distribution value chain.

The conference program will feature plenary lectures by Dr. Deokho Kim, President of the Korea National Food Cluster, titled "Innovative Strategies for Future Food: AI-Driven K-Food Transformation and Value Chain Advancement" and Dr. Vincent Martin, Director of the Food and Agriculture

Organization of the United Nations (FAO), titled "Governing AI for Impact at Scale: A Practical Blueprint for Inclusive and Impact-Driven Digital Agriculture and AI Innovation." In addition, there will be award recipient lectures, 29 academic sessions, and five international sessions including the Korea–China Symposium. Approximately 300 poster presentations showcasing the latest research findings and 30 exhibition booths will be featured. Furthermore, a variety of programs for emerging researchers are prepared, including a graduate student presentation competition, workshops on AI-assisted scientific writing and patents, and capstone design competition.

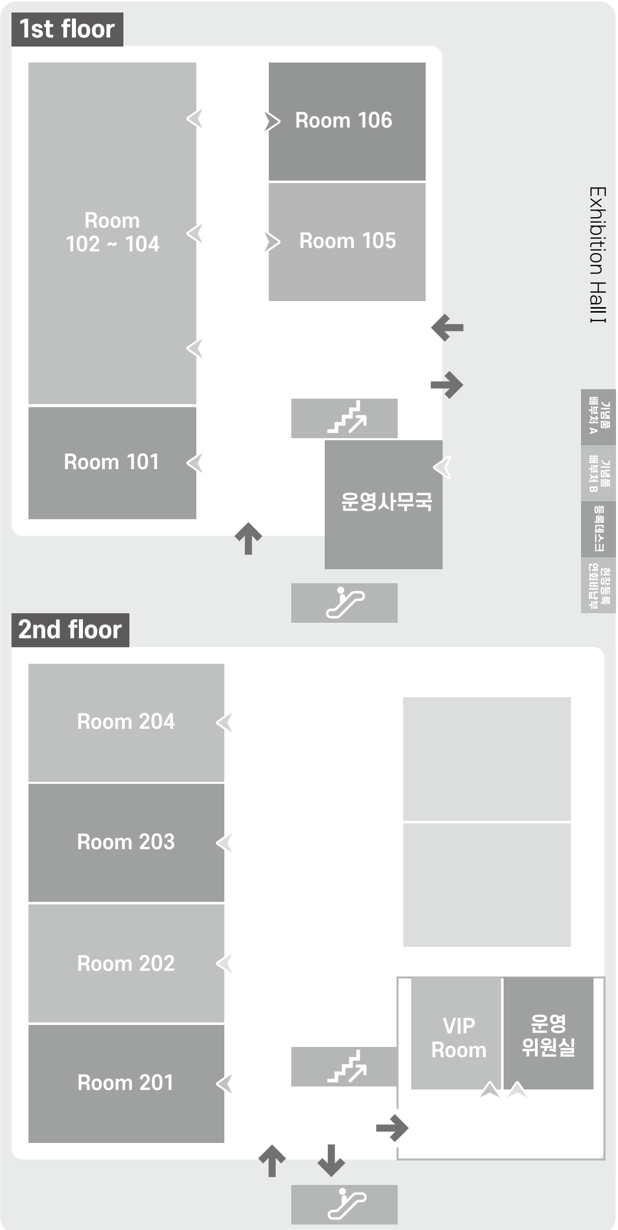
I would like to extend my sincere gratitude to the Organizing Committee, the secretariat staff, and all those who have contributed to the successful preparation of this conference. I also deeply appreciate the generous support from related institutions and industry partners despite the challenging circumstances.

We hope this conference will serve as a meaningful platform not only for sharing future visions of the food industry amidst the rich historical atmosphere of Gyeongju, but also for fostering academic exchange and strengthening professional networks.

We cordially invite you to join us and look forward to your valuable participation. Wishing you and your families continued happiness and prosperity. Thank you.

Sincerely,
Kwang-Sup Youn, President, KoSFoP

Venue Information



Schedule

Place / Time	Room 101	Room 105	Room 106	Room 201	Room 202	Room 203	Room 204	Exhibition Hall I
July 22 (WED)								
12:30 -17:00	Registration (Lobby, 1F)							
13:30 -15:10		WS1	YSL	IS1	Session 1	Session 2	SPOC1	CDC
		AI for Scientific Writing	Young Scientist Presentation	Bioactive Ingredients and Functional Applications	Global Food Distribution System & Alcohol Industry Response	Mushroom and Herbal-Based Multifunctional Cosmeceuticals	Oral Competition (MS)	Capstone Competition
15:10-15:20	Break							
15:20-17:00		WS2	SL1	IS2	Session 3	Session 4	SPOC2	
		Patent Information Search Workshop	UCC Competition	Innovations in Food Processing and Quality Management	Microbiome-Based Functional Materials	Hyperspectral Imaging across Pathology, Biomedicine, and Food Science	Oral Competition (Ph. D)	
18:00-20:00	Board Member Meeting							
July 23 (THU)								
08:30-17:50	Registration (Lobby, 1F)							
09:00-09:20	General Assembly Meeting (Room 102+103+104)							
09:20-09:30	Break							
09:30-11:10	IS3	Session 5	Session 6	Session 7	Session 8	Session 9	Session 10	Poster
	Smart Food Safety and Quality Assessment	Green Bio Era Strategies for LAB Materials	Island and Coastal Bioresource Innovation	Safety Assessment for Food Contact Materials	Functional Food Development with FoodTech	Functional Properties and Mechanisms of Traditional Korean Fermented Soy Products	Smart and Sustainable Strategies for Global K-Food Export	
11:10-11:20	Break							
11:20-12:00	[PL I] (Room 102+103+104)							
12:00-13:00	Lunch							

Place / Time	Room 101	Room 105	Room 106	Room 201	Room 202	Room 203	Room 204	Exhibition Hall I
12:00-13:00	Lunch							Poster
13:00-14:20	Opening Ceremony / Award Ceremony [AAL] (Room 102+103+104)							
14:20-14:40	Break							
14:40-16:20	IS4	Session 11	Session 12	Session 13	Session 14	Session 15	Session 16	
	Advances in Food Safety and Risk Assessment	AI-Based Food Safety Management	K-Enzyme Foods: Emerging Demand and Global Expansion	AI Transformation of Agricultural Product Quality & Distribution	Extending Freshness Beyond Distance	Hyper-Automated Noodle Manufacturing	AI-Driven Food Safety and Future Food Technologies	
16:20-16:30	Break							
16:30-18:10	IS5	Session 17	Session 18	Session 19	Session 20	Session 21	Session 22	
	Plant-Based Foods and AI Innovation	Management of Hazardous Substances Generated during Food Manufacturing and Processing	Future Directions of K-Food Fermentation	The Future of Analysis for Food Status and Distribution	An Integrative Approach to Sarcopenia Prevention	Multidimensional Understanding of Starch Architecture	Precision Fermentation for Sustainable Food	
July 24 (FRI)								
08:30-12:00	Registration (Lobby, 1F)							
09:00-09:30	[PL II] (Room 102+103+104)							
09:30-09:40	Break							
09:40-11:20	[SL2] Career Pathway (Room 102+103+104)							
	Session 23	Session 24	Session 25	Session 26	Session 27	Session 28	Session 29	Poster
	Senior-Friendly Food Application of Fermented Herbal Materials	Functional Materials Driven by Regional Agricultural Data	Jeonnam RISE Co-Growth (D1) FoodTech Group Project	Smart K-Food Distribution Innovation	Seafood Technology for AI-Based Future Blue Food Tech Innovation	Eco-Materials & Packaging in FoodTech	Driving Future Innovation through the Suncheon Green Bio District	
11:10-11:20	Closing Remarks / Awarding Ceremony / Gift Drawing (Room 102+103+104)							

YSL Young scientist lecture; **WS** Workshop; **SL** Special lecture; **SPOC** Student presentation oral competition; **PL** Plenary lecture; **AAL** Academic award lecture; **IS** International symposium sessions; **CDC** Capstone design competition

Plenary Lecture

[PL1]

Innovative strategies for future food: AI-driven K-food transformation and value chain advancement

Deokho Kim
Food Industry Promotion Agency

The global food industry is undergoing a structural transition from a traditional manufacturing-centered model to a high value-added industry driven by data, planning, and intellectual property (IP), alongside the advancement of Digital Transformation. In particular, artificial intelligence (AI) technologies are emerging as key drivers of industrial innovation, being applied across the entire product development and value chain process, including food formulation design, quality prediction, and consumer demand analysis. Amid this paradigm shift, the K-food industry stands at a critical crossroads where it must move beyond its conventional production-oriented growth model to secure technological sovereignty and achieve a structural transformation toward future-oriented industries.

This keynote presentation proposes three strategic directions and highlights the role of the Food Industry Promotion Agency in strengthening the global competitiveness of the K-food industry.

First, it emphasizes the advancement of high value-added industrialization through fostering "private K-food branding and planning agencies." This approach discusses a new business model that transforms food products from simple manufactured goods into high value-added planning industries integrated with data-driven precision planning and marketing.

Second, the presentation proposes the establishment of a "Food Copyright" system aimed at assetizing food recipes as well as processing and preservation technologies. By utilizing AI technologies to formalize technical know-how and protect it as intellectual property, this framework seeks to ensure the sustainability of industrial innovation and secure technological sovereignty.

Third, it introduces the development of an organic industrial ecosystem based on "regional clusters." By creating hub-centered ecosystems where research, production, and distribution are closely interconnected, this strategy aims to revitalize local economies while promoting the co-growth of the entire industry.

In conclusion, this presentation suggests practical approaches to improving product development efficiency and strengthening responsiveness to global markets by applying AI-based generative formulation design, quality prediction, and process and distribution optimization technologies across the entire food value chain. Ultimately, the presentation seeks to derive future development directions and policy implications for K-food by comprehensively integrating technological innovation with systemic industrial transformation.

Plenary Lecture

[PL2]

Governing AI for impact at scale: a practical blueprint for inclusive and impact-driven digital agriculture and AI innovation

Vincent Martin
Food and Agriculture Organization of the United Nations, Italy

Artificial intelligence is rapidly emerging as a transformative force across agrifood systems, with the potential to enhance productivity, resilience, and sustainability while supporting better decision-making along value chains. Yet, realizing this potential requires moving beyond isolated technological applications toward approaches that are inclusive, trusted, and grounded in real-world impact, ensuring that innovation reaches farmers, reduces inequalities, and delivers tangible benefits at scale.

The Digital Agriculture and AI Innovation Roadmap for the global agrifood systems transformation sets out a shared vision for inclusive, trusted, and impact-driven agrifood innovation. It translates this vision into a three-year action plan aimed at transforming agrifood systems by moving beyond fragmented pilot initiatives toward a collaborative innovation ecosystem. This ecosystem promotes the reuse, adaptation, and alignment of solutions across contexts and stakeholders.

As its first collective output, the initiative has developed an AI Governance Toolkit defining key principles related to accountability, equity, efficiency, security, and data stewardship. The roadmap further structures collaboration by pooling knowledge, infrastructure, and funding, thereby enabling governments, innovators, researchers, and funders to align efforts and scale solutions more effectively.

The roadmap serves both as a practical blueprint and as an open invitation for global participation. Together, the roadmap and the toolkit aim to translate ambition into scalable and inclusive impact.

The presentation will also provide insights into the ongoing implementation of the roadmap through the Science, Technology and Innovation Portal, as well as through two complementary business models: (1) the Precompetitive Space, which enables public and private actors to jointly develop shared data, tools, and foundational AI components before they are commercialized, thereby reducing risk and duplication; and (2) the AI Hubs, which support the testing, adaptation, and scaling of AI solutions in real-world contexts.

The presentation will conclude with an overview of the test version of the AI Use Case Development Blueprint.

Academic Award Lecture

Research on high-value processing technologies for agricultural resources

Wonyoung Lee
Kyungpook National University

This presentation summarizes recent research advances in food engineering focusing on natural product extraction and purification, eco-friendly packaging materials, and elderly-friendly texture-modified foods. Advanced extraction technologies were developed to improve the recovery and functionality of bioactive compounds from brown algae and edible insects. Resin-based purification enhanced the recovery of brown algae polyphenols, while hybrid extraction methods improved the extraction efficiency and bioactivity of edible insect proteins. Process optimization using Response Surface Methodology (RSM) and artificial intelligence (AI)-based modeling further increased process accuracy and efficiency.

To promote sustainable resource utilization, agricultural by-products such as okra and citrus peel were converted into biodegradable packaging materials. The developed bio-composite films exhibited improved mechanical strength, barrier properties, UV protection, and biodegradability, while effectively extending the shelf life of fresh produce.

The presentation also introduces the development of elderly-friendly texture-modified foods using edible insect proteins and plant-derived pectin. Process optimization and structural modification improved protein functionality and enabled the production of nutritionally enhanced foods suitable for individuals with dysphagia.

Overall, these studies demonstrate the integration of sustainable biomass utilization, advanced food processing technologies, and AI-assisted optimization to develop high-value functional ingredients, biodegradable packaging materials, and innovative food products that address current environmental, industrial, and nutritional challenges.

Symposium Session

Session 1

July 22(Wed) · 13:30-15:10 · Room 202

Global changes in food distribution systems and response strategies in the alcohol industry

Sponsored by Food Additives Standard Division, Ministry of Food and Drug Safety

Chair_ Hyung Il Kim (Ministry of Food and Drug Safety)

S1-1	13:30-13:55 **Public-private cooperation to improve food additive regulations in alcoholic beverages** Jung-Ah Do *Ministry of Food and Drug Safety*
S1-2	13:55-14:20 **Current status and future direction of the Korean alcoholic beverage industry** Jangwoo Chun *HITEJINRO R&D Center*
S1-3	14:20-14:45 **AI-driven changes in food distribution systems and response strategies in the imported alcohol industry** Sunyong Yoon *Korea Wines & Spirits Importers Association*
S1-4	14:45-15:10 **Global alcohol industry trends and AI-driven development strategies for aged distilled spirits** Tae-Wan Kim *Korea Food Research Institute*

Symposium Session

Session 2 July 22(Wed) · 13:30-15:10 · Room 203

Development strategy for multifunctional cosmetic materials based on mushrooms and natural bio-resources

Sponsored by Jangheung Research Institute for Mushroom Industry

Chair_ Ho-Jin Heo (Gyeongsang National University)

S2-1	13:30-13:55 **Development and industrial trends of mushroom-derived functional cosmetic ingredients** **Rhim Ryoo** *National Institute of Forest Science*
S2-2	13:55-14:20 **Collaboration research 1: development of radiation-breeding kenaf (*Hibiscus cannabinus* L.) cultivars for sustainable cosmetic applications in Korea** **Jaihyunk Ryu** *Korea Atomic Energy Research Institute*
S2-3	14:20-14:45 **Collaboration research 2: development strategies for cosmetic materials and products from functional plants using radiation technology** **Jae Hoon Kim** *Korea Atomic Energy Research Institute*
S2-4	14:45-15:10 **From inner to outer beauty: human clinical approaches for skin efficacy substantiation** **Jangmi Suk** *Prederma Clinical Research Institute Co., Ltd.*

Symposium Session

Session 3 July 22(Wed) · 15:20-17:00 · Room 202

Next-generation microbiome-based functional materials: from development to industrialization strategies

Sponsored by Nodcure, Inc.

Chair_ Min-Kyoung Shin (Gyeongsang National University)

S3-1	15:20-15:55 **Microbiome research and functional material development for disease management** **Jeon-Kyung Kim** *Jeonbuk National University*
S3-2	15:55-16:30 **Identification and characterization of key bioactive components in probiotics** **Seung Hyun Han** *Seoul National University*
S3-3	16:30-17:00 **Development of functional food materials for managing metabolic syndrome using honeybee-derived probiotics** **Ah-Ra Jang** *Nodcure, Inc.*

Symposium Session

Session 4 July 22(Wed) · 15:20-17:00 · Room 203

Multidisciplinary convergence of hyperspectral imaging: expanding the scope of toxicologic pathology, biomedicine, and food science

Sponsored by Hyperspectral Histo-Metrix Convergence Cluster

Chair_Yoon Cho (Korea Institute of Toxicology)

S4-1	15:20-15:55 **Understanding toxicologic pathology: from exposure to lesion development** **Woojin Kim** *Korea Institute of Toxicology*
S4-2	15:55-16:30 **Development of hyperspectral imaging methods for biomedical applications** **Jonghee Yoon** *Ajou University*
S4-3	16:30-17:00 **Expanding hyperspectral imaging through hyperspectral microscopy: microstructural interpretation and applications** **Jeongseok Cho** *Korea Food Research Institute*

Symposium Session

Session 5 July 23(Thu) · 09:30-11:10 · Room 105

Expansion strategies for the lactic acid bacteria-based materials industry in the green bio era

Sponsored by Imsil Cheese & Food Research Institute

Chair_Hyun-Joong Kim (Mokpo National University)

S5-1	09:30-10:05 From probiotics to postbiotics: expanding functional lactic acid bacteria for green bio-industry applications Sung Wook Hong *World Institute of Kimchi*
S5-2	10:05-10:40 Development of functional cosmetic ingredients using Jeju-derived microorganisms Jeong Mi Kim *UCL*
S5-3	10:40-11:10 Microbial community dynamics during Gouda cheese manufacturing using the novel *Lactococcus lactis* subsp. *lactis* KFOM 0478 starter culture with anticlostridial activity Jae-sung Shin *Eulji University*

Symposium Session

Session 6 July 23(Thu) · 09:30-11:10 · Room 106

Development and utilization of the technological value of island and coastal wildlife

Sponsored by Honam National Institute of Biological Resources

Chair_Kyung-Min Choi (Honam National Institute of Biological Resources)

S6-1	09:30-09:55 **Obtainment of materials from island wildlife and establishment of the material useful information system** **Won Woo Lee** *Honam National Institute of Biological Resources*
S6-2	09:55-10:20 **Ameliorative effect of cheonggukjang fermented with *Bacillus amyloliquefaciens* (SCGB 574) on inflammatory responses and inflammation-related diseases** **Yung-Choon Yoo** *Konyang University*
S6-3	10:20-10:45 **A narrative connecting K-specialty local ingredients to glocalized K-NPD process** **Jihyo Kim** *Institute of BIo industry for Namwon*
S6-4	10:45-11:10 **Alginic acid, a functional dietary ingredient derived from *Ecklonia maxima* stipe, attenuates the pro-inflammatory responses on particulate matter-induced lung macrophages** **Hyun-Soo Kim** *Gyeongsang National University*

Symposium Session

Session 7 July 23(Thu) · 09:30-11:10 · Room 201

Safety assessment of food utensils, containers and packages

Sponsored by Food Additives and Packages Division,
National Institute of Food and Drug Safety Evaluation
Chair_Youn Ju Choi (National institute of food and drug safety evaluation)

S7-1	09:30-10:05 **Safety assessment of food utensils, containers and packages: domestic and international approaches** **Min-Kyung Song** *Korea Resource Economics Research Institute Co., Ltd.*
S7-2	10:05-10:40 **Improvement of the safety assessment model for food utensils, containers and packages in Korea** **Jun Tae Kim** *Kyung Hee University*
S7-3	10:40-11:10 **Key policies and research trends for ensuring the safety of food utensils, containers and packaging in Korea** **Siweon Choi** *National institute of food and drug safety evaluation*

Session 8 | July 23(Thu) · 09:30-11:10 · Room 202

Development of functional food utilizing FoodTech

Sponsored by Project Group for Sejong FoodTech

Chair_Sungjin Park (Korea University)

S8-1	09:30-09:55 **AI-based cultivar classification for the future growth of health functional foods: a case study on Haskap** Hyeon Woo Park *Korea University*
S8-2	09:55-10:20 ***Pueraria lobata*** **as a functional medi-food ingredient for sarcopenia management: potential and strategies** Seongil Heo *Hongcheon Institute of Medicinal Herb*
S8-3	10:20-10:45 **Developing for functional food materials targeting barrier dysfunction and microbiome-related diseases** Sung Keun Jung *Kyungpook National University*
S8-4	10:45-11:10 **Effects of additives on the viscoelastic properties and 3D printability of pregelatinized rice flour dough** Youngseung Lee *Dankook University*

Symposium Session

Session 9 July 23(Thu) · 09:30-11:10 · Room 203

Functional poroperties and mechanisms of traditional Korean fermented soy products

Sponsored by Microbial Institute for Fermentation Industry

Chair_Chang Joo Lee (Wonkwang University)

S9-1	09:30-10:05 **Anti-inflammatory and immunomodulatory effects of traditional Korean fermented soy products** Dong Yeop Shin *INVIVO Co., Ltd.*
S9-2	10:05-10:40 **Protective effects and mechanisms of traditional fermented soy products on colitis and colitis-associated colorectal cancer** Seon-Young Kim *Jeonju AgroBio-Materials Institute*
S9-3	10:40-11:10 **Chungkookjang as a neuroprotective functional food: multi-target mechanisms via the gut-microbiome-brain axis in memory impairment, alzheimer's disease, and ischemic stroke** Sunmin Park *Hoseo University*

Symposium Session

Session 10 July 23(Thu) · 09:30-11:10 · Room 204

Global K-food export development: emerging challenges in shelf-life, distribution, packaging, and regulation

Sponsored by Samyang Foods Co., Ltd.

Chair_Jong Seok Park (Dongguk University)

S10-1	09:30-10:05 Sustainable food packaging strategies for global markets **Bokyung Park** *Korea Food Industry Cluster Promotion Agency*
S10-2	10:05-10:40 AI-driven K-food innovation: product development innovation through AI-based generative formulation and quality prediction **Junho Choi** *Dassault Systèmes – Industry Consultant*
S10-3	10:40-11:10 Regulatory compliance strategies for expanding K-food exports **Jae-Yong Lee** *National Food Safety Information Service*

Symposium Session

Session 11 July 23(Thu) · 14:40-16:20 · Room 105

Scientific verification strategies for AI-based food development and safety management

Sponsored by National Food Safety Information service

Chair_Byung-Yong Kim (Konyang University)

S11-1	14:40-15:15 **End-to-end functional ingredient development strategy based on AI-powered NAMs (New Approach Methodologies)** Bok Kyung Han *Korea University*
S11-2	15:15-15:50 **AI-driven sensory standardization: from electronic sensors to brain responses** Eui-Cheol Shin *Gyeongsang National University*
S11-3	15:50-16:20 **Development of Returnable Transport Packaging (RTP) and Returnable Transport System (RTS) for the safety of temperature-sensitive products** Su-Hyun Kim *KCP R&D Institute*

Symposium Session

Session 12 July 23(Thu) · 14:40-16:20 · Room 106

Creation of new demand and globalization strategy for K-enzyme foods

Sponsored by Korea Enzyme Food Association, Inc

Chair_Joong-Ho Kwon
(Grainon Ancient Grains Materialization Research Institute)

S12-1	14:40-15:15 **The current landscape and future development of K-enzyme foods** **Yong-Jin Jeong** *Keimyung University & KMF*
S12-2	15:15-15:50 **Fermented emmer wheat (*Emmer Wheat Forte*) ameliorates diet-induced obesity by modulating lipid metabolism, inflammation, and gut microbiota** **Eun-Young Kwon** *Kyungpook National University*
S12-3	15:50-16:20 **Driving demand for grain-based enzyme foods** **Dong Hoon Lee** *Grainon Co., Ltd.*

Symposium Session

Session 13 July 23(Thu) · 14:40-16:20 · Room 201

Research toward AI transformation of quality evaluation, sorting, storage & distribution of agricultural products

Sponsored by National Institute of Horticultural & Herbal Science, Rural Development Administration

Chair_Eun Jin Lee (Seoul National University)

S13-1	14:40-15:15 **From omics to intelligence: discovery and application of biomarkers for agricultural product quality** **Dong-Shin Kim** *Gyeongsang National University*
S13-2	15:15-15:50 **Application of AI for quality assessment and sorting in agri-food systems** **Suk-Ju Hong** *Kyungpook National University*
S13-3	15:50-16:20 **AI & sensing technologies for quality control of agricultural products during the storage and distribution** **Ghiseok Kim** *Seoul National University*

Symposium Session

Session 14 July 23(Thu) · 14:40-16:20 · Room 202

Extending freshness beyond distance

Sponsored by World Institute of Kimchi

Chair_Sung Hee Park (World Institute of Kimchi)

S14-1	14:40-15:15 Smart cold chain system with a focus on maritime transport Jisung Jo *Korea Maritime Institute*
S14-2	15:15-15:50 Understanding the operation of reefer containers for the maritime transport of fresh agricultural cargo Tae-Hoon Kim *Smart Applied Technology Research Center, Dong-A University*
S14-3	15:50-16:20 K-food on the move: a field view of global cold chain Haksu Shin *SEEKHAN CORP.*

Symposium Session

Session 15 July 23(Thu) · 14:40-16:20 · Room 203

Data-AI-digital twin convergence for hyper-automation of noodle manufacturing processes

Sponsored by Korea Food Research Institute

Chair_Jeong-Ho Lim (Korea Food Research Institute)

S15-1	14:40-15:15 **Interpretation of nondestructive data based on the structural and physical properties of noodle dough** **Hwabin Jung** *Korea Food Research Institute*
S15-2	15:15-15:50 **A scalable virtual sensor slot framework for ultra-low latency edge-AIoT: design and field demonstration in noodle production lines** **Joon Heo** *MathAI Inc.*
S15-3	15:50-16:20 **Ontology technology and its integration with digital twin for intelligent food manufacturing** **Ho-Seon Lee** *E8 Co., Ltd.*

Symposium Session

Session 16 July 23(Thu) · 14:40-16:20 · Room 204

AI and data-driven innovation in food safety management and future food technologies

Sponsored by Korea Agency of HACCP Accreditation and Services

Chair_Sung Ok Song (Korea Agency of HACCP Accreditation and Services)

S16-1	14:40-15:15 **Digital transformation of food safety management leveraging proprietary data-driven specialized AI** **Jung il Park** *Korea Agency of HACCP Accreditation and Services*
S16-2	15:15-15:50 **AI-driven risk scoring for intelligent unannounced inspection trageting in HACCP-certified establishment** **Jieun Jeong** *CSLEE Co.,Ltd.*
S16-3	15:50-16:20 **Cellulose-first structuring technology for alternative foods** **Young Hoon Jung** *Kyungpook National University*

Symposium Session

Session 17 July 23(Thu) · 16:30-18:10 · Room 105

Management of hazardous substances generated during food manufacturing and processing

Sponsored by New Hazardous Substances Division, National Institute of Food and Drug Safety Evaluation

Chair_Ockjin Paek (Ministry of Food and Drug Safety)

S17-1	16:30-16:55 Management of process-induced contaminants in foods based on Total Diet Study (TDS) Ji hye Jeon *National Institute of Food and Drug Safety Evaluation*
S17-2	16:55-17:20 Formation and mitigation of furans in foods: sources, risks, and control strategies Young-Suk Kim *Ewha Womans University*
S17-3	17:20-17:45 Occurrence and risk assessment of 3-MCPD, 3-MCPD esters, and glycidyl esters in Home Meal Replacement (HMR) products: results of a total diet study in South Korea Kwang-Won Lee *Korea University*
S17-4	17:45-18:10 Impact of air-frying practice and storage of lotus root on the acrylamide formation in air-fried chips Mun Yhung Jung *Woosuk University*

Symposium Session

Session 18 July 23(Thu) · 16:30-18:10 · Room 106

Tradition to innovation: future directions of K-food fermentation

Sponsored by National Institute of Crop and Food Science, Rural Development Administration

Chair_Sangbum Kim (National Institute of Crop and Food Science)

S18-1	16:30-17:05 **From traditional fermented foods to future food ingredients: trends and prospects of the K-fermentation industry** **Byung-Yong Kim** *Konyang University*
S18-2	17:05-17:40 **Leaping into the global market through Jang fermentation technology** **Yongho Choi** *SEMPIO FOODS COMPANY*
S18-3	17:40-18:10 **Strategic research for advancing K-SPIRITS: from tradition to value-driven maturation** **Tae-Wan Kim** *Korea Food Research Institute*

Symposium Session

Session 19 July 23(Thu) · 16:30-18:10 · Room 201

Assessment of oxidative behavior and storage stability of food systems under accelerated RSSOT conditions

Sponsored by Anton Paar Korea Ltd.

Chair_Sang-Soon Kim (Konkuk University)

S19-1	16:30-17:05 **Correlation between food distribution storage and oxidation stability analysis** **Carolin Edinger** *Anton Paar GmbH*
S19-2	17:05-17:40 **Utilization of oxidation stability analysis for the quality control of raw materials and products of global food companies** **Carolin Edinger** *Anton Paar GmbH*
S19-3	17:40-18:10 **Summary of RSSOT method** **Juno Ham** *Anton Paar Korea Ltd.*

Symposium Session

Session 20 July 23(Thu) · 16:30-18:10 · Room 202

An integrative approach to sarcopenia prevention: bioactive compounds, big data, and nutritional interventions

Sponsored by Research Institute of Human Ecology, Yeungnam University

Chair_Choon Young Kim (Yeungnam University)

S20-1	16:30-17:05 **Muscle-protective potential of *Poncirus trifoliata* extract and its bioactive coumarins in a dexamethasone-induced atrophy model** **Hyejin Ko** *Korea Institute of Science and Technology (KIST)*
S20-2	17:05-17:40 **Development of a risk prediction model for sarcopenia prevention based on multimodal nutrition and health information** **Sihyung Lee** *Research Institute of Human Ecology, Yeungnam University*
S20-3	17:40-18:10 **Nutritional interventions for the prevention and management of sarcopenia in an aging population** **Dasom Yoon** *Chung-Ang University Gwangmyeong Hospital*

Symposium Session

Session 21

July 23(Thu) · 16:30-18:10 · Room 203

Multidimensional understanding of starch architecture

Sponsored by Korea Food Research Institute

Chair_Hoon Kim (Korea Food Research Institute)

S21-1	16:30-17:05 **Multi-scale characterization and AI-driven prediction of cooked rice quality attributes** Hyun-Jung Chung *Chonnam National University*
S21-2	17:05-17:40 **Structural control of starch digestibility and kinetic insights into starch digestion** Ha Ram Kim *Korea Food Research Institute*
S21-3	17:40-18:10 **Model derivation technique to reveal starch granule architecture** Jung Sun Hong *Korea Food Research Institute*

Symposium Session

Session 22 July 23(Thu) · 16:30-18:10 · Room 204

Precision fermentation: innovating next-generation food ingredient production for a sustainable future

Sponsored by Department of FoodTech, Chonnam National University

Chair_Soo-Jung Kim (Chonnam National University)

S22-1	16:30-17:05 Programmable yeast surfaces for precision fermentation Soo Rin Kim *Kyungpook National University*
S22-2	17:05-17:40 Precision fermentation and the potential of traditional fermentation microorganisms Young-Wook Chin *Korea Food Research Institute*
S22-3	17:40-18:10 Cas9 ribonucleoprotein-mediated genome editing in yeast toward food applications Chan-Woo Kim *National Institute of Crop and Food Science*

Symposium Session

Session 23 · July 24(Fri) · 09:40-11:20 · Room 101

Bioconversion-based development strategy of fermented herbal materials for senior-friendly food applications

Sponsored by Dongyangdang

Chair_Ho-Jin Heo (Gyeongsang National University)

S23-1	09:40-10:15 **Development and industrialization strategy of senior-friendly foods using mushroom mycelial fermented black ginseng** **Do-gyeong Kim** *Dongyangdang*
S23-2	10:15-10:50 **Strategies for promoting the senior-friendly green bio-Industry using bioconversion technology** **Kyung-wuk Park** *Suncheon Research Center for Bio Healthcare*
S23-3	10:50-11:20 **Advanced analysis and enhancement of ginseng compound K via optimized processing and bioconversion methods** **Kyung-yun Kang** *Suncheon Research Center for Bio Healthcare*

Symposium Session

Session 24 July 24(Fri) · 09:40-11:20 · Room 105

Developing functional materials driven by regional data of agricultural products

Chair_Cheol-Soo Lee
(Korea Advanced Food Research Institute of Korea Food Industry Association)

S24-1	09:40-10:05 **Functional properties and utilization of native and cultivated *Artemisia fukudo* Makino in Jeollanam-do** Hwan-Sik Na *Jeollanam-do Institute of Health and Environment*
S24-2	10:05-10:30 **Effect of steam treatment on functional compounds in Korean ginger** Su-Jin Kim *Jeonbuk State Institute of Health & Environment Research*
S24-3	10:30-10:55 **Utilization potential of Korean *Cannabis sativa* L.: functional components and biological activities of hemp seeds, roots, and stems** Hyemee Shim *Gyeongsangbuk-Do Government Public Institute of Health & Environment*
S24-4	10:55-11:20 **Open discussion** (Developing functional materials driven by regional data of agricultural products)

Symposium Session

Session 25

July 24(Fri) · 09:40-11:20 · Room 106

Jeonnam RISE shared growth: sustainable food technology through university-regional collaboration and AI-enabled future food systems

Sponsored by Jeonnam RISE Project Team (D1), Sunchon National University & Research Institute of Food Industry, Sunchon National University

Chair_Ki Man Kim (Gwangju University)

S25-1	09:40-10:15 Advancing regional innovation: current status and strategic future directions of the Jeonnam RISE Co-Growth (D1) FoodTech group project Chang Ki Huh *Sunchon National University*
S25-2	10:15-10:50 Research on the potential use of cheese whey as brewing water in soy sauce production Su Hwan Kim *Fermented Food Industry Support Center*
S25-3	10:50-11:20 AI transformation in the food industry: trends, technologies, tools, and future directions Hyun Sim *Sunchon National University*

Symposium Session

Session 26 July 24(Fri) · 09:40-11:20 · Room 201

Advanced tech-driven innovation strategy for K-food smart distribution

Sponsored by Miryang & Gyeongnam Antiaging Research Institute

Chair_Jeong Hee Choi (Korea Food Research Institute)

S26-1	09:40-10:05 **Technology trends in Autonomous Mobile Robot (AMR) applications for smart food logistics** Kyoung Yee Kim *Inje University*
S26-2	10:05-10:30 **AI-driven quality management of agri-food products based on quality data and its extension to digital distribution** Dong-Shin Kim *Gyeongsang National University*
S26-3	10:30-10:55 **Digital transformation and challenges in Korean agriculture** Jung Hoon Han *Korea Rural Economic Institute*
S26-4	10:55-11:20 **The present and future of smart fresh produce distribution and bio-logistics systems** Hak-kyu Song *CXL Bio Center, Sejung Group*

Symposium Session

Session 27

July 24(Fri) · 09:40-11:20 · Room 202

Seafood technology for AI-based future blue Food Tech innovation

Organized by Seafood Products Division, KoSFoP

Chair_Kil Bo Shim (Pukyong National University)

S27-1	09:40-10:15 **Machine vision and AI-based seafood quality evaluation** **Jong-Jin Park** *Korea Food Research Institute*
S27-2	10:15-10:50 **Non-destructive quality assessment of fish fillets: olive flounder (*Paralichthys olivaceus*) evaluated via Vis-NIR multispectral imaging and multi-omics validation** **Jimin Hyun** *Pukyong National University*
S27-3	10:50-11:20 **Machine learning-based freshness assessment of seafood using colorimetric analysis** **Du-Min Jo** *National Marine Biodiversity Institute of Korea*

Symposium Session

Session 28 July 24(Fri) · 09:40-11:20 · Room 203

Research directions for eco-friendly food materials and packaging : core technologies in FoodTech

Sponsored by JinJu Bioindustry foundation & HADONG TEA & BIO FOUNDATION

Chair_Gyeong Hwan Jo (HADONG TEA & BIO FOUNDATION)

S28-1	09:40-10:05 **Development of natural flavor enhancers for saltiness and umami using microorganisms from traditional fermented foods** Ji Yoon Chang *Gyeongsang National University*
S28-2	10:05-10:30 **Development of versatile material technologies based on zero-waste valorization of fruit byproducts** Ju Seok Yang *JinJu Bioindustry foundation*
S28-3	10:30-10:55 **Eco-friendly food packaging technology** Chang-Yun Chung *Arame Materials Co., Ltd.*
S28-4	10:55-11:20 **Application development and market outlook for bio-based materials** Yong Dae Park *Dongsung Chemical Co., Ltd.*

Symposium Session

Session 29

July 24(Fri) · 09:40-11:20 · Room 204

Driving future innovation through the Suncheon green bio district

Sponsored by FERMENTED FOOD INDUSTRY SUPPORT CENTER

Chair_Hyun-Dong Cho (Sunchon National University)

S29-1	09:40-10:15 **Vision for the Suncheon green bio specialization district** Junseok Oh *Suncheon Fermentation Industry Support Center*
S29-2	10:15-10:50 **Genetic and functional diversity according to environmental adaptation of next-generation probiotics** Ji-Sun Kim *Sunchon National University*
S29-3	10:50-11:20 **High value-added utilization of agricultural products and green bio industry development strategies in Suncheon city** Seung-Je Lee *Cheong-am University*

International Session

IS1 | July 22(Wed) · 13:30-15:10 · Room 201

Bioactive food ingredients and functional applications

Sponsored by Food Science & Technology, Jeonbuk National University

Chair_Yong-Suk Kim (Jeonbuk National University)

IS1-1	13:30-13:55 **A study on the antioxidant effect of resveratrol on milk thistle seed oil at frying temperature** **Xuanjun Li** *Yanbian University, China*
IS1-2	13:55-14:20 **Isolation and purification of peptides from Jianglu liquor and their antioxidant activity mechanism and structure-activity relationship** **Tie-Yan Jin** *Yanbian University, China*
IS1-3	14:20-14:45 **Quality characteristics of different cuts of Yanbian Yellow Cattle beef and utilization of their subcutaneous fat for oleogel preparation** **Hua Zhang** *Yanbian University, China*
IS1-4	14:45-15:10 **Transforming *Locusta migratoria* protein into low-allergen biofunctional ingredients through ultrasound-assisted enzymatic hydrolysis** **Jae Hoon Lee** *Jeonbuk National University*

International Session

IS2 July 22(Wed) · 15:20-17:00 · Room 201

Innovations in food processing and quality management

Sponsored by Food Science & Technology, Jeonbuk National University

Chair_Soon-Il Yun (Jeonbuk National University)

IS2-1	15:20-15:45 **Research on key technologies for green processing of high-quality dry-cured ham and comprehensive utilization of by-products** **Baide Mu** *Yanbian University, China*
IS2-2	15:45-16:10 **Bioreactor culture of *Rhodiola sachalinensis* cells from the Changbai Mountain region and their biological activity evaluation** **Jun Jiang** *Yanbian University, China*
IS2-3	16:10-16:35 **AI-driven aptamers discovery and applications in food quality control and safety assessment** **Yongjie Yang** *Yanbian University, China*
IS2-4	16:35-17:00 **Efficient production of functional food ingredients via synthetic biology-guided microbial precision fermentation** **Hyun Gyu Hwang** *Jeonbuk National University*

International Session

IS3 July 23(Thu) · 09:30-11:10 · Room 101

Emerging innovations in food processing, safety, and quality assessment

Chair_Deog-Hwan Oh (Kangwon National University)

IS3-1	09:30-09:55 Recovery of RG I pectin from mandarin canning wastewater as a functional food ingredient **Xingqian Ye** *Zhejiang University, China*
IS3-2	09:55-10:20 AI-driven on-site rapid detection of key food-associated microorganisms via optical sensing techniques **Jun Wang** *Guangdong Ocean University, China*
IS3-3	10:20-10:45 Decontamination of fresh wet rice noodles using a vertical in-package cold plasma system **Xinyu Liao** *Zhejiang University, China*
IS3-4	10:45-11:10 AI-driven intelligent freshness assessment and quality prediction for aquatic products across the value chain using hyperspectral imaging and advanced YOLO11 **Shuai Wei** *Guangdong Ocean University, China*

International Session

IS4 July 23(Thu) · 14:40-16:20 · Room 101

Advances in dietary exposure assessment for food safety and risk evaluation

Chair_Joon-Goo Lee
(Seoul National University of Science and tecahnology)

IS4-1	14:40-15:15 **Understanding Singapore consumers' dietary exposure to chemicals through Singapore's first Total Diet Study (TDS)** **Geraldine Lim** *Singapore Food Agency, Singapore*
IS4-2	15:15-15:50 **Study on the simultaneous determination of quaternary ammonium disinfectant compounds (QACs) in food samples collected in Hanoi, Vietnam, using LC-MS/MS** **Dinh Viet Chien** *National Institute for Food Control, Vietnam*
IS4-3	15:50-16:20 **Dietary exposure assessment of sorbates in commonly consumed foods in the Philippines** **Rosemarie J. Dumag** *Food and Nutrition Research Institute, Philippines*

International Session

IS5	July 23(Thu) · 16:30-18:10 · Room 101

Integrating plant-based food science and AI for future food systems

Chair_Bokyung Son (Dong-A University)

IS5-1	16:30-17:05 **Future food systems through AI-driven hydration informatics: from seed morphology to process control in legume value chains** Pilairuk Intipunya *Chiang Mai University, Thailand*
IS5-2	17:05-17:40 **Multifaceted functional properties of adzuki beans *(Vigna angularis*)-with special emphasis on their prebiotic effects** Kyuho Han *Obihiro University of Agriculture and Veterinary Medicine, Japan*
IS5-3	17:40-18:10 **Beyond prediction: a data-driven framework for AI food design** Suyong Lee *Sejong University*

Young Scientist Presentation

YSL July 22(Wed) · 13:30-15:10 · Room 106

Young Scientist Presentation

Chair_Woongjae Yoo (Pohang University of Science and Technology)

YSL-1	13:30-13:55 Waterborne opportunistic pathogen *Legionella* and host interaction: implications for food storage environments Seongok Kim *Gachon University*
YSL-2	13:55-14:20 Bacteriophage-based precision microbial control and mechanism studies Jinshil Kim *Hanyang University*
YSL-3	14:20-14:45 Dysregulation of mitochondrial signaling patterns and dietary approaches to ameliorate inflammation and metabolic disease Yu Geon Lee *Suncheon National University*
YSL-4	14:45-15:10 From sequence to function: an AI-driven pipeline for discovering positional-specific lipases Chi Rac Hong *Kunsan National University*

Graduate Student Presentation

SPOC1 | July 22(Wed) · 13:30-15:10 · Room 204

Graduate Studnet Presentation Oral Competiton (MS)

SPOC1-1	Rheological, structural, and aroma characteristics of low- and high-moisture extruded meat analogs incorporated with shiitake mushroom **Ayeon Han** *Kongju National University*
SPOC1-2	Improvement HACCP plan for rice cake products manufacturing process **Hye-Rim Ji** *Sunchon National University*
SPOC1-3	Anti-cancer and anti-allergic effects of *Morinda citrifolia* L. fruit juice powder **June-Seok Lim** *Kangwon National University*
SPOC1-4	Structural and functional insights into a modular endolysin for the targeted control of *Bacillus licheniformis* **Minseo Hong** *Dong-A University*
SPOC1-5	Antifungal activity and mechanisms of *Lactiplantibacillus plantarum* KM2 cell-free supernatant as a biopreservative against *Cladosporium* spp. in yogurt **Sung-Hyup Hong** *Kyungpook National University*

SPOC1-6	Comparison of a QuEChERS method and a saponification-based extraction method for the determination of PAHs in HMRs **Minju Koo** *Seoul National University of Science and Technology*
SPOC1-7	*Corchorus olitorius* L. extract attenuates dexamethasone-induced muscle atrophy in C2C12 myotubes by regulating protein homeostasis and mitochondrial quality control **Eon Ji Kim** *Yeungnam University*

Graduate Student Presentation

SPOC2 July 22(Wed) · 15:20-17:00 · Room 204

Graduate Studnet Presentation Oral Competiton (Ph.D)

SPOC2-1	Starvation-induced extracellular polymeric substances secretion protects *Staphylococcus aureus* against cold plasma stress by quenching reactive species **Yuhao Sun** *Zhejiang University, China*
SPOC2-2	Monitoring and dietary risk assessment of trichloroethylene and perchloroethylene in Korean foods using headspace GC-MS **Kiyun Kim** *Seoul National University of Science and Technology*
SPOC2-3	Deep learning-guided discovery of neuroprotective flavonoids from Korean citrus peels for Alzheimer's disease **Samuel Park** *Gyeongkuk National University*
SPOC2-4	Genomic and functional evaluation of *Bacillus velezensis* NY12-2 (KACC 92193P) as a safe starter culture for *doenjang* fermentation and development of a strain-specific marker **Seong Eui Yoo** *National Institute of Crop and Food Science, Rural Development Administration*
SPOC2-5	Study on the effect of dense phase carbon dioxide treatment on the allergenicity of parvalbumin from *Trachinotus ovatus* **Hui Qiu** *Guangdong Ocean University, China*

Capstone Design Competition

CDC | July 22(Wed) · 13:30-17:00 · Exhibition Hall Ⅰ

Capstone Design Competition

CDC-1	Reducing phytate-derived phosphorus discharge from monogastric livestock feed using yeast surface display of phytase **Jee Won Um** *Kyungpook National University*
CDC-2	SalSeroDB: An AI-based software for rapid *Salmonella* serotype classification **Ahyoung Kim** *Gyeongkuk National University*
CDC-3	안동 생강 유래 나노소포체를 첨가한 콜드브루 커피의 품질 특성 및 관능평가 **윤동환** *국립경국대학교*
CDC-4	Construction of a food engineering and heritage-based ontology and development of a hallucination-controlled RAG chatbot system for K-food reinterpretation **Dayeong Lee** *Gyeongkuk National University*
CDC-5	Stainless steel 표면에서 알코올 처리 시간에 따른 식중독 미생물의 저감화 평가 **송수민** *국립순천대학교*

CDC-6	Preparation and quality evaluation of upcycled bakery products supplemented with wheat bran **Kyung-Kyun Lee** *Daegu University*
CDC-7	Comparison of phenolic compound profiles and antioxidant activities of different parts of *Dendropanax morbifera* Léveille **Youmin Kim** *Gyeongkuk National University*
CDC-8	Fermentation-assisted improvement of antioxidant activity and amino acid quality in triple-brew *makgeolli* supplemented with upcycled krill-derived peptides **Hyun-Sun Kang** *Sunchon National University*
CDC-9	Prediction of freshness changes in roasted coffee beans exposed to oxygen using MOS sensor array **Min-Seo Kim** *Chonnam National University*
CDC-10	Development and quality features of dandy prepared with wild pear syrup and concentrate **Dae Won Gwon** *Sunchon National University*
CDC-11	Development and quality features of chocolate containing Jindo *Hwanggeumbong* jelly **Dae Won Gwon** *Sunchon National University*
CDC-12	Development and quality features of *Nurungji* sandwich wafers containing Jindo *Hwanggeumbong* marmalade **Ro-Jin Lee** *Sunchon National University*

CDC-13	유통기한 임박 김치를 활용한 상온유통형 김치 스프레드 개발 **조수연** *전남대학교*
CDC-14	Development of a functional co-fermentation system for corn cob upcycling and production of an off-flavor reduced fermented beverage material **Soyeon Sim** *Kyungpook National University*
CDC-15	Development of a functional food material from upcycled asparagus (*Asparagus officinalis* L.) extract for anti-sarcopenic obesity **Xiaolu Fu** *Kangwon National University*
CDC-16	Variety- and germination stage-dependent changes in the antioxidant activity and glycemic index of yellow and black soybeans **Soyeon Joo** *Sunchon National University*
CDC-17	유당 함량 데이터베이스 기반 개인 맞춤형 유당불내증 관리 앱 개발: '락토버디(Lacto Buddy)' **유지수** *고려대학교*
CDC-18	냉매의 종류 및 위치가 샐러드 운송 중 온도 증가에 미치는 영향 **이은미** *국립순천대학교*
CDC-19	주세 및 로스팅 처리된 단삼의 대사체 특성 **김수호** *전남대학교*

CDC-20	프리바이오틱 소재 이눌린 생산을 위한 inulosucrase 스크리닝 **범서연** *전남대학교*
CDC-21	Influence of *Glehnia littoralis* addition on quality characteristics, storage stability, and biological activities of high-fat muffins **Jun-Yeol Park** *Sunchon National University*
CDC-22	Preparation of microcrystalline cellulose from apricot pruning waste and its application in carrageenan-based composite films **Seung-Woo Lee** *Mokpo National University*
CDC-23	*Bacillus velezensis* 발효물을 활용한 절임배추 내 병원성 미생물 저감화 연구 **주나라** *국립목포대학교*
CDC-24	이산화염소 가스 처리에 따른 밀가루의 제빵 적성 변화 **이동혁** *국립목포대학교*
CDC-25	Quality characteristics of *dasik* (Korean traditional confection) prepared with soybean curd residue according to drying methods **So Hee Kim** *Changwon National University*

Special Lecture

SL1 July 22(Wed) · 15:20-17:00 · Room 106

UCC Competition

SL2	July 24(Fri) · 09:40-11:20 · Room 102+103+104

Career Pathway

SL2-1	09:40-10:00 **식품 전공자를 위한 경력개발 가이드** **박미희** *㈜커리어 도트*
SL2-2	10:00-10:20 **세계김치연구소 및 채용제도 소개** **박현석** *세계김치연구소*
SL2-3	10:20-10:35 **한국식품산업클러스터진흥원 소개 및 채용 설명** **장하나** *한국식품산업클러스터진흥원*
SL2-4	10:35-10:50 **국민 안심을 위한 식품안전관리의 중심, 식품의약품안전처** **전지혜** *식품의약품안전평가원*
SL2-5	10:50-11:05 **Career Pathway-한국식품연구원** **윤대용** *한국식품연구원*
SL2-6	11:05-11:20 **연구직 공무원 입문** **이진수** *농촌진흥청 국립원예특작과학원*

Symposium Session

S1-1

Public-private cooperation to improve food additive regulations in alcoholic beverages

Jung-Ah Do
Food Additives Standard Division
Ministry of Food and Drug Safety

Not only food additives used in alcoholic beverages are defined by the standards and specifications under the Food Sanitation Act, the Liquor Tax Act also specifies the food additives permitted for each type of alcohol. Therefore, for the safe management of food additives used in alcoholic beverages, cooperation between the Ministry of Food and Drug Safety (MFDS) and the National Tax Service (NTS) must be required. Recently, new alcoholic beverage products such as highballs have emerged. Since, in many cases, domestic use level for food additives are different from those of other countries, the demand for international harmonization is growing. Regarding food additives used in alcoholic beverages, various regulations have been improved via continuous exchange between the MFDS, NTS, and alcohol-related associations since the year of 2023. For example, in 2023, a new use level for anhydrous sulfur dioxide in non-alcoholic wine was established, and in 2024, the use level, for sulfites in ‘other alcoholic beverages’ manufactured from fruit wine as a raw material, was raised from 0.030 to 0.20 g/kg. In addition, in 2025, the use level for ‘modified hop extract’ was improved to allow its use in non-alcoholic beer. Since June 2025, a consultative body for improving regulations on food additives used in alcoholic beverages has been officially launched and is in operation. In order to keep pace with changing alcohol consumption trends, the MFDS will make great efforts to improve regulations for the harmonization with international standards such as CODEX, and for diverse consumer choices as well, with the persistent cooperation of the consultative body.

S1-2

Current status and future direction of the Korean alcoholic beverage industry

Jangwoo Chun
HITEJINRO R&D Center

The Korean alcoholic beverage industry has traditionally grown based on soju, beer, and traditional liquors. However, the market environment is rapidly changing due to shifts in consumer lifestyles, demographic changes, and the spread of health-conscious culture. Major recent trends include premiumization, lower-alcohol products, diversification of products, and the expansion of the “sober curious” movement, which encourages reducing or moderating alcohol consumption. In particular, younger generations are increasingly avoiding alcohol and prioritizing health, leading to rapid growth in the non-alcoholic beer and alternative beverage markets. Meanwhile, the domestic liquor market is facing structural challenges. A declining drinking population, reduced alcohol consumption among younger consumers, and the continued population decline expected in the future are likely to become major risk factors for the Korean alcoholic beverage industry. This suggests that the conventional growth strategy centered on domestic demand and volume expansion is no longer sustainable. This study aims to analyze the current status of the Korean alcoholic beverage industry and propose future development strategies under these changing conditions. First, it examines market trends such as premiumization, health-oriented consumption, and the expansion of low- and non-alcoholic products. Second, it suggests that in response to changing consumer demand, the industry should develop low-alcohol beverages, non-alcoholic products, functional alcoholic beverages, and new products with diverse flavors and concepts. In addition, globalization strategies are essential to overcome the limitations of the domestic market. Expanding overseas markets for K-liquor, particularly soju, fruit wine, and traditional liquors, along with localized marketing strategies, will be necessary for sustainable growth. Finally, AI technology can serve as a key driver of innovation across the entire liquor industry value chain. AI-based consumer needs analysis, personalized product development, smart brewing technologies, advanced quality control, demand forecasting, and cost reduction in production and distribution are expected to strengthen industrial competitiveness. The convergence of AI and the alcoholic beverage industry will become an important strategy for driving the global growth of K-liquor and innovation in future food systems.

S1-3

AI-driven changes in food distribution systems and response strategies in the imported alcohol industry

Sunyong Yoon
Korea Wines & Spirits Importers Association

The alcohol industry is undergoing significant changes driven by increasingly diversified consumer preferences, small-volume consumption trends, and rapidly evolving distribution channels. Traditional analog-based distribution systems are gradually shifting toward digital data-based ordering and inventory management systems, while online platforms, parallel imports, and cross-border e-commerce are expanding throughout the market. Along with these changes, the adoption of artificial intelligence (AI) and data technologies is also increasing within the alcohol industry. At the government level, AI technologies are being utilized in import declaration reviews and product classification processes to improve administrative efficiency. In addition, AI-based demand forecasting, inventory management, and consumer-tailored recommendation services are increasingly being introduced across alcohol distribution and retail environments. However, the diversification of distribution channels has also created new challenges related to product information, quality control, and distribution traceability. In particular, the expansion of parallel imports and cross-border e-commerce has increased the importance of consumer information transparency and product reliability. Although the alcohol industry has traditionally shown relatively slow digital transformation compared to other industries, the pace of AI adoption is expected to accelerate as data accumulation increases. Accordingly, there is a growing need for AI-based distribution management systems and stronger cooperation among industry, government, and academia. This presentation examines structural changes in imported alcohol distribution systems amid AI-driven transformations in food distribution environments and discusses future response strategies and collaborative challenges for the industry.

S1-4

Global alcohol industry trends and AI-driven development strategies for aged distilled spirits

Tae-Wan Kim

Food Convergence Research Division
Korea Food Research Institute

This research examines global trends in the alcohol industry and proposes AI-driven development strategies for aged distilled spirits, with a focus on strengthening the competitiveness of K-SPIRITS. The global market for aged spirits, such as whisky and brandy, is increasingly driven by premiumization, technological integration, and data-based production systems. In contrast, the K-SPIRITS sector faces challenges in the scientific control of maturation, standardization of processes, and the development of globally competitive premium products. To address these gaps, this research proposes a data-driven maturation framework based on digital transformation (DX) and AI-based maturation prediction (AX). First, key environmental and process variables throughout maturation will be systematically collected and integrated to establish a digital monitoring system. Second, AI models will be developed to predict maturation outcomes and support process optimization, enabling improved reproducibility and quality consistency. Third, the research emphasizes the localization of core enabling technologies, including microbial resources, distillation systems, and maturation equipment, to establish a self-sustaining technological foundation. By integrating DX-AX-based maturation technologies with localized production systems, this research aims to develop strategies for producing globally competitive premium aged distilled spirits. Ultimately, it seeks to establish a scientific and industrial framework for advancing K-SPIRITS in the global market.

S2-1

Development and industrial trends of mushroom-derived functional cosmetic ingredients

Rhim Ryoo

Division of Forest Microbiology and Application
National Institute of Forest Science

Recently, the cosmetics industry has seen growing interest in high-performance, naturally derived ingredients, driven by the "Clean Beauty" and "Conscious Beauty" paradigms that prioritize safety and sustainability. Amid this trend, mushrooms are emerging as a core resource with significant potential as next-generation cosmetic materials, effectively bridging historical reliability from traditional uses with diverse physiological activities elucidated through modern science.

Mushrooms serve as functional resources rich in various secondary metabolites, including polysaccharides, B vitamins, polyphenols, and terpenoids. "Tremella fuciformis" enhances moisturization and skin elasticity through its superior water-binding capacity. Concurrently, ganoderic acid from "Ganoderma lucidum" and polyphenols from "Inonotus obliquus" deliver potent antioxidant and skin-soothing effects. Furthermore, "Lentinula edodes" functions as an anti-aging and brightening agent via anti-inflammatory and melanin-inhibiting mechanisms, while pachymic acid from "Wolfiporia hoelen" offers a dual-action approach—reducing edema by regulating water metabolism and brightening skin through tyrosinase inhibition.

To maximize the stability and bioavailability of these functional components, precision processing technologies, such as supercritical fluid extraction and enzyme-based depolymerization, are increasingly being utilized. Moreover, the global market is embracing mushroom-derived materials as "adaptogens," prompting a surge in cross-industry convergence. Specifically, the mass production of rare active ingredients via biofoundry-based precision fermentation is transforming these resources into standardized, high-value-added biomaterials. Consequently, mushroom-derived materials are securing global competitiveness by meeting the growing demand for vegan and eco-friendly solutions of the cosmetics industry.

S2-2

Collaboration research 1: development of radiation-breeding kenaf (*Hibiscus cannabinus* L.) cultivars for sustainable cosmetic applications in Korea

Jaihyunk Ryu[1*], Jae Hoon Kim[1], Si-Yong Kang[2], Jin-Baek Kim[1], Sang Hoon Kim[1], Joon-Woo Ahn[1]

[1]Advanced Radiation Technology Institute, Korea Atomic Energy Research Institute
[2]Department of Horticulture, College of Industrial Sciences, Kongju National University

Kenaf (Hibiscus cannabinus L.) is an annual herbaceous plant in the Malvaceae family whose leaves, bast fibers, flowers, and seed oil have attracted increasing attention as sustainable cosmetic ingredients. In Korea, early-maturing imported varieties (primarily European) are capable of domestic seed production but exhibit significantly lower biomass productivity—approximately 50% of late-maturing types. Conversely, late-maturing varieties (from China and the United States) provide high biomass yields but are unsuitable for seed production under Korean conditions, limiting their use in continuous cultivation systems and stable raw material supply for the cosmetic industry. To address these limitations, the Korea Atomic Energy Research Institute has developed a series of domestically adapted kenaf cultivars using radiation breeding technology. Starting with 'Jangdae' (No. 4560), which offers enhanced seed and seed oil productivity, additional varieties have been tailored for cosmetic applications. These include 'Baekma' and 'Wonbaek', characterized by reduced flower chromaticity for improved formulation compatibility; 'Jeokbong' and 'Wongang', enriched with anthocyanins; and 'Woncheong', a high-biomass cultivar containing elevated levels of functional phytochemicals in flowers. Leveraging these cultivars, radiation-based convergence technologies have been applied to develop functional cosmetic ingredients with enhanced bioactivity. Key bioactive compounds, including kaempferitrin, have been characterized and evaluated for their potential skin-related benefits, such as antioxidant and skin-conditioning effects. In parallel, extraction optimization and material standardization have been conducted to ensure consistent quality and efficacy. Furthermore, prototype cosmetic formulations incorporating kenaf-derived ingredients have been developed by domestic companies, demonstrating their feasibility and commercial potential. This work highlights the value of domestically bred kenaf cultivars as a stable, sustainable, and functionally versatile resource for the cosmetic industry.

S2-3

Collaboration research 2: development strategies for cosmetic materials and products from functional plants using radiation technology

Jae Hoon Kim
Advanced Radiation Technology Institute
Korea Atomic Energy Research Institute

In this study, we present development strategies and a representative case study for high-value cosmetic ingredients using radiation technology applied to a novel kenaf cultivar developed through radiation breeding. The effects of irradiation on color improvement and functional enhancement of plant-derived extracts were systematically evaluated. The results showed that radiation treatment significantly increased lightness (L*), while reducing redness (a*) and yellowness (b*), leading to a substantial improvement in the dark color of the extract. In terms of biological activity, irradiation reduced the production of inflammatory mediators, including nitric oxide (NO), TNF-α, and IL-6, indicating enhanced anti-inflammatory effects. Furthermore, irradiation promoted skin-related functional properties, including increased procollagen synthesis in dermal fibroblasts, enhanced ceramide kinase activity, and elevated hyaluronic acid levels. Notably, irradiation at a dose of 10 kGy for kenaf leaf extract was identified as the optimal condition, minimizing compositional changes while improving both anti-inflammatory activity and skin regeneration efficacy, as well as effectively reducing dark coloration.

In conclusion, radiation technology can be effectively utilized as a processing method to improve the color of plant-derived natural extracts while simultaneously enhancing their functional properties. This approach holds strong potential for the development of high-value cosmetic ingredients with improved sensory and biological performance. With the growing demand for plant-derived natural materials in the cosmetic industry, there is an increasing need for technologies that can simultaneously enhance not only functional efficacy but also sensory qualities such as color. Plant extracts are widely recognized for their rich content of bioactive compounds, including polyphenols; however, organic solvents such as alcohol are commonly used during extraction, which co-extract plant pigments such as chlorophyll. As a result, the extracts often exhibit dark coloration, limiting their applicability as cosmetic ingredients despite their excellent biological activities.

S2-4

From inner to outer beauty: human clinical approaches for skin efficacy substantiation

Jang-Mi Suk
Prederma Clinical Research Institute Co., Ltd.

The rapid expansion of the inner beauty market has led to increasing scientific and industrial interest in functional ingredients that can improve skin condition through oral intake. As consumer demand for evidence-based beauty products continues to grow, the importance of clinically substantiated efficacy data has become a critical factor in both product development and market competitiveness. In particular, skin-related claims such as hydration, elasticity, wrinkle improvement, skin brightening, soothing effects, and skin barrier enhancement require reliable human clinical evidence to support product credibility and regulatory compliance.

This presentation will discuss practical human clinical study strategies for evaluating the skin efficacy of inner beauty products from a dermatological and cosmetic clinical research perspective. The similarities and differences between clinical approaches used in cosmetics and health functional foods will be compared, with emphasis on study design, endpoint selection, subject inclusion criteria, placebo control considerations, and interpretation of clinical outcomes. Key instrumental and visual assessment methods commonly utilized in skin clinical studies will be introduced, including trans epidermal water loss (TEWL), corneometer for skin hydration, skin elasticity measurements, melanin and erythema indices, wrinkle imaging analysis, and investigator visual grading. In addition, the presentation will address the importance of selecting clinically meaningful biomarkers and consumer-relevant endpoints to strengthen claim substantiation.

Recent trends in the field of skin efficacy evaluation will also be explored, including microbiome-related approaches, personalized beauty concepts, multi-omics applications, and AI-based skin image analysis technologies. Furthermore, regulatory perspectives and the growing need for scientifically robust human evidence in global cosmetic and nutraceutical markets will be discussed.

S3-1

Microbiome research and functional material development for disease management

Jea-Hoon Jeong[1†], Yoo-Bin Lee[1†], Minsun Kim[2,3], Jeon-Kyung Kim[1*]

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[†]*These authors contributed equally to this work*

The gut microbiome plays an important role in host metabolism, immunity, and neurological function, making it a promising target for disease management. This study investigated the therapeutic potential of beneficial microorganisms in metabolic and neurological disorders.

The effects of Pediococcus acidilactici isolated from healthy newborns and Limosilactobacillus reuteri isolated from healthy mice were evaluated in experimental animal models using behavioral, biochemical, and microbiome analyses. Administration of P. acidilactici improved cognitive performance and mitigated cognitive impairment. In addition, L. reuteri supplementation reduced body weight gain and improved anxiety- and depression-like behaviors in diet-induced obesity models. These beneficial effects were associated with alterations in gut microbial composition and gut-derived signaling pathways, suggesting the involvement of the gut-brain axis.

Overall, these findings highlight the potential of microbiome-derived functional materials as novel strategies for managing metabolic and neurological diseases and provide a basis for the development of microbiome-based therapeutics and functional food applications.

S3-2

Identification and characterization of key bioactive components in probiotics

Seung Hyun Han
Seoul National University

Probiotics including lactic acid bacteria have been extensively investigated for their beneficial effects on human health and their potential applications in the prevention and treatment of a wide range of diseases. Accumulating evidence suggests that specific molecular components derived from probiotics are largely responsible for many of their biological activities. Identification and characterization of these key bioactive molecules is therefore essential for understanding the mechanisms underlying probiotic efficacy, establishing reliable efficacy markers, and developing next-generation functional biomaterials and therapeutics. Our research has focused on the isolation, characterization, and mechanistic evaluation of probiotic-derived bioactive components with therapeutic potential. Among the bioactive molecules identified, probiotic-derived lipoteichoic acid (LTA) exhibits potent anti-biofilm activity against a broad spectrum of clinically relevant pathogens, including Streptococcus mutans, Porphyromonas gingivalis, and Candida albicans. By disrupting biofilm formation, a critical virulence mechanism underlying microbial persistence and pathogenicity, LTA effectively suppresses the development of dental caries, periodontitis, and candidiasis. These findings highlight the potential of probiotic-derived LTA as a novel postbiotic molecule for preventing and managing biofilm-associated infectious diseases. In addition, LTA promotes tissue repair and regeneration in both oral and cutaneous wound-healing models, suggesting broader therapeutic applications beyond oral health. We have also identified probiotic-derived peptidoglycan as a critical regulator of bone homeostasis. Through modulation of bone remodeling pathways, the peptidoglycan exhibits protective effects against osteoporosis and inflammatory bone destruction. Furthermore, specific probiotic lipoproteins have been found to enhance innate immune responses, indicating their potential utility as immunomodulatory agents. This presentation will highlight our recent advances in identifying key bioactive components from probiotics and discuss their mechanisms of action, biological functions, and translational potential as novel preventive and therapeutic agents for oral and systemic diseases.

S3-3

Development of functional food materials for managing metabolic syndrome using honeybee-derived probiotics

Ah-Ra Jang[1*], Jong-Hwan Park[1,2]

[1]*Nodcure, Inc.*
[2]*College of Veterinary Medicine, Chonnam National University*

Honeybee-derived probiotics have emerged as promising functional food ingredients for the management of obesity and metabolic syndrome. This study investigated the beneficial effects of Lactiplantibacillus plantarum NCHBL-004 using both a high-fat diet-induced obese mouse model and a randomized, double-blind, placebo-controlled clinical trial in overweight adults. In the animal study, oral administration of NCHBL-004 reduced body weight gain, improved glucose metabolism, and helped maintain lipid homeostasis. NCHBL-004 also increased glucagon-like peptide-1 production and fecal short-chain fatty acids, including acetate and propionate, accompanied by favorable changes in gut microbiota, such as increases in SCFA-producing bacteria and microbes associated with GLP-1 secretion. Notably, heat-killed NCHBL-004 showed beneficial effects comparable to those of live bacteria, suggesting its potential applicability as a postbiotic ingredient. In the clinical trial, 12-week supplementation with NCHBL-004 at 1×10^9 CFU/day significantly reduced body fat mass and body fat percentage in overweight adults compared with placebo after adjustment for baseline BMI, without clinically meaningful safety concerns. Taken together, these preclinical and clinical findings support the potential of honeybee-derived L. plantarum NCHBL-004 as a functional food ingredient for body fat management and metabolic health improvement.

S4-1

Understanding toxicologic pathology: from exposure to lesion development

Woojin Kim

Biomedical Diagnostics Research Center
Korea Institute of Toxicology

Food-related substances, including food additives, processing by-products, packaging migrants, and contaminants, may eventually reach humans through dietary exposure. Therefore, their safety evaluation requires an understanding of how exposure can lead to biological responses and, in some cases, tissue lesions. Toxicologic pathology provides a useful framework for interpreting these changes in the context of dose, duration, route of exposure, and target organs. This presentation introduces the basic principles of toxicologic pathology for researchers who may not be familiar with this field. It will also explain how findings from animal toxicity studies are evaluated through gross and microscopic examination, together with clinical pathology data and organ weights. Key concepts, including adaptive versus adverse changes and dose-response relationships, will be discussed. By following the pathway from exposure to lesion development, this talk aims to show how toxicologic pathology contributes to regulatory science and risk assessment for food-related substances. The presentation will provide a general overview, helping participants understand how pathology findings support evidence-based safety decisions.

S4-2

Development of hyperspectral imaging methods for biomedical applications

Jonghee Yoon
Department of Physics
Ajou University

Optical imaging techniques have been widely applied in biomedical diagnostics because of their high spatial resolution, compact design, safety, and cost-effectiveness. In particular, hyperspectral imaging has attracted considerable attention as a promising tool for disease diagnosis, as it enables precise analysis of wavelength-dependent reflectance and subtle variations in the optical properties of biological tissues. In this presentation, I will introduce recently developed wide-field hyperspectral imaging optical system and a hyperspectral imaging microscope, along with their biomedical applications. The developed systems can be applied to a wide range of biological samples, from excised tissues to tissue slides for histological analysis, and enable visualization of subtle optical differences within tissue. Based on these capabilities, we demonstrate that spectral differences between normal and diseased tissues can be analyzed with high precision, allowing effective identification of disease location and extent. In addition, by applying artificial intelligence-based analysis to hyperspectral images, we achieved more precise disease diagnosis through improved classification and interpretation of complex spectral features. These results suggest that hyperspectral imaging, combined with artificial intelligence, can serve as an integrated diagnostic platform that bridges large-area tissue assessment and microscopy-based high-precision diagnosis.

S4-3

Expanding hyperspectral imaging through hyperspectral microscopy: microstructural interpretation and applications

Jeongseok Cho
Korean Food Research Institute

Hyperspectral imaging (HSI) has been established as a non-destructive technique for assessing food quality and safety, providing per-pixel spectral information across a sample. At the macro scale typically used for whole-food inspection, however, HSI cannot resolve the micrometer-level structural and compositional features that govern many quality-relevant and biological phenomena. Hyperspectral microscopy (HMI), which couples microscopic spatial resolution with a full per-pixel spectrum, has emerged as a natural extension of HSI for accessing this finer scale. This presentation positions HMI as a continuation of a research trajectory progressing from RGB image analysis, through visible–near-infrared (VIS–NIR) and short-wave infrared (SWIR) HSI of agricultural and food products, to spectral microscopy of biological tissue. As an initial case, lung tissue from rodents exposed to an environmental toxicant via intratracheal instillation was processed into histological slides and examined under a VIS–NIR (400–1000 nm) hyperspectral microscope. The aim is to evaluate whether HMI can complement the qualitative evaluation currently performed by pathologists under conventional light microscopy, by providing quantitative spectral signatures and signal-pattern indicators of toxicant-induced tissue change. Beyond this case, HMI is proposed as a unifying optical platform connecting food-domain HSI with tissue-level toxicology and biomedical applications.

S5-1

From probiotics to postbiotics: expanding functional lactic acid bacteria for green bio-industry applications

Sung Wook Hong
World Institute of Kimchi

Probiotics are live microorganisms in fermented foods that are widely recognized for their health benefits, particularly in maintaining gut microbiome balance. Prebiotics are selectively utilized substrates that promote beneficial microbial activity, while postbiotics—defined as inactivated microbial cells, their components, and metabolites that provide biological benefits—have recently emerged as a next-generation paradigm in microbiome-based interventions. This study aims to introduce recent advances in kimchi-derived probiotics, prebiotics, and postbiotics.

Lactic acid bacteria (LAB), serving as key starter and adjunct cultures in dairy fermentations such as cheese, play essential roles in acidification, flavor and texture development, and bioactive compound production during ripening. However, probiotics exhibit techno-functional limitations, including viability loss, limited stability, and safety concerns in vulnerable populations, which have accelerated the shift toward postbiotics. Postbiotics demonstrate diverse biological activities, including immunomodulatory, anti-inflammatory, and metabolic regulatory effects, and offer advantages such as improved safety, enhanced stability, and well-defined composition.

In dairy systems, they provide opportunities as functional ingredients to improve product quality and targeted health functionalities. Within this framework, functional LAB are being redefined as bio-factories for the efficient production of value-added metabolites through controlled fermentation and ripening processes. This shift expands their application from conventional dairy products to green bio-industrial domains, including nutraceuticals, pharmaceuticals, and sustainable biomaterials, while supporting eco-friendly and resource-efficient bioprocessing. Looking ahead, the transition from probiotics to postbiotics is expected to accelerate, driven by increasing demand for safe and effective health solutions. The integration of functional LAB with advanced fermentation technologies will advance dairy science and the green bio-economy, positioning postbiotics as a key platform for sustainable and high-value applications in cheese and dairy-based bio-industries.

S5-2

Development of functional cosmetic ingredients using Jeju-derived microorganisms

Jeong Mi Kim

UCL

The industrial application of local microbial resources for cosmetic raw materials remains limited despite extensive research into microbial functionality. This study aimed to develop high-value functional cosmetic ingredients by utilizing indigenous microorganisms from Jeju Island in combination with native plant resources.

In collaboration with the Biodiversity Research Institute of Jeju Technopark and DaebongLS, we utilized Pediococcus acidilactici BDD10 (isolated from bee-derived material) and Bacillus coagulans KK7 (isolated from kimchi) for the fermentation of various Jeju-native plants, including Pinus densiflora leaf, carrot leaf, Houttuynia cordata, Sasa quelpaertensis, and rosemary. The skin-improving efficacy of these fermented extracts was evaluated through the inhibition of lipid production in human sebocytes and the quantification of skin barrier proteins.

Our results demonstrated that the fermentation process significantly enhanced the therapeutic potential of these botanical extracts. Notably, the carrot leaf fermented extract exhibited significant anti-acne effects through the regulation of sebocyte lipid production, while the Houttuynia cordata fermented extract showed efficacy in alleviating skin pruritus. Furthermore, increased expression of filaggrin and hyaluronic acid (HA) suggests these extracts provide substantial moisturizing benefits. These findings demonstrate that utilizing regional microbial resources for plant fermentation is a viable strategy for developing advanced, evidence-based functional cosmetic ingredients.

S5-3

Microbial community dynamics during Gouda cheese manufacturing using the novel *Lactococcus lactis* subsp. *lactis* KFOM 0478 starter culture with anticlostridial activity

Jae-sung Shin
Eulji University

Clostridium tyrobutyricum causes late blowing defect (LBD) during Gouda cheese production, resulting in cracks and off–odors and thus compromising cheese quality. To inhibit the growth of C. tyrobutyricum, a novel Lactococcus lactis subsp. lactis KFOM 0478 starter with high acidification ability and anticlostridial activity was developed, and its effect on the microbial community and physicochemical properties during cheese manufacturing was investigated. Final Gouda cheese samples from AFDKF and BFDKF groups inoculated with Lc. lactis KFOM 0478 did not exhibit LBD, whereas noninoculated AFD and BFD groups exhibited LBD, leading to decreased cheese quality. Microbial flora analysis revealed C. tyrobutyricum and Enterobacter cloacae, which is associated with early blowing defect (EBD), in cheeses without Lc. lactis KFOM 0478, whereas the growth of both species was inhibited and undetected in the inoculated samples. This study demonstrates that the novel Lc. lactis KFOM 0478 strain, through its acidification ability and inhibition of C. tyrobutyricum growth, effectively maintains the quality of cheese and contributes to the advancement of the cheese industry.

S6-1

Obtainment of materials from island wildlife and establishment of the material useful information system

Won Woo Lee

Practical Research Division, Honam National Institute of Biological Resources

The emergence of life-threatening challenges, such as incurable diseases and infectious pathogens, has accelerated the search for and development of novel therapeutic agents. Extensive exploration across continental regions has left only a limited number of extreme environments on Earth—such as volcanoes and polar areas—remaining largely unexplored for the discovery of unknown natural resources. Islands, characterized by geographic isolation and unique ecosystems, represent promising habitats for rare species and potential sources of previously unidentified bioactive compounds.

Through the exploration of several islands, we collected hundreds of indigenous Korean plant species and prepared plant extracts using 30% ethanol or 50% alcohol for functional evaluation. The antibacterial activities of the extracts were assessed, while anti-inflammatory effects were evaluated through in vitro assays. In addition, collaborating institutions have investigated various physiological functions of these extracts, including enhancement of immune responses, reduction of blood neutral fat levels, improvement of muscle strength and joint health, enhancement of cognitive function, skin whitening, and wrinkle reduction.

Overall, plant extracts represent valuable natural resources with significant potential as antimicrobial agents and functional biomaterials. The comprehensive dataset generated from this study may contribute not only to expanding scientific knowledge but also to the development of health-related products.

S6-2

Ameliorative effect of cheonggukjang fermented with *Bacillus amyloliquefaciens* (SCGB 574) on inflammatory responses and inflammation-related diseases

Yung-Choon Yoo
Konyang University

In this study, the anti-inflammatory effect of cheonggukjang fermented with Bacillus amyloliquefaciens (SCGB 574) in mouse macrophages and BMDM was investigated. First, in RAW 264.7 cells stimulated with LPS, the treatment of SCGB 574 cheonggukjang extract significantly inhibited the expression of pro-inflammatory cytokines such as NO and TNF-α and IL-6 in a concentration-dependent manner. It also inhibited iNOS, a synthease of NO, at the mRNA level. In western blot analysis, it was confirmed that phosphorylation of ERK, JNK, and P38, which are members of MAPK pathways, was significantly inhibited, and phosphorylation of IkB, a hallmarker of NFkB activation, was also markedly suppressed. Second, the inhibitory effect of NLRP3 inflammasome activation in BMDM stimulated with LPS/ATP was investigated. Treatment with SCGB 574 significantly inhibited IL-1β production in a dose-dependent manner. In Western blot analysis, SCGB 574 treatment significantly reduced the expression of caspase-1, IL-1β, NLRP3 and ASC. The decrease in these proteins in BMDM was also clearly observed in confocal microscopy. Cell mechanism analysis related to the inhibitory effect of SCGB 574 on the NLRP3 inflammasome activation showed that SCGB 574 effectively inhibited the generation of intracellular ROS and Ca++ influx induced by LPS/ATP stimulation. On the other hand, in an in vivo model for sepsis, SCGB 574 significantly inhibited the lethal shock induced by LPS injection, thereby showing a significant decrease in the secretion of inflammatory cytokines such as TNF-α and IL-1β in the serum. Furthermore, SCGB 574 significantly suppressed inflammatory injury of stomach called gastritis in mice. Collectively, this study shows that SCGB 574 has a very potent activity to ameliorate inflammatory responses of macrophages and inflammation-related diseases like sepsis and gastritis, also proves that this microorganism is a favorable candidate for the development of functional foods that can be used to improve inflammatory diseases.

S6-3

A narrative connecting K-specialty local ingredients to glocalized K-NPD process

Jihyo Kim

Institute of BIo industry for Namwon

With the global rise of the Korean wave, K-beauty and K-food are becoming global main trend for customers around the world. The global beauty and food industry are currently re-setting new standards around authenticity and resilience. Consumers seek products that connect with their cultural backgrounds while delivering scientifically-and clinically- proven, sustainable results. K-specialty local ingredients' storytelling showcases traditional Korean plant resources combined with modern, innovative formulations, allowing brands to build a premium image through the "story" behind their ingredients. The Institute of Natural BIO Industry for Namwon (NBN) is a public research and industrial support institute headquartered in Namwon, Jeonbuk Province, Republic of Korea. NBN supports a regionally specialized bio-economy built on featured K- local specialties from the previously investigated 1,002 natural plant resourses database - the key ingredients of the green, blue, and red bio ecosystems.

The institute integrates bio R&BD, analysis and quality assurance, and strategic planning with branded specialty local ingredients' storytelling, and glocalized K-new product development (NPD) process in collaboration with universities, research institutes, companies, and government. It's core R&D activities focus on cosmetics & foods and innovation, insect biotechnology, and data-driven precision cultivation and processing of natural biomaterials.

NBN provides end-to-end infrastructure, including a natural raw-material processing facility certified to EFfCI GMP standards, a cGMP- and ISO 22716-compliant final-product manufacturing line, business incubation space, and full cycle of technical services for SMEs - covering pilot production, scale-up support, and certification/validation.

These new platforms will enable collaborative global projects by providing patented K-specialty ingredients, process and product development, and validated testing capacity - all aimed at accelerating global K-beauty and K-food growth and international partnerships.

S6-4

Alginic acid, a functional dietary ingredient derived from *Ecklonia maxima* stipe, attenuates the pro-inflammatory responses on particulate matter-induced lung macrophages

Hyun-Soo Kim
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Alginate is a prominent food component extensively employed in developing functional food items and a dietary supplement with significant anti-inflammatory potential. Globally, rising air pollution by particulate matter (PM) has become a significant threat to humans, causing collateral lung tissue damage by inflammation. Therefore, the present study aimed to evaluate the anti-inflammatory potential of alginate isolated from Ecklonia maxima stipes (EMSA) against lung inflammation due to PM exposure. Initial results from cell viability, nitric oxide, prostaglandin E-2, and pro-inflammatory cytokine production assays showed that EMSA has potential anti-inflammatory activity against PM-induced inflammation. Western blot and qPCR results revealed the anti-inflammatory potential of EMSA through inflammatory signaling pathways, further confirmed by in vivo results and inductively coupled plasma-optical emission spectrometry. Therefore, EMSA can produce low-cost and high-quality alginate for several fields, such as functional foods using E. maxima stipes, a natural source such as functional foods, pharmaceuticals, and nutraceuticals.

S7-1

Safety assessment of food utensils, containers and packages: domestic and international approaches

Min-Kyung Song

Korea Resource Economics Research Institute Co., Ltd.

Food contact materials and articles are used throughout food production, processing, storage, preparation, and consumption. However, chemical substances from utensils, containers, packaging materials, and processing equipment may migrate into food depending on material composition, food type, contact time, temperature, and conditions of use. Therefore, their safety assessment requires an integrated approach covering material management, migration testing, exposure assessment, toxicological evaluation, and regulatory decision-making.

This presentation reviews domestic and international safety assessment frameworks for food contact materials and articles. In Korea, recent policy and research efforts have focused on re-evaluating standards and specifications, developing raw material lists, and establishing safe-use measures for utensils, containers, and packages. These efforts indicate a shift from end-product compliance testing toward a more systematic, substance-based, and risk-based management approach. Internationally, the European Union applies a harmonized framework including general safety principles, good manufacturing practice, Union lists for plastic materials, and specific and overall migration limits. The United States manages food contact substances through regulatory clearances, notifications, inventories, and exposure-based safety evaluations. Japan has introduced a positive list system for synthetic resins used in utensils, containers, and packaging, emphasizing the control of permitted substances and safety management across the supply chain. By comparing these domestic and international approaches, this presentation highlights key considerations for improving safety assessment systems. It also discusses how science-based regulation, data generation, and international harmonization can support the safer use of food contact materials and articles.

S7-2

Improvement of the safety assessment model for food utensils, containers and packages in Korea

Jun Tae Kim

Department of Food and Nutrition
Kyung Hee University

Thorough safety management is essential for food utensils, containers, and packaging materials because they come into direct contact with food. Since the COVID-19 pandemic, significant changes have occurred in the types of food consumed and packaging methods due to the increase in single-person households, dining out, and food delivery consumption. Consequently, there is a need to develop safety assessment models for food utensils and packaging materials that incorporate these rapidly changing dietary habits. This study aims to evaluate safety tailored to modern consumption by identifying the model best suited to the domestic environment through a comparison of packaging safety assessment models from countries such as European Union (EU) and the United States of America (USA). In particular, it will focus on discussing safety assessment models that consider the potential hazardous substances and their quantities that may transfer to each packaging material depending on the type of food in contact and usage conditions.

S7-3

Key policies and research trends for ensuring the safety of food utensils, containers and packaging in Korea

Siweon Choi

Food additives and packages division
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Food utensils, containers, and packaging require appropriate safety management because hazardous substances may migrate into food during contact. In Korea, the Ministry of Food and Drug Safety (MFDS) regulates food contact materials (FCMs) under the "Standards and Specifications for Utensils, Containers and Packaging," which establish material-specific safety standards and analytical test methods. In recent years, Korea has increasingly adopted risk assessment-based scientific evaluation models to strengthen the safety management of FCMs. This presentation introduces the concepts and current applications of FCM safety assessment models used in Korea and reviews the operational framework of key evaluation factors, including migration-based exposure assessment, dietary exposure estimation, food-type-specific distribution coefficients, and packaging factors. In addition, the presentation highlights recent policy directions and research trends aimed at improving the scientific basis of FCM regulation, harmonizing domestic systems with international regulatory approaches, and enhancing preventive safety management throughout the product life cycle. These efforts are expected to contribute to both public health protection and the sustainable development of the food packaging industry in Korea.

S8-1

AI-based cultivar classification for the future growth of health functional foods: a case study on Haskap

Hyeon Woo Park

Department of Food & Biotechnology
Korea University

The growing demand for bioactive-rich ingredients is accelerating the development of health functional foods. Among various candidates, Lonicera caerulea (Haskap) has emerged as a promising berry due to its high content of anthocyanins, polyphenols, and other health-promoting compounds. However, differences in functional component profiles across cultivars necessitate reliable identification methods to ensure consistent product quality and efficacy. In this study, we present an AI-based approach to classify Haskap cultivars using deep learning models trained on annotated images. A total of 1,000 images across eight cultivars were manually annotated and used to train a deep learning-based object detection and classification pipeline. While the binary classification between Haskap and non-Haskap categories achieved high performance (AP: 95%, AR: 93%), multiclass classification across cultivars initially showed limited results (AP: 79.1%, AR: 69.2%). To address this, we introduced a human perception-inspired strategy that emphasizes leaf-level features, which substantially improved the performance (AP: 85.7%, AR: 83.6%). These findings demonstrate the potential of AI-driven cultivar classification as an enabling technology for the future growth of health functional foods, by supporting raw material standardization, post-harvest quality control, and data-driven product development.

S8-2

Pueraria lobata as a functional medi-food ingredient for sarcopenia management: potential and strategies

Seongil Heo
Hongcheon Institute of Medicinal Herb

Sarcopenia, characterized by the progressive loss of skeletal muscle mass, strength, and physical performance, has become a critical health and social issue in aging societies. In response, the food industry is shifting its focus from conventional nutrition toward medi-food solutions that support dietary management and functional maintenance in older adults and nutritionally vulnerable populations. This presentation reinterprets Pueraria lobata, a traditional botanical material, as a potential medi-food ingredient for muscle health and discusses its scientific evidence and commercialization strategy.

Pueraria lobata contains bioactive isoflavones, including puerarin, daidzin, and genistin. In this research framework, puerarin-rich Pueraria lobata extract powder was investigated as a candidate ingredient for muscle health. The extract was standardized to 4.17% puerarin, with an HPLC-confirmed content of 41.68±0.18 mg/g.

In vitro studies using C2C12 myoblasts and myotubes demonstrated protective effects against H2O2-induced oxidative stress and dexamethasone-induced myotube atrophy. Pueraria lobata powder reduced intracellular ROS accumulation, restored glutathione levels, attenuated apoptosis, and preserved myotube diameter. Furthermore, it suppressed catabolic markers such as Atrogin-1, MuRF1, and Myostatin, while upregulating myogenic markers including MyoD, Myogenin, and IGF-1.

In vivo evaluation using a dexamethasone-induced muscle atrophy mouse model indicated that Pueraria lobata powder improved exercise endurance, capacity, grip strength, lean body percentage, and muscle weights. Additionally, a 12-week randomized, double-blind, placebo-controlled human trial using Pueraria lobata root powder-mixed porridge showed high compliance and no serious adverse events. Although between-group differences in handgrip strength were limited, positive signals were observed in selected lower-limb muscle mass indicators.

In conclusion, Pueraria lobata serves as a promising botanical ingredient for muscle-care medi-food, supported by puerarin standardization and mechanistic evidence related to oxidative stress control and muscle protein metabolism. Future development should focus on marker-based standardization, formulation with complementary nutrients (e.g., protein, leucine, vitamin D, and dietary fiber), and stepwise commercialization through geriatric nutrition and medical care foods.

S8-3

Developing for functional food materials targeting barrier dysfunction and microbiome-related diseases

Sung Keun Jung

School of Food Science and Biotechnology
Kyungpook National University

Dietary fiber deficiency and exposure to particulate matter impair epithelial barrier function in both the gut and skin, leading to increased inflammation and health risks. This study proposes a hybrid nutraceutical approach combining dietary fiber with 2-ketoglutaric acid (2-KG) to restore barrier integrity and regulate the gut–skin axis. Dietary fiber alleviated microbiome imbalance and improved resilience to environmental stress, while 2-KG suppressed intestinal permeability by modulating tight junction proteins and inhibiting the TAK1–NF-κB signaling pathway. Together, this combined strategy effectively reduced inflammation and restored epithelial homeostasis. These findings suggest the potential of hybrid nutraceuticals as a novel platform for developing functional food-based materials targeting barrier dysfunction and microbiome-related diseases.

S8-4

Effects of additives on the viscoelastic properties and 3D printability of pregelatinized rice flour dough

Youngseung Lee
Dankook University

This study investigated the individual and interactive effects of sugar, salt, and whey protein concentrate (WPC) on the rheological properties and 3D printability of pregelatinized rice flour (PRF) doughs. Using a response surface methodology (RSM) with a Box-Behnken design, sugar (0~10%), salt (0~2%), and WPC (0~5%) were designated as independent variables to evaluate their impact on the structural integrity of the PRF system. All formulations exhibited shear-thinning behavior, a critical characteristic for extrusion-based 3D printing. However, the addition of sugar, salt, and WPC significantly decreased the maximum storage modulus and yield stress. These changes are primarily attributed to competitive hydration between the additives and the pregelatinized starch, which restricts the formation of a robust three-dimensional gel network. Specifically, the introduction of salt increased the ionic strength within the system, further destabilizing the starch-protein interfacial binding. The rheological shifts directly correlated with 3D printing performance. As additive concentrations increased, the printing percentage error and deformation factor rose significantly, indicating a loss of structural stability and fidelity. Strong negative correlations were confirmed between viscoelastic parameters and printing accuracy. Through RSM optimization, the ideal formulation was identified as 2.25% sugar, 0.97% salt, and 2.55% WPC. This specific composition provided sufficient yield stress to support the layered structure while maintaining adequate processability for extrusion. In conclusion, this study elucidates the complex molecular interactions between common food additives in PRF systems. These findings provide a foundational framework for optimizing the quality, manufacturability, and structural precision of 3D-printed rice-based functional foods.

S9-1

Anti-inflammatory and immunomodulatory effects of traditional Korean fermented soy products

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Traditional Korean fermented sauces refer to fermented foods such as doenjang, gochujang, and ganjang, which are made by fermenting soybeans as the main ingredient; they are representative examples of K-food crafted over long periods by using the power of nature. Recent studies have reported that various bioactive compounds produced during the fermentation process of traditional fermented foods have a positive effect on the human immune system. In particular, strains of the genus Bacillus, the primary fermentative microorganisms in traditional Korean fermented sauces, and their metabolites, such as peptides, isoflavone derivatives, and polyphenols, are associated with the regulation of immune cell activity as well as anti-inflammatory and antioxidant effects. Thus, traditional fermented sauces are gaining attention not only as food products but also for their potential as functional foods with anti-inflammatory and immune-modulating properties. Therefore, the aim of this study was to examine the effects of traditional fermented soybean paste consumption on improving intestinal inflammation and enhancing immunity by using animal models for intestinal inflammation and immunosuppression.

According to the results, gochujang exhibited anti-inflammatory effects in an animal model for colitis induced by 3% sodium dextran sulfate, alleviating histological damage by suppressing inflammatory cytokines (IL-6, TNF-α) and regulating phosphorylation of the MAPK/NF-κB signaling pathway. Furthermore, in an immunosuppressed model induced by 5 mg/kg cyclophosphamide, gochujang, cheonggukjang, and doenjang restored the leukocyte count, cytokines, immunoglobulin G, splenocyte proliferation, splenic natural killer cell activity, and MAPK/NF-κB signaling pathways that had been reduced by the immunosuppressant, thereby enhancing immune function. In addition, improvements were observed in the spleen, which had been damaged by the immunosuppressant. These findings suggest that traditional Korean fermented sauces have the potential to be utilized as functional food ingredients with both anti-inflammatory and immunomodulatory effects.

S9-2

Protective effects and mechanisms of traditional fermented soy products on colitis and colitis-associated colorectal cancer

Seon-Young Kim
Jeonju AgroBio-Materials Institute

Colitis-associated colorectal cancer (CAC) arises from chronic intestinal inflammation and is driven by immune dysregulation, epithelial barrier disruption, and the activation of tumor-related signaling pathways. Recently, traditional fermented soy products have gained attention as functional dietary components with potential preventive and therapeutic effects against colitis and CAC. This presentation systematically reviews preclinical research results focusing on the efficacy and underlying mechanisms of traditional fermented soy products. Accumulating evidence from preclinical model studies, traditional fermented soy products were shown to significantly alleviate the severity of colitis and suppress tumor development and progression in CAC. These effects are closely related to the reduction in the expression of pro-inflammatory cytokines and the regulation of inflammation-related signaling pathways. In addition, the restoration of intestinal epithelial cell integrity through the improvement of barrier function was identified as a key mechanism. Moreover, traditional fermented soy products inhibit tumor development by suppressing cell proliferation and inducing apoptosis. Some studies suggest that changes in the composition of the gut microbiome may contribute to these effects. In conclusion, traditional fermented soybean products exhibit protective effects against colitis and colorectal cancer through the regulation of inflammatory responses, epithelial barrier function, and tumor-related pathways. Further research is required to verify the applicability to human and elucidate the specific mechanism of action.

S9-3

Chungkookjang as a neuroprotective functional food: multi-target mechanisms via the gut-microbiome-brain axis in memory impairment, alzheimer's disease, and ischemic stroke

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Chungkookjang, a traditional Korean short-term fermented soybean product enriched with bioactive Bacillus species, has emerged as a functional food with significant neuroprotective potential. Cognitive decline in mild cognitive impairment (MCI) and Alzheimer's disease (AD) is associated with gut dysbiosis potentially mediated through parasympathetic nervous system (PNS) suppression, disrupting the gut–brain axis. This presentation integrates findings from multiple preclinical studies to examine how chungkookjang intake ameliorates memory impairment, AD-like neurodegeneration, and ischemic stroke through this axis. In artery-occluded gerbil models, chungkookjang reduced neuronal cell death, improved cerebral blood flow, and attenuated post-ischemic hyperglycemia. In scopolamine-induced memory deficit models — where PNS suppression recapitulates gut dysbiosis patterns observed in MCI and AD — chungkookjang reversed cognitive decline and suppressed hippocampal neuroinflammation. Across all models, these effects were accompanied by improved glucose homeostasis, enhanced brain insulin sensitivity, and favorable modulation of gut microbiota composition, including increases in beneficial taxa such as Lactobacillus and Akkermansia, implicating the gut–microbiome–brain axis as a central mediating pathway. To elucidate the underlying mechanisms, network pharmacology analysis of LC–MS-identified metabolites revealed convergence on shared molecular targets — including MMP9, STAT3, ESR1, PTGS2, ACE, and PPARγ — across disease conditions. Enrichment analyses indicated involvement in insulin signaling, estrogen receptor activation, and neuroinflammatory cascades, reflecting a disease-transversal rather than disease-specific mechanism. Collectively, chungkookjang exerts neuroprotective effects through multi-target, multi-pathway mechanisms integrating metabolic regulation, anti-neuroinflammation, and gut microbiota remodeling, potentially through restoration of PNS-mediated gut–brain communication. These findings support dietary chungkookjang as a preventive and therapeutic strategy against neurodegenerative and cerebrovascular disorders, highlighting the translational value of combining traditional fermented foods with modern network pharmacology approaches.

S10-1

Sustainable food packaging strategies for global markets

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Korea Food Industry Cluster Promotion Agency

Food packaging is increasingly recognized as a strategic element for carbon neutrality, circular economy, and global market compliance, beyond its conventional roles of product protection, convenience, and information delivery. Regulations such as the EU Packaging and Packaging Waste Regulation (PPWR) have strengthened requirements for the entire lifecycle of packaging, a trend that is becoming increasingly critical globally. Food companies must address packaging reduction, recyclability, recycled content, and hazardous substance management.

With the expansion of K-food exports, Korean food companies are required to maintain product quality and safety under long-distance transport and diverse distribution conditions, while complying with country-specific regulations and international transport packaging requirements. This presentation introduces sustainable food packaging strategies based on technical support cases conducted by the Korea Food Industry Cluster Promotion Agency, focusing on EU PPWR regulatory interpretation, technical documentation guidance, and alternative packaging materials tailored to food product characteristics.

Through these technical support cases, the presentation aims to provide practical directions for sustainable packaging transition and to support K-food companies in strengthening their global export competitiveness.

S10-2

AI-driven K-food innovation: product development innovation through AI-based generative formulation and quality prediction

Junho Choi

Dassault Systėmes – Industry Consultant

As the global K–Food market continues to expand, accelerating product development while ensuring consistent quality has become a critical priority. Traditional experience–driven R&D approaches are increasingly constrained by evolving consumer demands, stricter regulations, and rising cost pressures. In this context, Dassault Systėmes' 3DEXPERIENCE platform enables a fundamental shift toward AI–driven innovation through Generative Formulation and Quality Prediction. Generative Formulation leverages AI to analyze extensive datasets—including raw materials, nutritional profiles, physicochemical properties, and sensory results—to rapidly generate and evaluate optimal recipe combinations. By inputting target criteria such as nutrition, texture, and cost, researchers can replace repetitive trial–and–error experiments with data–driven design, significantly reducing development time and improving early–stage success rates. Quality Prediction complements this by using historical production, quality, and process data to forecast key attributes such as taste, texture, stability, and shelf life before physical production begins. This allows teams to proactively identify risks, refine formulations, and optimize process conditions, ultimately reducing variability, minimizing recalls, and lowering overall costs. Together, these AI–driven capabilities transform food R&D from an experiment–centric model into a predictive, data–centric approach—delivering faster development, greater quality consistency, and enhanced cost efficiency. This shift is essential for K–Food companies seeking sustainable global competitiveness, with Dassault Systėmes' integrated platform serving as a key enabler of this transformation.

S10-3

Regulatory compliance strategies for expanding K-food exports

Jae-Yong Lee
National Food Safety Information Service

While K-Food is experiencing unprecedented export growth driven by the global "Hallyu" (Korean Wave) phenomenon, food safety regulations in major importing countries are becoming increasingly sophisticated and complex, functioning as significant non-tariff barriers. In particular, the European Union's strengthened regulations on composite products and the Packaging and Packaging Waste Regulation (PPWR), along with Vietnam's amendments to its food safety laws, pose direct challenges to domestic exporters.

This presentation proposes global regulatory response strategies promoted by National Food Safety Information Service to support the sustainable expansion of K-Food exports. First, it shares a "proactive information provision" system based on real-time monitoring of food safety regulations and non-compliance cases in major countries. Second, it emphasizes the importance of "international standard harmonization" through active participation in the Codex's standard-setting process. Third, in alignment with the era of digital transformation, it suggests the implementation of AI-based automated foreign regulation matching systems and strategies for utilizing digital data.

In conclusion, securing the global competitiveness of K-food depends on the ability to preemptively respond to export regulations, moving beyond simple product quality. To this end, it is necessary to discuss the establishment of an organic information-sharing network among the government, public institutions, and private enterprises, alongside country-specific customized regulatory compliance strategies.

S11-1

End-to-end functional ingredient development strategy based on AI-powered NAMs (New Approach Methodologies)

Bok Kyung Han

Korea University

The global paradigm for safety and efficacy assessment in the functional ingredient industry is rapidly shifting toward non-animal alternatives, driven by stringent international regulations and ethical imperatives. To lead this transition, this study presents an innovative, comprehensive strategy for full-lifecycle (End-to-End) functional ingredient development utilizing AI-powered New Approach Methodologies (NAMs), with a core focus on in silico technology for bioactive compound discovery. Furthermore, this seminar highlights the critical necessity of implementing NAMs within a global regulatory sandbox. Traditional regulatory frameworks, heavily reliant on animal data, often act as barriers to integrating cutting-edge biotechnology. By establishing regulatory sandboxes, industries and regulators can collaboratively validate human-relevant computational data in a controlled, flexible testing environment, thereby accelerating the regulatory acceptance of innovative methodologies. Traditionally, discovering novel functional ingredients suffered from labor-intensive screening, high costs, and high failure rates. By leveraging AI-driven in silico tools—such as virtual screening, molecular docking, and quantitative structure-activity relationship (QSAR) models—researchers can now rapidly evaluate thousands of candidates, predict computational toxicity, and pre-screen biological efficacy at the earliest stages of research. This presentation will cover the entire pipeline of this next-generation strategy: from computational discovery and in vitro validation to regulatory approval and commercialization. Furthermore, actionable business insights will be shared on how functional food, and cosmetic enterprises can integrate in silico NAMs to dramatically reduce R&D risks and slash time-to-market.

S11-2

AI-driven sensory standardization: from electronic sensors to brain responses

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Food sensory evaluation has traditionally relied on human panels, which are inherently subjective and limited in reproducibility. Although instrumental techniques such as electronic nose (E-nose) and electronic tongue (E-tongue) provide objective measurements of aroma and taste-related attributes, their direct linkage to human perception remains insufficient. Neurophysiological approaches, including electroencephalography (EEG), offer a means to quantify sensory perception at the brain level, while standardized Low Resolution Brain Electromagnetic Tomography (sLORETA) enables spatial mapping of brain activity and functional interpretation at the level of Brodmann areas. This study proposes an AI-based integrative framework combining E-nose, E-tongue, and EEG–sLORETA analyses for standardized food sensory evaluation. Multimodal data were collected under controlled sensory stimuli and analyzed using machine learning to explore relationships between physicochemical signals and brain responses. Results indicate that sensory attributes can be consistently mapped across instrumental and neurophysiological domains. In particular, Brodmann area-level activation patterns showed meaningful associations with sensory stimuli, enabling improved prediction of human perception. This approach demonstrates strong potential for reproducible, objective, and scalable standardization in AI-driven food sensory evaluation.

S11-3

Development of Returnable Transport Packaging (RTP) and Returnable Transport System (RTS) for the safety of temperature-sensitive products

Su-Hyun Kim
KCP R&D Institute

Temperature-sensitive products, including food, pharmaceuticals, biological materials, and fresh agricultural and fishery products, require strict temperature control throughout storage and transportation. Temperature deviations occurring during logistics processes can lead to quality deterioration, reduced shelf life, and safety issues. In particular, changes in distribution environments have increased the importance of cold chain packaging and monitoring systems. Furthermore, growing environmental concerns associated with single-use packaging have highlighted the need for reusable packaging solutions.

In this study, a reusable Returnable Transport Packaging (RTP) and a Returnable Transport System (RTS) were developed to improve the stability of temperature-sensitive products and reduce environmental impacts.

The developed packaging features a multi-layer insulation structure with excellent thermal performance, minimizing internal temperature fluctuations caused by external environmental changes. In addition, structural analysis was conducted to optimize the strength and structural integrity of the packaging. The packaging was manufactured using a single-material composition to enhance recyclability.

IoT-based sensors were integrated into the RTP to collect temperature and location data during transportation. Through the cloud-based monitoring platform (RTS), the internal temperature conditions of the RTP can be monitored in real time. Furthermore, the system enables object-level management to support the repeated use and efficient circulation of the packaging.

S12-1

The current landscape and future development of K-enzyme foods

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This study highlights the origins, scientific basis, industrial significance, and global anti-obesity potential of K-enzyme foods derived from Korea's traditional fermentation culture of meju and nuruk. By combining the protein-degrading activity of meju and the starch-degrading function of nuruk with modern fermentation and enzyme technologies, K-enzyme foods have evolved into next-generation wellness materials with benefits for gut health, metabolic regulation, and anti-obesity functionality. Beneficial microorganisms such as Bacillus subtilis and Aspergillus oryzae contribute to the production of bioactive compounds including low-molecular-weight peptides, free amino acids, and short-chain fatty acids (SCFAs), which are associated with improved gut microbiota balance, reduced body fat accumulation, blood glucose control, and enhanced immune function.

This study contrasts pharmaceutical digestive agents, purified enzyme preparations, and grain-based fermented enzyme foods, underscoring that K-enzyme foods serve as a fundamental solution by improving the intestinal environment and overall metabolic systems rather than merely providing short-term symptom relief. In the rapidly expanding global anti-obesity market, the limitations of GLP-1 receptor agonists—including muscle loss, nutritional deficiencies, and gut dysbiosis—have become increasingly evident. In this context, K-enzyme foods are emerging as a Nutrition-Pharma convergence strategy. By promoting short-chain fatty acid (SCFA) production, supplying low-molecular-weight proteins, and stabilizing gut microbiota, K-enzyme foods complement the shortcomings of pharmacological therapies and highlight their potential as sustainable interventions for metabolic health and obesity management.

In conclusion, K-enzyme foods are projected to evolve into sustainable solutions for obesity management and intestinal health within the emerging paradigm of global healthcare. By bridging traditional fermentation practices with modern biotechnological innovations, K-enzyme foods signify a paradigm shift from "drug-only therapy" toward an integrated model of "pharmacological intervention combined with fermented nutritional management." This integrative approach underscores their potential to complement conventional pharmacotherapies, address their inherent limitations, and establish a comprehensive framework for long-term metabolic regulation and gut health enhancement.

S12-2

Fermented emmer wheat (*Emmer Wheat Forte*) ameliorates diet-induced obesity by modulating lipid metabolism, inflammation, and gut microbiota

Eun-Young Kwon
Kyungpook National University

Obesity is a major metabolic disorder closely associated with dyslipidemia, insulin resistance, and chronic inflammation. Fermentation has been recognized as an effective strategy to enhance the bioactivity of food-derived compounds. This study aimed to evaluate the anti-obesity effects of Emmer Wheat Forte, a fermented emmer wheat product, and to elucidate its underlying mechanisms in a high-fat diet (HFD)-induced obesity model.

Male C57BL/6J mice were fed an HFD supplemented with Emmer Wheat Forte (1% or 2%, w/w) for 12 weeks. Non-fermented emmer wheat and β-glucan groups served as controls. Body weight, adiposity, plasma lipid profiles, hepatic lipid accumulation, glucose metabolism, inflammatory markers, and gut microbiota composition were analyzed, along with gene and protein expression related to lipid metabolism and inflammation.

Emmer Wheat Forte supplementation significantly reduced body weight gain, fat mass, and food efficiency ratio without altering energy intake. Both 1% and 2% supplementation exerted comparable anti-obesity effects, indicating that a low dose was sufficient to achieve metabolic benefits. However, the higher dose (2%) showed greater improvements in specific parameters, including plasma cholesterol levels and glucose tolerance. Emmer Wheat Forte markedly decreased visceral adipose tissue weight and hepatic triglyceride accumulation. Mechanistically, it suppressed intestinal lipid absorption by downregulating ApoB48, FATP4, FABP1, and FABP2, thereby reducing chylomicron formation. In adipose tissue, it enhanced lipolysis and increased the expression of proteins associated with fatty acid oxidation (HSL, PGC-1α, and UCP1). Furthermore, it attenuated obesity-induced inflammation by reducing circulating TNF-α levels and downregulating inflammatory gene expression. These effects were associated with improved insulin resistance and glucose tolerance, with the high-dose group showing a more pronounced improvement in glycemic control. Additionally, Emmer Wheat Forte increased lean mass, muscle strength, and gut microbiota diversity.

Emmer Wheat Forte exerts anti-obesity effects through coordinated regulation of lipid metabolism, inflammation, and gut microbiota. Comparable benefits at both doses indicate that a low dose is sufficient for metabolic improvement, while higher intake provides additional advantages in glycemic control and lipid profiles. These findings suggest its potential as a dietary intervention for obesity and related metabolic disorders.

S12-3

Driving demand for grain-based enzyme foods

Dong Hoon Lee
Grainon Co., Ltd.

As consumer interest in digestive health and naturally derived ingredients continues to grow in the functional food market, grain-based enzyme products are emerging as a new growth category. However, market expansion remains limited due to consumers' lack of understanding of enzyme mechanisms and the difficulty in distinguishing differences between products.

GrainOn is redefining the value of grain fermentation-based enzyme products within this market environment and is implementing differentiated strategies to drive demand growth. In particular, by applying encapsulation technology, the company enhances in-body stability and functionality of its enzyme products, while actively utilizing content-driven communication to help consumers better understand enzyme mechanisms.

In addition, GrainOn is expanding consumer touchpoints through various channels such as TV commercials (TVCF), product placements (PPL) in health information programs, influencers, and experiential content, thereby building both brand awareness and trust through repeated exposure. These education- and experience-based marketing strategies contribute to positioning enzyme products not merely as supplements, but as everyday health management solutions.

In the global market, the premium image of Korean fermentation technology is being strengthened under the keyword "K-HYOSO." Centered on the Japanese market, a phased expansion strategy is being implemented by integrating online platforms with offline distribution channels. In particular, a review-driven repurchase structure is securing stable revenue growth.

In conclusion, the growth in demand for grain-based enzyme products can be achieved when product technology, enhanced consumer understanding, and integrated marketing strategies are organically combined. Through this, enzyme products are expected to evolve into a key category in the future health food market.

S13-1

From omics to intelligence: discovery and application of biomarkers for agricultural product quality

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Omics has emerged as an important approach for discovering biomarkers associated with the quality, storability, functionality, and sensory properties of agricultural products. This presentation introduces recent studies on metabolomics, one of the key omics technologies, focusing on biomarker discovery and its potential applications in agricultural product quality evaluation and postharvest management. Metabolite profiling was applied to various agricultural products, including rice, strawberries, citrus fruits, onions, cucumbers, and fermented foods, to identify metabolites closely associated with quality-related traits. In stored rice, changes in sugars and fatty acids showed strong correlations with sensory acceptability and eating quality, suggesting the potential of metabolite-based quality indicators for evaluating aged rice. Furthermore, integrated transcriptomic and metabolomic analyses of cucumbers during postharvest storage identified chlorophyll degradation-related metabolites, lysophospholipids, and senescence-associated pathways closely associated with peel yellowing and storage stability. In citrus fruits, metabolomics analysis revealed cultivar-dependent differences in polymethoxyflavones and hydroxycinnamic acid amides, which were closely associated with storability, antifungal activity, and sensory characteristics. Correlation analyses between metabolite profiles and physicochemical or sensory properties further enabled the identification of candidate biomarkers related to sweetness enhancement, antioxidant activity, and storage stability. Particular attention was given to feruloyl putrescine, a hydroxycinnamic acid amide identified through citrus metabolomics analysis. This compound exhibited antifungal activity against major citrus pathogens and showed sweetness-enhancing effects despite having little intrinsic taste. These findings demonstrate that metabolomics-based biomarkers can be utilized not only for quality evaluation but also for the development of functional materials related to food preservation and taste modulation. Ultimately, the integration of metabolomics-based biomarkers with non-destructive sensors, machine vision, and artificial intelligence technologies may contribute to the development of next-generation smart distribution platforms capable of real-time monitoring and prediction of physiological status and quality changes in agricultural products.

S13-2

Application of AI for quality assessment and sorting in agri-food systems

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A key difference between agri-food products and industrial goods is the high variability in quality attributes due to factors such as genetic variation, cultivation conditions, and postharvest deterioration. Due to these inherent characteristics, the need for quality inspection and sorting in agri-food products is particularly critical. Because destructive quality evaluation methods cannot be applied to the inspection of all items, non-destructive techniques have long been widely adopted for grading and sorting purposes. Various non-destructive evaluation technologies have been utilized in the agri-food sector, including spectroscopy, X-ray imaging, ultrasound, near-infrared imaging, multispectral imaging, and hyperspectral imaging. Following data acquisition, data processing and modeling are essential steps for analysis. In recent years, artificial intelligence (AI) has gained increasing attention across diverse fields and is progressively replacing conventional approaches in agri-food sorting, where data-driven quality prediction modeling is indispensable. In particular, as digital transformation across the entire postharvest chain gains momentum, the need for quantitative analysis of grading data based on data and AI is becoming more prominent. The integration of non-destructive sensing technologies with AI is expected to provide new opportunities for data-driven food quality management, safety inspection, and distribution monitoring.

S13-3

AI & sensing technologies for quality control of agricultural products during the storage and distribution

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This study presents a recurrent neural network (RNN)-based model for predicting physical quality changes in agricultural products (onions and apples) during long-term low-temperature storage. Unlike previous studies that primarily used simple regression equations with certain time points, this model utilizes time series-based storage-environment histories. The model was designed to use only easily obtainable, real-time environmental information and storage periods as inputs, thereby enhancing practicality. The agricultural products were stored under controlled conditions for model development, with quality factor data accumulated through regular sampling and destructive testing. Data preprocessing addressed environmental noise and time resolution issues, and bioyield strength or weight loss rate were selected as the prediction targets considering interrelationships with environmental and quality factors. For comparison, four RNN-based models (stacked RNN, stacked long short-term memory (LSTM), residual LSTM, baseline LSTM) were proposed, along with a conventional multiple linear regression (MLR) model. Given the scarcity of pre-verified models for agricultural product quality prediction, a grid search was employed to explore various model structures and parameter combinations. The performance was compared using the same independent test data on the retrained models based on the optimized combinations. The residual LSTM model, scored 0.0532 on the normalized test root mean-squared error (RMSE), demonstrating the best performance by predicting up to 336 h ahead. The baseline LSTM model predicted up to 504 h with an RMSE of 0.0601. In contrast, the MLR model showed complete overfitting, with a test RMSE of 0.2814, indicating the unsuitability of utilizing storage history for quality prediction. This study verifies the potential of RNNs in agricultural product storage/distribution and anticipates the utility of the developed model as a foundational technology for future post-harvest process research.

S14-1

Smart cold chain system with a focus on maritime transport

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The first study introduces a comprehensive blockchain technology (BCT)-based cold chain framework designed to improve traceability, monitoring, and operational efficiency across the food supply chain, with particular emphasis on maritime reefer logistics. The initial study focused on developing an integrated digital architecture capable of connecting all stages of the cold chain — including production, processing, inland transportation, ports, maritime transport, storage, wholesale, retail, and final consumption — where monitoring is often fragmented and disruptions frequently occur. Based on the findings of this first study, a subsequent pilot demonstration project was conducted to validate the practical applicability of the proposed framework under real logistics environments. The proposed framework consists of four integrated layers: the business layer, IoT layer, blockchain layer, and application layer. The business layer defines the operational structure and stakeholder interactions across the cold chain. The IoT layer enables real-time collection of temperature, humidity, location, and logistics data through IoT sensors, data loggers, and hybrid communication systems combining mobile networks and VSAT satellite communication for maritime transportation. The blockchain layer records and manages quality, logistics, and transaction data using distributed ledger technology and smart contracts. Considering current interoperability and scalability challenges, the framework adopts a hybrid architecture that combines conventional EDI systems with blockchain-based mechanisms. The application layer then provides stakeholders with web- and mobile-based access to traceability, quality management, customs clearance, and logistics monitoring information. To quantitatively evaluate the effectiveness of the proposed framework, import and export beef cold chain simulation models were developed. The simulation results demonstrated that implementation of the BCT-based monitoring system could significantly reduce recall response time, economic losses, discarded reefer containers, and associated greenhouse gas emissions. In import scenarios, discarded containers and related emissions were reduced by more than 40%, while export scenarios showed reductions exceeding 20%. In addition, consumer preference analysis indicated that consumers value transparent logistics information — including temperature records, logistics routes, and country-of-origin traceability — even when the disclosed information contains negative quality deviations. Following the completion of the conceptual framework study, we conducted a pilot demonstration project as a proof-of-concept (PoC) to verify the operational feasibility of the proposed system in actual maritime cold chain environments. The pilot project focused on the export of Shine Muscat grapes from Korea to Bangkok, Thailand, integrating IoT sensors, data loggers, AIS-based vessel tracking, and blockchain-based condition monitoring technologies throughout the logistics process. Prior to shipment, distribution environment simulation tests were conducted to establish optimal temperature and humidity conditions and evaluate packaging durability under vibration and impact conditions. During the pilot shipment, real-time monitoring enabled identification of operational bottlenecks and cold chain vulnerabilities, including temperature management issues, communication limitations during maritime transport, and customs clearance challenges. Despite these operational risks, the pilot confirmed that product quality was successfully maintained throughout the transportation process. Overall, the studies demonstrate that integrating blockchain, IoT, and data-driven monitoring technologies into maritime cold chain systems can enhance supply chain transparency, food safety, operational resilience, and environmental sustainability. The combined results of the conceptual framework study and the subsequent pilot implementation further highlight the potential for expanding technology-based cold chain solutions through future international collaboration and large-scale deployment initiatives.

S14-2

Understanding the operation of reefer containers for the maritime transport of fresh agricultural cargo

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Dong-A University

Driven by the growing global popularity of K-food, including kimchi, the demand for Korean fresh produce and processed foods has increased significantly. Due to the high cost and limited capacity of air transportation for large-scale exports, maritime logistics has emerged as a primary mode of transport. Accordingly, cold chain logistics using reefer containers plays a critical role in maintaining the quality of perishable goods. However, during extended maritime transit, external ambient temperature variations and the structural characteristics of the container can cause temperature deviations across cargo zones, potentially leading to quality degradation. Therefore, a precise understanding of the structural characteristics and control mechanisms of reefer containers is essential for ensuring logistics stability. This study analyzes the structural features and chilled-mode control algorithms of Daikin reefer units. Operational patterns are validated using data collected from controlled test scenarios and are further examined through correlation with results from prior maritime field experiments. The findings provide practical insights into temperature management and contribute to improving cargo quality control in maritime cold chain logistics.

S14-3

K-food on the move: a field view of global cold chain

Haksu Shin
SEEKHAN CORP.

Korean food exports, led by kimchi, have grown rapidly across global markets over the past decade. As volumes rise, the cold chain that carries these products across oceans has become a decisive factor in product quality. A gap remains, however, between what operators measure on the ground and what storage and fermentation research has captured in the literature. This presentation draws on thirteen years of field experience in K-Food global distribution to share what the cold chain actually looks like once a container leaves the port. The speaker has operated kimchi OEM supply chains across Korea, China, Vietnam, and Australian local production, and has lost two full reefer containers to surface-yeast spoilage. After those losses, loading patterns within containers, accumulated voyage time, and ambient conditions at destination markets were tracked through IoT data loggers. The same rice of the same grade and packaging was shipped in two ways at each buyer's request. Brisbane received it ambient and Canada received it under a full cold chain. The refrigerated cargo stayed sound for more than ten months. The ambient cargo developed mold and insects within three months. The market shaped each configuration and the outcome showed which configuration was right. Kimchi behaved similarly: storage habits, retail infrastructure, and consumer behavior at destination shifted what the right cold chain looked like. These cases point to something often overlooked. The well-known fact that temperature varies by container position is not the real problem. The real problem is how that variance is addressed through loading design — a domain rarely covered in published standards. K-Food cold chain is not a single standard but a function of product, market, route, and destination environment. Field data already captures variables that current research has yet to incorporate. When operational data from the field meets fermentation and quality science from the laboratory, K-Food export standards can rest on a more complete foundation.

S15-1

Interpretation of nondestructive data based on the structural and physical properties of noodle dough

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Smart Food Manufacturing Research Group
Korea Food Research Institute

Advancing toward automated food manufacturing requires nondestructive sensing approaches that can be linked to the underlying structural and physical properties of intermediate products. As part of this effort, the present study explored the interpretation of nondestructive hyperspectral imaging (HSI, 400–1700 nm) data in relation to the physical properties of dough at both mechanical and molecular levels, characterized by stress relaxation testing and low-field nuclear magnetic resonance (LF-NMR), respectively. Noodle doughs were prepared from three flour types differing in gluten content and subjected to mixing times ranging from 2 to 22 min. Mechanical behavior was evaluated through stress relaxation parameters, including initial stress, equilibrium stress, stress decay ratio, relaxation rate, and relaxation time. Water mobility and distribution within the dough matrix were characterized using CPMG T2 relaxation, with parameters (T21, I1, T 22, I2) extracted by bi-exponential fitting. Flour type produced more pronounced differences than mixing time across both LF-NMR and mechanical responses: doughs with higher gluten content exhibited a greater proportion of less-mobile water associated with the gluten matrix (lower I1 and higher I2), consistent with slower stress decay and longer relaxation times in stronger gluten networks, whereas mixing time induced relatively subtle changes, particularly in T22 and I2 associated with free or mobile water behavior. Regression models were subsequently applied to estimate stress relaxation-derived viscoelastic parameters and LF-NMR-derived water mobility parameters from HSI data, with O-H overtone regions (~970, ~1450 nm) expected to contribute primarily to hydration-related predictions and C-H/N-H regions (~1200, ~1500 nm) to those linked with protein-water interactions and matrix organization. These findings translate nondestructive data into interpretable quality indicators reflecting raw-material variation, providing a foundation for data-driven control in automated noodle processing.

S15-2

A scalable virtual sensor slot framework for ultra-low latency edge-AIoT: design and field demonstration in noodle production lines

Joon Heo

MathAI Inc.

This study proposes a scalable sensor slot and virtual sensor framework designed to achieve hyper-automation in continuous food manufacturing, specifically within noodle production lines. In high-speed continuous manufacturing, traditional cloud-based data management systems often encounter critical bottlenecks due to communication latency and the massive volume of raw sensor data, which hinders real-time quality control and autonomous decision-making. To address these challenges, we have developed a framework utilizing a "Slot-based" architecture that allows for the seamless integration and expansion of both physical and virtual sensors. The framework is structured into several core modules: Sensor Sources for managing diverse data inputs, Sensor Slots for flexible hardware-software mapping, and Live Capture for real-time data streaming and status monitoring. The system is designed to support more than 30 types of complex sensors essential for food production, including environmental, motion, vision, and robot state sensors. A key technical feature of this research is the Virtual Sensor Framework, which enables the generation of synthetic data to augment physical sensing limitations. This approach is particularly effective for stages such as mixing, aging, and rolling, where installing physical sensors is often restricted by the manufacturing environment. The framework incorporates a Real-time Bridge to process multi-modal data streams and an Integrated Judgement engine to provide immediate status diagnostics. While the core framework development is complete, an empirical validation in an actual noodle production line is scheduled to be performed. Through this future demonstration, we aim to achieve ultra-low latency targets, including a sensor response time of under 20ms and algorithm processing speeds within 30ms. Furthermore, by synchronizing time-lag variables across sequential processes, the system is expected to proactively predict quality defects such as cracks or texture inconsistencies with high accuracy. The proposed framework provides a robust foundation for autonomous production systems in the food industry. By decentralizing data intelligence to the Edge and utilizing virtual sensing to overcome physical data gaps, this research is expected to significantly enhance operational efficiency and product uniformity. This study presents a scalable and standardized model for intelligent, self-optimizing manufacturing environments, contributing to the digital transformation of the food sector.

S15-3

Ontology technology and its integration with digital twin for intelligent food manufacturing

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E8 Co., Ltd.

Despite the increasing level of automation in the food manufacturing industry, manufacturing, quality, equipment, and environmental data are still managed separately across heterogeneous systems, resulting in limitations in data interoperability and integrated utilization. In particular, continuous-process food manufacturing industries, such as noodle production, require comprehensive analysis of the relationships among raw material characteristics, process conditions, equipment status, and quality outcomes. Therefore, the establishment of standardized data structures and knowledge systems has become increasingly important. Recently, digital twin technology has attracted significant attention as a means to connect, analyze, and simulate manufacturing data throughout the entire production lifecycle in virtual environments. However, challenges remain in achieving semantic integration and reusable knowledge representation across heterogeneous datasets.

This presentation introduces ontology technology as a core enabling technology for intelligent food manufacturing and proposes a framework for integrating ontology with digital twin systems. Focusing on the noodle manufacturing process addressed in the ongoing research project, this study presents the development direction of a domain ontology capable of representing integrated knowledge across raw materials, processes, equipment, and quality information. In addition, a semantic framework for manufacturing data standardization is proposed to enhance interoperability among heterogeneous industrial data sources.

Furthermore, sensor data and production information collected from manufacturing sites are structured based on ontology technologies to enable semantic reasoning, process-state interpretation, and anomaly analysis. By integrating ontology-based knowledge systems with digital twin platforms, the proposed framework supports process simulation, production optimization, quality prediction, and intelligent operational decision-making.

The proposed approach is expected to provide a foundation for autonomous and intelligent manufacturing beyond conventional data monitoring systems. Moreover, it is anticipated to contribute to the advancement of data standardization and AI-driven digital transformation across the food manufacturing industry.

S16-1

Digital transformation of food safety management leveraging proprietary data-driven specialized AI

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Korea Agency of HACCP Accreditation and Services

Amid the global proliferation of generative Artificial Intelligence (AI) and the acceleration of digital transformation (DX), the capability to curate and utilize verified, specialized data has emerged as a core competency in the food safety sector. Accordingly, this study aims to present innovative case studies and the future vision of a domain-specific AI service for food safety, developed by utilizing accumulated proprietary HACCP audit data.

First, regarding internal innovation, administrative efficiency has been maximized by integrating AI—extensively trained on relevant laws, guidelines, and public notifications—into the HACCP management system. Notably, consistency and accuracy in auditing have been significantly improved through machine learning-based risk prediction and intelligent audit scheduling models. This infrastructure now functions as a digital control tower, serving as a 'national statutory system' shared seamlessly with the Ministry of Food and Drug Safety (MFDS).

Externally, the expansion of 'Smart HACCP' utilizing IoT sensors has catalyzed a paradigm shift in the safety management framework, transitioning from a conventional 'post-response' approach to a proactive focus on 'real-time prevention and prediction.' Furthermore, the establishment of an 'Intelligent Portal,' which features AI-driven automated verification of civil documents, aims to deliver tangible administrative innovation to the public. In conclusion, by refining vast volumes of food safety data, the institute will complete a 'Vertical AI Service for Food Safety' optimized for the domestic food industry, thereby firmly solidifying a data-driven, scientific management system.

S16-2

AI-driven risk scoring for intelligent unannounced inspection trageting in HACCP-certified establishment

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CSLEE Co.,Ltd.

As the number of HACCP-certified food establishments in Korea continues to grow, efficiently identifying high-risk establishments for unannounced inspections has become a critical challenge in food safety management. Conventional target selection methods rely primarily on rule-based manual processes, making it structurally difficult to incorporate data-driven risk judgment. In this study, exploratory data analysis (EDA) was conducted on variables including past inspection outcomes, regulatory violation history, certification duration, and product type to identify factors significantly associated with non-compliance. Based on these findings, LightGBM-based classification models were developed for food and livestock establishment categories. Borderline-SMOTE oversampling was applied to address the severe class imbalance (approximately 9:1) between compliant and non-compliant cases, and Optuna-based Bayesian optimization was used for hyperparameter tuning. SHAP (SHapley Additive exPlanations) was further applied to quantify each variable's contribution to risk scores, ensuring model interpretability. The models achieved ROC-AUC scores of 0.91 and 0.99 for food and livestock establishments respectively, with Recall values of approximately 90%. Validation confirmed that non-compliant establishments were significantly concentrated within the top risk tier, demonstrating practical applicability for field deployment. This study presents a data-driven framework for proactive food safety management, with further accuracy improvements anticipated through real-time data integration and continuous model refinement.

S16-3

Cellulose-first structuring technology for alternative foods

Young Hoon Jung

Kyungpook National University

Hybrid meats are a sustainable option to reduce meat consumption while maintaining product quality. Ensuring structural stability requires functional design of protein, fat, and binder components. Polysaccharides play a key role in forming stable matrices by controlling water and oil retention. This study aimed to improve hybrid patties by applying cellulose–ether–based materials to these components.

HPMC showed high viscosity and recovery but low mechanical strength, whereas MC with agar formed a thermally stable and strong matrix. Enzymatically hydrolyzed yeast protein showed improved solubility, dispersibility, and structural reactivity, with enhanced water and oil retention and emulsion stability. Its essential amino acid ratio exceeded 50%, confirming its quality as an alternative protein source. A coconut oil–based bigel improved hardness and stability of HPMC systems and maintained structure under high temperature conditions. A zein – tannic acid complex improved adhesion and water resistance.

Hybrid patties combining these components showed properties comparable to conventional patties, with improved cooking yield and color stability. These results demonstrate the potential of cellulose–ether materials and yeast protein for stable hybrid meat systems.

S17-1

Management of process-induced contaminants in foods based on Total Diet Study (TDS)

Ji Hye Jeon
National Institute of Food and Drug Safety Evaluation

Process-induced contaminants can be generated during food manufacturing, processing, or cooking, posing potential risks to food safety. In recent years, the development of a wide variety of processed foods, along with increased consumption, has led to a higher likelihood of consumer exposure to these harmful substances compared to the past.

To ensure food safety and protect public health, the Ministry of Food and Drug Safety (MFDS) has been conducting the Total Diet Study (TDS) since 2013. This study serves as a key scientific tool to support the establishment and revision of food safety standards based on evidence.

The TDS is conducted alongside monitoring programs for chemical contaminants and consists of four stages: planning, implementation, exposure assessment, and reporting. It is carried out on a five-year cycle. Representative foods are selected based on consumption frequency data from the Korea National Health and Nutrition Examination Survey. Food samples are purchased nationwide, prepared according to typical Korean dietary practices, and categorized by physical characteristics prior to analysis. Subsequently, measured concentrations of chemical substances are combined with individual dietary intake data to estimate realistic exposure levels and their distribution across the population. These data provide a robust foundation for exposure assessment and support risk characterization through comparison with toxicological reference values such as TDI (Tolerable Daily Intake), BMDL (Benchmark Dose Lower Confidence Limit), and MOE (Margin of Exposure).

Through the TDS, the safety of population exposure to harmful substances amid rapidly changing dietary patterns is evaluated. In addition, research is being conducted to reduce exposure to unintentionally formed contaminants during food processing, such as furan, 3-MCPD, and polycyclic aromatic hydrocarbons (PAHs). Practical mitigation strategies, including consumer-applicable cooking methods, are also proposed to minimize these substances. By providing technical information on contaminant reduction, the TDS contributes to ensuring food safety and improving public health.

Looking ahead, the TDS conducted by the MFDS will continue to generate highly representative data on population-level exposure in Korea, enabling accurate long-term monitoring and supporting evidence-based decision-making in food safety management.

S17-2

Formation and mitigation of furans in foods: sources, risks, and control strategies

Young-Suk Kim
Ewha Womans University

Furan (C_4H_4O) is a volatile, fat-soluble compound classified as "probably carcinogenic to humans" by the International Agency for Research on Cancer (IARC). It is generated from various precursors such as carbohydrates, amino acids, lipids, ascorbic acid, and carotenoids during heating. In 2017, the European Food Safety Authority (EFSA) highlighted that current furan exposure levels constitute a public health concern, with methylfurans significantly contributing to this risk. Recent studies have also identified other alkylfurans, such as 2-pentylfuran and 2-ethylfuran, as food contaminants. Furan and alkylfurans have been detected in various foods, including coffee, baby foods, soups, crisps, juices, cereals, biscuits, and popcorn. This study provides their formations in diverse foods, including coffee, pumpkin puree, and microwave popcorn. Also, some possible mitigation strategies to reduce them will be discussed. Finally, based on total diet study in Korea, risk assessment on furan was conducted to evaluate its contribution to overall health risk.

S17-3

Occurrence and risk assessment of 3-MCPD, 3-MCPD esters, and glycidyl esters in Home Meal Replacement (HMR) products: results of a total diet study in South Korea

Kwang-Won Lee
Korea University

This study investigated the occurrence, distribution, and dietary risk of 3-monochloropropane-1,2-diol (3-MCPD), 3-MCPD esters (3-MCPDEs), and glycidyl esters (GEs) in Home Meal Replacement (HMR) products available in South Korea. These process-induced contaminants arise from distinct pathways: 3-MCPD (free form) is primarily generated from acid-hydrolyzed vegetable protein (HVP)-based ingredients such as soy sauce and seasoning pastes, while 3-MCPDEs and GEs are formed during the high-temperature refining of edible oils. A total of 240 HMR samples representing four major categories—stir-fried dishes, stews, nabe/shabu-shabu, and pasta—were collected and analyzed before and after domestic cooking using gas chromatography-mass spectrometry (GC-MS). Free 3-MCPD was predominantly detected in stew and stir-fried products containing HVP-based sauces, with cooking significantly reducing its concentration through dilution, evaporation, and thermal degradation; nabe/shabu-shabu samples approached non-detectable levels post-cooking. In contrast, 3-MCPDEs and GEs were concentrated in pasta products due to high refined oil content. Dietary risk was assessed using the Tolerable Daily Intake (TDI; 2.7 μg/kg bw/day) for 3-MCPD and 3-MCPDEs, and the Margin of Exposure (MOE) approach for GEs. Hazard indices (HI) across all contaminants and age groups remained well below 1, and MOE values for GEs exceeded the level of concern, collectively indicating no significant health risk to Korean consumers from HMR product consumption. These findings provide essential baseline data for integrated monitoring and safety management of HMR products, and highlight the important role of domestic cooking methods in reducing dietary exposure to lipid-derived process contaminants.

S17-4

Impact of air-frying practice and storage of lotus root on the acrylamide formation in air-fried chips

Mun Yhung Jung

Woosuk University

Air-fried lotus root chips were prepared by cooking sliced lotus roots in an air fryer. This study observed that the postharvest storage duration of lotus roots significantly affects acrylamide formation in the chips. Longer storage periods led to higher acrylamide content. A concerning finding was that chips made from lotus roots stored for nine days or more contained extremely high levels of acrylamide. Freshly harvested lotus roots possessed high levels of asparagine and sucrose (a non-reducing sugar) but very low levels of reducing sugars such as glucose and fructose. While asparagine levels remained relatively constant during storage, reducing sugar levels increased substantially. This marked increase in reducing sugars was identified for the first time as the primary factor driving elevated acrylamide levels in air-fried chips prepared from stored roots. A strong correlation was found between acrylamide levels in the chips and the reducing sugar content of the lotus roots; conversely, no significant correlation was observed with asparagine content. Pre-soaking the slices in acetic acid and salt solutions significantly reduced acrylamide levels. This study highlights the temporal changes and risks associated with postharvest storage in relation to acrylamide formation during air frying. Furthermore, it provides effective pretreatment strategies to minimize acrylamide formation in air-fried lotus chips. This work was supported by a grant (25192MFDS004) from Korea Ministry of Food and Drug Safety (MFDS) in 2025.

S18-1

From traditional fermented foods to future food ingredients: trends and prospects of the K-fermentation industry

Byung-Yong Kim
Konyang University

With the global expansion of K-Food, international demand for fermented foods has increased significantly. In particular, kimchi has experienced rapid diversification of export markets, while strain-based quality enhancement, innovations in storage and distribution technologies, and the smartization of manufacturing processes have emerged as important competitive factors across the industry. Traditional fermented sauces and alcoholic beverages are likewise moving beyond their conventional identity, seeking new market opportunities through quality standardization, verification of functionality and safety, premiumization strategies, and global branding.

Meanwhile, in the global food industry, precision fermentation is emerging as a key platform for the production of high-value components such as proteins, enzymes, and vitamins, while postbiotics are gaining increasing attention as next-generation functional ingredients with strong industrial potential. Accordingly, the K-fermentation industry is now required to move beyond the commercialization of traditional fermented foods themselves and toward strategies centered on functional ingredient development, value addition, and platformization based on fermentation technology and microbial resources.

Based on these domestic and international industrial trends, this presentation will propose key strategies for strengthening the competitiveness of K-fermentation ingredients, including improvement of storage stability, assurance of safety, quality standardization, advancement of starter and microbial strain industries, AI-based quality prediction, reduction and valorization of fermentation by-products, and the establishment of sustainable production systems. Ultimately, the lecture will discuss the future direction of the K-fermentation industry and its academic and industrial challenges from the perspective not merely of “modernizing tradition,” but of “industrializing and platformizing tradition.”

S18-2

Leaping into the global market through Jang fermentation technology

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The Jang industry has experienced a slowdown in growth and currently remains at a market scale of approximately 1 trillion KRW, with the production of several Jang products even showing a decline. This phenomenon reflects a decrease in domestic Jang consumption driven by factors such as the rise of single-person households and the Westernization of dietary habits. Accordingly, concerted efforts are required to revitalize the Jang industry.

Jang is a food that has been consumed by Koreans for thousands of years, and throughout its long history no significant safety-related issues have been reported, attesting to its inherent safety as a food. Nevertheless, consumer expectations regarding food safety continue to rise, and advances in analytical technology have made it possible to detect even trace amounts of harmful constituents. Moreover, in the context of food globalization, food safety can serve as a non-tariff trade barrier; for this reason, the development of safer and more reliable Jang fermentation technologies is of paramount importance.

Academic R&D on the excellence of Jang should be continued for the sustainable growth and development of the Jang industry in Korea. Research on the excellence of intestines is important in terms of physiological function, but considering that the essence of Jang is taste and has developed along with food culture, research in terms of taste is more important. This is because Jang is a food, and food is evaluated by taste and aroma. In addition, our food culture has undergone many changes in recent years. As consumers' tastes have become westernized, foods with ingredients that were not seen before and various recipes applied are coming to our table. Jang also needs to be transformed into a new form in line with the changing consumption trends. Perhaps it will significantly increase the scope of its use by making Jang-based seasoning materials or sauces so that Jang can be used in other food groups. Jang is a great flavor sauce in itself, but it should be transformed into a more suitable source for each food culture. The globalization of Korea's Jang industry will accelerate if various efforts and research and development are carried out for intestinal seasoning materialing or sauce, along with Jang's own flavor research.

S18-3

Strategic research for advancing K-SPIRITS: from tradition to value-driven maturation

Tae-Wan Kim

Food Convergence Research Division
Korea Food Research Institute

This research aims to establish a data-driven industrial strategy to enhance the global competitiveness of the Korean traditional liquor and fermented food industry (K-SPIRIT industry) by focusing on maturation, a core concept in the global spirits industry. Despite its strong foundation in tradition and regional identity, the K-SPIRIT industry faces limitations in the quantification of maturation quality, process standardization, technological independence, and global product development. First, this research will implement digital transformation (DX) across the maturation process to collect and integrate key environmental and process data, and develop AI-based maturation prediction models (AX) to establish a data-driven maturation management system. Second, it will promote the localization of core technologies, including microbial strains, distillation systems, and maturation equipment, to ensure technological independence. Third, by integrating DX-AX-based maturation technologies with localized core technologies, this research will propose strategies for developing globally competitive premium products based on the quantitative characterization of quality attributes and sensory properties across maturation stages. This research redefines maturation as a data-driven process of quality completion and value creation, and proposes an integrated industrial ecosystem linking technology, equipment, and product development. Ultimately, it aims to promote the industrialization of maturation in the K-SPIRIT industry and strengthen its global competitiveness.

S19

Assessment of oxidative behavior and storage stability of food systems under accelerated RSSOT conditions

Carolin Edinger
Anton Paar GmbH

Nowadays, the oxidation stability of food products plays a highly important role not only because of latest developments in shipping and transportation.

In this contribution investigation possibilities for oxidative behaviour derived from applying the Rapid Small Scale Oxidation Test (RSSOT) are demonstrated. Under accelerated conditions (elevated temperature and pure oxygen pressure) the oxygen uptake of a sample is measured. Typical conditions of the method are temperatures between 60 ° C – 140 ° C and an initial oxygen pressure of 700 kPa. These conditions initiate a rapid oxidation process, that is monitored by recording the pressure which drops according to oxygen consumption of a sample. The respective pressure-time curve gives rise to further investigation possibilities such as calculating oxygen uptake and activation energy, providing a deeper understanding of the product's oxidation behavior.

As a major benefit samples can be analysed without additional preparation. This allows the investigation of products in their original state, supporting realistic shelf-life and storage stability assessments. Application and measurement examples demonstrate the broad variety of possibilities for analysis and the effectiveness. With its automated operation, standardized RSSOT compliance, and powerful evaluation tools, the RapidOxy 100 supports R&D and quality control laboratories in making faster, data-driven decisions about product stability and shelf life.

S20-1

Muscle-protective potential of *Poncirus trifoliata* extract and its bioactive coumarins in a dexamethasone-induced atrophy model

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Skeletal muscle loss is a major health concern associated with aging, chronic disease, and glucocorticoid exposure, and there remains strong interest in food-derived materials that can support muscle health. In this study, we evaluated the anti-atrophic activity of a 70% ethanol extract of Poncirus trifoliata and characterized its major active constituents using dexamethasone-induced muscle atrophy models in C2C12 myotubes and C57BL/6J mice. The extract improved myotube survival under dexamethasone challenge and promoted anabolic signaling related to muscle protein synthesis while suppressing markers associated with proteolysis. It also enhanced myogenic differentiation and alleviated mitochondrial impairment, as reflected by reduced oxidative stress, improved cellular ATP production, recovery of mitochondrial content, and increased expression of genes involved in mitochondrial biogenesis and function. Bioactivity-guided fractionation further identified auraptene, ponciol, and triphasiol as representative coumarin compounds contributing to these protective effects. In the animal study, oral administration of the extract attenuated dexamethasone-induced declines in muscle mass and physical performance, improving tibialis muscle weight, grip strength, and treadmill exercise capacity. In addition, the extract favorably modulated gut microbial diversity and altered the abundance of specific taxa associated with improved muscle-related phenotypes, suggesting possible involvement of the gut-muscle axis. Collectively, these findings indicate that Poncirus trifoliata extract, together with its coumarin constituents, has potential as a functional food material for supporting muscle function through coordinated effects on protein turnover, mitochondrial homeostasis, and gut microbiota regulation. This research was supported by Korea Institute of Science and Technology intramural research grants (2E32621 and 2E32702) and the NST – KIST Postdoctoral Fellowship Program for Young Scientists.

S20-2

Development of a risk prediction model for sarcopenia prevention based on multimodal nutrition and health information

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Sarcopenia is a progressive age-related condition characterized by declines in skeletal muscle mass and strength, and early identification is important for prevention and timely intervention. However, current diagnosis relies on binary cut-off values, which may overlook individuals in a ‘gray zone’ of subclinical risk. Nutritional status is a key modifiable risk factor for sarcopenia, and integrating nutritional indicators with multimodal health information may improve early identification of at-risk individuals. This study aimed to develop an AI-based risk prediction model for sarcopenia prevention using multimodal nutritional and health information. Data were collected from 320 community-dwelling Korean adults aged 19–79 years. A total of 80 variables were analyzed, including nutritional status (Nutrition Quotient; NQ/NQ-E), body composition, muscle strength, gait characteristics, and fall history. The proposed regression-guided classification with soft-threshold rule supervision (RGC-ST) framework predicts continuous clinical indicators of sarcopenia and then classifies risk using threshold-aware supervision. Model performance was compared with that of a standard multilayer perceptron (MLP), Random Forest, Logistic Regression, XGBoost, and LightGBM. The prevalence of sarcopenia risk (SR) was 18.4% (59/320). The SR group showed significantly lower muscle mass and strength, with no significant age difference compared with the normal group, suggesting that sarcopenia risk may reflect multimodal health factors beyond age alone. The proposed RGC-ST model showed the best overall performance, achieving an accuracy of 0.9412, recall of 0.8333, specificity of 0.9744, and F1-score of 0.8696. In contrast, Random Forest, XGBoost, and LightGBM achieved a recall of 0.5000, while MLP and Logistic Regression reached 0.6667. The RGC-ST framework effectively identifies sarcopenia risk in the ‘gray zone’ by integrating nutritional assessment with multimodal health data and a regression-guided classification approach. These findings highlight the importance of integrating multimodal nutritional and health information into AI-driven sarcopenia screening for earlier intervention and personalized prevention strategies.

S20-3

Nutritional interventions for the prevention and management of sarcopenia in an aging population

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Sarcopenia is an age-related muscle disease characterized by progressive declines in skeletal muscle mass, muscle strength, and physical performance. As the aging population rapidly increases worldwide, sarcopenia has emerged as a major public health concern. Since there is currently no approved pharmacological treatment for sarcopenia, nutritional interventions combined with resistance exercise are receiving increasing attention as effective non-pharmacological strategies for maintaining muscle health and physical function in older adults.

Recent studies have emphasized the importance of adequate protein intake and high-quality protein sources for improving anabolic resistance and stimulating muscle protein synthesis in aging populations. Nutritional interventions using whey protein, essential amino acids, and branched-chain amino acids have been actively investigated for their beneficial effects on muscle health. In addition, various non-protein functional ingredients, including probiotics and plant-derived bioactive compounds, are being studied as potential nutritional strategies for the prevention and management of sarcopenia. Multi-nutrient interventions combining protein and functional bioactive compounds have also demonstrated beneficial effects on muscle strength and physical performance.

This presentation will discuss recent research trends in nutritional interventions and functional ingredients for the prevention and management of sarcopenia, as well as the clinical applicability and future perspectives of functional food-based nutritional strategies for healthy aging.

S21-1

Multi-scale characterization and AI-driven prediction of cooked rice quality attributes

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Cooked rice quality is governed by complex interactions among molecular composition, processing conditions, and structural transformations occurring during cooking and storage. However, conventional approaches based solely on intrinsic compositional factors are insufficient to explain variability in eating quality. A multiscale framework was developed to systematically characterize and predict cooked rice quality by incorporating leachate as a key intermediate variable linking processing, structure, and sensory attributes. The effects of cooking conditions on starch leaching behavior were investigated, and variations in leachate composition and amylopectin structure were found to be closely associated with textural properties. A multiscale dataset integrating rice flour composition, leachate characteristics, and microstructural features was constructed, and its predictive capability was evaluated using artificial neural networks. The models demonstrated superior performance compared to conventional statistical methods, with leachate-based variables alone achieving high predictive accuracy. Furthermore, changes in leachate behavior under different processing and storage conditions reflected both initial structural disruption and subsequent retrogradation. These findings highlight the functional role of leachate as a sensitive descriptor of cooked rice quality and demonstrate the effectiveness of integrating multiscale characterization with AI-driven modeling for quality prediction.

S21-2

Structural control of starch digestibility and kinetic insights into starch digestion

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Starch digestibility is strongly influenced by its molecular structure and crystalline organization, which determine postprandial glucose response and potential health benefits. In vitro digestion commonly classifies starch into rapidly digestible starch (RDS), slowly digestible starch (SDS), and resistant starch (RS) fractions, yet accurate characterization of these fractions remains challenging. This presentation summarizes studies on the interpretation of in vitro starch hydrolysis using first-order kinetics and the control of starch digestibility through molecular structural modulation. The modified logarithm of slope (LOS) method can be applied to better describe digestion of starches with diverse digestibility. This approach uses 1st-order kinetics with customized curve-fitting periods for individual starch samples, allowing more accurate description on RDS and/or SDS fractions. It provides quantitative information on both digestion rate and proportion of each starch fraction, strongly supporting Englyst's traditional starch fraction classification concept. The formation mechanism of low-digestible fractions was investigated using modified starches with controlled amylopectin branch chain lengths as a model system. Structural analyses revealed that branch chain length determined double-helical organization, crystalline arrangement, and the amylose-amylopectin interactions, which ultimately governed starch digestibility. RDS mainly consisted of amorphous or poorly aligned structures with long starch chains, whereas SDS and RS were associated with semi-crystalline and crystalline double helices, particularly with DP 13–24. Longer amylopectin chains favored RS formation, while optimized intermediate chain lengths promoted SDS development. These findings demonstrate that precise structural modification of starch provides an effective strategy for producing customized low-digestible starches with improved nutritional functionality.

S21-3

Model derivation technique to reveal starch granule architecture

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Starch model derivatization simulates the chemical substitution process in which fluorescent probes are introduced into starch molecules through reactive functional groups. Confocal microscopic and chromatographic visualization of derivatized starch enables direct probing of how starch granule architecture governs chemical reactivity and subsequent functionality. Various fluorescent labeling techniques have been employed to investigate starch structure. Non-reactive fluorescent probes are useful for visualizing molecular diffusion pathways and accessibility within starch granules, whereas reducing-end fluorescent labeling enables analysis of molecular chain distribution and the localization of amylose molecules within starch granules. Meanwhile, reactive fluorescent reagents provide distinct advantages in identifying the localization and reactivity of derivatization reactions at both granular and molecular levels. Based on studies combining fluorescent derivatization with SEC-RI/FL analytical systems, this presentation discusses not only differences in derivatization pattern uniformity arising from pore and channel structures within starch granules, but also differential reactivities among amylose and amylopectin branch chains. Furthermore, the effects of these reaction patterns on physicochemical functionalities of starch, including swelling behavior, gelatinization, and retrogradation properties, will be discussed. Through these perspectives, starch derivatization reactions will be considered not merely as chemical modification techniques, but as structural probing solutions capable of revealing the hierarchical architecture of starch granules and their structure-function relationships.

S22-1

Programmable yeast surfaces for precision fermentation

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Precision fermentation requires robust microbial platforms that enable efficient and selective bioconversion across diverse applications. Here, we present yeast cell-surface engineering as a versatile strategy for precision fermentation, combining chassis development, whole-cell biocatalysis, and sustainable biomass utilization. Using Saccharomyces cerevisiae as host systems, we established surface-display platforms for heterologous enzymes and demonstrated their applicability to the production of functional molecules and value-added ingredients. These studies highlight the potential of engineered yeast surfaces as reusable and modular biocatalytic interfaces for targeted synthesis and renewable feedstock conversion. Collectively, our work positions yeast cell-surface display as a promising approach for next-generation biomanufacturing in food, nutrition, and feed applications.

S22-2

Precision fermentation and the potential of traditional fermentation microorganisms

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Precision fermentation is a food technology that combines biotechnologically engineered microbial cell factories with traditional fermentation techniques to enable the economical and eco-friendly mass production of food ingredients. Meanwhile, traditional Korean fermented foods, produced through natural fermentation without starter cultures, possess a highly diverse microbial community and contain microbial strains with great potential as cell factories. This presentation introduces an industrialization case of precision fermentation and efforts to utilize microorganisms derived from traditional fermented foods as cell factories. The first research case is a study that produced human breast milk oligosaccharides using conventional bacterial host. Through various genetic engineering, the production capacity of breast milk oligosaccharides was enhanced to an industrially viable level. The second study demonstrates efforts to utilize Saccharomyces cerevisiae strains derived from fermented foods as cell factories to produce heme, a key additive in plant-based meat substitutes.

S22-3

Cas9 ribonucleoprotein-mediated genome editing in yeast toward food applications

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Genome editing technologies based on CRISPR-Cas9 have enabled precise and efficient modification of target genomic loci across various organisms, including industrially relevant yeast strains. Despite these advances, the application of conventional CRISPR systems in the food industry remains limited due to safety concerns associated with antibiotic resistance markers and the stable integration of foreign DNA constructs encoding Cas9 and guide RNA. These issues raise regulatory challenges and negatively affect consumer acceptance of genetically modified food products. In this study, we employed a DNA-free genome editing strategy based on Cas9-ribonucleoprotein (RNP) complexes for use in yeast. The RNP complex, composed of purified Cas9 protein and in vitro transcribed single guide RNA (sgRNA), was directly introduced into yeast cells via electroporation, eliminating the need for plasmid-based delivery systems. As proof of concept, the ADE2 gene was successfully deleted, confirmed by the formation of characteristic pink colonies. Furthermore, optimization of RNP concentrations improved gene editing efficiency, with the highest efficiency of 8.1% achieved using 10 μg of Cas9 protein and 7 μg of sgRNA. This RNP-based approach offers advantages for food-related applications. The absence of antibiotic selection markers and foreign DNA reduces biosafety concerns and supports clean-label and non-GM food technologies. Additionally, the transient nature of RNP complexes minimizes the risk of off-target effects, enhancing precision and safety. This method has potential for application in non-conventional yeast strains used in food fermentation that lack established genetic tools. Overall, the Cas9-RNP platform represents a practical strategy for developing improved microbial strains for the food industry while addressing regulatory and consumer concerns.

S23-1

Development and industrialization strategy of senior-friendly foods using mushroom mycelial fermented black ginseng

Do-gyeong Kim

Dongyangdang

With the rapid progression of population aging, the demand for anti-aging and immune-enhancing functional foods has continuously increased. Black ginseng and deer antler are recognized as premium health-promoting materials due to their various physiological activities. In addition, mushroom mycelia fermentation technology has recently attracted attention as an effective bioconversion process capable of enhancing bioactive compounds and improving functional properties. Therefore, this study aimed to develop functional fermented materials using mushroom mycelia-fermented black ginseng to apply them to elderly-friendly functional beverages.

In this study, several functional mushroom mycelia, including Phellinus linteus, Lentinula edodes, Hericium erinaceus, and Cordyceps militaris, were used for the fermentation of black ginseng. To improve fermentation efficiency, preprocessing conditions such as grinding, extraction, and drying were optimized. Furthermore, fermentation parameters including temperature, incubation time, humidity, carbon source, and nitrogen source were investigated to establish optimal fermentation conditions.

In addition, elderly-friendly functional beverages containing fermented black ginseng was formulated by optimizing the mixing ratios of fermented materials and supplementary ingredients. Product quality characteristics, palatability, and storage stability were evaluated, and the applicability of retort pouch-based liquid formulations was also investigated.

Overall, the findings of this study demonstrate the potential of mushroom mycelia fermentation technology for the development of high-value-added functional materials and elderly-friendly beverages. These results may provide useful foundational data for the future expansion of fermented functional food industries targeting the aging population.

S23-2

Strategies for promoting the senior-friendly green bio-Industry using bioconversion technology

Kyung-wuk Park

Suncheon Research Center for Bio Healthcare

This study aimed to present strategies for promoting the senior-friendly green bio-industry through bioconversion technology and to evaluate the industrial applicability of bioconverted biomaterials. Functional biomaterials were produced from natural food and medicinal resources using microbial and mushroom mycelia fermentation processes. Fermentation conditions, including temperature, incubation time, and nutrient sources, were optimized to improve functional compound conversion and product stability.

Physiological activities of fermented materials were evaluated through antioxidant, anti-inflammatory, immune-enhancing, and anti-obesity assays. Based on these results, elderly-friendly functional beverage formulations containing fermented biomaterials were developed, and their quality characteristics, palatability, and storage stability were investigated. Furthermore, this study discussed regional industrial promotion strategies, including the establishment of bio-production infrastructure, industry-academia-research collaboration systems, customized enterprise support platforms, and export-oriented commercialization models.

These findings suggest that bioconversion technology can contribute to the development of high-value-added functional food materials and support the sustainable growth of the senior-friendly green bio-industry. Bioconversion technology using microorganisms and mushroom mycelia has recently attracted attention as an effective approach for improving the bioavailability and physiological functionality of agricultural and biological materials.

S23-3

Advanced analysis and enhancement of ginseng compound K via optimized processing and bioconversion methods

Kyung-yun Kang

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Compound K (CK), a rare ginsenoside generated through the enzymatic or microbial bioconversion of major ginsenosides including Rb1, Rb2, and Rc has attracted considerable scientific attention owing to its superior bioavailability and potent pharmacological activities relative to its parent compounds. Unlike primary ginsenosides, which are poorly absorbed in the gastrointestinal tract due to their hydrophilic sugar moieties, Compound K is produced via the stepwise deglycosylation of protopanaxadiol-type ginsenosides, and consequently exhibits markedly enhanced intestinal absorption and systemic bioactivity. Despite its well-documented therapeutic potential encompassing anticancer, antidiabetic, hepatoprotective, and immunomodulatory effects the precise metabolic pathways governing Compound K biosynthesis and its downstream transformations in biological systems remain insufficiently characterized. In particular, the enzymatic mechanisms underlying glycosidic bond hydrolysis, the identification of key microbial taxa and their glycosidase repertoires, and the regulatory factors modulating conversion efficiency across diverse biological matrices all warrant systematic investigation. Given the substantial structural and compositional variability among ginseng processing forms ranging from fresh and white ginseng to red, black, and sprout ginseng it is equally imperative to develop and standardize methodologies that maximize Compound K yield while preserving overall phytochemical integrity, through approaches such as fermentation-based bioconversion, enzymatic hydrolysis, and physicochemical pretreatment strategies including high-pressure, ultrasonic, and thermal processing. By elucidating the metabolic routes of Compound K and establishing robust processing protocols applicable to the diverse ginseng resources of the Jeollanam-do region, this research is anticipated to provide an essential scientific basis for the development of next-generation health functional foods, cosmeceuticals, and companion animal health products, thereby contributing meaningfully to the sustainable advancement of the regional green bioindustry.

S24-1

Functional properties and utilization of native and cultivated *Artemisia fukudo* Makino in Jeollanam-do

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Artemisia fukudo Makino is a biennial halophytic plant belonging to the family Asteraceae, naturally distributed in coastal salt marshes of Jeollanam-do. Its ability to thrive under high-salinity conditions has led to the identification of various bioactive compounds with distinctive biological properties compared to those of typical terrestrial plants, suggesting its high potential as a functional material. Some studies have reported the biological activities and volatile aroma compounds of A. fukudo Makino. Since 2023, our institute has conducted preliminary studies demonstrating its potential for field cultivation, and variation in volatile aroma compounds depending on growth stages. Based on research conducted over the past two years, the present study further investigated changes in volatile aroma compounds during the steam distillation process. In addition, non-volatile metabolites of A. fukudo Makino were comparatively analyzed according to growth stages, and the skin-related efficacy of its extracts was comprehensively evaluated for cosmetic applications. The aim of this study was to elucidate the compositional characteristics and functional value of A. fukudo Makino and to provide fundamental data for assessing its applicability as a functional material. A. fukudo Makino cultivated in open fields in Hampyeong and its steam-distilled hydrosol were analyzed to identify volatile aroma compounds. The major constituents included eucalyptol, camphene, sabinene, camphor, and terpinen-4-ol, with eucalyptol being the predominant compound in the hydrosol. Analysis of non-volatile metabolites revealed a total of 27 compounds, including quinic acid and CQA/DCQA derivatives, with significant compositional changes observed depending on the growth stage. To explore its potential in cosmetic applications, various skin-related functional properties of A. fukudo Makino extracts were evaluated, including antioxidant, whitening, anti-inflammatory, anti-wrinkle, and moisturizing effects. The extract exhibited a tyrosinase inhibition (whitening effect) of 52.6% at a concentration of 100 μg/mL. Anti-inflammatory activity, assessed via inhibition of nitric oxide (NO) production, showed a 75.6% inhibition at the same concentration. For anti-wrinkle efficacy, inhibition of MMP-1 expression reached 60.1% at 30 μg/mL. Moisturizing effects, evaluated through AQP-3 expression, showed a 119.0% increase at 3 μg/mL. In addition, to verify safety, cosmetic prototypes formulated with A. fukudo Makino extract—such as mist, facial cleanser, and sheet mask—were evaluated for six heavy metals (Pb, Cd, As, Hg, Sb, Cd) and major microbial parameters. All tested items met the regulatory standards, confirming the safety of the developed products.

S24-2

Effect of steam treatment on functional compounds in Korean ginger

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Ginger (Zingiber officinale Roscoe) is a tropical herbaceous plant belonging to the Zingiberaceae family and has been reported to possess anti−inflammatory, antioxidant, and cancer−preventive effects. This study was conducted to compare the changes in antioxidant activity and functional ingredient contents according to steaming treatments. The samples consisted of Korean conventional gingers (WO−1, WO−2, AO) and Chinese seed gingers (C−1, C−2) grown in Wanju, Jeollabuk−do, and Seosan, Chungcheongnam−do. These samples were subjected to steaming treatments at 121 ° C for durations ranging from 2 to 8 hours using and autoclave. Antioxidant activity was assessed by measuring total polyphenol and flavonoid contents, as well as ABTS and DPPH radical scavenging activities. Furthermore, the contents of functional ingredients, specifically gingerols and shogaols, were analyzed. Comparing the untreated control group with the groups subjected to different steaming durations, it was confirmed that the content of antioxidant components increased in proportion to the steaming time. Notably, at 6 hours of steaming, Wanju conventional ginger (WO−2) exhibited the highest total phenolic compound (85.24 mg GAE/g) and total flavonoid (98.14 RE/100g) contents. In all sample groups, the contents of gingerols were highest in the control group and decreased as steaming time increased, while the contents of shogaols showed a corresponding increase. In particular, the shogaol content of Wanju conventional ginger (WO−2) reached its maximum at 8 hours of steaming. The results of this study confirm that the functional ingredient content of ginger can be maximized by adjusting the steaming treatment time. These findings are expected to provide valuable data for the utilization of steamed ginger as a material in the functional food industry.

S24-3

Utilization potential of Korean *Cannabis sativa* L.: functional components and biological activities of hemp seeds, roots, and stems

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This study investigated the nutritional composition, functional components, and biological activities of domestically produced Cannabis sativa L. and evaluated its utilization potential. First, nutritional composition, functional components, antioxidant activity, and biomarker compounds of dehulled hemp seeds were analyzed according to cultivation region and cultivars (Ordinary and Cheongsam). Crude fat content was higher in Ordinary cultivars (51.40–52.02%) than in Cheongsam (44.16–49.58%). Unsaturated fatty acids predominated, with linoleic acid (45.3–47.3%) and linolenic acid (18.2–20.4%) as the major components. Among tocopherols, γ-tocopherol and δ-tocopherol were the predominant forms in both Ordinary and Cheongsam cultivars. Major minerals such as potassium and magnesium were present in high amounts, along with trace minerals including copper, iron, manganese, and zinc. THC content was higher in Ordinary cultivars, while CBD was higher in Cheongsam cultivated in Andong. Antioxidant activity was higher in Cheongsam cultivars. Using UPLC-QTOF-MS and OPLS-DA multivariate analysis, 42 differential metabolites were identified between cultivars, including amino acids, phenolic compounds, lipids, and cannabinoids. Subsequently, antioxidant activity, cannabinoid content, and anti-inflammatory effects of hemp roots, stems, and seeds were evaluated. Antioxidant activity (DPPH and ABTS) and total phenolic and flavonoid contents were highest in the stem extract. Total cannabinoid content was highest in the stem (6.85 mg/kg), followed by the seed (5.98 mg/kg) and root (0.27 mg/kg). Anti-inflammatory activity, assessed by nitric oxide (NO) production inhibition, was most effective in the root extract, which also demonstrated low cytotoxicity, confirming its safety. The stem extract also showed significant inhibitory effects. No antibacterial activity was observed in any of the three parts. These findings indicate that the functional component profile of hemp varies significantly by cultivars and plant part, and highlight the notable potential of domestically produced hemp, particularly the Cheongsam cultivars and its stem extract, as a valuable functional bioresource for industrial and nutraceutical applications.

S25-1

Advancing regional innovation: current status and strategic future directions of the Jeonnam RISE Co-Growth (D1) FoodTech group project

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Our study presents the current status and future development strategies of the Jeonnam RISE (Regional Innovation System & Education) Co-Growth (D1) Food-Tech Group initiative. To facilitate regional industrial innovation, the initiative aims to integrate food technology with emerging fields (eg. AI (artificial intelligence), ICT (information and communication technology), and data-driven platforms) and to strengthen the collaboration between academia, industry, and local communities. The focus of the Food-Tech program is to enhance the value of the agri-food sector by supporting R&D, commercializing technology, training the workforce, and enhancing enterprise competitiveness in Jeollanam-do, South Korea. Some of the principal activities include education programs on food processing and fermentation, AI and big data utilization training workshops, field-based technical support, and industry-academia-research network establishment. The introduction of AI-based solutions, such as SCNU-GPT and digital content creation has accelerated knowledge dissemination and improved operational efficiency of participating companies. Through custom consultation, pilot production support, and promotional content development for local enterprises, the project has also contributed to building regional capacity in the food sector. Furthermore, on-site industrial challenges have influenced policy recommendations that support the advancement of both general food and functional health food industries in the region. These achievements are, however, tempered by several challenges that include limited R&D outcomes, insufficient industry-led participation, and gaps between initial project goals and actual performance, especially in research outputs and technology validation. To address these issues, future strategies emphasize strengthening industry engagement, enhancing practical R&D outcomes, expanding AI-driven innovation, and establishing a sustainable ecosystem for continuous collaboration. As a model for regional co-growth, the Jeonnam RISE Food-Tech initiative not only links the development of technology, industry and human resources but also contributes to the long-term competitiveness and sustainability of the local food industry.

S25-2

Research on the potential use of cheese whey as brewing water in soy sauce production

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Although whey contains various components and functional properties, most of it is currently discarded in Korea. This study aimed to enhance whey utilization and improve soy sauce quality by incorporating whey into the soy sauce production process. Through whey fermentation based on Meju, a correlation between lactose content and amino nitrogen concentration was established. It was found that an amino nitrogen concentration of at least 284.23 mg/100g is required to reduce lactose content by 50%. By applying Meju selection criteria, the effects of varying whey addition ratios on physicochemical properties, microbial counts, and antioxidant activity were evaluated. As the amount of whey added and the fermentation period increased, pH and lactose content decreased, while sugar content, titratable acidity, and free amino acid levels increased. Bacterial counts increased with longer fermentation periods but decreased after 30 days. As the amount of whey added increased, polyphenol content rose by 188% to 491% compared to the group without added whey, and DPPH radical scavenging activity increased by 39% to 161%. Using whey as the brewing water during soy sauce production reduces lactose content due to the activity of microorganisms in the Meju and increases free amino acid content in the final product. Therefore, whey has been identified as a suitable raw material for soy sauce production.

S25-3

AI transformation in the food industry: trends, technologies, tools, and future directions

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The food industry faces a multi-layered crisis comprising climate-driven raw material instability, rising chronic disease burdens, increasingly sophisticated non-tariff barriers (EU PPWR, FSMA 204, Vietnam Food Safety Act amendments), intensifying sustainability requirements, and rising R&D cost pressures. These compound challenges can no longer be addressed by experience-based, trial-and-error operations; they demand a new paradigm grounded in data-driven, predictive, and autonomous industrial systems. This presentation diagnoses the macroscopic diffusion of artificial intelligence (AI) across the food industry value chain and proposes a phased AX (AI Transformation) model for the Korean food sector.

The presentation is organized into four parts. First, four major AI trends are reviewed: (1) the paradigm shift from generative AI to agentic AI, (2) the industrial normalization of precision fermentation following regulatory, cost, and infrastructure inflection points, (3) integrated industrial redesign symbolized by the PepsiCo–Siemens–NVIDIA digital twin collaboration announced at CES 2026, and (4) the academic emergence of “AI for Food” formalized in npj Science of Food (2025). Second, five core AI technologies essential for food scientists—computer vision, generative inverse design, protein structure prediction with molecular docking, reinforcement learning for process optimization, and large language models with AI agents—are explained in connection with the food value chain. Third, freely or low-cost-accessible AI tools (Claude, NotebookLM, Code Interpreter, AlphaFold Server) and standard workflows for food R&D are introduced. Fourth, anchored on three-year transformation projections, the AXMM (AX Maturity Model: Aware–Trying–Adopting–Integrating–Autonomous) and 3A System (AI Assessment–Advancement–Accreditation) developed by the HyperAI&ESG Institute are presented as the foundation of a four-phase K-Food AI Transformation Roadmap (2026–2030).

S26-1

Technology trends in Autonomous Mobile Robot (AMR) applications for smart food logistics

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The food industry is rapidly shifting from labor-intensive logistics systems to intelligent automated logistics systems due to the growing demand for multi-variety, small-batch production, the expansion of cold chain logistics for fresh food, labor shortages in logistics operations, and increasingly stringent hygiene and safety standards. In this context, autonomous mobile robots (AMRs) have emerged as a key smart logistics solution capable of performing a wide range of tasks in manufacturing plants and distribution centers, including raw material transport, inter-process transfer, picking and stacking, pallet movement, and sample delivery for inspection. Based on LiDAR, SLAM, machine vision, and AI-based path planning and obstacle avoidance technologies, AMRs can be flexibly deployed even in complex and dynamic food logistics environments. In addition, integration with IoT sensors and WMS/ERP systems improves inventory visibility, traceability, operational efficiency, and workplace safety simultaneously. Their value is particularly significant in refrigerated and frozen logistics environments, where they help reduce worker burden, maximize storage space utilization, minimize energy loss, and strengthen hygiene management. However, several challenges remain, including battery performance degradation in low-temperature environments, condensation and icing issues, wireless communication stability, interface compatibility with existing automation facilities, and the need to assess economic feasibility against high initial investment costs. This study comprehensively examines the technological trends of AMR-based smart logistics in the food industry, focusing on core technologies, major application areas, benefits, and limitations. Furthermore, it proposes future development directions, including AI-based integrated control systems, digital twins, cold-chain-specialized robotic systems, and data-driven predictive operation frameworks.

S26-2

AI-driven quality management of agri-food products based on quality data and its extension to digital distribution

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Artificial intelligence (AI) and omics technologies are increasingly being applied to agri-food quality management and digital distribution systems. In this study, metabolomics-based machine learning approaches for food authenticity verification and storage-environment prediction are introduced. In kimchi, metabolite profiling combined with logistic regression models enabled discrimination between Korean and Chinese products despite limited differences in conventional quality characteristics. In perilla seed powder, machine learning models successfully predicted storage humidity and storage period based on metabolite changes associated with lipid oxidation during storage. In addition, machine learning models were compared with conventional response surface methodology (RSM) models for predicting quality changes during pre-peeling drying of garlic. Machine learning models showed superior predictive performance for several quality traits and sulfur-containing compounds, including allicin, diallyl disulfide, and diallyl trisulfide, compared with conventional statistical models. These results suggest that machine learning approaches may improve predictive capability for complex postharvest quality responses under diverse processing conditions. However, current omics-based AI applications still face several limitations, including high-dimensional low-sample-size datasets, biological variability, insufficient temporal information, and difficulties in integrating multi-omics data with quality traits. Nevertheless, overcoming these limitations may enable the development of AI-driven digital twin systems capable of real-time simulation and prediction of quality changes during agricultural product storage and distribution. Furthermore, such technologies are expected to contribute to the expansion of bioinformatics-based digital distribution systems for agri-food products.

S26-3

Digital transformation and challenges in Korean agriculture

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Domestic agriculture in Korea is facing a range of growing risks, including climate change, deteriorating production conditions, and shifts in the global trade environment. In response, the importance of utilizing digital technologies as a means of overcoming these challenges has increased significantly. Digital transformation—the most advanced stage of digital technology utilization—is expected to generate substantial value across the entire agricultural supply chain, from production to consumption. In practice, a wide range of digital technologies, including artificial intelligence (AI) and big data analytics, are already being adopted in the Korean agricultural sector, producing positive outcomes such as enhanced productivity and efficiency, as well as reductions in labor and operational costs.

Recognizing the strategic importance of digital technologies in agriculture, the Korean government has also made continuous efforts to promote digital transformation through initiatives such as the establishment of the "Master Plan for the Promotion of Digital Agriculture" and the development of related legislation and support programs. Digital transformation represents not only a key solution to many of the structural challenges facing Korean agriculture, but also a critical driver of new opportunities for growth and innovation. Digital technologies are expected to play a decisive role in strengthening agricultural supply and demand management, increasing farm income, and mitigating agricultural price volatility.

Despite these expectations, however, the agricultural sector has yet to fully advance toward comprehensive digital transformation due to several persistent challenges, including limited digital capabilities among stakeholders and the high initial costs of technology adoption. Therefore, it is necessary to establish a stronger foundation for digital transformation by enhancing the capacity of agricultural production areas to utilize digital technologies, securing economically viable digital solutions, and improving the effective use and integration of digital information.

S26-4

The present and future of smart fresh produce distribution and bio-logistics systems

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Digital transformation is accelerating the integration of IT, IoT, and AI into fresh produce distribution and bio-logistics, enhancing efficiency and user convenience across the value chain. In Korea, Agricultural Products Processing Centers (APCs) are the core infrastructure for fresh produce distribution, with about 550 centers established nationwide between 1992 and 2014 through government support. Approximately 30–40% of fresh produce is now graded, packaged, and shipped through APCs, positioning them as a major pillar of domestic distribution alongside public wholesale markets and large retail channels. However, APCs exhibit considerable disparities in quality management, facilities, and operational capabilities. A 2020 assessment of 31 major APCs handling 12 key commodities showed that only a minority reached the highest performance level, indicating substantial room for improvement compared with advanced packing houses in leading agricultural countries. In response, the Korean government is pursuing a smart APC initiative targeting 100 smart APCs by 2027, accompanied by pilot demonstration centers that focus on automation and digitalization to modernize fresh produce distribution. In parallel, global flows of biopharmaceuticals, cell and gene therapies, vaccines, and healthcare products are rapidly increasing, driving the emergence of bio-logistics as a high-reliability, regulation-intensive sector. Bio-logistics is built on Good Distribution Practice (GDP)-based quality systems, incorporating temperature-controlled storage, cold-chain transport, real-time environmental monitoring, data logging, validation, and temperature mapping. The Osong CXL BIO GSC Center operated by Sejung Shipping exemplifies this trend through its dedicated temperature-controlled logistics hub and Smart Validation Center, which provide customized storage, real-time data management, and transport qualification services. Looking ahead, AI-driven predictive risk management, digital twins, unmanned automated logistics centers, blockchain-based traceability, and ultra-low temperature systems are expected to further advance both fresh produce smart distribution and bio-logistics as critical infrastructure for future agri-food and healthcare industries.

S27-1

Machine vision and AI-based seafood quality evaluation

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The reduction in the working population and the expansion of the seafood industry have increased the demand for maintaining high product quality, thereby highlighting the necessity of establishing automated quality evaluation systems. Among various sensing technologies, machine vision is a non-destructive and efficient technique that enables rapid and objective quality assessment. The purpose of this study is to introduce case studies on seafood quality assessment based on machine vision systems, utilizing various types of image data, such as RGB and hyperspectral imaging, to evaluate key quality attributes including freshness, grade classification, and component quantification. In addition, we discuss the challenges encountered when utilizing image data acquired through machine vision for quality evaluation and present approaches to overcome these challenges using artificial intelligence (AI) technologies. Through this work, we aim to contribute to sustainable innovation in future food systems by enhancing the reliability, efficiency, and scalability of seafood quality evaluation, while also enabling real-time monitoring and facilitating integration into automated processing lines.
This research was supported by the Main Research Program of the Korea Food Research Institute (KFRI) (E0211001-05) funded by the Ministry of Science and ICT and by the Korea Institute of Marine Science & Technology Promotion funded by the Ministry of Oceans and Fisheries (RS-2025-02263222).

S27-2

Non-destructive quality assessment of fish fillets: olive flounder (*Paralichthys olivaceus*) evaluated via Vis-NIR multispectral imaging and multi-omics validation

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Olive flounder (Paralichthys olivaceus) is one of the most economically valuable and widely consumed commercial aquaculture species in South Korea. However, the traditional quality evaluation of flounder fillets relies heavily on subjective visual inspection or time-consuming, destructive chemical analysis. To address this limitation, this study investigates the application of Vis-NIR multispectral imaging (365–970 nm) for the rapid, non-destructive quality assessment of olive flounder fillets. We evaluated the correlation between fish size and lipid accumulation by comparing extreme sample groups: a High-Quality Large group (>2.0 kg) and a Low-Quality Small group (<1.5 kg). Multispectral image analysis revealed significant spectral differences in the near-infrared (NIR) region, specifically at 940–970 nm, where lipid exhibits strong reflectance while water-rich muscle tissue absorbs the light. The Large group showed a 12.3% higher mean reflectance and a 6.7% higher fat index compared to the mall group. These significant differences in lipid distribution were consistently observed across the fin muscle on the eyed side and the entire blind side. Given the significant differences observed in lipid distribution, comprehensive destructive analyses were conducted in parallel to validate the spectral findings and meticulously profile the quality attributes. These complementary validations included the quantification of total lipid and protein contents, LC-Qtof MS/MS-based lipidomics to analyze lipid metabolites, electronic tongue (E-tongue) profiling for objective sensory and taste evaluation, and texture analysis to assess physical properties such as hardness and chewiness. In conclusion, this study demonstrates that multispectral imaging, firmly supported by physical and chemical validations, is a powerful tool for evaluating the quality of olive flounder. These findings lay a critical foundation for developing an AI-driven, in-line automated grading system, which will enable customized value-up processing and minimize resource waste in the global seafood industry.

S27-3

Machine learning-based freshness assessment of seafood using colorimetric analysis

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Ensuring seafood freshness is essential for maintaining product quality and improving the efficiency of distribution systems, increasing the demand for rapid and non-destructive assessment technologies. Conventional freshness evaluation methods are often labor-intensive, time-consuming, and destructive, limiting their applicability for real-time quality monitoring during storage and distribution. In response to these limitations, machine learning-based approaches have recently attracted attention as promising tools for intelligent evaluation of seafood freshness. The integration of machine learning with colorimetric analysis demonstrated strong potential for assessing seafood freshness, with freshness-related quality changes effectively identified through color-based patterns. Variations in color characteristics were closely associated with freshness deterioration during storage, indicating that colorimetric information can serve as an effective indicator of seafood freshness. Furthermore, AI-assisted analytical approaches enabled the discrimination of freshness conditions and provided enhanced interpretability of freshness-related patterns through data-driven analysis. This approach may provide a useful foundation for next-generation seafood freshness assessment systems by enabling more efficient and data-driven freshness evaluation in the seafood industry.

S28-1

Development of natural flavor enhancers for saltiness and umami using microorganisms from traditional fermented foods

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The food industry is increasingly seeking natural alternatives to synthetic flavor enhancers and sodium, particularly for the development of healthier low-sodium products. Fermentation-derived peptides have attracted attention as potential taste-active compounds capable of enhancing saltiness and umami without increasing salt content. Traditional fermented foods are rich sources of proteolytic Bacillus spp., which can generate diverse peptide metabolites with possible flavor-enhancing functions. However, only limited studies have directly linked specific microbial peptides with quantifiable saltiness and umami attributes. This study investigated the potential of Bacillus strains isolated from traditional fermented foods to produce saltiness- and umami-enhancing peptides. Twenty-two Bacillus isolates were identified and subjected to comprehensive safety assessment, including hemolysis, antibiotic resistance, enzymatic profiling (API ZYM), MYP/PEMBA screening, and B. cereus toxin gene detection. Safe, non-toxigenic strains were selected and evaluated for fermentation performance, peptide production, and taste properties. Taste-associated metabolites and peptide fractions were analyzed using NMR, GC-MS, and LC-UPLC-Q-TOF-MS, identifying candidate peptides including SKGGTAGAGL, LGFPSGALG, TFKY, FY, FPGPL, and AMAKH. These peptides were chemically synthesized and evaluated individually using an ASTREE electronic tongue system. Among them, SKGGTAGAGL exhibited the highest saltiness sensor response (CTS 9.8), while FY showed the strongest umami response (NMS 11.9). TFKY also demonstrated notable saltiness activity (CTS 8.4), and FPGPL showed moderate umami activity (NMS 5.8). To provide mechanistic insight, in silico molecular docking and MM-GBSA analyses were performed against the epithelial sodium channel (ENaC), and similar analyses for the umami receptor T1R1/T1R3 are in progress. SKGGTAGAGL showed the strongest predicted interaction with ENaC, with a docking score of −10.2 at Site 1 and an MM-GBSA binding energy of −95.7 kcal/mol at Site 2, while TFKY also showed

favorable ENaC binding energies. Fermentation time-course analysis further showed that peptide generation was closely associated with Bacillus peptidase activities, especially during 36–48 h of fermentation. These findings suggest that Bacillus strains from traditional fermented foods are promising microbial resources for producing natural flavor-enhancing peptides that may serve as functional ingredients in sodium-reduced food systems.

S28-2

Development of versatile material technologies based on zero-waste valorization of fruit byproducts

Ju Seok Yang
JinJu Bioindustry foundation

This study aims to develop a zero-waste system for converting fruit processing byproducts—such as pear, maesil (green plum), omija (Schisandra), and persimmon—into high value-added multifunctional materials. In Korea, byproducts generated from juice extraction and sugaring processes are mostly discarded due to their high moisture and sugar content, which limit the applicability of conventional drying and utilization methods.

To address this issue, an integrated processing platform combining hygienic pretreatment, oxygen-controlled drying, and bioconversion technologies was established. In particular, a vacuum gas-substitution drying process was applied to suppress oxidation and enzymatic browning while preserving more than 90% of bioactive compounds, including polyphenols and flavonoids.

Furthermore, advanced processing techniques—including dietary fiber (pectin) extraction, enzymatic saccharification, and microbial fermentation—were employed to produce various functional materials such as antioxidant-rich concentrates, dietary fibers, and functional oligosaccharides.

The proposed system incorporates a full lifecycle management framework, covering byproduct collection, quality standardization, HACCP implementation, and circular resource certification. In addition, economic, environmental, and industrial feasibility evaluations were conducted to verify its practical applicability.

This study ultimately promotes the valorization of fruit processing byproducts and contributes to the advancement of a sustainable food industry and the expansion of the upcycling sector.

S28-3

Eco-friendly food packaging technology

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As environmental pollution caused by conventional plastic and non-biodegradable food packaging intensifies, major developed countries, particularly in Europe, are strengthening regulations on single-use plastics and mandating the adoption of eco-friendly packaging by corporations. In response to these global regulatory trends, research on sustainable bio-based materials is actively being conducted. This study examines the technical characteristics and potential food industry applications of Disk-Shaped Cellulose Nanofibrils (DSCNF) as a next-generation eco-friendly material that can overcome the limitations of conventional Cellulose Nanofibrils (CNF).

Compared to standard CNF, DSCNF possesses enhanced mechanical strength and superior gas barrier properties, while offering both economic and environmental advantages in terms of waste resource utilization. This study proposes two specific application directions for DSCNF. First, its role as a functional coating agent to improve the preservation of fresh fruits and vegetables. DSCNF coatings have been confirmed to significantly extend shelf life by inhibiting moisture evaporation and controlling gas permeability. Second, its application as a food packaging material that can replace conventional plastic films. Based on its proprietary DSCNF manufacturing technology, Arame Materials Co., Ltd. aims to lead the high-value eco-friendly material industry and contribute to the sustainable development of the food storage and distribution sectors.

S28-4

Application development and market outlook for bio-based materials

Yong Dae Park
Dongsung Chemical Co., Ltd.

Realizing carbon neutrality and ESG management to combat global climate risks have now become essential survival strategies, not choices. In particular, environmental pollution and microplastics of petroleum plastics are causing global regulations and changes in perception, calling for a rapid transition to biodegradable biomaterials. Focusing on Dongsung Chemical's eco-friendly brand 'ECOVIVA®', Dongsung Chemical's roadmap for technological progress and market trends in bio-based materials, and the case of technological innovation through Korea's first bioplastic processing center (BPC) will be introduced in this lecture. Specifically, we will share the achievements of developing various industrial applications such as biodegradable bead foam, logistics air cap, multi-layer film for cold chain, strap band, and tape that completely replace the existing Styrofoam (EPS). It also proposes ways to secure objective reliability through global certification such as TUV and DIN and biodegradation certification (EL724) of the Ministry of Environment in Korea, and sheds light on business models and future market volatility to build a "Circular Eco-system" where nature and humans coexist beyond simple material supply.

S29-1

Vision for the Suncheon green bio specialization district

Junseok Oh

Suncheon Fermentation Industry Support Center

The Suncheon Green Bio Specialization District aims to establish a regional innovation ecosystem based on microbial resources, fermentation technologies, and the microbiome industry. The district seeks to create new value from local agricultural resources while fostering sustainable growth in the green bio sector.

The Suncheon Fermentation Industry Support Center plays a pivotal role in supporting research and development, technology commercialization, industrial cooperation, and human resource development. Through close collaboration among industry, academia, research institutes, and government, the center promotes the advancement of fermentation and microbiome-based industries.

Furthermore, the district seeks to strengthen functional evaluation and industrial applications of fermented foods, expand microbiome-related technologies, and enhance the value of regional agricultural resources. By integrating these efforts, Suncheon aims to become a leading hub for the green bio industry and contribute to the sustainable development of future bioeconomy.

S29-2

Genetic and functional diversity according to environmental adaptation of next-generation probiotics

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Probiotics such as Lactobacillus sp. and Bifidobacterium sp. exist in a variety of habitats, which has led to niche-specific genetic evolution. However, the relationship between this type of genetic evolution and bacterial phenotypes remains unclear. According to several previous studies, habitat diversity in probiotics is thought to lead to niche-specific genetic evolution through single nucleotide polymorphisms (SNPs) and genome structural variation. Variations in bacterial genes, especially those encoding functional proteins, are known to affect bacterial phenotype. For example, one study showed that L. paracasei strains varied in their ability to utilize carbohydrates depending on the abundance of sugar-converting genes present. This is observed not only in probiotics but also in obligate anaerobic gut bacteria. It was reported that changes in the intestinal environment due to dietary variations resulted in point mutations in the genome of the gut commensal microbe Bacteroides fragilis. In this study, we demonstrated that Lactobacillus reuteri, a probiotic widely used in the food industry, particularly in dairy industry, and Akkermansia muciniphila, a next-generation probiotic candidate, underwent genetic evolution to adapt to the intestinal environment, which also affected the functional diversity of these strains. Overall, our findings showed that the niche-specific genetic evolution of these probiotic strains is associated with host health and physiological functions. Our studies can help guide the exploration and application of probiotics in specific niche-based probiotic applications. This work was supported by the National Research Foundation of Korea (NRF) grants funded by the Korean government (MSIT) (NRF-2016M3A9F3947962 and RS-2025-24662973) and a Research promotion program of SCNU.

S29-3

High value-added utilization of agricultural products and green bio industry development strategies in Suncheon city

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Agriculture is rapidly evolving from a production-oriented sector into a high value-added industry that integrates functional bioresources with biotechnology. The Korean government aims to become a global leader in the green bio industry by 2030 through its Green Bio Industry Development Strategy, while Jeollanam-do Province is actively promoting bio-industries based on regionally specialized agricultural resources.

Suncheon City possesses abundant agricultural resources and an outstanding ecological environment, providing diverse functional bioresources. Agricultural products such as bitter lettuce (Ixeris dentata), water parsley (Oenanthe javanica), wild pear, and Japanese apricot contain bioactive compounds with antioxidant, anti-inflammatory, and immune-enhancing properties, making them promising resources for the health functional food, functional labeled food, cosmetic, and pet food industries. This presentation analyzes the commercialization potential of functional ingredients derived from Suncheon's agricultural products and proposes strategies for transforming the regional agricultural sector from a production-oriented system into a high value-added industry centered on functional ingredient development and product commercialization.

The Functional Labeled Food System offers lower regulatory barriers and a shorter commercialization period than conventional health functional foods, making it an effective pathway for adding value to regional agricultural products. A case study of functional labeled foods developed from water parsley and soybean sprouts by the Jeonju AgroBio Research Institute was analyzed to examine the processes of functional validation, product development, and market entry. Based on this case, strategies for establishing a Suncheon-specific green bio industry model are proposed.

In addition, this study discusses strategies for expanding into the health functional food, cosmetic, and pet food industries and emphasizes the need to establish industry–academia–research–government collaboration, strengthen GMP-based production infrastructure, and support functional evaluation and product development. Furthermore, it introduces a practice-oriented workforce development model centered on the Department of Green Bio Industry at Cheongam College to meet the growing demand for skilled professionals in the regional green bio sector.

In conclusion, Suncheon City has strong potential to become a leading green bio industrial hub in Korea's southern coastal region through the discovery of functional agricultural resources, commercialization of functional labeled foods, workforce development, and the establishment of an integrated industrial ecosystem. Achieving this vision will require sustained investment in research and development as well as a collaborative platform linking industry, academia, research institutes, and local government.

International Session

IS1-1

A study on the antioxidant effect of resveratrol on milk thistle seed oil at frying temperature

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The purpose of this research is to observe the changes in physical and chemical indicators of milk thistle seed oil (MTO) and milk thistle seed oil with resveratrol (MTOR) at the frying temperature, and to explore the antioxidant properties of resveratrol added milk thistle seed oil. The results show the antioxidant effect of resveratrol at the frying temperature. During the heating process, the polyunsaturated fatty acids of MTO is 56.98–52.37(area%) and MTOR is 62.63–56.10(area%) at fresh (0 h) and after heating at frying temperature for 16h , but the degradation rate of γ-linolenic acid of MTO is 0.835 faster than that of MTOR(0.615), and resveratrol can effectively inhibit the degradation of linoleic acid. There is no significant difference between the three aldehydes groups measured by 1H NMR between MTO and MTOR, which is almost consistent with the trend of thiobarbituric acid reactive substances (TBARs). However, the conjugated trienes (K270) content of MTOR is much lower than that of MTO. Resveratrol is a common natural antioxidant, which can be used for antioxidation of milk thistle seed oil. This study can provide for the antioxidant properties of resveratrol in milk thistle seed oil.

IS1-2

Isolation and purification of peptides from Jianglu liquor and their antioxidant activity mechanism and structure-activity relationship

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Jianglu liquor has evolved from the fusion of the Korean ethnic group's soybean paste culture and drinking culture, and represents a new category of liquor. This type of liquor uses Baijiu of varying alcohol content as a base spirit, to which traditional Korean soybean paste is added. Functional components are extracted through a cold maceration process, and the final product is produced using modern filtration techniques. The liquor is pale yellow in colour, has a smooth body and a pure soybean paste aroma, and possesses vast prospects for industrial development. Currently, research on soybean paste-infused liquor has largely focused on the analysis of its composition and physiological activity; however, there remains a significant gap in understanding the non-volatile functional components within the liquor, particularly in the field of bioactive peptides with smaller molecular weights. Food-derived antioxidant peptides, known for their natural safety, high absorbability, and multi-target physiological activities, have become a research focus in the functionalization of fermented foods. The soybean fermentation and maceration process used for Jianglu liquor provides favorable conditions for the enrichment of active peptides. Therefore, this study uses traditional Korean Jianglu liquor as the raw material and aims to systematically investigate the antioxidant peptides present in the liquor, elucidate their structural characteristics, activity mechanisms, and structure-activity relationships, and provide a scientific basis for the functional enhancement and high-value industrial development of Jianglu liquor. The specific experimental procedures and results are as follows:

The study focused on three types of Jianglu liquor with alcohol contents of 38%vol, 42%vol and 52%vol respectively. Crude peptides with molecular weight <3 kDa were enriched via ultrafiltration. Based on amino acid composition, molecular weight distribution analysis, and in vitro antioxidant assays, 38%vol Jianglu liquor was selected as the optimal raw material. Its crude peptides contained 44.48% hydrophobic amino acids and 64.39% small peptides (<1000 Da), exhibiting the highest antioxidant potential.

After separation and purification through Sephadex G-15 gel filtration chromatography, a highly active fraction F3 was obtained. Q Exactive HF-X mass spectrometry identified 233 peptides, and through bioinformatics screening and molecular docking simulation, 10 highly active candidate peptides were selected. Among them, the decapeptide DI-10 (peptide sequence: DWGEDGYIWI) demonstrated the best performance: it exhibited a low binding energy of -5.5 kcal/mol with ABTS+· free radicals and could interact with the KEAP1 protein. After artificial synthesis, it showed significant free radical scavenging capacity at a concentration of 5 mg/mL, with DPPH and ABTS+· free radical scavenging rates reaching 68.46% and 53.97%, respectively.

A network pharmacology analysis of its structure-activity relationship revealed that DI-10 acts on 161 core targets, including ALB, AKT1 and EGFR, and is enriched in biological processes such as the oxidative stress response and reactive oxygen species metabolism. It may exert a regulatory effect on key signalling pathways such as PI3K-Akt; notably, its binding energy with the ALB target is as low as -9.4 kcal/mol, indicating a stable interaction.

Cell experiments confirmed that within the appropriate concentration range, DI-10 exhibited no significant cytotoxicity. It significantly increased the survival rate of oxidatively damaged HepG2 cells, upregulated intracellular SOD and CAT activity, reduced ROS accumulation, and mitigated cellular oxidative stress damage.

In summary, this study used 38%vol Jianglu liquor as the raw material. Through antioxidant activity screening, separation and purification, structural identification, and mechanistic analysis, a novel non-cytotoxic antioxidant decapeptide DI-10 was obtained. This work fills the gap in systematic research on small-molecule bioactive peptides in Jianglu liquor, provides solid molecular-level scientific evidence for the health attributes of traditional Korean Jianglu liquor, and establishes a core theoretical foundation for its functional enhancement and high-value industrial development.

IS1-3

Quality characteristics of different cuts of Yanbian Yellow Cattle beef and utilization of their subcutaneous fat for oleogel preparation

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This study investigates the fat distribution characteristics of different cuts of Yanbian Yellow Cattle beef and explores the feasibility of utilizing their subcutaneous fat for oleogel preparation, with the dual objectives of achieving high-value utilization of beef by-products and developing degradable packaging materials. Four representative primary cuts—strip loin, rib eye, flank, and tenderloin—were selected for analysis. Low-field nuclear magnetic resonance (LF-NMR) combined with physicochemical methods was employed to elucidate the intrinsic relationships between fat distribution and beef quality attributes. In parallel, beef tallow rendered from subcutaneous fat was used as the lipid phase and compounded with natural waxes and ethyl cellulose (EC) to formulate oleogels, whose physicochemical properties and oxidative stability were systematically evaluated. The results demonstrate that LF-NMR serves as an effective non-destructive tool for assessing beef quality, and a correlative model linking LF-NMR parameters to the fat and nutritional components of Yanbian Yellow Cattle is established. Furthermore, this study provides a novel strategy for the high-value utilization of beef tallow by-products and lays a theoretical foundation for the development of degradable food packaging materials. Notably, the rice bran wax-EC composite system is identified as a core formulation for producing high-stability oleogels.

IS1-4

Transforming *Locusta migratoria* protein into low-allergen biofunctional ingredients through ultrasound-assisted enzymatic hydrolysis

Jae Hoon Lee

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Edible insects have attracted increasing attention as sustainable alternative protein sources; however, allergenicity remains an important barrier to their use as food ingredients. In particular, tropomyosin is recognized as a major insect allergen with potential cross-reactivity to crustacean allergens. This study aimed to reduce tropomyosin in Locusta migratoria protein through ultrasound-assisted enzymatic hydrolysis and to evaluate the functional properties of the treated protein material. Ultrasound treatment alone did not effectively reduce tropomyosin levels, and enzymatic hydrolysis without prior ultrasound treatment also showed limited effects. In contrast, the combination of ultrasound pretreatment and subsequent enzymatic hydrolysis markedly decreased tropomyosin, suggesting that ultrasound-induced structural modification facilitated enzymatic degradation of the allergenic protein. In addition, the combined treatment significantly enhanced antioxidant activities, as confirmed by ABTS and DPPH radical scavenging assays. Immunomodulatory activity was also evaluated using RAW 264.7 macrophages, where the treated samples significantly increased nitric oxide production and upregulated the expression of inflammatory cytokines, including TNF-α and IL-6. These findings indicate that ultrasound-assisted enzymatic hydrolysis can produce L. migratoria-derived protein materials with reduced antigenicity and enhanced biofunctional properties, supporting their potential application as value-added food ingredients.

IS2-1

Research on key technologies for green processing of high-quality dry-cured ham and comprehensive utilization of by-products

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Dry-cured ham, a traditional premium meat product celebrated for its unique flavor and texture, faces challenges such as high sodium content, inefficient coating techniques, and low by-product utilization. This report, conducted by the Key Innovation Laboratory for Deep and Intensive Processing of Yanbian High-Quality Beef (Ministry of Agriculture and Rural Affairs), focuses on developing green processing technologies for low-salt dry-cured ham and enhancing the value of by-products to address these issues and promote sustainable industrial development. Traditional Chinese hams often contain 7%–12% salt, exceeding WHO recommendations, and suffer from texture issues due to suboptimal coatings and underutilized by-products like skin and bones. Aligned with China's "Healthy China 2030" initiative, the work targets innovations to improve safety, quality, and resource efficiency, aiming to balance consumer health with product appeal.

The report details the development of a low-sodium compound salt formula—70% NaCl, 18% potassium lactate, and 12% lysine—to replace traditional salt, reducing sodium while enhancing flavor and texture. Sensory evaluations and analytical tests showed this formula improved antioxidant activity, with higher hydrophobic amino acid content from increased protein degradation into bioactive peptides, and promoted lipid oxidation to generate more unsaturated fatty acids, enhancing aromatic profiles. High-throughput sequencing revealed dominant microbial taxa like Firmicutes and Staphylococcus in low-salt ham, contributing to improved proteolytic activity and flavor formation. Additionally, natural antioxidants such as onion peel extract and quercetin were tested as eco-friendly coatings, with onion peel extract enhancing odor and color and quercetin improving umami and reducing astringency. These coatings inhibited lipid oxidation, maintaining stability without synthetic additives, while GC-MS analysis identified complex volatile profiles crucial for sensory quality.

In by-product valorization, peptidomics and molecular docking identified 633 umami peptides in ham skin and bones, with distinct abundance changes in low-salt versus full-salt groups, and characterized key precursor proteins for natural flavor enhancer development. Three protease-producing Staphylococcus strains isolated from low-salt ham showed efficient protein hydrolysis, promising for accelerating flavor formation. These advancements, supported by national research projects and published in top-tier journals, address industrial challenges by integrating low-salt formulation, green coating, and by-product utilization. The report's innovations enhance product quality, reduce waste, and align with global trends toward healthier, sustainable food processing, offering a replicable model for traditional meat industries. Future directions include scaling industrial applications, exploring microbial starters, and characterizing bioactive peptides for functional foods, ensuring economic viability and technological advancement in dry-cured ham production.

IS2-2

Bioreactor culture of *Rhodiola sachalinensis* cells from the Changbai Mountain region and their biological activity evaluation

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Rhodiola sachalinensis A. Bor. is a rare and endangered genuine medicinal herb native to the Changbai Mountain region. However, its industrial development and application have been markedly constrained by the increasing depletion of wild resources, as well as limitations associated with traditional artificial cultivation, including immature cultivation techniques and insufficient quality stability. In this study, cells of R. sachalinensis derived from the Changbai Mountain region were used as the research material, and bioreactor-based cultivation technology was proposed as an alternative to conventional planting methods to systematically investigate culture optimization and its intervention effects on ulcerative colitis (UC).

First, a bioreactor culture system for R. sachalinensis cells was established, and key process parameters, including culture mode, medium composition, and culture period, were optimized to promote the efficient accumulation of medicinally active components such as salidroside and polysaccharides. On this basis, appropriate extraction processes were applied according to the physicochemical properties of different categories of active constituents, enabling efficient and environmentally friendly extraction of target compounds from the cell cultures. Subsequently, a dextran sulfate sodium (DSS)-induced mouse model of ulcerative colitis was established to systematically evaluate the ameliorative effects of R. sachalinensis cells on UC from the perspectives of intestinal mucosal barrier repair, inflammatory factor regulation, and restoration of gut microbiota homeostasis, and to further explore the underlying molecular mechanisms.

This study aims to overcome the critical bottleneck of limited R. sachalinensis resources and to establish an integrated technical framework spanning "plant cell culture – active constituent preparation – pharmacodynamic evaluation," thereby providing a theoretical basis and scientific support for the high-value development and utilization of characteristic medicinal resources from the Changbai Mountain region, as well as for standardized and large-scale production in the context of industry – education integration.

IS2-3

AI-driven aptamers discovery and applications in food quality control and safety assessment

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This presentation systematically expounds the revolutionary application of Artificial Intelligence (AI) in the field of aptamer discovery and its enormous potential in food safety testing. In response to the bottlenecks of traditional detection technologies and the limitations of SELEX screening, AI, particularly machine learning and deep learning models, has become a key driving force to accelerate aptamer discovery and improve screening success rates. Through specific case studies, the report demonstrates how AI can mine high-affinity aptamers masked by experimental biases from massive sequencing data and intelligently identify their key binding motifs, achieving a leap from “blind screening” to “intelligent design”. AI-driven aptamer technology provides innovative solutions for the rapid and sensitive detection of various food safety risks, such as foodborne pathogens, pesticide residues, and heavy metals, heralding the advent of an era of intelligent detection.

IS2-4

Efficient production of functional food ingredients via synthetic biology-guided microbial precision fermentation

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Bioactive compounds—including small molecules such as flavonoids as well as post-translationally modified (PTM) proteins and peptides—are essential for applications in nutrition and health. To enable their efficient and scalable production, we established a synthetic biology-guided microbial precision fermentation platform that supports multi-level pathway optimization. For flavonoid production, combinatorial pathway libraries were constructed and systematically screened using a riboswitch-enabled high-throughput strategy, allowing rapid identification of high-performing variants and significant enhancement of product yields. In parallel, we engineered microbial hosts with customized PTM pathways to facilitate the production of functional biomolecules with well-defined modification profiles. This platform addresses key limitations of conventional eukaryotic expression systems, particularly in terms of scalability, tunability, and process control. Collectively, our work demonstrates an integrated microbial engineering framework for the efficient production of diverse functional food ingredients, offering a versatile foundation for applications in food, nutraceutical, and biomedical fields.

IS3-1

Recovery of RG I pectin from mandarin canning wastewater as a functional food ingredient

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Canned mandarin segments in light syrup is major citrus processing products in China. During the processing, the segments membrane is removed by soaking them in dilute hydrochloric acid solution and sodium hydroxide solution. The wastewater produced contains a large amount of functional components such as pectin and hesperidin. The content of pectin is as high as 0.1–0.5%. We established a technology for recovering pectin from this high COD waste water. It includes collecting the water, filtering by special machine, concentration, precipitation, pressing, drying and milling. After being recovered by ethanol precipitation method, we found that its properties are quite different from traditional commercial pectin. Its galacturonic acid content is lower than 50%, the methylester degree is low, and the gelation property is poor. Further experiments confirmed that it is RG I pectin. Although its quality is poor compared to traditional commercial pectin in jelly capacity, it is a good prebiotic that can promote the growth of common probiotics. Further research has proved that it has anti-tumor and antioxidant activities and is a good functional food raw material.

IS3-2

AI-driven on-site rapid detection of key food-associated microorganisms via optical sensing techniques

Jun Wang

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Rapid on-site screening of food-associated microorganisms is important for food safety monitoring and early risk management. Conventional culture-based and molecular methods are often time-consuming, operationally complex, and dependent on laboratory instruments. In this study, we developed an optical sensing approach that integrates aptamer-functionalized plasmonic gold nanostructures, coffee-ring pattern formation, and deep learning-based image recognition for rapid and visual microbial detection.

Gold nanocubes were synthesized using a seed-mediated method and functionalized with nucleic acid aptamers through a microwave-assisted strategy. After target recognition, sample droplets were heated to induce evaporation and generate coffee-ring patterns. These patterns were recorded using a standard smartphone and then used to construct image datasets for model training and evaluation. To improve image interpretation, both VGG16-based transfer learning and customized convolutional neural network models were optimized through input format adaptation, hyperparameter tuning, and data augmentation. Under the optimal configuration, with a batch size of 16 and a learning rate of 0.0005, the optimized model achieved approximately 95% validation accuracy, with a test precision of around 0.96 and an F1-score of approximately 0.93.

This study provides a practical on-site screening workflow for food-associated microorganisms, with potential applications in food safety monitoring and aquaculture disease control.

IS3-3

Decontamination of fresh wet rice noodles using a vertical in-package cold plasma system

Xinyu Liao

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Fresh wet rice noodles (FWRN) have high moisture and starch content, providing a suitable environment for microbial growth. In this study, an in-package dielectric barrier discharge (DBD) cold plasma system operating in a vertical mode was used for the decontamination of FWRNs. The effects of applied voltage, dielectric barrier thickness, discharge gap, electrode area, and package atmosphere on electrical behavior and microbial inactivation were systematically investigated. During refrigerated storage at 4° C, in-package DBD cold plasma-treated FWRNs maintained total plate counts below 5 log CFU/g for more than 16 days, significantly longer than conventional thermal pasteurization, while better preserving textural properties, cooking quality, and visual appearance. Furthermore, a pilot-scale in-package DBD cold plasma system was constructed and validated for the decontamination of large-packaged FWRNs, indicating its potential to reduce microbial contamination and retard quality deterioration. Overall, these results provide essential insights linking reactor design, discharge characteristics, and microbial inactivation, supporting the development of scalable, industrial in-package cold plasma equipment for commercial FWRN processing.

IS3-4

AI-driven intelligent freshness assessment and quality prediction for aquatic products across the value chain using hyperspectral imaging and advanced YOLO11

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Freshness assessment is critical for intelligent quality control of aquatic products across the food value chain. Conventional methods are often destructive, time-consuming, and unsuitable for rapid real-time monitoring. This study developed an AI-driven non-destructive framework integrating visible–near-infrared hyperspectral imaging and an advanced YOLO11 model, with Trachinotus ovatus as a representative aquatic product. For quantitative freshness prediction, multiple feature extraction and modeling strategies were compared. Supervised wavelength selection outperformed unsupervised methods, and RFE-SVR achieved a test-set R^2 of 95.27% and RMSE of 1.286 mg/100 g. The selected wavelengths were mainly associated with water migration, pigment degradation, and C–H/N–H bond changes. Based on these features, an optimized residual network further improved robustness, achieving a test-set R^2 of 96.26% and reducing RMSE from 1.345 to 1.048 mg/100 g. In addition, a CNN-LSTM-attention fusion model effectively captured key spectral regions, particularly around 970–1000 nm and 569 nm. For visual freshness classification, storage-stage images were analyzed, and the fish-eye region showed strong discriminative ability. The optimized YOLO11 model achieved high precision, recall, and mAP while maintaining real-time mobile detection. Overall, this study provides a rapid, non-destructive, and interpretable AI-based approach for aquatic product freshness assessment and quality prediction, supporting intelligent quality control across the value chain.

IS4-1

Understanding Singapore consumers' dietary exposure to chemicals through Singapore's first Total Diet Study (TDS)

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A Total Diet Study (TDS), recognised by the World Health Organization as a standardised and cost-effective approach for assessing population-level dietary exposure to chemical hazards, was conducted in Singapore between 2021 and 2023 to establish baseline exposure estimates and support food safety risk management and communication. Dietary data were obtained from a nationally representative 24-hour dietary recall survey of 2,014 residents, reflecting Singapore's multi-ethnic population. A total of 281 representative foods — covering approximately 90% of overall dietary intake by weight and spanning items commonly consumed across demographic sub-groups — were selected for analysis. Chemical hazards, including heavy metals, pesticides, mycotoxins, and process contaminants, were prioritised based on potential health risks and international benchmarks. Foods were prepared in consumption-ready forms using cooking methods representative of local practices, including stir-frying, deep-frying, and steaming, to reflect the diversity of Singapore's food culture. In total, 4,215 sub-samples were combined into 494 pooled samples for laboratory analysis. Preliminary findings indicate that beverages and grain-based products account for approximately half of the average adult daily diet, with notable variation across demographic groups; adults aged 75 years and above, for instance, consume a higher proportion of home-prepared meals and favour softer foods such as fish and porridge. Contaminant concentrations in Singapore's food supply were broadly comparable to those reported in Australia, Hong Kong, and the European Union, though elevated levels of certain substances — such as aluminium in bakery products and furan in fats and oils — were observed in specific food categories. By integrating local consumption data with contextually relevant food preparation practices, Singapore's inaugural TDS provides a robust baseline for tracking contaminant trends, informing risk assessments, strengthening risk management strategies, and guiding targeted risk communication aligned with local dietary patterns.

IS4-2

Study on the simultaneous determination of quaternary ammonium disinfectant compounds (QACs) in food samples collected in Hanoi, Vietnam, using LC-MS/MS

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This study developed and validated a method for the simultaneous determination of nine quaternary ammonium compounds (QACs) in food matrices using liquid chromatography–tandem mass spectrometry (LC–MS/MS). Target analytes were extracted from samples using a mixture of acetonitrile and water (70:30, v/v) containing 2 mmol/L trifluoroacetic acid (TFA), assisted by ultrasonication in combination with the QuEChERS approach. The method was fully validated in terms of linearity, sensitivity, accuracy, and precision. Matrix-matched calibration curves showed good linearity with coefficients of determination (R^2) ≥ 0.995. For liquid matrices, the method limits of detection and quantification were 0.38 μg/kg and 1.25 μg/kg, respectively, whereas for solid matrices they were 1.90 μg/kg and 6.25 μg/kg. Recoveries ranged from 72% to 111%, with repeatability (RSDr) 〈 10.6%, meeting the performance requirements specified by the AOAC International. The validated method was applied to the analysis of 195 food samples collected in Hanoi, Vietnam, during 2024 – 2025. QAC residues were detected in 9.74% of the samples, including BAC-C12, BAC-C14, BAC-C16, and DDAC-C10. All positive findings were observed in dairy products, with the highest concentration reaching 29.9 μg/kg, which is below the maximum residue limit established by EU regulations (100 μg/kg).

IS4-3

Dietary exposure assessment of sorbates in commonly consumed foods in the Philippines

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Sorbates are widely utilized as effective preservatives to help maintain the quality and safety of food. Despite its low toxicity, concerns remain on the potential health risks including metabolic acidosis, hyperpnea, and allergic reactions from chronic exposure to sorbates exceeding established safety limits. Based on the previous screening level exposure assessment conducted by the Institute, water-based flavored drinks, fruit nectars, bakery wares, and processed meats were identified as the top contributors to sorbate intake. This study therefore refined the dietary exposure estimates of Filipinos by combining actual sorbate concentrations, determined through a validated High Performance Liquid Chromatography equipped with Photodiode Array detector (HPLC-PDA) method, with food consumption data from the 2021 Expanded National Nutrition Survey (ENNS) for the identified major food sources. The results showed that sorbate concentrations in water-based flavored drinks, fruit nectars, bakery wares, and processed meats ranged from 25.68 to 1,232.07 mg/kg as sorbic acid, with most levels meeting Codex Maximum Permissible Levels (MPLs). Dietary exposure estimates of Filipinos revealed higher relative intakes among specific groups, such as young children and high-level consumers. However, exposure across all age groups remained consistently below the Acceptable Daily Intake (ADI) of 25 mg/kg body weight, indicating no significant health risks from excessive exposure. Exposure estimates ranged from 0 – 6%, 0 – 19%, 0 – 23%, and 0 – 7% of the ADI for water-based flavored drinks, fruit nectar, bakery wares, and processed meats, respectively. These findings demonstrate effective regulation of food additives in the local food supply. To maintain safety standards, continued monitoring, targeted data collection, and further research are recommended to address data gaps and adapt to evolving food consumption trends and processing practices.

IS5-1

Future food systems through AI-driven hydration informatics: from seed morphology to process control in legume value chains

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AI is increasingly positioned as a cross-cutting enabler of "future food systems," accelerating innovation from farm-level raw materials to industrial processing, quality assurance, and sustainability outcomes. This presentation highlights how data-driven modeling can translate crop diversity into actionable process intelligence, using cowpea (Vigna unguiculata L. Walp.) hybrids as a case study for AI-enabled process design in plant-based food systems. Cowpea is a protein- and micronutrient-rich legume with strong food security relevance, yet its industrial utilization is constrained by limited, variety-specific knowledge of hydration kinetics and thermodynamic behavior that govern soaking, cooking, and downstream operations.

Drawing on hydration datasets from seven cowpea hybrids, we demonstrate an integrated framework combining classical hydration models (Peleg, Page, Weibull, Kapatso, and Fick's diffusion) with machine learning (ML) models to improve prediction accuracy and decision support under processing-relevant temperatures (30–90° C). Among conventional approaches, the Peleg model provides the best overall fit for hydration behavior across varieties and conditions. However, ML models consistently outperform classical models in predictive performance, with Support Vector Regression (SVR) achieving the highest accuracy (overall R^2 = 0.9997; RMSE = 0.0113), enabling robust surrogate modeling for real-time process optimization. Explainable AI analysis using SHAP further indicates that soaking time is the most influential driver of water absorption kinetics, followed by temperature—supporting interpretable control strategies for industrial soaking/cooking systems.

Beyond prediction, the talk links AI to value-chain innovation by showing how morphological differentiation (via PCA capturing 97.2% of variance in seed dimensional data) provides a structural basis for varietal process customization, while thermodynamic profiling quantifies energetic barriers and temperature sensitivity relevant to efficiency and product quality. Collectively, this work illustrates a scalable pathway toward legume hydration informatics—a practical AI layer that supports sustainable processing, improved product consistency, and value addition in plant-based food manufacturing.

IS5-2

Multifaceted functional properties of adzuki beans (*Vigna angularis*)-with special emphasis on their prebiotic effects-

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This study aimed to scientifically elucidate the functional effects of adzuki bean (Vigna angularis)–based legume agricultural products on the intestinal environment and metabolic health. The results demonstrated that adzuki beans are rich in resistant starch and dietary fiber, which escape digestion in the small intestine, reach the colon, and are subsequently fermented by intestinal microbiota to produce short–chain fatty acids (SCFAs). This fermentation led to increased intesinal SCFA concentrations and a reduction in intestinal pH, thereby promoting the growth of beneficial gut bacteria. Concomitantly, reductions in serum cholesterol levels and improvements in lipid metabolism were observed. In animal experiments, dietary intake of adzuki beans and their indigestible starch fractions resulted in significant decreases in serum total cholesterol and low–density lipoprotein cholesterol, along with increased fecal excretion of bile acids and sterols, indicating enhanced lipid metabolism. Furthermore, consumption of adzuki beans in a practical food form, namely adzuki bean paste, suppressed visceral fat accumulation and reduced energy intake. In addition, an in vitro intestinal fermentation model using human fecal microbiota was established, enabling rapid evaluation of fermentation characteristics and microbial community changes induced by food materials such as adzuki beans. Within this model, indigestible fractions of adzuki beans enhanced the production of beneficial SCFAs, particularly propionic acid, while suppressing the generation of putrefactive metabolites, yielding results comparable to those observed in animal studies. Collectively, these findings provide mechanistic insights into the gut–modulating effects of adzuki beans and support their value as functional food ingredients, contributing to the added value of regional agricultural products and the development of health–promoting foods.

IS5-3

Beyond prediction: a data-driven framework for AI food design

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The rapid expansion of artificial intelligence in the food sector has led to increasing reliance on data-centric approaches for understanding complex food systems. Current applications predominantly focus on predicting quality attributes, recommending personalized diets, and detecting foreign materials based on various datasets. While these efforts have improved analytical capabilities, their direct impact on practical product and process development remains limited. This seminar introduces a design-driven perspective on artificial intelligence in food science, emphasizing the transition from data interpretation to actionable innovation. By integrating inverse problem-solving approaches, artificial intelligence can be utilized to identify optimal ingredient compositions and processing conditions that meet predefined quality targets. Such strategies enable a more proactive and solution-oriented framework for food development. Ultimately, this approach highlights the evolving role of artificial intelligence as a key driver in connecting scientific understanding with industrial implementation, supporting the development of next-generation food products and processes.

Young Scientist Lecture

YSL1

Waterborne opportunistic pathogen *Legionella* and host interaction: implications for food storage environments

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Legionella pneumophila is a waterborne opportunistic pathogen capable of persisting in both natural and man-made aquatic environments, even under nutrient-limited conditions. This long-term persistence is not driven by active growth but by a coordinated survival strategy involving metabolic downregulation, stress adaptation, and structural maintenance. Upon infection, L. pneumophila establishes an intracellular replication niche by deploying a repertoire of effector proteins that modulate host cellular processes and evade innate immune defenses. In particular, Sde family effectors alter ubiquitin signaling and membrane trafficking, thereby inhibiting early endosomal fusion and impairing autophagic recognition. These activities enable the bacterium to survive and replicate within host cells.

Together, the environmental persistence and host immune evasion strategies of L. pneumophila have important implications for food storage environments. Water-based systems, such as misting devices used to maintain freshness, can generate aerosols and may increase the risk of human exposure if contaminated. Although direct foodborne transmission of L. pneumophila has not been clearly established, its ability to persist in water systems and evade host defenses suggests a potential risk associated with water-based systems in food storage settings. These considerations highlight the need to evaluate potential risks beyond conventional foodborne contamination.

YSL2

Bacteriophage-based precision microbial control and mechanism studies

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Bacteriophages (phages), the natural predators of bacteria, offer high specificity and efficiency in microbial management. Phages and their encoded proteins are increasingly recognized as programmable functional biomaterials. This study explored the dual potential of phages in achieving targeted microbial control and serving as a source of novel bio-derived materials. First, we focused on the precision control of Shiga toxin-producing Escherichia coli (STEC). Unlike toxin-inducing conventional treatments, the lytic phages effectively controlled this pathogen without inducing Shiga toxin expression. This highlighted the role of phages as safe, high-precision biocontrol agents that mitigated both bacterial growth and virulence. We also developed a phage cocktail to resolve the common issue of multi-drug-resistant (MDR) E. coli interference during the Campylobacter isolation process. By selectively reshaping the microbial composition using a phage cocktail during the enrichment process, this phage-based approach significantly enhanced the isolation efficiency of Campylobacter spp., identifying phage as a functional biomaterial for the selective isolation of bacteria. Finally, we investigated the functional identification of the early proteins derived from T4 phage. Our findings revealed that these proteins acted as molecular bio-modulators that hijacked the host's transcriptional machinery and heat-shock response. By investigating these host-takeover mechanisms, we identified these phage-derived proteins as potential biomaterials capable of reprogramming microbial metabolism for specific industrial or food-grade applications. Taken together, these findings confirm the potential of phages in both precision microbial modulation and the discovery of functional bio-substances for advancing food safety and microbial biotechnology.

YSL3

Dysregulation of mitochondrial signaling patterns and dietary approaches to ameliorate inflammation and metabolic disease

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Suncheon National University

Mitochondria are dynamic organelles that function not only as bioenergetic and biosynthetic centers but also as critical regulators of intracellular signaling pathways that govern inflammation and metabolic homeostasis. In addition to ATP production, mitochondria integrate nutrient availability, redox balance, and stress responses to coordinate cellular adaptation under physiological and pathological conditions. Disruption of mitochondrial signaling patterns—through altered oxidative phosphorylation, impaired fatty acid oxidation, excessive reactive oxygen species generation, and defective mitochondrial quality control—has emerged as a key driver of chronic inflammation and metabolic disease. In obesity, insulin resistance, nonalcoholic fatty liver disease, and related cardiometabolic disorders, persistent exposure to nutrient excess, hypoxia, and oxidative stress compromises mitochondrial integrity and promotes maladaptive inflammatory responses. Growing evidence suggests that dietary interventions and naturally occurring bioactive food compounds can mitigate these pathological processes by preserving mitochondrial function and remodeling mitochondrial signaling networks. Specific dietary approaches, including calorie restriction, intermittent fasting, and diets enriched with mitochondria-supportive nutrients and phytochemicals, have been shown to improve mitochondrial respiration, enhance fatty acid utilization, reduce oxidative stress, and suppress pro-inflammatory signaling. Our recent findings further highlight the anti-inflammatory potential of selected dietary components through their regulation of key mitochondrial pathways linked to energy metabolism, redox control, and cell survival. Collectively, these observations support the concept that restoration of mitochondrial signaling represents a promising strategy for ameliorating inflammation and metabolic dysfunction. Targeting mitochondrial health through dietary modulation may therefore offer an effective and translational approach for the prevention and management of chronic metabolic disease.

YSL4

From sequence to function: an AI-driven pipeline for discovering positional-specific lipases

Chi Rac Hong
Kunsan National University

Lipases are versatile biocatalysts widely used in the synthesis of structured lipids, lipid processing, and the production of functional lipid materials. In particular, position-specific lipases that selectively act on defined positions of the triacylglycerol backbone are important for the tailored production of structured lipids, such as cocoa butter equivalents, human milk fat substitutes, and other functional lipids. However, industrially useful position-specific enzymes are still limited, and conventional discovery approaches remain time-consuming and costly. This study established an AI-driven discovery pipeline integrating large-scale sequence information, machine-learning-based prediction, and AlphaFold3-mediated structural analysis. Lipase-related datasets were compiled from UniProt, PDB, NCBI, and the Lipase Engineering Database (LED), and sequence-derived features, including amino acid composition, physicochemical properties, stability factors, and charge-related characteristics, were extracted to develop multi-stage machine-learning classification models. AlphaFold3 was then used to predict enzyme–ligand complex structures, and functional candidates were further prioritized through evaluation of catalytic triad geometry, distances between catalytic serine and substrate, substrate accessibility, and lid-domain characteristics. The machine-learning-based classification showed promising performance in predicting lipase positional specificity, while the structure-based analysis effectively narrowed the candidate pool. Selected candidates were further evaluated through recombinant expression, purification, activity analysis, characterization of reaction properties, and positional specificity assessment. Experimental results showed that the validated candidate exhibited non-specific lipolytic activity. Overall, this study suggests that AI-assisted discovery strategies may provide a valuable foundation for ingredient discovery in the development of lipid-based food products.

Graduate Student Presentation

SPOC1-1

Rheological, structural, and aroma characteristics of low-and high-moisture extruded meat analogs incorporated with shiitake mushroom

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This study evaluated the potential of shiitake mushroom as a functional ingredient for extruded meat analogs by investigating rheological, structural, and aroma characteristics. The base formulation consisted of isolated soy protein, wheat gluten, and corn starch at 6:3:1, and shiitake mushroom was added at 0, 5, 10, 15, and 20%. Low- and high-moisture extruded meat analogs (LMMA and HMMA) were prepared under different moisture conditions. Pre-extrusion blends were analyzed by temperature sweep, and extrudates were analyzed using FTIR spectroscopy and an electronic nose. During heating and cooling, storage modulus (G′) and loss modulus (G″) increased, with G′ higher than G″, indicating elastic behavior and heat-induced network formation. However, final modulus values did not increase proportionally with shiitake mushroom level. FTIR spectra showed similar patterns between LMMA and HMMA, with slight differences in the C–O/C–O–C stretching region. Electronic nose PCA separated samples by shiitake mushroom level and extrusion type, and HMMA showed increased sulfur- or ester-related volatile peaks at higher levels. These results suggest that shiitake mushroom modified rheological behavior and aroma profiles and may be used as a functional ingredient for meat analog development.

SPOC1-2

Improvement HACCP plan for rice cake products manufacturing process

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In this study, microbiologically unsuitable cases among rice cake products were investigated and an improved HACCP plan was proposed. Analysis of non-compliant cases showed that rice cakes with toppings had the highest rate of microbiological failure, and currently no CCP is applied to topping processing. Escherichia coli and Staphylococcus aureus (approximately 6 log CFU/g) were inoculated into soybean, castella, and black sesame flours, and dry heat sterilization was carried out at 120℃ and 125℃ for 5–40 min. In soybean flour, E. coli was reduced by more than 6 log CFU/g after at least 20 min at both temperatures, while S. aureus was reduced by more than 4 log CFU/g after 10 min or longer. In castella flour, E. coli and S. aureus were reduced by at least 6 and 4 log CFU/g at 120℃ for 30 min and at 125℃ for 20 min or longer, respectively. In black sesame flour, E. coli and S. aureus were reduced by more than 6 and 4 log CFU/g after dry heat at 120℃ for 40 min and at 125℃ for 30 min, respectively. These findings indicate that dry heat sterilization of rice cake toppings enhances the microbiological safety of rice cake products and could serve as a new CCP in rice cake manufacturing.

This work was supported by the Ministry of Food and Drug Safety (MFDS) in 2026 (Grant No. 25192MFDS009).

SPOC1-3

Anti-cancer and anti-allergic effects of *Morinda citrifolia* L. fruit juice powder

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Cancer is a leading cause of mortality, and cytotoxic agents (5-FU, DOX, VCR) are essential but also affect normal cells, causing adverse effects that lead to treatment discontinuation. Accordingly, research on natural products that enhance anti-cancer activity while suppressing such effects is active. This study assessed whether Morinda citrifolia L. fruit juice powder (MFJP) and its aged form (A-MFJP) potentiate standard drugs and attenuate drug-induced allergy. A549, MCF-7, and SH-SY5Y cells and RBL-2H3 mast cells were used, with combination index, migration, apoptotic markers (BAX/BCL-2, caspase-9/3), and an A23187/VCR-induced allergy model assessing β-hexosaminidase, histamine, and MAPK. Both showed concentration-dependent activity; A-MFJP gave lower combination index values, indicating stronger synergy. A-MFJP suppressed migration, raised BAX/BCL-2, and promoted caspase cleavage via intrinsic apoptosis. In the allergy model, A-MFJP more potently inhibited degranulation; MFJP suppressed only JNK, whereas A-MFJP inhibited JNK, p38, and ERK1/2. A-MFJP enhances chemotherapy efficacy through intrinsic apoptosis and attenuates drug-induced allergy via MAPK-mediated mast cell suppression, suggesting promise as an ingredient for foods for special medical purposes for cancer patients.

SPOC1-4

Structural and functional insights into a modular endolysin for the targeted control of *Bacillus licheniformis*

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Bacillus licheniformis is a spore-forming food spoilage bacterium that poses challenges to the dairy industry due to its environmental persistence and resistance to harsh processing conditions. This study characterized LysPS1, an endolysin from lytic phage PS1, as a potential biocontrol agent. Bioinformatic and structural analyses revealed that LysPS1 consists of an N-terminal glycoside hydrolase family 25 enzymatically active domain and two C-terminal LysM-containing cell wall-binding domains. Recombinant full-length LysPS1 showed potent bactericidal and lytic activities against B. licheniformis. Notably, the isolated EAD also retained strong lytic activity, indicating that the catalytic domain can function independently. Both constructs remained active across a broad pH range and under dairy-related processing conditions. Comparative analyses showed that the EAD retained relatively higher activity at elevated temperatures, whereas the presence of CBDs may contribute to enhanced salt tolerance and a broader lytic spectrum. Furthermore, both constructs effectively reduced B. licheniformis populations in milk. These findings demonstrate the antimicrobial potential of LysPS1 and provide insights into the distinct functional roles of its catalytic and cell wall-binding domains.

SPOC1-5

Antifungal activity and mechanisms of *Lactiplantibacillus plantarum* KM2 cell-free supernatant as a biopreservative against *Cladosporium* spp. in yogurt

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Cladosporium species are common fungal contaminants associated with yogurt spoilage due to their ability to grow under acidic and refrigerated conditions. This study evaluated the antifungal activity and mechanism of Lactiplantibacillus plantarum KM2 and its cell-free supernatant (CFS) against Cladosporium colombiae YP2, C. oxysporum FT7, and C. pini-ponderosae SRF2 isolated from a yogurt facility. Antifungal activity was assessed by an overlay assay, while the minimum inhibitory concentration (MIC) and minimum fungicidal concentration (MFC) were determined by an MTT assay. Antifungal mechanisms were investigated by heat, enzyme, and pH treatments, AKP activity, intracellular leakage, membrane integrity, and spore morphology. L. plantarum KM2 inhibited all tested isolates, and its CFS exhibited fungicidal activity with MIC and MFC values of 50 mg/mL. Antifungal activity remained stable after heat and enzyme treatments but decreased at higher pH values, suggesting that organic acids were primarily responsible for antifungal activity. CFS treatment increased AKP activity and induced membrane disruption and morphological deformation. These results suggest that L. plantarum KM2 CFS has potential as a biopreservative for controlling Cladosporium contamination in yogurt.

SPOC1-6

Comparison of a QuEChERS method and a saponification-based extraction method for the determination of PAHs in HMRs

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Polycyclic aromatic hydrocarbons (PAHs) are hazardous contaminants generated during food processing and cooking. Due to their carcinogenic and genotoxic properties, reliable analytical methods are required for the determination of PAHs in food products. Therefore, a simple and efficient analytical method is required for accurate determination of PAHs in home meal replacements (HMRs).

Saponification-based extraction methods for PAH analysis require complex sample preparation and substantial solvent consumption. In this study, a QuEChERS-based method was compared with a saponification-based extraction method for the determination of PAHs in representative HMR matrices, including doenjang stew, ttukbaegi bulgogi, pasta, and gambas. The analytical performance of both methods was evaluated through method validation, including matrix effect (ME), specificity, linearity, limit of detection (LOD), limit of quantification (LOQ), precision, and accuracy, using GC-MS. The QuEChERS method demonstrated analytical performance comparable to that of the saponification-based extraction method and was successfully applied to various HMR matrices. These findings support the applicability of the QuEChERS method for the determination of PAHs in HMRs.

This research was supported by a grant(25192MFDS004) from the Ministry of Food and Drug Safety in 2026.

SPOC1-7

Corchorus olitorius L. extract attenuates dexamethasone-induced muscle atrophy in C2C12 myotubes by regulating protein homeostasis and mitochondrial quality control

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Climate change has facilitated the cultivation of subtropical crops such as Corchorus olitorius L. in South Korea, increasing the need to investigate their potential as functional materials. This study evaluated the effects of C. olitorius L. extract (COE) on dexamethasone (Dex)-induced muscle atrophy in C2C12 myotubes and compared the levels of a bioactive compound in Korean and Egyptian COE. COE treatment preserved myotube morphology, as evidenced by increased myotube diameter and MyHC levels. Mechanistically, COE suppressed myostatin expression and downregulated muscle-specific ubiquitin ligases, while promoting markers of protein synthesis, indicating restoration of protein synthesis signaling. Additionally, COE improved mitochondrial function by restoring mitochondrial membrane potential and upregulating regulators of mitochondrial biogenesis. COE also restored mitochondrial dynamics and alleviated impaired autophagic flux. HPLC analysis revealed that Korean-grown COE contained higher chlorogenic acid levels than Egyptian COE. These findings suggest that COE attenuates muscle atrophy by regulating protein homeostasis and mitochondrial quality control, highlighting its potential as a functional food for skeletal muscle health.

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SPOC2-1

Starvation-induced extracellular polymeric substances secretion protects *Staphylococcus aureus* against cold plasma stress by quenching reactive species

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Cold plasma (CP) is an efficient disinfection technology. However, Staphylococcus aureus (S. aureus) commonly secretes extracellular polymeric substances (EPS) and forms biofilm under starvation, which acts as a shield to protect bacteria against bactericidal substances. This research evaluates the interaction between EPS and CP tolerance. After 48-hour starvation, S. aureus showed a significant increase in CP tolerance, accompanied by enhanced EPS secretion. The protective role of EPS was confirmed by removing and adding EPS, which eliminated and enhanced the tolerance, respectively. Chemical analyses revealed that EPS solutions exhibited slower ORP increases and pH decreases compared to saline controls during CP treatment. Specifically, EPS consumed dissolved O3 and inhibited the generation of NO3−. Transcriptomic analysis revealed that the small regulatory RNA, RNAIII, was significantly downregulated after starvation. RNAIII deletion mutant exhibited higher EPS production and higher CP survival rates compared to the wild-type, while the overexpression mutant showed decreased survival, confirming that RNAIII regulates EPS secretion and CP tolerance. These findings emphasize the critical role of EPS in CP tolerance and help optimize practical applications of CP.

SPOC2-2

Monitoring and dietary risk assessment of trichloroethylene and perchloroethylene in Korean foods using headspace GC-MS

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Trichloroethylene and perchloroethylene are chlorinated volatile contaminants that may enter foods through environmental pathways. Because these compounds can be lost during sample handling, a reliable analytical procedure is required for accurate food monitoring. This study established a headspace GC–MS method for determining trace levels of these compounds in various food matrices and applied it to a nationwide food survey. Sample preparation and headspace conditions were optimized using representative matrices, and the method was validated for selectivity, linearity, sensitivity, recovery, and precision. The validated method was then used to analyze 1,800 food samples, including agricultural, livestock, and fishery products distributed in Korea. Both compounds were detected in a small proportion of samples, and quantified levels were generally below 10 ng/g. Fishery products showed relatively higher detection frequencies, whereas agricultural products contributed more to dietary intake because of their higher consumption amounts. Dietary exposure was estimated using national food consumption data, and health concern was characterized by a margin-of-exposure approach. The calculated margins were above the corresponding uncertainty factors, indicating that current dietary exposure is unlikely to pose an appreciable health risk. These results provide baseline occurrence data and support continued surveillance of volatile chlorinated contaminants in foods.

This work was supported by the Ministry of Food and Drug Safety, Republic of Korea.

SPOC2-3

Deep learning-guided discovery of neuroprotective flavonoids from Korean citrus peels for Alzheimer's disease

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Citrus peel flavonoids are promising neuroprotective agents against Alzheimer's disease (AD), which involves cholinergic dysfunction, amyloid-beta (Aβ) accumulation, oxidative stress, and tau hyperphosphorylation. This study aimed to screen anti-AD flavonoids from citrus peel using deep learning, compare cultivar-dependent flavonoid profiles among different Korean citrus cultivars, evaluate their neuroprotective activities, and investigate the bioactivities of selected flavonoids identified in the extracts. Deep neural network models for AChE, BACE1, caspase-3, and GSK3β were developed using ChEMBL data, RDKit descriptors, Bayesian optimization, and ensemble learning. Citrus peel extracts and selected flavonoids were evaluated for AChE activity, Aβ aggregation, cell viability and ROS levels in PC12 cells, and tau phosphorylation in a P301L tau-expressing cell model. Milgam showed the highest flavonoid content (>94 mg/g DW) and the strongest bioactivities, reducing oxidative stress, Aβ aggregation, AChE activity, and tau phosphorylation. Subsequent evaluation identified didymin, naringin, naringenin, and hesperidin as active candidate compounds. These results highlight Korean citrus peel flavonoids as potential bioactive materials for mitigating AD-related pathological changes.

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SPOC2-4

Genomic and functional evaluation of *Bacillus velezensis* NY12-2 (KACC 92193P) as a safe starter culture for *doenjang* fermentation and development of a strain-specific marker

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This study evaluated Bacillus velezensis NY12-2, isolated from traditional Korean doenjang and reclassified by WGS-based ANI/dDDH (accession no. CP033576.1), as a safe starter for soybean fermentation and developed a strain-specific marker for monitoring. KEGG annotation suggested fermentation-related metabolic potential, and antiSMASH identified gene clusters for antimicrobial metabolites. B. velezensis NY12-2 showed high protease and α-amylase activities, indicating roles in protein and carbohydrate degradation, and inhibited B. cereus, a pathogen of concern in fermented soybean products. Safety assessment showed no detectable antibiotic resistance, hemolysis, or biogenic amine production. In a soybean-based doenjang fermentation system, B. velezensis NY12-2 increased amino nitrogen, reduced tyramine, and B. cereus was not detected in the treated group. WGS/BLAST-based comparative analysis identified B. velezensis NY12-2-specific genomic regions, and the BV2 primer set specifically detected B. velezensis NY12-2 without cross-reactivity against closely related Bacillus strains. Overall, this study presents a full-cycle starter development framework by linking functional validation, safety assessment, fermentation application, and strain-specific monitoring.

SPOC2-5

Study on the effect of dense phase carbon dioxide treatment on the allergenicity of parvalbumin from *Trachinotus ovatus*

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The effects of dense-phase carbon dioxide (DPCD) treatment on the sensitization and spatial structure of PV in Trachinotus ovatus were evaluated in this study. WB and indirect ELISA were used to determine the allergenicity changes and spatial conformations of PV treated by DPCD. Tris-tricine-SDS-PAGE, circular dichroism, surface hydrophobicity, endogenous fluorescence, UV spectrophotometry, free amino group, total sulfhydryl group and SEM analyses were applied to characterize PV structure. The results showed that DPCD treatment could reduce PV-induced allergic reactions by 39 – 41 %, which destroyed the normal conformational epitopes and reduced the risk of PV-induced allergy. The secondary structure changed from ordered to disordered with a decreased content of α-helical groups, while the internal hydrophobic groups were exposed. The total sulfhydryl group content decreased significantly. The surface hydrophobicity and ultraviolet absorption spectrum were enhanced, and the endogenous fluorescence peak shifted to a long wavelength. Meanwhile, the content of free amino groups increased significantly. This study could provide a theoretical basis and a promising technical approach for reduction of PV allergenicities.

Capstone Design Competition

CDC-1

Reducing phytate-derived phosphorus discharge from monogastric livestock feed using yeast surface display of phytase

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Phytate is the predominant phosphorus storage form in plant-based feed, but monogastric animals lack endogenous phytase to digest it, excreting over 80% of dietary phosphorus undigested. This phosphorus enters aquatic systems through manure runoff, driving eutrophication and toxic cyanobacterial blooms that threaten aquatic ecosystems. To address this, Saccharomyces cerevisiae was used as host, and CRISPR/Cas9 was employed to build an expression cassette with overexpression promoter (CCW12p) and secretion signal peptide (MFα1), developing a surface display system to immobilize phytase (AppA). Among four anchor proteins — AGA1, DAN4, SED1, and TIP1 — the AGA1-based strain showed the highest activity, releasing 0.52–0.62 μmol inorganic phosphate and retaining 84.3% activity after three cycles. This system cuts purification costs over commercial phytases and allows direct yeast addition to feed. The AGA1-based phytase display system demonstrates promise as a cost-effective, eco-friendly biocatalyst for phytate degradation and phosphorus reduction in livestock production, offering a practical alternative to conventional enzyme supplementation.

This research was supported by the Korea Synthetic Biology Association.

CDC-2

SalSeroDB: An AI-based software for rapid *Salmonella* serotype classification

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Salmonella is a major foodborne pathogen, and serotype-level identification is essential for outbreak investigation and contamination tracing. However, conventional serotyping is labor-intensive and requires specialized antisera. To address this limitation, we developed SalSeroDB, an artificial intelligence-based matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) model that classifies Salmonella as Enteritidis, Typhimurium, or other serotypes. MALDI-TOF MS spectra were collected from Salmonella strains, with six replicate spectra obtained for each strain. An XGBoost model was developed using preprocessed and aligned spectra. Feature-importance analysis identified discriminatory m/z peaks, and the top-ranked feature subset provided stable and interpretable results. The final classifier was compiled as a standalone Windows executable for no-code, sub-second identification. In blind validation, SalSeroDB showed 100% concordance with WGS- and PCR-based confirmation methods. In contrast, commercial database-based identification was limited to genus-level assignment and could not reliably distinguish serotypes. These results indicate that SalSeroDB is a rapid and practical tool for serotype classification in food safety monitoring.

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CDC-3

안동 생강 유래 나노소포체를 첨가한 콜드브루 커피의 품질 특성 및 관능평가

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식물 유래 나노소포체(plant-derived nanovesicles, PDNVs)는 기능성 식품 소재로 주목받고 있으나 식품 적용 연구는 제한적이다. 본 연구에서는 안동 생강 유래 나노소포체(ginger-derived nanovesicles, GDNVs)를 첨가한 콜드브루 커피를 제조하고 소비자 관능 특성을 평가하였다. GDNVs를 안동산 생강에서 분리하여 콜드브루 커피에 1, 5, 10 mg 농도로 첨가하였다. 소비자 관능평가는 20-25세 성인 패널을 대상으로 실시하였으며, 색, 향, 맛 등, 전체 기호도 9가지의 항목을 5점 척도로 평가하였다. 생강 유래 나노소포체 첨가에 따라 생강 향과 맛의 강도는 증가하였으며, 색과 커피 향 기호도는 대조군과 유사하게 유지되었다. 전체 기호도는 GDNVs 1 mg 및 GDNVs 5 mg 처리군에서 비교적 높게 나타났고, 특히 GDNVs 1 mg 처리군의 선호도가 높게 관찰되었다. 따라서 GDNVs는 콜드브루 커피의 품질을 유지하면서 기능성 소재로 활용 가능성이 있는 것으로 판단된다. GDNVs는 커피의 기본적인 관능 특성을 크게 변화시키지 않으면서 생강 특유의 향미를 부여하였다. 특히 GDNVs 1, 5 mg 첨가군은 높은 소비자 수용성을 보여 기능성 음료 소재로서의 활용 가능성을 확인하였다.

본 과제(결과물)는 교육부와 경상북도의 지원을 받아 수행된 글로컬대학30 사업의 연구결과이며, 한국 정부(과학기술정보통신부)의 지원을 받아 한국연구재단(NRF)에서 제공한 연구비(RS-2024-00340542)로 수행되었습니다.

CDC-4

Construction of a food engineering and heritage-based ontology and development of a hallucination-controlled RAG chatbot system for K-food reinterpretation

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Recent advances in K-food globalization have accelerated the application of generative AI in the food-tech industry. However, conventional large language models (LLMs) rely on statistical associations among ingredients and often generate unrealistic recipes because they fail to reflect the scientific causality of cooking processes. To address this limitation, this study proposes an AI knowledge graph-based food engineering ontology. Using the traditional food heritage of Andong, Gyeongbu, as a case study, a knowledge graph database was constructed by linking ingredients, cooking techniques, food engineering principles, and local storytelling resources. A hybrid Retrieval-Augmented Generation (RAG) architecture integrating the knowledge graph with an LLM was developed.The proposed AI chef chatbot generates responses based on scientifically validated knowledge and provides explainable ingredient substitution recommendations by considering physicochemical properties and flavor mechanisms. By integrating scientific cooking knowledge with regional culinary heritage, this study provides a standardized data infrastructure for future K-food research and development and supports innovation in local food and beverage industries.

CDC-5

Stainless steel 표면에서 알코올 처리 시간에 따른 식중독 미생물의 저감화 평가

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본 연구는 집단급식소 조리·배식도구의 에탄올 소독 유효성을 재검증하고자 하였다. 실험에 사용된 스테인리스 스틸은 SUS 304를 사용하였으며, Escherichia coli, Staphylococcus aureus, Bacillus cereus 3종의 식중독 세균을 각각 접종한 뒤 에탄올 처리 시간(1, 2, 3, 4, 5, 8, 10분)에 따른 저감화 균수를 분석하였다. 소독제는 집단급식소에서 많이 사용되는 쎄니콜 70을 사용하였다. 미생물 실험은 식품공전 실험법에 따라 수행하였다. 접종된 시편은 sample bag에 넣고 멸균인산완충용액 30 mL를 가한 후 100회 흔들어 균을 회수하였다. 실험 결과, E. coli와 S. aureus는 5분 처리 시 각각 99.9% 감소하여 높은 소독 효과를 나타냈다. 반면 B. cereus는 8분 처리 시 90% 이상 저감되었고, 에탄올에 대한 소독 효과가 낮게 나타났다. 따라서 에탄올을 분무한 후 바로 닦기 보다는 최소 8분 이상 충분히 방치하는 것이 기구·용기류의 에탄올 살균 효과를 높이는 데 효과적인 것으로 판단된다. 또한 B. cereus는 에탄올 소독 전 충분한 세척을 통해 먼저 제거하는 것이 저감화 효과를 높이는 데 효과적일 것으로 판단된다.

CDC-6

Preparation and quality evaluation of upcycled bakery products supplemented with wheat bran

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This study evaluated the quality characteristics and sensory acceptability of bakery products (baguette and scone) prepared by substituting wheat flour with 10% and 20% wheat bran, comparing them to a control group. For baguettes, increasing wheat bran content significantly decreased lightness but increased redness and yellowness ($p<0.05$). The hardness, resilience, and chewiness significantly increased with higher substitution levels (20% 〉 10% 〉 control, $p<0.05$), while the baking loss rate significantly decreased ($p<0.05$). For scones, both the spread ratio and leavening rate significantly decreased as wheat bran content increased ($p<0.05$). Sensory evaluation indicated that although score followed the order of control 〉 10% 〉 20% group, no significant differences of aroma, taste, texture, and overall acceptability were observed between the control and 10% substitution groups ($p>0.05$). In conclusion, a 10% wheat bran substitution is optimal for maintaining the typical quality and sensory properties of bakery products. These findings demonstrate the potential of wheat bran as a sustainable ingredient for upcycled food development.

CDC-7

Comparison of phenolic compound profiles and antioxidant activities of different parts of *Dendropanax morbifera* Léveille

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Dendropanax morbifera Léveille (Araliaceae), commonly known as Hwangchil, has been conditionally authorized as a limited use food material under the Korea Food Code, and has attracted attention as a source of bioactive compounds. In this study, the phenolic acid profiles and antioxidant activities of leaf, fruit, and stem of D. morbifera were compared. Phenolic acids were quantified using HPLC-PDA, and antioxidant activities of the 70% and 100% ethanol extracts were evaluated. The results showed that total phenolic acid content was highest in leaf (97.67 ±7.69 mg/g), followed by fruit (21.47±1.80 mg/g) and stem (7.90±0.43 mg/g), with chlorogenic acid being the predominant phenolic acid in all parts. Stem extracts of D. morbifera exhibited the strongest antioxidant activity, including ABTS and DPPH radical scavenging activity and reducing power, followed by leaf and fruit extracts, while 70% ethanol extraction resulted in higher activity than 100% ethanol extraction, except for fruit extracts. Overall, this study provides baseline information on the part- and solvent-dependent antioxidant properties and phenolic acid profiles of D. morbifera, supporting its potential use as a natural source of bioactive compounds for functional food applications.

CDC-8

Fermentation-assisted improvement of antioxidant activity and amino acid quality in triple-brew *makgeolli* supplemented with upcycled krill-derived peptides

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Krill meal, a by-product of krill oil production, is a protein-rich marine resource with limited utilization. This study investigated the effects of krill-derived peptides on the functional and nutritional properties of Triple-Brew makgeolli, focusing on peptide bioconversion during fermentation. Five groups were prepared: control (TBM), krill meal groups (TBM+K1 and TBM+K2), and krill peptide groups (TBM+P1 and TBM+P2). Peptide-added groups showed higher antioxidant activities than the control and krill meal groups. TBM+P2 had the highest total polyphenol content (453.14 μg GAE/g) and DPPH radical scavenging activity (19.66%), while TBM+P1 showed the highest ABTS radical scavenging activity. Free amino acid analysis indicated increased total amino acid content, especially sweetness- and umami-related amino acids and lysine. These results suggest that Triple-Brew fermentation promotes the bioconversion of krill-derived peptides into low-molecular-weight peptides and free amino acids, improving the antioxidant, nutritional, and flavor-related properties of makgeolli. Krill-derived peptides may serve as upcycled functional ingredients for premium Korean rice wine.

CDC-9

Prediction of freshness changes in roasted coffee beans exposed to oxygen using MOS sensor array

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Gas chromatography–mass spectrometry (GC–MS) is a reliable method for analyzing volatile organic compounds (VOCs) associated with coffee freshness deterioration, but its routine use is limited by cost and operational complexity. As an alternative, electronic nose (E–nose) systems enable rapid aroma analysis; however, commercial instruments remain expensive and largely confined to laboratory settings. In this study, MOS sensor array was developed to evaluate freshness changes in roasted coffee beans exposed to oxygen. Beans were stored under different oxygen exposure conditions to simulate freshness loss during storage and distribution. Headspace VOCs patterns were measured as changes in sensor resistance and categorized into freshness stages according to oxygen exposure levels. Machine learning models were applied to classify freshness levels based on sensor response patterns, achieving high classification accuracy. The proposed MOS sensor array demonstrated its potential as a compact and cost–effective tool for objective freshness evaluation and quality deterioration monitoring of roasted coffee beans during storage and distribution.

CDC-10

Development and quality features of dandy prepared with wild pear syrup and concentrate

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The wild pear refers to a deciduous broad–leaved small tree or its fruit belonging to the genus Pyrus in the Rosaceae family. With a distinctive sour taste, it is a representative, specialized resource of Jeonnam Province and is rich in organic acids, vitamin C, and flavonoids. Since it is primarily distributed only in the form of juice, it is essential to expand its product lines. In our study, we processed wild pears into syrup and highly concentrated forms to use as candy fillers. We also conducted general component analyses of the manufactured candies as well as the antioxidant capacity analysis of the fillers. To manufacture candy in the form of a throat candy, we combined sugar, isomalt, corn syrup, quince extract, artificial flavors, menthol, citric acid, among others. To create a groove for the filling in the center, we placed the manufactured throat candy in a mold. Wild pear syrup and concentrate were processed to approximately 70° Bx and filled in the groove. The moisture content of the manufactured candy was 12.43 ± 1.06% for the highly concentrated candy and 10.55 ± 0.11% for the wild pear syrup candy. Regarding DPPH radical scavenging activity, the concentrate showed 41.12 ± 1.21% [EDA%] and the wild pear syrup showed 23.14 ± 5.77% [EDA%].

CDC-11

Development and quality features of chocolate containing Jindo *Hwanggeumbong* jelly

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Various subtropical fruits, such as Hwanggeumbong, Redhyang, and Yuja, are cultivated in Jindo-gun because of the advantages of a warm climate. However, there is limited farm income growth because most fruits are distributed fresh. Therefore, it is necessary to develop processing strategies for non-marketable, low-grade fruits to enhance their added value. In our study, we developed chocolate products filled with subtropical fruit jellies processed from crops cultivated in Jindo-gun. This was then followed by an evaluation of their proximate composition and manufacturing costs. We separated the fruit pulp and juice of the fruits to prepare the formulation. The extracted juice was blended with sugar, citric acid, vitamin C, konjac powder, and agar powder to prepare a filling jelly, which was subsequently enveloped with chocolate. The moisture content of the manufactured chocolate was 20.55 ± 0.31%. For every 100 g, the nutritional profile consisted of 4.83 ± 0.06% crude protein, 14.15 ± 2.10% crude fat, and 1.19 ± 0.02% crude ash. Economic analysis revealed that, on the basis of retail consumer prices, the raw material cost of 100 g of the final product was 616.81 KRW. This cost is anticipated to decrease substantially when wholesale pricing is used or when local raw material supply chains, such as locally produced fruits, are secured. Through our findings, we demonstrate the commercial viability of using local subtropical fruits to produce high-value-enhanced regional specialties.

CDC-12

Development and quality features of *Nurungji* sandwich wafers containing Jindo *Hwanggeumbong* marmalade

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As one of the major subtropical fruits cultivated in Jindo-gun, Hwanggeumbong is mainly distributed as fresh fruit. There is demand to develop value-added processed food products of Hwanggeumbong. In our study, we developed and evaluated the quality features and economic feasibility of Nurungji sandwich wafers containing Hwanggeumbong marmalade. The filling was prepared based on a nougat cream formulation. The marmalade content and heating conditions were the measures used for sensory evaluation. With the addition of 21% to 22.5% Hwanggeumbong marmalade, the intensities of the flavor and texture of Nurungji sandwich wafers were at their peak. There was high acceptance for the use of black rice nurungji as the sandwich base, with the optimal filling amount determined to be 80% to 100% of the sandwich base weight. The final product showed a caloric value of 370.34 kcal/100 g, with stable microbial counts during 30 days of refrigerated storage. The manufacturing cost was estimated at an approximate value of 1832.83 KRW per 100 g. As a regional specialty processed food and as a tourism product, there is potential in Nurungji sandwich wafers developed using Hwanggeumbong.

CDC-13

유통기한 임박 김치를 활용한 상온유통형 김치 스프레드 개발

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김치는 대표적인 한국 발효식품으로 세계 시장에서의 관심이 증가하고 있으나, 냉장 유통이 필수적이고 발효 및 젓갈 유래 풍미로 인해 해외 소비자의 일상적 소비에 한계가 있다. 이에 본 연구는 유통기한이 임박한 김치를 활용하여 상온 유통형 김치 스프레드를 개발하고 해외 소비자에게 접근성을 높이고자 하였다. 지역 김치 업체로부터 제공받은 김치를 원료로 사용하였으며, 젓산, 크림치즈 파우더, 초산을 첨가하여 발효 풍미는 유지하면서 비린 향미를 완화하였다. 또한 분쇄, 농축 공정을 통해 발림성을 부여하고 멸균 공정을 적용해 저장 안정성을 확보하였다. 감각 및 기호도 평가 결과 초산 처리군이 풍미 균형, 발림성 및 전체 기호도에서 가장 높은 평가를 받아 최종 시료로 선정되었다. 저장시험 수행 결과 품질이 안정적으로 유지되었으며, 유산균 수 변화 관찰을 통해 추가 발효가 효과적으로 억제됨을 확인하였다. 본 연구는 유통기한 임박 김치의 부가가치를 향상시키고, 상온 유통형 스프레드 형태로 재해석함으로써 해외 시장 확대 가능성을 제시하였다.

CDC-14

Development of a functional co-fermentation system for corn cob upcycling and production of an off-flavor reduced fermented beverage material

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Corn (Zea mays L.) is one of the world's major crops, and increasing production has raised concerns regarding corn waste management. Corn cobs account for a significant portion of corn residues but are mostly discarded, causing environmental burdens and requiring sustainable utilization strategies. This study developed a co-fermentation system to convert corn cobs into functional food materials using them as a 100% fermentation substrate. Corn cobs from waxy corn and super sweet corn were sequentially fermented with Bacillus subtilis, Saccharomyces cerevisiae, and Lactobacillus bulgaricus. Compared with single fermentation, co-fermentation enhanced antioxidant activity and increased phytochemical contents, including polyphenols. Moreover, strong off-flavors produced during Bacillus fermentation were reduced through secondary fermentation with yeast, improving sensory acceptability while maintaining functionality. The developed fermented products can be utilized as both liquid beverages and solid functional materials without additional waste generation. This study highlights the potential of corn cobs as high-value agricultural resources and provides a sustainable approach for developing functional fermented beverages through upcycling technology.

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CDC-15

Development of a functional food material from upcycled asparagus (*Asparagus officinalis* L.) extract for anti-sarcopenic obesity

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Asparagus (Asparagus officinalis L.) processing generates abundant by-products, mainly the woody lower stems that are discarded after harvest though still rich in bioactive compounds. Sarcopenic obesity, in which muscle loss and fat accumulation progress together during aging, still lacks effective food-based interventions. Therefore, this study aimed to transform these by-products into a functional food material for anti-sarcopenic obesity. Sixteen extracts were prepared by combining plant part (edible spear [A] vs. by-product [AB]), drying method (freeze [FD] vs. hot air [HD]), solvent (water [WE] vs. ethanol [EE]), and extraction time (1 h vs. 3 h), and evaluated for antioxidant capacity, marker compound content by HPLC-PDA, anti-sarcopenic effects in C2C12 myotubes, and anti-obesity effects in 3T3-L1 adipocytes. All indicators were Z-score normalized and shown as a clustered heatmap, and the 16 conditions were ranked by a weighted integrated Z-score to select the optimal extraction condition. These results suggest that upcycled asparagus by-products can be developed into a value-added functional ingredient, supporting healthy aging and food-waste valorization.

CDC-16

Variety- and germination stage-dependent changes in the antioxidant activity and glycemic index of yellow and black soybeans

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This study evaluated the effects of germination stage on antioxidant activity and glycemic index (GI) in yellow soybean (YS), Seoritae (SB), and Seomoktae (SM). Soybeans were germinated under identical conditions and classified according to sprout length (0 mm, 2–6 mm, 7–10 mm, and 11–17 mm). Antioxidant activity was determined by DPPH and ABTS radical scavenging activities, total polyphenol content (TPC), and total flavonoid content (TFC), while GI was assessed using an in vitro method. Among ungerminated samples, SM exhibited the highest antioxidant activity with DPPH, ABTS, TPC, and TFC values of 879.4 μg GAE/g, 3888.8 μg AAE/g, 4395.7 μg GAE/g, and 4.19 μg QE/g, respectively. During germination, antioxidant activities generally decreased in SB and SM, whereas YS showed increased DPPH activity (205.8 μg GAE/g) and TPC (1665.1 μg GAE/g) at the 7–10 mm stage. The lowest GI values were observed in YS at 2–6 mm (18.9), SB at 7–10 mm (22.2), and SM at 2–6 mm (28.9). Two-way ANOVA revealed significant effects of variety, sprout length, and their interaction on most parameters ($p < 0.05$). Notably, YS did not reach the 11–17 mm stage under identical germination conditions, whereas SB and SM continued sprout elongation, indicating varietal differences in germination vigor. These results demonstrate that changes in antioxidant activity and GI during germination are highly variety-dependent. Specific germination stages, particularly YS (7–10 mm), SB (7–10 mm), and SM (2–6 mm), showed favorable functional properties and may be useful as functional food ingredients.

CDC-17

유당 함량 데이터베이스 기반 개인 맞춤형 유당불내증 관리 앱 개발: ‘락토버디(Lacto Buddy)’

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유당불내증은 국내 성인의 상당수가 겪는 흔한 소화 불내성임에도, 체계적인 관리 도구의 부재로 대부분이 유제품을 단순 회피하는 데 그치고 있다. 본 연구에서는 식품의약품안전처 공공 DB와 USDA 등 해외 DB를 연계하여 1회 섭취량 기준 유당 함량이 수록된 총 7,740개 항목의 자체 유당 데이터베이스를 구축하고, 이를 기반으로 개인 맞춤형 유당 관리 앱 ‘락토버디(Lacto Buddy)’를 개발하였다. 본 앱은 음식 검색 또는 연동된 AI 기반 이미지 분석 기능을 통해 음식의 유당 함량과 위험도를 실시간으로 제공하며, 사용자의 개인 내성 수준에 따라 필요 락타아제 복용량(FCC)을 자동 산출하는 개인화 알고리즘을 탑재하였다. 또한 누적된 섭취 및 증상 기록을 바탕으로 당일 섭취 가능한 메뉴를 추천하고, 캐릭터 육성 기반의 게임화 요소를 적용하여 꾸준한 관리 습관 형성을 유도한다. 아울러 월별 AI 리포트를 통해 전월 대비 무증상 비율, 위험 식품, 증상 변화 추이를 직관적으로 제시하며, 앱 내 캘린더와 히스토리 탭에서 한 달 간의 락타아제 총 복용량과 일별 증상을 통합적으로 관리할 수 있도록 설계되었다. 본 연구는 유당불내증 관리의 디지털 헬스케어 활용 가능성을 제시하고, 사용자의 식생활 만족도 및 삶의 질 향상에 기여할 것으로 기대된다.

CDC-18

냉매의 종류 및 위치가 샐러드 운송 중 온도 증가에 미치는 영향

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본 연구에서는 샐러드 운송 중 온도 변화를 조사하고, 냉매의 종류와 위치에 따른 배송 조건을 제안하고자 하였다. 택배로 운송되는 샐러드의 품온은 11 ˚ C-17 ˚ C로 온도 관리가 미흡한 것으로 조사되었다. 택배용 스티로폼에 샐러드를 넣고 물 아이스 팩을 상(1개)-하(1개)로 배치하여 에어캡 4겹을 감싸 38 ˚ C 배양기에 보관할 경우, 10 ˚ C 초과까지 17시간이 소요되었다. 또한 동일 조건에서 물 아이스 팩을 상(2개)-하(2개) 배치한 뒤, 에어캡 4겹을 감싼 조건에서 10 ˚ C 초과까지 21시간이 소요되었다. 친환경 젤 아이스 팩을 상(2개)-하(2개)로 배치한 뒤, 에어캡 4겹을 감싸 38 ˚ C 배양기에 보관할 경우, 10 ˚ C 초과까지 23시간이 소요되었다. 이러한 결과와 신선식품의 택배 배송 시간이 24시간 이내라는 조건을 고려할 때, 친환경 젤 아이스 팩을 상(2개)-하(2개)로 배치하여 에어캡 4겹을 감싸는 조건으로 배송에 가장 안전할 것으로 판단된다.

CDC-19

주세 및 로스팅 처리된 단삼의 대사체 특성

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본 연구에서는 주세 및 로스팅 처리에 따른 단삼의 성분학적 차이를 규명하기 위해 UPLC-ESI-QTOF-MS 기반 비표적 대사체 분석을 수행하였다. 분석 결과, 주세 및 로스팅 처리군은 대조군에 비해 유의적으로 높은 항산화 활성을 보였으며, TPC와 TFC 역시 이와 유사하게 증가하는 경향을 나타냈다. LC-MS 분석을 통해 salvianolic acid류, tanshinone류, triterpenoid류를 포함한 총 36종의 주요 대사체를 동정하였다. 다변량 통계분석을 통해 처리군 간의 성분학적 차이를 확인하였고, VIP 〉 1.0을 기준으로 이러한 차이를 나타내는 주요 화합물은 salvianolic acid류와 tanshinone류로 동정되었다. 상관관계 분석 결과, salvianic acid A와 salvianolic acid A, E, Y, D 등은 ABTS+ 라디칼 소거능($r \geq 0.92$) 및 철환원력($r \geq 0.82$)과 높은 양의 상관관계를 나타냈다. 결과적으로 주세 및 로스팅 처리는 단삼 내 salvianolic acid류의 상대적 함량을 증가시킴으로써 항산화 활성 증진에 영향을 미친 것으로 확인되었다. 본 연구 결과는 주세 및 로스팅 처리가 단삼의 항산화 활성 및 건강기능성을 증진시키는 효과적인 방법이 될 수 있음을 시사한다.

CDC-20

프리바이오틱 소재 이눌린 생산을 위한 inulosucrase 스크리닝

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프리바이오틱스 시장은 2034년 384억 달러 규모로 성장이 전망되며, 그중 이눌린은 35.7%의 최대 점유율을 차지한다. 이눌린은 장 건강 개선 및 당뇨·비만 예방용 식품에 활용도가 높으나, 기존 식물 추출 방식은 중합도 제어가 어렵고 환경 부담이 크다. 본 연구에서는 이를 극복하고자 균주 유래 inulosucrase를 발굴·재조합 발현하여 균일한 중합도의 이눌린 생산 공정을 개발하고자 했다. 연구는 non-GMO 야생형 발굴과 GMO 기반 재조합 효소 스크리닝을 동시 수행했다. 청국장에서 Bacillus 속 등 총 16종의 야생형 균주를 동정했고, GMO 기반으로는 Halalkalibacter 및 Limosilactobacillus 유래 유전자를 타깃으로 깁슨 어셈블리 기반 벡터를 구축했다. 이를 대장균 시스템에 형질전환하여 스크리닝한 결과, BL21 pLysS에서 자당 분해 및 이눌린 합성 활성을 성공적으로 검증했다. 향후 생산된 이눌린의 안정성 검증과 조건 최적화를 통해 프리바이오틱스 원료 국산화 및 맞춤형 메디푸드 등 고부가가치 식품 소재 산업에 기여할 것으로 기대된다.

CDC-21

Influence of *Glehnia littoralis* addition on quality characteristics, storage stability, and biological activities of high-fat muffins

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The increasing consumption of high-fat bakery products has increased interest in functional ingredients that can improve storage stability and glycemic control. Glehnia littoralis contains dietary fiber and various bioactive compounds with antioxidant potential. This study evaluated the quality characteristics, biological activities, and pore structure of muffins supplemented with 0, 1, 3, 6, and 9% G. littoralis powder. As the supplementation level increased, pH decreased from 7.02 to 6.71, while moisture content increased. Muffin height decreased from 5.77 to 5.37 cm, accompanied by reduced chewiness. DPPH radical scavenging activity increased from 12.85 to 93.09 μg GAE/g, and α-glucosidase inhibitory activity increased from 1.15% to 8.72%. Pore structure analysis revealed that smaller particle sizes produced smaller pores and a denser internal structure, which may limit oxygen diffusion and delay lipid oxidation during storage. These results suggest that G. littoralis powder has potential as a functional ingredient for improving storage stability and biological activity in high-fat muffins.

CDC-22

Preparation of microcrystalline cellulose from apricot pruning waste and its application in carrageenan-based composite films

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Agricultural pruning residues are an abundant lignocellulosic resource with potential applications in biodegradable packaging materials. In this study, microcrystalline cellulose (MCC) was isolated from apricot pruning waste and incorporated into κ-carrageenan-based composite films. Apricot branch powder was subjected to chemical treatments and acid hydrolysis to obtain MCC. The prepared MCC was characterized for its physicochemical properties. The results confirmed the removal of non-cellulosic components and the formation of MCC with a cellulose I crystalline structure. The prepared MCC also exhibited suitable properties for use as a reinforcing filler in biodegradable films. To evaluate its application in food packaging, MCC was incorporated into κ-carrageenan films, and its effects on mechanical, oxygen barrier, UV-blocking, and functional properties were investigated. The incorporation of MCC improved film performance, demonstrating its potential as a functional filler for biodegradable packaging applications. These findings suggest that apricot pruning waste can serve as a sustainable source of MCC for biodegradable composite films and provide an approach for utilizing agricultural residues.

CDC-23

Bacillus velezensis 발효물을 활용한 절임배추 내 병원성 미생물 저감화 연구

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박테리오신은 천연 단백질성 항균 물질로, 유해균 및 경쟁 미생물의 생장을 억제한다. 본 연구에서는 배추 김치에서 분리한 박테리오신 생성 균주 B. velezensis를 이용하여 화학적 살균제를 대체할 수 있는 천연 발효물을 개발하고, 이의 병원성 미생물 저감 효과를 평가하였다. 아울러 식품 원료만으로 구성된 배지를 개발하여 산업적 적용 가능성을 함께 검토하였다. 발효물을 Well diffusion assay로 항균 활성을 평가한 결과, B. cereus (12.0 ± 0.6 mm), L. monocytogenes (15.0 ± 0.6 mm) 및 P. carotovorum (22.5 ± 3.7 mm)에 대한 저해환이 관찰되었다. 12–15% NaCl 조건에서도 L. monocytogenes에 대한 저해 활성이 유지되었으며(12%: 18.1±0.8 mm, 13%: 17.6±0.5 mm, 14%: 18.2±0.4 mm, 15%: 17.2±0.4 mm), 염 농도 증가에 따른 활성 저하는 관찰되지 않았다. 식품 원료로 구성된 배지에서 제조한 발효물을 절임배추에 적용한 결과, 병원성 미생물과 연부병균을 모두 효과적으로 저해함을 확인하였고 이는 향후 식품 산업에서 발효물을 활용한 미생물 제어의 기반 자료로 활용될 수 있을 것으로 판단된다.

CDC-24

이산화염소 가스 처리에 따른 밀가루의 제빵 적성 변화

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밀가루의 글루텐 단백질은 반죽 점탄성, 가스 보유력, 빵 부피 형성에 핵심적인 역할을 하며, 밀가루 개량제로 이산화염소 가스를 처리하면 글루텐 단백질의 SH기가 산화되어 SS 결합 형성에 관여하여 제빵 품질에 영향을 주는 것으로 알려져 있다. 이산화염소 가스를 산업적 밀가루 개량제로 사용하기 위한 처리 조건에 대한 연구는 미비한 상태이다. 본 연구에서는 이산화염소 가스 처리 농도(30, 60, 90 ppm) 및 시간(1, 3, 5, 10 min)에 따른 제빵 품질을 분석하여 밀가루 개량제로 이산화염소 가스의 활용 가능성을 검토하였다. 발효 팽창력을 분석한 결과 무처리군은 38.6±2.15 mL로 나타났으며, 30 ppm에서 3, 5, 10분, 60 ppm에서 1, 3분간 처리한 실험군이 유의적으로 높게 나타났고, 30 ppm에서 3분간 처리한 실험군에서 46.4±3.77 mL로 대조군 대비 약 20% 가장 높은 팽창력을 보여주었다. 가스 처리 농도와 시간이 길수록 부피 팽창력은 감소함을 보여주었다. 굽기 손실을 분석한 결과 무처리군이 11.3%로 나타났으며, 30 ppm에서 3분간 처리한 실험군에서 9.3%의 낮은 손실율을 나타내어 밀가루 개량제로 이산화염소 가스는 30 ppm에서 3분간 처리하는 것이 가장 효율적인 처리 조건으로 판단된다.

CDC-25

Quality characteristics of *dasik* (Korean traditional confection) prepared with soybean curd residue according to drying methods

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Soybean curd residue (SCR), a major by-product of tofu production, contains valuable nutritional components, such as protein and dietary fiber, yet it is often regarded as a low-value resource. This study aimed to evaluate the effects of different drying methods, including freeze-drying, hot-air drying, oven drying, and roasting, on the physicochemical properties of SCR powder and the quality characteristics of dasik prepared with dried SCR powder. Proximate composition, total polyphenol content, DPPH radical scavenging activity, and browning index were analyzed for each treatment group, and the color properties of dasik manufactured using the dried SCR powders were measured. The results showed that freeze-dried SCR exhibited the highest total polyphenol content and antioxidant activity, while roasting treatment induced significant changes in the browning index (44.7) and lightness (L^* value, 73.8) of dasik ($p < 0.05$). These findings suggest that the drying method is a critical factor affecting the functional properties and processing suitability of SCR. Therefore, this study provides fundamental data for the development of antioxidant-functional traditional Korean confectionery products using SCR.

Timetable for Poster Sessions

Poster Presentation and Evaluation Schedule		
7.23(THU) 9:30 ~ 7.24(FRI) 11:20 (Exhibition Hall Ⅰ)		
Poster Category	P1	Food Preservation, Packaging, and Distribution
	P2	Food Processing and Quality
	P3	Food Chemistry and Analysis
	P4	Food Microbiology, Fermentation, and Safety
	P5	Nutritional, Bioactive and Functional Property

Session	Standing Time	Poster No.
Poster Session I	7.23(THU) 10:00 ~ 11:00	Even-Numbered Posters
Poster Session II	7.23(THU) 16:00 ~ 17:00	Odd-Numbered Posters

◆ **Please check your poster number in the conference proceedings**

◆ **Poster Presentation Guidelines**

■ You are required to complete both the posting and removal of your poster personally.

■ Please use **Clear tape and stapler** to attach your poster; double-sided tape is prohibited.

■ The recommended **poster size is 90 cm wide × 120 cm~130 cm high.**

■ Presenters are required to be at their poster during the designated Standing Time to answer questions. Failure to do so will result in exclusion from the poster awards.

■ The announcement of the Outstanding Poster Award winners will take place on **July 24 (Fri) at 11:20 AM in Room 102+103+104.**

Poster Session

PART 1 Food Preservation, Packaging, and Distribution

P1-01

Effects of rice flour-based and nano-foam-structured films on the quality of cut Korean cabbage *kimchi* during storage at ambient temperature

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Shelf-life extension of *kimchi* using a smart reefer container with temperature control and fermentation monitoring

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Effects of duplex wave-assisted washing on the quality characteristics of strawberries during storage

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Jeong-Heon Kim*, Yea-Ji Kim, Dong Hyun Keum, Ji Yoon Cha, Hyuk Cheol Kwon, Tae-Kyung Kim, Yun-Sang Choi
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지역농업네트워크 협동조합

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권혜정*, 김두은, 이효영, 임재길, 이재희, 이기연, 배재혁
강원특별자치도농업기술원 농식품연구소

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Hyeonbin Oh*, Mihee Choi, Chun Wan Park, Young Hun Kim, Min-Jee Kim
National Academy of Agricultural Science, Rural Development Administration

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So-Yoon Park*, Ha-Jun Lee, Seul-Bi Lee, Jae-Young Her
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Ji Seon Park*, Soo Jeong Lim, Youn Gi Moon, Ki Duk Park, Yu Shin Kwak, Heuck Hahn
Gangwon State Agricultural Research and Extension Services

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Hyunjoo Kong[1*], Jieun Kwon[1], Okkyung Cha[1], Minsoo Kim[1], Myeonghyun Jeon[1], Dong-Mok Lee[2], Kyurim Kim[3], ByeongHwan Ahn[3]
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Johnson Olowoniyi[1], Hey Kyung Moon[2], Minh Huy Tieu[1], Soo won Lee[1], Jong kuk Kim[1*]
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PART 2 Food Processing and Quality

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Quality Management and Evaluation Research Division, Department of Food Sciences, National Institute of Crop Science, Rural Development Administration

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Effects of sorbitol treatment on the essential amino acid composition of *Tenebrio molitor* Larvae

Jin-A Ko*, Jihye Kim, Jihyo Kim
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So Yoon Park[1,2*], Ji Eon Jeong[1,2], Ho Hyun Chun[1]
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Do-Gyun Park, Sooyeon Lim, Jin Hee Lee, Nayeong Kwon, Yeon Jin Jang, Yeo-Eon Yun, Jinsu Lee, Jae-Han Cho*
Postharvest Technology Division, National Institute of Horticultural and Herbal Science, Rural Development Administration

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So-Yeon Lee*, Jae-Rim Lee, Jong-Kug Lee, Chong-Tae Chung
Agricultural Environment Research Division, Chungcheongnam-do Agricultural Research and Extension Services

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So-Yeon Lee*, Jae-Rim Lee, Jong-Kug Lee, Chong-Tae Chung
Agricultural Environment Research Division, Chungcheongnam-do Agricultural Research and Extension Services

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Yea-Ji Kim[1*], Jeong-Heon Kim[1], Dong Hyun Keum[1], Ji Yoon Cha[1], Bon-Jae Gu[2], Yun-Sang Choi[1]
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Hye Jin Park*, Jae Eun Park, Nu Ri Gwon, Hyun Ju Cho, Jin Sun Lee, Hyang-Sik Yoon
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Yu-Jeong Yang*, Woo Soo Jeong, Kyung Mi Kim, Yong Sik Cho, HaYun Kim
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Ha Yun Kim[1], Woosoo Jeong[1], Yong Sik Cho[1]
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Min Jung Lee*, Yun-Jeong Choi, Ji Young Choi, Sung Jin Park,
Hyojin Kwon, Mi-Ai Lee, Sung Hee Park
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Dong Hyun Keum*, Seonmin Lee, Yea-Ji Kim, Jeong-Heon Kim, Ji Yoon Cha, Yun-Sang Choi
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Korea Agency of HACCP Accreditation and Services

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Hyun-Jin Park[1*], Hyeona Oh[1], Eun-Young Sim[1], Jae Youn Yi[2], Jiyoung Park[1],
Hyeonmi Ham[1], Yu-Chan Choi[1], Moon Seok Kang[1], Areum Chun[1]
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Jae-Eun Jeon*, Bit-Na Song, Yong-Sik Cho, Ha-Yun Kim, Kyung-Mi Kim
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김표현*, 이선경, 지수현, 정아영, 이상호, 최선미, 고숙주
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Yoonyoung Jang*, Woo-Ju Kim
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Jiin Kim*, Woo-Ju Kim
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Sun-A Park*, So-Jeong Kim, Jin-Ju Park, So-Young Kim
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Deuk Hyeon Lee[1], Baekwang Kang[1], Dahyun Lee[2], Ga-eun Kim[2], Chaehee Kim[2], Kwontack Hwang[2,3*]
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Deuk Hyeon Lee[1], Baekwang Kang[1], Dahyun Lee[2], Ga-eun Kim[2], Chaehee Kim[2], Kwontack Hwang[2,3*]
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김지영*, 김은혜, 안호섭, 박현석, 정수진, 이유석, 김길자
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이선경*, 지수현, 정아영, 김표현, 이세라, 김유진, 고숙주
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Influence of MCT-canola oil ratio on the encapsulation and freeze-thaw stability of *Leuconostoc mesenteroides* in o/w emulsions

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Hee-Gyeong Jeong[1*], Kyung-Je Kim[1], Seong-Woo Jin[1], Young-Woo Koh[1], Seoung-Bin Im[1], Sang-Wook Jeong[1], Neul-I Ha[1], Dong-Uk Kim[1], Jinjoo Kim[1], Sujin Kwon[1], Seung-Ju Kim[2], Jeong-Hee Kim[2], Bok-Seon Kim[2], Kyoung-Sun Seo[1]
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전남광주통합특별시농업기술원

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Quality characteristics and antioxidant effects of *Yanggaeng* (sweet red bean jelly) supplemented with *Pyropia yezoensis*

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지수현*, 이선경, 정아영, 김표현, 김도아, 고숙주
전남광주통합특별시농업기술원 친환경농업연구소

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Inhibition of browning in low-salt sea squirt *(Halocynthia roretzi) Jeotgal* using pH-adjusted washing water

Hyunjung Yun*, Jieon Kim, Yuni Noh, Danhui Kim, Nara Han, Sun-Young Park, Ki-Ho Nam
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국산 장립종 쌀 품종(IPS) 이용 국수의 품질특성

김표현*, 이선경, 지수현, 정아영, 이은실, 고숙주
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Hyperspectral assessment of wheat dough development during mixing

Jeonghan Moon[1,2*], Minchae Song[1,2], Sang Seop Kim[2], Hwabin Jung[2], Jiyoon Kim[2], Jeong-Ho Lim[2], Jeong-Seok Cho[1,2]
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Hyperspectral imaging for monitoring cold-induced sweetening and assessing storage-related quality changes in potatoes

Minchae Song[1,2*], Sang Seop Kim[1], Jeonghan Moon[1,2], Jiyoon Kim[1], Jeong-Seok Cho[1,2]
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Modification of kale pomace fibers via alkaline hydrogen peroxide pretreatments combined with high-speed homogenization: Structural, physicochemical, functional, and emulsifying properties

Suk-Min Yun*, Jae-Hak Moon, Jeong-Yong Cho
Department of Integrative Food, Bioscience and Biotechnology, Chonnam National University

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D-Tagatose enhances Maillard browning and sensory quality of enzyme-mediated sucrose-free white pan bread

Yubin Yang, Siwoo Lee, Minseo Kim, Minji Yu, Sung Ho Lee*
Department of Food Science and Technology, Sangmyung University

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Improving the rheological properties and printability of high-protein starch-protein food inks using iota-carrageenan

Dae-Won Jung*, Se-Young Na, Bum-Soo Shin, Jae-Young Her
Department of Food Engineering, Mokpo National University

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Evaluation of minimal processing characteristics and storage stability of fresh-cut produce

Min-Sun Chang*, Seung-Hun Chae, Ji Weon Choi,
Sun Yi Lee, Jae-Han Cho, Haejo Yang, Do Gyun Park
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Rural Development Administration*

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Quality characteristics and antioxidant activity of soymilk fortified with *Peucedanum japonicum* Thunberg powder

Hee-Jeong Oh*, Yu-Jin Park, Da-Jeong Jeong, Yeon-Joo Kim, Seung-Yong Lim
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Deep learning enables evaluation of persimmon quality with your smartphone

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Quality characteristics and antioxidant activity of pound cakes with *Peucedanum japonicum* Thunberg powder

Da-Jeong Jeong*, Yu-Jin Park, Hee-Jeong Oh, Yeon-Joo Kim, Seung-Yong Lim
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Effects of *Peucedanum japonicum* Thunberg powder addition on the probiotic viability and quality characteristics of pudding

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Yeon-Joo Kim[1], Seunghwa Yoon[1,2], Seung-Yong Lim[1]
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Machine learning-guided screening of bigel formulations as shortening alternatives

Hae Su Hwang*, Min Ji Choi, Mi Jeong Kim
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Physicochemical and sensory properties of kefir supplemented with lactic acid bacteria derived from *makgeolli* and commercial strains

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Comparative study of aquafaba- and egg-based mayonnaise prepared with diverse vegetable oils

Hyerim Jeon[1*], Ayeon Han[1], YoonKi Hong[2], Bon-Jae Gu[1]
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Optimization of ultrasound-assisted extraction of *Zophobas morio* protein using artificial neural network genetic algorithm (ANN-GA) and its effects on structural and functional properties

Ha-Seong Cho[1*], Won-Young Lee[1,2]
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Explainable deep learning for predicting weight loss and interpreting environmental drivers in stored onions

Jaeeun Lee[1,2], Sang-Yeon Kim[2,3], Xianghui Xin[1,2], Uik Lee[1,2], Ghiseok Kim[1,2,3*]
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PART 3 Food Chemistry and Analysis

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Sugar and sweetener analysis of cafe beverages in Daegu

Yeoun-suk Kim*, Hyeon-min Jang, Yeon-soo Kim, Eun-ji Ha, In-suk Kim
Health and Environment Research Institute of Daegu

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Deriva-LM: Scaffold-constrained chemical language modeling for synthetically plausible natural product analogue generation

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Characterization, antibacterial mechanisms, and toxicity assessment of *Fagonia indica*-derived AgNPs and chitosan-functionalized nanocomposites

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Upcycling banana (*Musa* spp.) agro-waste into functional polysaccharides: Influence of extraction pH on structure, antioxidant activity, and functionality

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Isolation and identification of p-hydroxybenzyl methyl ether from *Gastrodia elata*

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경상북도농업기술원 생물자원연구소

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Free amino acid and metabolomic profiles of domestic green tea powder

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감자 polyphenol oxidase의 효소학적 특성

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Comparison and pretreatment optimization of assay methods for sodium selenate and sodium selenite

Young-Jae Heo[1*], Tae-Woong Song[1], Su-Jong Kim[2], Xiaolu Fu[2], Ji-Hyun Im[2], June-Seok Lim[2], Min-Hye Kim[2], Hee-Jae Suh[3], Sun-Il Choi[1,2], Ok-Hwan Lee[1,2]
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Study on the improvement of the arsenic test method in the food utensils, containers and packaging

Dain Bae*, Minyoung Lee, Jonghyun Choi, Siweon Choi, Eunju Lee
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Jeong Hyun Kwon*, Gi Jeong Woo, Jung Eun Lee, Ock Jin Paek
New Hazardous Substances Division, National Institute of Food and Drug Safety Evaluation, Ministry of Food and Drug Safety

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PetTech and pet public health: Convergence of digital health, smart diagnostics, and environmental hygiene technologies

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Dog-associated zoonoses and anthelmintic resistance: Implications for food safety and one health

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Analysis of vitamin K content in soy-based food products commonly consumed in Korea

Hyeongyu Lee*, Youmin Kim, Jeehye Sung
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Comprehensive characterization of vitamin B_6 vitamers, folate, and antioxidant properties in common fruit and vegetable juices for national food composition database development

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Citrus reticulata peel pectin as a bio-stabilizer: Structural insights and functional performance in super-premium ice cream

Juan Pablo Gaona Hernandez[1*], Gbemileke Moses Olapade[1], Ha-Seong Cho[1], Won-young Lee[1,2,3]
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Analysis of veterinary drug residues in livestock and fishery products distributed in Korea

Mi Jin Lee[1], Ji Hye Shin[1], June Song[1], Gi-Ppeum Kim[2], Hye-Rim Ji[2], Eun-mi Lee[2], Jung-Beom Kim[2], Mi Hyun Ka[1*]
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Validation of analysis method for the simultaneous determination of five pyridine alkaloids in food using LC-MS/MS and the risk assessment

Min Woo Choi*, Hae Jin Kim, Taehyun Ahn, Ji Woo Seo, Na Young Park, Jin Sook Kim
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Comparison of LC-MS-based non-volatile metabolites of three *Hydrangea serrata* cultivars

Ye-Seon Won*, Jae-Hak Moon, Jeong-Yong Cho
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Isolation and structural determination of flavonoids from licorice (*Glycyrrhiza uralensis*)

Ji-Woo Hong*, Ye-Seon Won, Jae-Hak Moon, Jeong-Yong Cho
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Chemical constituents and structural determination of bioactive compounds from *Godulbaegi (Crepidiastrum sonchifolium)*

Seon-Jin Lee*, Jae-Hak Moon, Jeong-Yong Cho
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Isolation and structural determination of flavonoids from kale pomace

Ji-Won Shin*, Ji-Woo Hong, Ye-Seon Won, Seon-Jin Lee, Jae-Hak Moon, Jeong-Yong Cho
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Isolation and structural determination of anthocyanins from *Raphanus sativus* L.

Yu-Mi Park*, Si-Hun Song, Hyun-Jin Yun, Ju-Mi Lee, Jae-Hak Moon, Jeong-Yong Cho
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Analytical method development and validation for polycyclic aromatic hydrocarbons (PAH4) in coffee using GC-MS

Hyegyeong Lee*, Jihun Jeong, Taekyun Jeong, Yeji Bang, Ji hye Jeon, Ock Jin Paek
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Improved HPLC-UV quantification and LC/MS-based identification of hesperidin and enzymatically modified hesperidin

Chaebin Park[1*], Sieun Yu[1], Soojeong Choi[1], Sun-Il Choi[2], Ok-Hwan Lee[2], Hee-Jae Suh[1]
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Screening of polyphenol and flavonoid profiles in Imsil peach and plum using UPLC-QTOF-MS-based non-targeted metabolomics

Seo Jun Lee, Ji young Jeong, Ye Rim Jeong, Mi Kyoung Lee, Jong-Hyuk Park*
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AI-assisted prediction of positional-specific lipases for the discovery of novel lipolytic enzymes

Chi Rac Hong[1*], So Young Lee[1], Na-Young Lee[1], Yong-Tae Kim[1], Ju-Hyeong Jung[2], Sung-Chul Hong[1]
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Determination of acrylamide in roasted coffee and coffee extracts by LC-MS/MS

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Effect of pretreatment and extraction methods on the volatile aroma profiles of fig (*Ficus carica* L.) fruit

Ha-Jun Lee[1*], So-Yoon Park[1], Dae-Won Jung[1], Se-Young Na[1], Bum-Soo Shin[1], Seul-Bi Lee[1], Kim Kuk Jong[2], Jae-Young Her[1]
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Optimization of LC-MS/MS and pretreatment conditions for nisin determination in cultured meat-related samples

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Research on contamination of PFASs in food matrices

Peter Jesudara Olaniyi[*], Adebayo J. Akinboye, Joon-Goo Lee
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Bromoform in biological systems: An overview toxicity, analytical methods, occurrence, and risk assessment

Do Yen Nhi[*], Peter Jesudara Olaniyi, Joon-Goo Lee
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Isolation and identification of lignan glucosides from sesame seed cake

Yu-Na Lee[*], Ye-Seon Won, Seon-Jin Lee, Ji-Woo Hong, Jae-Hak Moon, Jeong-Yong Cho
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Metabolomic profiling of ramie leaves across growth stages (May to October) using UPLC-ESI-QTOF-MS

Hyun-Jin Yun*, Ye-Seon Won, Jae-Hak Moon, Jeong-Yong Cho
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Effects of cooking methods on the phospholipid content and composition of agricultural and livestock products

Sang-Gyu Lee*, Hyeon-Jun Chang, Jeung-Hee Lee
Department of Food and Nutrition, Daegu University

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Stability and *in vitro* bioavailability of liposomal fisetin prepared with saturated phosphatidylcholines

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Evaluation of true retention of cobalamins in chicken for the national food composition database

Minyoung Je[1*], Soyeon Joo[1], Ye-Eun Park[1], Jiyeon Chun[1,2,3]
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Development and validation of an LC-MS/MS method for the simultaneous determination of artemisinin and related compounds in soybean oil

Harim Lee*, Junghyun Cho, Joon-Goo Lee
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Compositional analysis of ether phospholipids from aquatic foods and evaluation of cellular uptake

Myeong-Ju Kim*, Jeung-Hee Lee
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Chlorostyrenes as emerging food contaminants: Toxicity, occurrence, and analytical strategies

Jiin Kim*, Joon-Goo Lee
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Integrated sensory, metabolite, and antioxidant profiling of tomato accessions using chemometrics

Hyeongyu Lee*, Jeehye Sung
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Development of a QuEChERS-GC-MS/MS method for chlorostyrenes and application to food monitoring in Korea

Ha-Gyeong Hwang*, Ji-In Kim, Joon-Goo Lee
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Development of an LC-MS/MS method using ultrasound-assisted extraction for the simultaneous quantification of quercetin and related flavonoids in foods

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Industrial optimization of culture and cryoprotectant conditions for *Lactobacillus brevis* IJRG101010 isolated from the Jinan Plateau

Sanghyeob Sim*, Jong-Hee Yoo, Dae Woon Kim, Hyo-bin Oh, Dong yun Hyun
Institute of Jinan Red Ginseng

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Quality characteristics and functionality of wines from Georgian wine grape varieties

Jeongmoon Cha*, Dong Kyu Yun, Eui Kwang Park, Chae-Eun Lee, Jae-Sun Lee
Wine Research Institute, Chungbuk Agricultural Research and Extension Services

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Functional characterization of lactic acid bacteria strains for potential application in functional foods

Kyung Eun Moon[1*], Hyeon Hwa Oh[1], Qianyu Wang[1], Do Youn Jeong[2], Soon-Il Yun[1,3]
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Effects of beneficial bacteria and harmful components on the antioxidant and anti-inflammatory activities of traditional Korean *gochujang*

Kyung Eun Moon[1*], Hyeon Hwa Oh[1], Si yeon Kim[1], Do Youn Jeong[2], Soon-Il Yun[1,3]
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Development of antioxidant and antidiabetic fermented paprika products through fermentation with lactic acid bacteria

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Isolation and characterization of *Pseudomonas silesiensis* ANU-5 with efficient indole degradation

Ju-Ho Yeom*, Ho-Yong Sohn
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Effect of acid pre-exposure history on high-pressure processing efficacy against *Escherichia coli* O157:H7 in juice matrices

Haeun Jeong*, Sang-Hyun Park
Kongju National University

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AI-assisted MALDI-TOF MS for accurate discrimination of *Vibrio harveyi* clade species in seafood safety monitoring

Jiyun Kim*, Baekhyeon Im, Ahyoung Kim, Jaesung Park, Eiseul Kim, Seung-Min Yang
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Monitoring of *Escherichia coli* contamination in retail meat

Sangjun Park[1*], Byunghwan Lee[1], Hyunah Lee[2], Junhyuk Park[2], Nanjoo Park[1]
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Effects of production systems on microbial communities and fatty acid profiles in raw milk

Jaesung Park*, Jiyun Kim, Ahyoung Kim, Baekhyeon Im, Seung-Min Yang, Eiseul Kim
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AI-guided development of a microfluidic chip-based on-site PCR platform for detection of *Salmonella* in eggs

Baekhyeon Im*, Ahyoung Kim, Jiyun Kim, Jaesung Park, Seung-Min Yang, Eiseul Kim
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Quality characteristics and physiological activities of vinegars produced from different fig cultivars using *Acetobacter pasteurianus* SC08

Su-Jin Shin*, Su-Hwan Kim, Donghyeon Kim, Junseock Oh, Yongkeun Park
Fermented Food Industry support Center

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Inhibitory effects of *ou-gon* (*Scutellaria* root) extracts against *kimchi* film-forming yeasts

Hyojin Kwon*, Mi-Ai Lee, Ji Young Choi, Yewon Kim, Yun-Jeong Choi, Min Jung Lee, Sung Jin Park, Sung Hee Park
Sustainable Distribution Research Group, World Institute of Kimchi

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Storage stability of *Eucommia ulmoides*-derived nanovesicles and their osteogenic

Bum-Joon Koo*, Young-Eun Cho
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압타머 및 ConA-자성비드를 이용한 타액 기반 노로바이러스 신속 비색 검출 기술 개발

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Optimization of bioactive material development from the red seaweed *Gloiopeltis tenax* using microbial bioconversion

Jun-Ki Park*, Kyung-Yun Kang, Beom-Gyun Jeong, Jeong-Ho Kim, Seul-Ki Mun, Ho-Yeol Jang, Yun-Seo Oh, Jin-Yeong Choi, Kyung-Wuk Park
Suncheon Research Center for Bio Health Care

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Comparative analysis of physicochemical characteristics of apple vinegars based on raw materials, manufacturing processes, and fermentation environments

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어린이집 급식실 에어컨필터의 미생물 오염도 조사

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국립순천대학교

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난각 번호 및 보관 방법에 따른 미생물 오염도 평가

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Effects of rice type and particle size on brewing characteristics of *Baromi*2 floury rice

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Antioxidant activity and phenolic profiles of low-iodine fermented *doenjang*

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Evaluation of fermented fruit extract B as an eco-friendly antibacterial material against *Xanthomonas campestris* pv. *campestris*

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Antibacterial activity of fermented fruit extract B against *Acidovorax citrulli*

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Phyllodulcin 생산을 위한 Pentopan 500BG 유래 β-glucosidase의 정제 및 생화학적 특성 분석

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Metabolite-spectral associations and machine learning for hyperspectral detection of microbial contamination in red pepper powder

Ju Young Lim[1], Sung Hee Park[2] , Mi-Ai Lee[2], Yun-Jeong Choi[2], Minjung Lee[2], Hyojin Kwon[2], Sung Jin Park[2], Jiwoon Kim[2], Ji-Young Choi[2*]
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내열성 당전이 효소를 활용한 신규 파노스 타입 올리고당 제조 및 소화특성 평가

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Caffeoyl-CoA *O*-methyltransferase를 활용한 *O*-methyl EGCGs의 생산

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용해도 및 안정성이 향상된 신규 레바우디오사이드 M 유도체의 합성 및 특성 분석

김옥철[1*], 이진화[1], 정보민[1], 홍성진[2], 조정용[1], 김영민[1]
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Raw material and quality profiles of award-winning *makgeolli* from the Korea Sool Award

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내열성 당전이 효소를 이용한 수용성 및 안정성이 향상된 신규 저칼로리 감미료 합성

이진화[1*], 정보민[1], 김옥철[1], 홍성진[2], 조정용[1], 김영민[1]
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Effects of acid treatment on bacterial control and quality characteristics of commercial *nuruk*

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P4-32

Genome-linked phenotypic characterization of vinegar-derived acetic acid bacterium CHR1 reveals acetic acid production, stress adaptation, and biofunctional potential

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Whole-genome and fermentation evidence supporting *Leuconostoc lactis* K2-11 for controlled *kimchi* fermentation

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IoT-based monitoring and indoor temperature control enhance fermentation stability and quality of traditional Korean soy sauce (*ganjang*)

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Screening and enzymatic characterization of *Bacillus* spp. isolated from Korean traditional fermented foods and plant-derived resources

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Agro-food Research Institute, Gangwon State Province Agricultural Research and Extension Services

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Effects of traditional *doenjang* on gut microbiota and short-chain fatty acid production in high-fat diet-induced mice

Myeong Seon, Ryu[1], Hak Yong, Lee[2], Gwangsu, Ha[1], Ran Hee, Lee[1], Jeong Ha, Lee[1], Hee-Jong Yang[1], Do-Youn Jeong[1*]
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Isolation and evaluation of probiotic lactic acid bacteria from Korean traditional fermented foods

Jeong-Ha Lee, Gwangsu Ha, Ranhee Lee, Hee-Jong Yang, Do-Youn Jeong*
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Changes in microbial communities and their physicochemical properties during the fermentation of *doenjang*

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Immunomodulatory effects of traditional Korean *gochujang* in rats immunosuppressed with cyclophosphamide

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Complete genome sequence of *Lacticaseibacillus paracasei* DA-14M-4 isolated from *ganjang* and characterization of its antibacterial activity

Hee Gun Yang, Ji Won Seo, Bo Ram Jung, Myeong Seon Ryu, Hee Jong Yang, Do Youn Jeong*
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Potential probiotic properties of *Bacillus subtilis* CL197 isolated from *cheonggukjang*

Bo Ram Jung, Hee Gun Yang, Ji Won Seo, Myeong Seon Ryu, Hee Jong Yang, Do Youn Jeong*
Microbial Institute for Fermentation Industry

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Valorization of *Sargassum horneri* through biotransformation by mold strains isolated from fermented foods

Ga-Hyeon Kim*, Hee-Yun Choi, Joo-Yeong Jin, Do-Yeong Ji, Hyun-Joong Kim
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P4-43

Effect of initial sugar concentration on the quality characteristics of sugar-fed honey wine

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Effect of initial sugar concentration on acetic acid fermentation and the quality of sugar-fed honey vinegar

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Comparison of quality characteristics of plum wine by fruit maturity

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Comparison of quality characteristics of plum vinegar by fruit maturity

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Evaluation of critical control point monitoring and effectiveness in meat extract product processes

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무증자 생쌀발효 기반 혼합 증류주 제조를 위한 당화제별 담금법의 적용성 평가

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Optimization of carbon sources for submerged cultivation of *Auricularia heimuer* and pilot-scale fermentation

Neul-I Ha, Jeong-Giol Moon, Kyung-Je Kim, Seong-Woo Jin, Sang-Wook Jeong, Hee-Gyeong Jeong, Dong-Uk Kim, Min-Woong Kim, Young-Woo Koh, Seoung-bin Im, Jinjoo Kim, Sujin Kwon, Kyoung-Sun Seo*
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P4-50

Useful components of fermented bamboo leaf extract by mushroom mycelia and lactic acid bacteria

Young-Woo Koh[1*], Jinjoo Kim[1], Seoung-Bin Im[1], Su-Jin Kwon[1], Jeong-Giol Moon[1], Kyung-Je Kim[1], Seong-Woo Jin[1], Sang-Wook Jeong[1], Neul-I Ha[1], Hee-Gyeong Jeong[1], Dae-Jung Park[2], Min-Hee Han[2], Yu-Jin Choi[3], Kyoung-Sun Seo[1]
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Optimization of fermentation conditions for mushroom mycelia cultivated on a sword bean and brown rice medium

Dong-Uk Kim[1*], Kyung-Je Kim[1], Seong-Woo Jin[1], Young-Woo Koh[1], Seoung-Bin Im[1], Neul-I Ha[1], Hee-Gyeong Jeong[1], Sang-Wook Jeong[1], Jin-Joo Kim[1], Seung-Ju Kim[2], Jeong-Hee Kim[2], Bok-Seon Kim[2], Kyoung-Sun Seo[1]
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Development of a competitive lateral flow immunoassay for rapid screening of ochratoxin A in corn-based processed foods

Hye-Jin Kim[1*], Jin-a An[2], Hyun-woo Park[3], Ho-Jin Song[2], In-Gyu Jung[2], Sung-Jin Lee[2], Won-Bo Shim[3,4]
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Development and evaluation of a competitive lateral flow assay based on a monoclonal antibody specific to edible insects from thermal stable-soluble proteins

Jin-a An[1*], Hye-Jin Kim[2], Ho-Jin Song[1], Sung-Jin Lee[1], In-Gyu Jung[1], Won-Bo Shim[3,4]
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Development of an Ara h 3-specific competitive lateral flow immunoassay for the rapid detection of peanut allergen contamination in processed foods

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Effect of combined immersion treatments with ethanol, vitamin C, and organic acid on the reduction of *Listeria monocytogenes* in fresh-cut melon

In-Gyu Jung[1*], Hye-Jin Kim[2], Ho-Jin Song[1], Sung-Jin Lee[1], Jin-A An[1], Won-Bo Shim[3,4]
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Cloning and soluble expression optimization of strain-derived cycloisomaltooligosaccharide glucanotransferases in Es*cherichia coli*

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P4-57

Biological and genomic characterization of a novel bacteriophage, C1, infecting *Pectobacterium carotovorum*

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A phage-derived genetic element enhances antibiotic susceptibility through selective outer membrane perturbation

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Fermentation and quality characterization for developing a low-alcohol smoothie-type fermented beverage based on raw Andong yam

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Enzymatic production of α-1,6-linked oligosaccharides and their digestibility

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Evaluation of a *Salmonella* real-time PCR method

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Selection and evaluation of ammonia-assimilating strains for ammonium removal in aquatic systems

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Isolation and screening of halotolerant microorganisms from Korean salted seafood for histamine reduction

Hye-In Ha[1*], Ga-Young Kim[1], Jae-Yong Lee[1], Su-Hyun Lee[1], Hee-Won Kim[2], Gyu-Na Weon[2], Sae-Byuk Lee[1,2,3]
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Evaluation of enhanced lignan recovery and utilization from *Schisandra chinensis* pomace through enzymatic pretreatment and reconstituted SCOBY fermentation

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P4-65

Potential of probiotic lactic acid bacteria as oral health-promoting agents

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Oral health-promoting potential of lactic acid bacteria fermented whey

Baul Yang, Min Gyeol Kim, Yu Jin Choi*
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Effects of lactic acid bacteria fermentation on the osteogenic activity of *Semisulcospira libertina* extract

Min Gyeol Kim, Baul Yang, Yu Jin Choi*
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땅콩과 새싹땅콩의 Ara h 1 발현 및 알레르기 유발 가능성 비교

김채영[1], 김수성[1], 김훈[2], 김영호[2], 김혜성[2], 신은순[2], 조현동[1*]
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Current evidence and a conceptual framework for data-driven quality management and traceability in plant-based and cultivated meat

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Extended HACCP and preventive control systems for novel foods: A review of global regulatory frameworks and digital applications

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Isolation and characterization of *Pseudomonas silesiensis* ANU-5 with efficient indole degradation

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Cyclical cold plasma module as a dynamic intervention for microbial control and quality preservation of red grapes and cherry tomatoes during storage

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Microbial inactivation and quality retention of blueberries using continuous in-package dielectric barrier discharge cold plasma

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Optimization of propagation strategy and characterization of a *Listeria monocytogenes*-specific phage

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PART 5 Nutritional, Bioactive and Functional Property

P5-01

Antioxidant and tyrosinase inhibitory activities of hot-water extracts from a mixture of *Torreya nucifera* leaves, *Rosa rugosa* flowers, and *Rosa rugosa* leaves

Ye Seul Seo[1*], Eun Ju Yang[1], Eunwon Choi[2], Seung-Hwa Yang[2], Moon-Hee Choi[2], Hyo Jin Son[1]
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P5-02

Optimization of blending ratios for *Camellia japonica* and *Rosa rugosa* hot-water extracts as functional nutricosmetic materials: balancing efficacy and industrial feasibility

Ye Seul Seo[1*], Seul Ki Kim[1], Eun Ju Yang[1], Eunwon Choi[2], Seung-Hwa Yang[2], Moon-Hee Choi[2], Hyo Jin Son[1]
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P5-03

Improvement of protein quality and functional properties of oats through edible mushroom mycelial inoculation

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P5-04

Evaluation of anti-oxidant, anti-diabetic and anti-thrombosis activity of different parts of paprika

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P5-05

Safety assessment and preventive effects of *cheonggukjang* (Korean fermented soybean paste) samples with distinct quality characteristics in DSS-induced colitis mice

Hyeon-Ji Lim[1*], In-Sun Park[1], Hee-Jong Yang[2], Do-Youn Jeong[2], Seon-Young Kim[1], Chan-Hun Jung[1]
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P5-06

Effects of sulfur-enriched rice on skin immune and inflammatory responses in DNCB-induced atopic dermatitis mouse model

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Korean traditional fermented foods improve eye health-associated indicators in the animal model

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Cheonggukjang enhances gut microbiota-induced SCFA production, alleviating lipid dysmetabolism in white adipose tissue

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Cheonggukjang improves gut health by elevating the fecal acetate level and regulating colonic G protein-coupled receptor in hypercholesterolemia-induced mice

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Cheonggukjang alleviates obesity-induced renal injury through gut microbiota-derived metabolites, improving the antioxidant system

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Ganjang ameliorates colorectal cancer via improving intestinal barrier integrity, mucin release, and gut microbiota-derived metabolite production despite its high salt

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Comparative analysis of the antithrombotic, antioxidant, and antidiabetic activities of Korean and Chinese *Salvia miltiorrhiza*

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Deer antler extract improves bone microarchitecture in ovariectomized mice

Jae-Hee Kwon*, Bum-Joon Koo, Hayeon Jang, Seung-Hwan Heo, Young-Eun Cho
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Plum-derived exosome-like nanovesicles enhance intestinal barrier function in DSS-induced acute colitis

Hayeon Jang*, Young-Eun Cho
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Honey- and pollen-derived extracellular vesicles attenuate melanogenesis and promote epidermal regeneration

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Ginger-derived nanovesicles inhibit breast cancer progression by suppressing cell growth and metastatic behaviors

Dong-ha Kim*, Seung-Hwan Heo, Bum-Joon Koo, Hayeon Jang, Young-Eun Cho
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Aster glehnii-derived nanovesicles suppress melanogenesis in B16F10 cells by modulating tyrosinase-related proteins

Seung-Hwan Heo*, Young-Eun Cho
Department of Food and Nutrition, Gyeongkuk National University

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Antioxidant activities and immune-enhancing effects of '*Baromi 2*' vinegar

Eun Bin Choi*, Ji-ho Choi, Hye-sun Choi
Fermented and Processed Food Research Division, National Institute of Crop and Food Science, Rural Development Administration

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Anti-hair loss mitigates of *Saccharomyces cerevisiae*-fermented *Laminaria japonica* in oxidative stress-induced follicle dermal papilla cells

Yun-Seo Oh*, Kyung-Yun Kang, Beom-Gyun Jeong, Jeong-Ho Kim, Seul-Ki Mun, Jun-Ki Park, Ho-Yeol Jang, Jin-Yeong Choi, Kyung-Wuk Park
Suncheon Research Center for Bio Health Care

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Protective effects of *Elsholtzia flava* (Benth.) Benth. against LPS-induced pulmonary inflammation via inhibition of nitric oxide production

Ye Seol Shin[1*], Krishna K. Shrestha[2], Jin Hyub Paik[3], Sung Keun Jung[1]
[1]*Kyungpook National University*
[2]*Ethnobotanical Society of Nepal*
[3]*International Biological Material Research Center*

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Antioxidant and antithrombotic activities of *Abies nephrolepis* extracts

Jungwoo Chae[1*], Huiseon Jo[1], Hoyong Sohn[2]
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[2]*Department of Food and Nutrition, Gyeongkuk National University*

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Biotransformation of licorice by *Leuconostoc mesenteroides* enhances skin protective activities

Hyunjin Kang[1], Seojin Kang[1], Dae-Eung Kim[2], Su-Hyun Kim[3], Choong-Hwan Lee[3], Sun Yeou Kim[4], Seong-Min Hong[1*]
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Protective effects of live and heat-killed *Limosilactobacillus fermentum* ANC4 against dexamethasone-induced skeletal muscle atrophy

Seojin Kang[1], Hyunjin Kang[1], Su-Hyun Kim[2], Sun Yeou Kim[3], Choong-Hwan Lee[2], Seong-Min Hong[1*]
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Effects of dried laver (*Porphyra yezoensis*) extracts on muscle atrophy in C2C12 cells

Bo Seop Kim[1*], Ju-Hye Im[2], Young-Seung Yoon[1], Yu-Jin Heo[2], Seo-Yeon Yoon[2], Mi-Kyung Lee[2], Hae-In Lee[2]
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Saccharina japonica ameliorates dexamethasone-induced muscle atrophy via the Akt/mTOR/FoxO3α signaling pathway in C2C12 myotubes

Ju-Hye Im[1*], Bo Seop Kim[2], Young-Seung Yoon[2], Yu-Jin Heo[1], Seo-Yeon Yoon[1], Mi-Kyung Lee[1], Hae-In Lee[1]
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최유림*, 최선우, 신소희, 이승윤, 나유영, 서경원
전북특별자치도농업기술원 작물식품과

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Functional cosmetic activity of *Aria alnifolia* extracts

Jungwoo Chae*, Huiseon Jo
Gyeonggi-do Forest Environment Research Center

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Chul-Min Park[1,2*], Young Ji Choi[1,2], Bo-ram Kim[1,2], Jina Lee[1,2], Jin-Ho Kim[1,2], SuA Im[1,2], Ji Soo Kim[1,2], Han-Bin Ryu[1,2], Haneul Kim[2], Sori Kang[2], Kyung-Min Choi[2], Jae-Hyoung Joo[1,2]
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Woo-Deung Sim*, Ye Seul Seo, Heami Sung
Jeonnam Bioindustry Foundation

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Jisu Choi*, Bo-Gyeong Park, Kyung Young Yoon
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Ji-Won Park[1,2*], Bohyun Yun[1,2], Haneul Kim[2], Sori Kang[2], Young Ji Choi[1,2], Bo-Ram Kim[1,2], Jin-Ho Kim[1,2], Jina Lee[1,2], Ji Soo Kim[1,2], Jae-Hyoung Joo[1,2], Won Woo Lee[1,2]
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Effects of *Euonymus alatus* leaf extract on apoptosis of triple-negative breast cancer cells

Hye-Ji Min[1*], Ji-An Heo[1], Jun-Hwi Kim[1], Sang-Won Han[1], Du-Hyun Kim[2], Kwon-Il Seo[1]
[1]Department of Food Biotechnology, Dong-A University
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Dae Il Hwang*, Hwa Young Song, Sun Min Ju, Ha Kyoung Choi, Dong Yun Hyun
Institute of Jinan Red Ginseng

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Multifunctional skin-improving activities of *Artemisia fukudo* Makino extract for functional cosmetics

Je Hyoung Kim*, Gyu Yeon Oh, Eun-Hee Kim, Hee Yeon Lee, Eun Jin Yang, Hwan Sik Na, Yang Jun An, Sook Park, Jin Young Kim
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갈색거저리(*Tenebrio molitor*) 유충 유래 오일의 항염증, 미백 및 피부 유해균에 대한 항균 활성 평가

임윤지*, 김성연, 오상아, 이주영, 장서우, 조자욱
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Suhyeon Jeon[1*], Jungwon Park[1], Youjin Yang[1], Goeun Choi[2], Youngmin Lee[2], Jiyoun Hong[1,2]
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Hyo Young Lee*, Ki Yeon Lee, Jae Geel Lim, Jae Hee Lee, Jae Hyuk Bae, Du Eun Kim, Hye Jeong Kwon, Nam Yong Um, Gye Hun Lim, Kyeong A Jang, Han Ul Park
Gangwon State Agricultural Research and Extension Services

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Wook-Chul Kim, Seung-Hong Lee*
Department of Medical Science, Soonchunhyang University

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Su-Hyeon Cho[1], Tae-Hyung Kim[1], Hee-Sung Hwang[1*], Kil-Nam Kim[1,2]
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Young-Woo Koh[1*], Jin-Joo Kim[1], Seoung-Bin Im[1], Su-Jin Kwon[1], Jeong-Giol Moon[1], Kyung-Je Kim[1], Seong-Woo Jin[1], Sang-Wook Jeong[1], Neul-I Ha[1], Hee-Gyeong Jeong[1], Dae-Jung Park[2], Min-Hee Han[2], Yu-Jin Choi[3], Kyoung-Sun Seo[1]
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[3]*Imsil Cheese and Food Institute*

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Jinjoo Kim[1], Jeong-Giol Moon[1], Kyung-Je Kim[1], Seong-Woo Jin[1], Young-Woo Koh[1], Seoung-Bin Im[1], Neul I Ha[1], Hee-Gyeong Jeong[1], Dong-Uk Kim[1], Sujin Kwon[1], Dae-Jung Park[2], Min-Hee Han[2], Kyoung-Sun Seo[1*]
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Seoung-Bin Im[1], Young-Woo Koh[1*], Jinjoo Kim[1], Sujin Kwon[1], Jeong-Giol Moon[1], Kyung-Je Kim[1], Seong-Woo Jin[1], Sang-Wook Jeong[1], Neul-I Ha[1], Hee-Gyeong Jeong[1], Yu-Jin Choi[2], Kyoung-Sun Seo[1*]
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Evaluation of antioxidant activity of water and ethanol extracts of tea flowers

Eun-Hye Kim[*], Ji-Yeong Kim, Ho-Sub An, Hyun-Seok Park, Su-Jin Jeong, You-Seok Lee, Kil-Ja Kim
Tea Industry Institute, Jeollanamdo Agriculture Research and Extension Services

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Min Woo Baek[1*], Ji-Hyun Im[2], Xiaolu Fu[2], June-Seok Lim[2], Min-Hye Kim[2], Je-Won Park[2], Tae-Woong Song[2], Sung-Phil Kim[3], Ok-Hwan Lee[1,2]
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Comparative analysis of the antioxidant activities of water and ethanol extracts from Adenophorae Remotiflori Radix

Yang Suk Lee, Su Jeong Seo[*]
Department of Herbal Biotechnology, Daegu Haany University

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The study of antioxidant activities of *R. uniflorum* extracts

Su-Jeong Seo[1], No-Sik Park[2], Yang-Suk Lee[1*]
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Antioxidant potential of water and ethanol reflux extracts from *Acer tegmentosum* Maxim. Branches

Yang Suk Lee, Man Guy Park, Su Jeong Seo*
Department of Herbal Biotechnology, Daegu Haany University

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Physiological activities of high-pressure hot water extract of *Patriniae radix*

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Anti-inflammatory effects of *Artemisia fukudo* extract via regulation of MAPK and NF-κB signaling pathways

Mi Seul Kim[1*], So Young Lee[1], Chi Rac Hong[1], Jung-Kil Seo[1], Yong-Tae Kim[1], Hyung Seop Kim[2], Ju-Hyeong Jung[3], Sung-Chul Hong[1]
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Evaluation of the anti-melanogenic potential of *Cnidium japonicum* extract as a natural functional ingredient

Go Eun Choi[1*], So Young Lee[1], Chi Rac Hong[1], Kwon-Sam Park[1], Yong-Tae Kim[1], Hyung Seop Kim[2], Ju-Hyeong Jung[3], Sung-Chul Hong[1]
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Microalgae-derived fucoxanthin attenuates Alzheimer's disease-like pathologies by regulating Aβ/Tau aggregation and NLRP3 inflammasome activation

Chi Rac Hong[1*], So Young Lee[1], Seung-Yong Lim[1], Yong-Tae Kim[1], Ju-Hyeong Jung[2], Sung-Chul Hong[1]
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Protective effects of ginsenoside Rg5-enriched red ginseng extract against oxidative stress in C2C12 myotubes

Da Eun Jeong*, Seon Min Ju, Hwa Young Song, Dong Yun Hyun, Hyo Bin Oh
Institute of Jinan Red Ginseng

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Antioxidant activities and cytoprotective effects of red ginseng and *Petasites japonicus* mixed extracts

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Ju Seon Min*, Jeong Da Eun, Song Hwa Young, Oh Hyo Bin, Hyun Dong Yun
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Antioxidant activities of protein hydrolysates from *Gryllus bimaculatus* and *Locusta migratoria* prepared by ultrasound-assisted enzymatic hydrolysis

Jae-Rim Kim[1*], Chae-Eun Lee[1], Jeong-Heon Kim[1,2], Yun-Sang Choi[2], Jae Hoon Lee[1]
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Immune-enhancing potential of heat-killed acetic acid bacteria in RAW 264.7 macrophages

Il-Ji Moon[1*], Eun Seo Kim[1], Hwan Hee Yu[2], So-Won Jang[2], Mi Jang[2], Jae Hoon Lee[1]
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Antibacterial activity and major bioactive compounds of Longan (*Dimocarpus longan*) seed extract

Ga-Yang Lee*, Min-Jeong Jung, Jong-Woong Nam, Jin Lee, Ju-Yeon Park, Byoung-Mok Kim, Joon-Young Jun
Korea Food Research Institute

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Antioxidant activities of granola bars supplemented with black sesame, hibiscus, and sweet pumpkin powders

Hye-Won Yang, Yu-Ri Jeong, Hye-Lim Jang*
Department of Food and Nutrition, Dong-Eui University

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Antioxidant properties of hibiscus-based jelly supplemented with red beet and blueberry

Ji-Yeong Hwang[1], Seon-Min Seo[2], Gyeong-Jun Oh[2], Hye-Lim Jang[2*]
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Anti-inflammatory effects of *Ainsliaea acerifolia* ethanol extract in LPS-induced RAW 264.7 cell

Seunghyun Kim*, Joobin In, Dayoung Kim, Gyuhwan Woo, Taewan Kim
Department of Food Science and Biotechnology, Gyeongkuk National University

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Photoprotective effects of a 30% ethanol extract of Abalone viscera against UVB-induced oxidative stress and apoptosis in human dermal papilla cells

Haiyang Shi[1*], Arachchige Maheshika Kumari Jayasinghe[2], Kirinde Gedara Isuru Sandanuwan Kirindage[1], Eun-A Kim[3], Nalae Kang[3], Jun-Ho Heo[3], Soo-Jin Heo[3,4], Soon-Do Yoon[5], Ginnae Ahn[1,2]
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Anti-melanogenic effects of strawberry (*Fragaria* × *ananassa*) stem by-products via downregulation of MITF-mediated signaling pathways

Su-Jin Lee[1*], Su-Min Oh[1], In-Chul Lee[2], Dan-Hee Yoo[3], Jeong-Hwan Kim[3], Jung Wook Kang[3]
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Potential of *Momordica cochinchinensis* peel extract as a functional material for preventing inflammatory skin disorders

Su-Min Oh[1*], Su-Jin Lee[1], In-Chul Lee[2], Dan-Hee Yoo[3], Jeong-Hwan Kim[3], Jung Wook Kang[3]
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Protective effects of *Chamaecrista nomame* (Siebold) H. Ohashi extract against obesity-induced inflammation and insulin resistance

Min-Hye Kim[1*], Ji-Hyun Im[1], Xiaolu Fu[1], June-Seok Lim[1], Je-Won Park[1], MinWoo Baek[2], Ok-Hwan Lee[1,2]
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Analysis of gastrointestinal kinetics: How processing methods alter the in vitro digestive characteristics of shrimp (*Litopenaeus vannamei*)

Jieqian Zhou*, Kyi Kyi HTWE, Yantao Yin, Zefu Wang, Naiyong Xiao, Yang Liu, Qinxiu Sun, Shuai Wei, Zongyuan Han, Shucheng Liu
College of Food Science and Technology, Guangdong Ocean University

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Effects of different acetic acid bacteria on organic acid composition and functional quality of dried persimmon vinegar

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주요기술 및 취급품목	세계김치연구소는 세계 유일의 김치 전문 연구기관으로서, 과학기술 기반의 ‘산업화-표준화-세계화’를 통합적으로 추진하며 김치산업의 고도화에 핵심적인 R&D 역할을 수행하고 있습니다. 1. 김치유산균 기반 기능성 미생물 소재 개발 (김치 종균, 건강기능성이 입증된 특화 김치 유산균 등) 2. 스마트 김치 제조공정 개발 (AI 기반 품질 예측 시스템, 제조 공정 자동화 등) 3. 글로벌 시장 대응형 유통·포장 기술 개발 (장거리 수출용 (과)냉각 컨테이너, 탈취 기능성 포장 필름 등)		

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주요기술 및 취급품목	재단법인 전남테크노파크는 지역 산・학・연・관을 비롯한 지역 혁신기관과의 유기적인 협력네트워크를 구축하고, 지역 실정과 특성에 맞는 산업발전 전략 및 정책을 수립하여 지식기반 강소기술기업을 발굴・육성하는 지역산업 육성 거점 기관입니다.		

주요기술 및 취급품목	 

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<tr><td>주요기술
및
취급품목</td><td colspan="3">㈜코젠바이오텍은 분자진단 전문기업으로 Real-time PCR 기반의 유전자 진단 시약 및 장비를 개발, 제조, 공급하고 있습니다. 국내 최초로 코로나19 분자진단키트를 개발하여 국내외에 공급하였으며, 현재 인체, 동물, 식품 및 환경 분야의 다양한 유전자 검사 솔루션을 제공하고 있습니다.

주요 기술로는 Real-time PCR, Multiplex PCR, 유전자 추출 기술 및 자동화 분자진단 플랫폼 개발 기술을 보유하고 있으며, 식품안전 분야에서는 식중독 원인균, 식품 유래 병원성 미생물, GMO, 식품 알레르겐, 축산물 및 수산물 유래 위해요소 검출을 위한 분자진단 솔루션을 제공하고 있습니다.

주요 취급 품목은 식품안전 검사 키트, 병원성 미생물 검출 키트, GMO 검출 키트, 알레르겐 검출 키트, 동물질병 진단 키트, 유전자 추출 시약, Real-time PCR 장비 및 자동화 검사 시스템 등이며, 연구기관, 시험검사기관, 식품기업 및 공공기관에 최적화된 분자진단 솔루션을 공급하고 있습니다.

㈜코젠바이오텍은 신속하고 정확한 유전자 분석 기술을 기반으로 식품안전 및 공중보건 향상에 기여하고 있으며, 고객 맞춤형 분자진단 솔루션 제공을 통해 식품산업 발전에 함께하고 있습니다.

주요 전시 품목 : Real-time PCR 기반 분자진단을 위한 토탈 솔루션
1) Extraction & PCR instrument
(PowerEXPTM & PowerAmp96TM PowerAmp™16 Plus)
2) Pathogen test system
3) Vegan test system
4) Halal test system</td></tr>
</table>

<table>
<tr><td>업체명</td><td colspan="3">(사)한국건강기능식품협회 부설 한국기능식품연구원</td></tr>
<tr><td>대표자 성명</td><td colspan="3">정명수</td></tr>
<tr><td>전화번호</td><td>031-628-2400</td><td>팩스번호</td><td>0507-0334-3051</td></tr>
<tr><td>홈페이지</td><td colspan="3">https://www.khff.re.kr/khff</td></tr>
<tr><td>이메일</td><td colspan="3">health@khff.or.kr</td></tr>
<tr><td>주소</td><td colspan="3">경기도 성남시 대왕판교로 700, 비동 102호 (삼평동, 코리아바이오파크)</td></tr>
<tr><td>주요기술
및
취급품목</td><td colspan="3">한국기능식품연구원은 2004년 식품의약품안전처로부터 식품위생검사기관으로 지정받은 이후 고품격 시험분석 서비스를 최고의 목표로 식품, 건강기능식품, 첨가물, 기구 및 용기포장, 수산물, 축산물, 화장품, 식품조사처리확인, 방사능 등 위탁시험검사와 개별인정 등 연구 사업, 위생점검 및 해외식품 위생평가기관, 수산물 안전성 검사기관, KOLAS 공인시험검사기관으로 국민의 안전과 더불어 산업계의 발전을 위해 노력하고 있습니다.</td></tr>
</table>

<table>
<tr><td>업체명</td><td colspan="3">㈜케이엠에프</td></tr>
<tr><td>대표자 성명</td><td colspan="3">정용진</td></tr>
<tr><td>전화번호</td><td>053-584-6523</td><td>팩스번호</td><td>053-584-6524</td></tr>
<tr><td>홈페이지</td><td colspan="3">www.kmfbio.kr</td></tr>
<tr><td>이메일</td><td colspan="3">engoh@naver.com</td></tr>
<tr><td>주소</td><td colspan="3">대구광역시 동구 율암로 12</td></tr>
<tr><td>주요기술
및
취급품목</td><td colspan="3">㈜케이엠에프는 발효 기반 기능성 소재를 개발 및 생산하는 바이오 기업으로,
건강기능식품 및 식품소재 시장을 대상으로 맞춤형 기능성 소재 사업을 전개하고 있습니다. 체지방 감소, 근손실 방어, 이너뷰티 등 다양한 기능을 결합한 GLP-1 대응 항비만 기능성 소재 및 복합 페어(pair) 솔루션을 중심으로 사업을 확장하고 있으며, 고객 맞춤형 소재 설계 및 ODM 연계를 통해 B2B 기반 기능성 소재 공급 및 제품화 사업을 수행하고 있습니다. 또한, 천연 유래 원료 기반의 차세대 클린라벨 대체 소재 개발을 통해 기능성 소재 시장과 식품소재 시장을 동시에 공략하고 있습니다.

(주요기술)
-. 발효공정 실시간 데이터 기반 기능성 소재 개발 플랫폼
-. RSM(Response Surface Methodology) 기반 발효 공정 최적화 기술
-. TDS(Target Delivery System) 기반 물질 전달 및 흡수율 향상 기술
-. AI 기반 기능성 예측 및 맞춤형 포뮬레이션 설계 기술
-. GLP-1 대응 항비만 기능성 소재 및 복합 페어(pair) 설계 기술
-. 저분자 펩타이드 및 기능성 발효 소재 생산 기술
-. 천연 기반 클린라벨 대체 소재 개발 기술</td></tr>
</table>

주요기술 및 취급품목	(취급품목) 1) TDS 소재 아쿠아쉘S (AquaShell S) 아쿠아쉘F (AquaShell F) 아쿠아쉘TG (AquaShell TG) 아쿠아쉘K (AquaShell K) 리포칼 (LipoCal) 리포엔자임 (LipoEnzyme) TDS애플사이다비니거분말 2) 항비만 소재 K-단쇄지방산 819 (K-SCFAs 819) 코어펩티 (CorePepti) 컴파운드S (Compound S) GLP-1 페어 기능성 복합소재 (Pair Formulation)

업체명	(사)한국효소식품산업협회		
대표자 성명	김상헌		
전화번호		팩스번호	
홈페이지			
이메일	korea_kefia@naver.com		
주소	경기도 광명시 일직로 43, 에이동 1709호(일직동, GIDC)		
주요기술 및 취급품목	<주요 내용> - 효소식품 관련 연구개발 및 학술활동 지원 사업 - 정부 정책 건의 및 제도 개선 활동 사업 - 유사 단체 및 기업과의 협력 활성화 운영 사업		

업체명	㈜그레인온		
대표자 성명	안창석		
전화번호	002-582-7601	팩스번호	02-582-7602
홈페이지	http://www.grainon.com		
이메일	grainon@naver.com		
주소	서울특별시 서초구 동광로 185, 3층(반포동, 양지빌딩)		
주요기술 및 취급품목	1. 주요 기술 1) 원물 기반 발효 효소 기술 - 곡물 자체를 발효한 효소로 곡물 영양 + 효소 동시 확보 2) 고대곡물 활용 기술 - 파로, 카무트를 활용한 기술 특허등록 및 논문 게재 3) 캡슐레이션 효소 기술 - 그레인온의 자체 개발 특허 공법으로 위산/소화 과정에서 효소를 보호함 4) 글로벌 원료, 공급망 구축 - 이탈리아 현지 협력사를 통해 원곡 직수입 5) FDA의 NDI 인증 추진(원료 기능성 강화) - 파로 원료 미국 NDI 인증 추진 MOU 체결 2. 취급 품목 1) 효소 제품군 - 카무트, 파로, 캡슐레이션 효소 2) 고대국물의 원물 - 카무트, 파로, 천혜진선향과 같은 원곡 3) 가공식품 - 파로를 활용한 누룽지, 바, 리조또, 차 4) 프리미엄 식품 - 올리브오일, 와인비니거		

업체명	(재)임실치즈앤식품연구소		
대표자 성명	심민		
전화번호	063-644-2188	팩스번호	063-644-2189
홈페이지	https://www.icf.re.kr/		
이메일	jyjeong@icf.re.kr		
주소	전라북도 임실군 성수면 도인2길 50		
주요기술 및 취급품목	임실 지역에서 생산된 복숭아 및 매실을 활용한 과실주 개발 기술을 보유하고 있으며, 원료 특성에 맞는 발효 공정 최적화 및 품질 관리 기술을 기반으로 고품질 과실 와인을 생산하고 있음. 또한, 과실주 제조 과정에서 발생하는 이화학적 변화 및 향기 성분 분석을 통해 제품의 관능 품질을 향상시키는 연구를 병행하고 있으며, 이를 바탕으로 소비자 선호도에 부합하는 제품 개발을 추진하고 있음. 주요 취급 품목으로는 복숭아 와인, 매실 와인을 중심으로 한 지역 특산 과실주 제품이 있으며, 향후 다양한 과실을 활용한 기능성 및 프리미엄 과실주 개발을 확대해 나갈 계획.		

업체명	국립호남권생물자원관		
대표자 성명	박진영		
전화번호	061-288-7800	팩스번호	061-288-8979
홈페이지	http://hnibr.re.kr		
이메일			
주소	전라남도 목포시 고하도 안길 99 (달동)		
주요기술 및 취급품목	국립호남권생물자원관 섬생물소재은행은 환경부 산하 공공기관으로 국내 섬·연안 지역에서 발굴된 생물소재의 다양한 활용을 위해 산학연 수요자 분들을 대상으로 생물소재 분양 및 유용성 정보를 제공하고 있습니다. 섬생물소재은행은 천연물, 유전자원, 배양체(세균, 균류, 미세조류) 총 3개의 은행을 운영하고 있습니다. 국립호남권생물자원관 섬야생생물소재 선진화연구단은 국가생명연구자원 빅데이터 구축 전략의 일환으로 2023년 5월 19일에 출범하였습니다. 섬·연안 야생생물 소재의 활용성을 높이기 위해 고품질의 생물자원 소재(기능성 천연물·발효미생물·펩타이드) 및 오믹스 빅데이터를 확보하고 품질 보존 관리체계를 마련해 섬생물소재은행을 통해 산·학·연 연구자를 대상으로 분양할 계획입니다.		

업체명	㈜푸드프로		
대표자 성명	김정수, 김지윤		
전화번호	070-8057-6412	팩스번호	0504-484-6078
홈페이지	https://www.instagram.com/foodpro_official		
이메일	ceo_js@foodpro.kr		
주소	대구광역시 북구 복현로 14, 2층(복현동)		
주요기술 및 취급품목	[3D 식품 프린팅 시스템 기반 초개인화 고령친화식단 제조 플랫폼] 노인 개개인의 복합병력, 건강 상태, 식습관을 반영한 3D 식품 프린팅 기술 기반 영양 및 물성을 정밀하게 맞춤 설계한 식이 솔루션		

업체명	콜마비앤에이치㈜		
대표자 성명	이승화		
전화번호	02-2286-3235	팩스번호	
홈페이지	https://kolmarbnh.co.kr/		
이메일	shyeon@kolmarbnh.co.kr		
주소	세종특별자치시 전의면 산단길 22-15		
주요기술 및 취급품목	건강한 혁신을 주도하는 글로벌 No.1 건강기능식품 연구·개발·생산기업 콜마비앤에이치는 건강기능식품 연구·개발·생산(ODM) 분야 국내 1위 기업으로, 2004년 한국콜마와 한국원자력연구원이 공동 설립한 대한민국 최초의 민관 합작회사이자 제1호 연구소 기업입니다. 천연물 기반 신소재 연구개발을 통해 국내 건강기능식품 산업의 품질과 혁신을 선도해왔으며, 트렌드 예측, 제품 기획·개발, 생산, 사후관리까지 전 과정을 아우르는 종합 ODM 서비스를 제공합니다. 현재 미국, 중국, 호주 등 26개국 300여 고객사에 1,000여 종 제품을 공급하며 글로벌 시장에서 신뢰받고 있습니다. 또한 2023년 세종 제3공장 준공을 통해 연간 7,000억 원 규모의 업계 최대 생산능력을 확보, K-헬스케어를 대표하는 글로벌 기업으로 도약하고 있습니다. 콜마비앤에이치 부설 연구소는 천연물 기반 기능성 소재 연구부터 제형 설계, 패키지 개발까지 전 과정을 지원하며, 화장품 소재 기술 개발 및 스마트팜 연구에도 힘쓰고 있습니다.		

주요기술 및 취급품목	대표 원료로는 국내산 당귀·천궁·작약을 활용한 국내 최초 면역기능 개선 원료 '헤모힘 당귀등 혼합추출물'을 비롯해 식후 혈당 상승 억제에 도움을 줄 수 있는 미숙여주주정추출분말과 관절·연골 건강에 도움을 줄 수 있는 타마플렉스 등 다양한 천연물 기반의 기능성 소재들이 있으며, 멀티바이알·쿨멜팅분말 등 특허 제형을 통해 시장 트렌드에 맞춘 혁신적 솔루션도 제공합니다. 주요 고객사 제품으로는 헤모힘당귀추출물을 함유한 액상제품인 애터미 헤모힘, 다양한 멀티비타민 라인업을 보유하고 있는 헤일리온 센트룸, 독자개발한 멀티바이알 용기를 적용한 숙취해소제 동아제약 모닝케어 프레스온, 국내 최초로 생산한 멀티PTP를 적용한 GNM 올인원 뉴르티션 멀티비타민, 링티 등이 있습니다. 콜마비앤에이치는 앞으로도 끊임없는 연구와 트렌드를 선도하는 제품으로 인류의 건강에 기여하는 글로벌 헬스케어 파트너로서의 역할을 강화하고자 합니다.

업체명	경북감수출농업기술지원단		
대표자 성명	김종국		
전화번호	054-530-1305	팩스번호	054-530-1309
홈페이지			
이메일	gamsuchul@naver.com		
주소	경북 상주시 경상대로 2559 경북대학교 상주캠퍼스 식품외식산업학과		
주요기술 및 취급품목	■ 사업명 : 경북 감의 수출 확대 및 부가가치 향상을 위한 현장애로 기술지원단 ■ 추진배경(필요성) ◎ 경상북도는 전국 떫은감 생산량의 절반 이상을 차지하는 최대 주산지로, 상주둥시곶감, 청도반시, 은풍준시 등 지역 대표 브랜드를 중심으로 국내 감 산업을 선도하고 있으며, 감을 수출 전략품목으로 육성하고 있음. ◎ 최근 떫은감 재배면적과 생산량은 지속적으로 증가하고 있으나 국내 소비는 정체되어 있어 수급 불균형과 가격 하락 위험이 커지고 있으며, 안정적인 판로 확보와 농가소득 증대를 위한 수출시장 확대가 요구되고 있음. ◎ 곶감과 감말랭이 등 가공품의 수출은 증가 추세이나, 건조·저장·유통기술, 콜드체인 구축, 수출 후 품질관리 및 국가별 검역기준 대응 등 수출 기반이 아직 충분하지 않아 현장 중심의 기술지원이 필요한 실정임. ◎ 특히 해외시장에서는 건강간식 및 간편식 소비 증가에 따라 감말랭이 등 가공제품의 수요가 확대되고 있어, 가공 표준화, 품질 고급화, 위생·안전성 확보 및 수출 경쟁력 강화를 위한 기술지원이 중요해지고 있음. ◎ 이에 따라 생산·가공·저장·유통·수출 전 과정을 연계한 전문 기술지원 체계를 구축하고, 감수출농업기술지원단을 중심으로 현장 컨설팅과 수출 대응 기술 보급을 체계적으로 추진하여 경상북도 감 산업의 지속 가능한 수출 기반을 마련하고자 함.		

주요기술 및 취급품목

■ 사업추진 목표

◎ 감(곶감) 수출 활성화 및 부가가치 증대
- 수출용 감 생산을 위한 주요 품종 특성표 제작 보급
- 수입국 기호도에 맞는 마케팅 전략 수립 및 재배생산 시스템 확보
- 감 가공품 수출을 통한 부가가치 향상
- 감(곶감) 수출 작목반 육성

◎ 고품질 원료 감 생산지원 시스템 구축
- 감나무 수고 낮추기 기술 보급으로 고품질 원료감 생산
- 수입국 기호도에 맞는 재배생산 시스템 확보
- 수출용 감 생산을 위한 수출대상국의 농약 잔류허용 기준(MRL) 작성 및 농약에 대한 안전관리 허용물질(PLS)작성 후 농가보급
- Global GAP 인증을 위한 기준안 마련 및 추진

◎ 감 가공 및 산업화 지원
- 위생적인 감 가공품 생산을 위한 HACCP 시설 확대
- 수출용 고품질 곶감 및 다양한 감 가공제품 기술 개발
- 유황대체 처리를 통한 위생적이고 안전한 고품질 곶감 생산 기술 개발
- 포장재, 저장유통기술 개발 및 소비자 신뢰 확보를 위한 인증제도 구축

■ 주요 사업 성과 및 애로사항 해결

□ 수출용 고품질 감 생산을 위한 농가 현장 애로기술 지도 및 컨설팅

□ 감 및 감가공품 수출작목반 소규모 교육 활동

주요기술 및 취급품목

- 떫은감 최신 연구동향 및 기술정보 공유를 위한 워크숍 및 세미나

- 상주시 감나무 재배환경(수고낮추기) 개선 사업 및 사후 현장 모니터링
  - 참여농가 : 123호, 나무수: 12,457주, 재배면적 43ha

- 탈삽용 감 '로조 브릴란트' 품종 시범 사업

- 떫은감 재배기술 교육 영상 제작(유튜브 채널로 동영상 자료 공유)

- 현장 시장조사 및 판로확대 노력 – 인도네시아, 일본

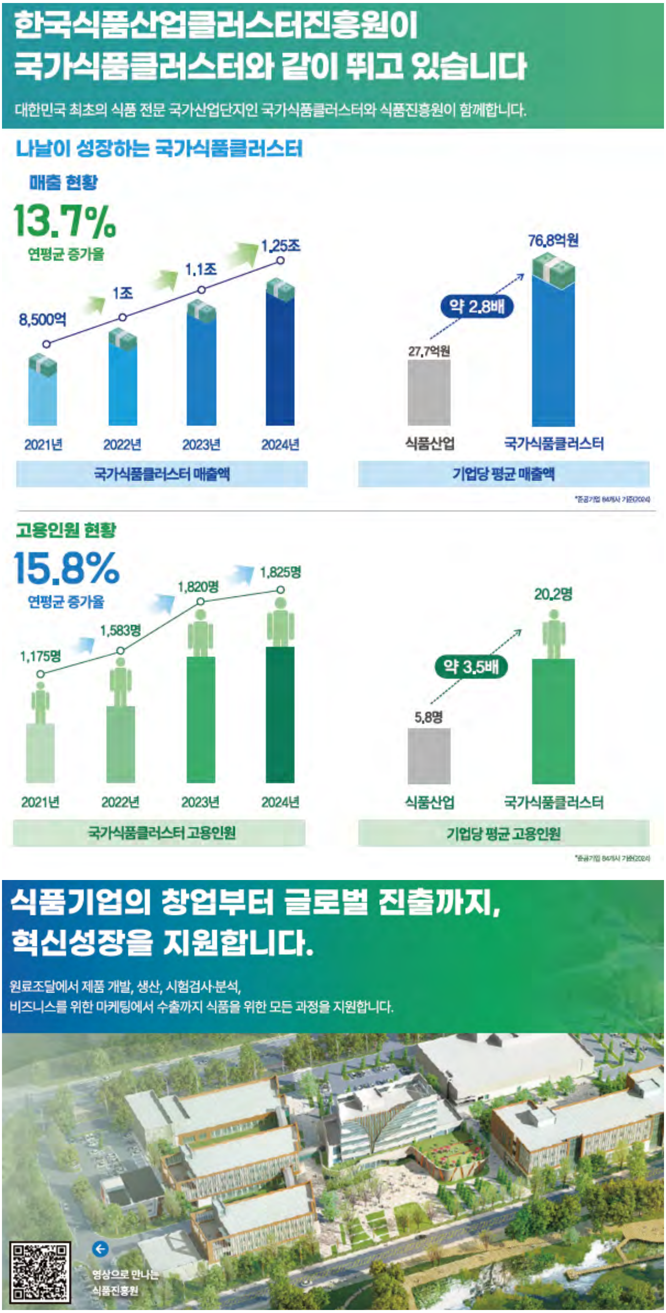
<table>
<tr><td>업체명</td><td colspan="3">(재)남해안권발효식품산업지원센터</td></tr>
<tr><td>대표자 성명</td><td colspan="3">김광현</td></tr>
<tr><td>전화번호</td><td>061-750-8204</td><td>팩스번호</td><td>061-750-8239</td></tr>
<tr><td>홈페이지</td><td colspan="3">www.ffic.kr</td></tr>
<tr><td>이메일</td><td colspan="3">db1533@ffic.kr</td></tr>
<tr><td>주소</td><td colspan="3">전라남도 순천시 승주읍 승주로 538-4</td></tr>
<tr><td>주요기술
및
취급품목</td><td colspan="3">주요역할
- 발효식품산업 육성을 위한 정책개발 및 계획수립
- 발효식품연구 및 실용화 기술 개발·보급·상품화
- 발효식품산업 및 발효식품산업과 관련된 사업
- 발효식품기업 종합컨설팅 및 발효전문인력 양성 등

산업화지원
- 발효차 및 발효음료 주력제품의 포장 유형에 따른 포장라인 설비
- 발효 및 추출 공정라인을 활용한 컨설팅 지원
- 시제품개발 및 수탁생산 등 기술지원
- 우리 농산물 활용 고부가가치 제품개발

연구개발
- 발효차 및 발효음료 품질분석, 유용성분 및 생리활성 분석
- 발효식품 신기술 및 신제품 RnD 수행
- 우리 농산물 활용 고기능성 소재개발

<table>
<tr><td></td><td></td><td colspan="2"> </td></tr>
<tr><td>인력양성
(민간자격증 인증기관)</td><td>기업지원
(회원사 46개소 운영)</td><td colspan="2">제품개발
(정원에 톡, 정원에 환)</td></tr>
</table>
</td></tr>
</table>

업체명	한국식품산업클러스터진흥원		
대표자 성명	김덕호		
전화번호	063-720-0500	팩스번호	063-720-0833
홈페이지	https://www.foodpolis.kr/		
이메일	helpdesk@foodpolis.kr		
주소	전북특별자치도 익산시 왕궁면 국가식품로 100		
주요기술 및 취급품목			

주요기술 및 취급품목	

한국식품산업클러스터진흥원이
국가식품클러스터와 같이 뛰고 있습니다
대한민국 최초의 식품 전문 국가산업단지인 국가식품클러스터와 식품진흥원이 함께합니다.
나날이 성장하는 국가식품클러스터
매출 현황
13.7%
연평균 증가율
8,500억
1조
1.1조
1.25조
2021년
2022년
2023년
2024년
국가식품클러스터 매출액
27.7억원
약 2.8배
76.8억원
식품산업
국가식품클러스터
기업당 평균 매출액
고용인원 현황
15.8%
연평균 증가율
1,175명
1,583명
1,820명
1,825명
2021년
2022년
2023년
2024년
국가식품클러스터 고용인원
5.8명
약 3.5배
20.2명
식품산업
국가식품클러스터
기업당 평균 고용인원
식품기업의 창업부터 글로벌 진출까지,
혁신성장을 지원합니다.
원료조달에서 제품 개발, 생산, 시험검사·분석,
비즈니스를 위한 마케팅에서 수출까지 식품을 위한 모든 과정을 지원합니다.
영상으로 만나는
식품진흥원

주요기술
및
취급품목

기업지원

본부
국가식품클러스터의 운영 및 관리

식품벤처센터
소규모 식품기업 운영을 위한 공간 임대 및
연구·개발·생산 테스트용 장비 지원

식품실무교육시설
식품산업 전문 인력양성을 위한 연구개발,
시험분석, 생산제조 교육 프로그램 운영

농식품원료중계공급센터
식품 제조를 위한 국내산 농축수산물
원재료와 가공 원료의 보관·조달·중계

기술지원

식품패키징센터
식품의 포장설계, 품질개선, 소재개발 및
유통안정성, 포장안전성을 위한 분석 지원

품질안전센터
자가품질검사, 품질·물성·영양성분 및
식품 기호적 품질분석(관능평가) 지원

식품기능성평가지원센터
세포·동물실험 등을 활용한 식품 원료의
유효성 및 안전성 평가 지원

기능성원료은행
기능성표시식품 개발을 위한 국산 농식품자원
소재화·표준화, 원료 비축·분양, 제품 검증 지원

생산지원

파일럿플랜트
분말·고체형 건강기능식품 및
기능성 식품의 시제품 제작, 위탁가공 지원

소스산업화센터
소스 레시피 개발·시제품 제작, 위탁가공 지원,
전통식품품질인증 기업 지원사업 운영

HMR기술지원센터
HMR 및 식물성 대체식품 개발·제조 지원,
식품을 위한 비열살균 및 냉해동 기술 지원

기능성식품제형센터
액상형 건강기능식품·기능성 식품 시제품 제작,
위탁가공 지원, 5G 스마트 제조기술 실증 지원

특화지원

고령친화산업지원센터
고령친화우수식품 지정제도 운영
고령친화식품 사용성 평가·시험분석 지원

청년식품창업센터
식품분야 창업희망자 대상 창업교육,
시제품 제작 시설·장비·공간 임대 지원

푸드테크연구지원센터
식물 기반 대체식품 분야 푸드테크기술 연구,
개발, 시제품제작, 위탁가공 등 상용화 지원

식품문화복합혁신센터
제품홍보·판매·관광프로그램 등
식품 문화 체험공간 운영

업체명	(재)전남바이오진흥원		
대표자 성명	김기홍		
전화번호	061-339-1312	팩스번호	061-333-8076
홈페이지	https://jbf.kr/		
이메일			
주소	전라남도 나주시 교육길 13, 디2동 210호(빛가람동, 스마트파크 지식산업센터)		
주요기술 및 취급품목	전남바이오진흥원은 지역의 풍부한 생물자원을 기반으로 천연물 소재의 발굴부터 표준화, 기능성 검증, 공정개발, 사업화까지 전주기를 아우르는 천연물소재 전주기 표준화 허브를 구축·운영하고 있다. 본 허브는 기존의 단순 연구개발을 넘어, 소재의 품질 균일성 확보를 위한 계약재배와 과학적 근거 기반의 기능성 검증, 산업화 연계를 동시에 수행하는 통합 플랫폼으로, 천연물 소재의 상업화 과정에서 요구되는 핵심 요소인 재현성, 안전성, 유효성 확보를 체계적으로 지원한다. 특히 농생명 및 해양바이오 자원을 활용한 기능성 소재를 중심으로, 건강기능식품·화장품·바이오소재 산업으로의 확장을 추진하며, 기업과의 협력을 통해 실질적인 제품화 및 시장 진출 성과를 창출하고 있다. 이를 통해 지역 기반 바이오 산업 생태계를 고도화하고, 글로벌 수준의 천연물 소재 산업 경쟁력을 확보하는 것을 목표로 한다. 주요 기술 1) 천연물 소재 발굴 및 지표성분 규명 기술 - 식물·해양생물 유래 유효성분 탐색 및 LC-MS/MS 기반 지표성분 도출 2) 표준화 및 품질관리 기술 - 원료의 균일성 확보를 위한 표준화 프로토콜 구축 및 품질관리 체계 확립 3) 기능성 평가 및 과학적 근거 확보 - 항산화·면역·대사질환·피부 등 생리활성 평가 및 비임상·인체 적용시험 연계		

주요기술 및 취급품목	4) 계약재배 기반 원료 생산 및 공급체계 구축 - 기능성 소재의 안정적 확보를 위해 지역 농가와 연계한 계약재배 모델을 구축하고, 재배·수확·전처리 단계까지 표준화하여 원료의 품질 균일성 확보 5) 데이터 기반 소재 DB 구축 및 활용 - 분석데이터 기반 지표성분 DB 구축 및 기능성 예측·연계 기술 보유 파이프라인 1) 천연물의약연구개발 파이프라인 - 우울증치료, 면역관문억제, 조골 및 연골재생) 2) 화장품소재연구개발 파이프라인 - 피부재생, 주름개선 3) 건강기능식품소재연구개발 파이프라인 - 눈피로개선, 알콜성간손상, 기억력개선, 스트레스 개선 및 수면개선, 여성갱년기, 수면장애개선 등 4) 바이오소재연구개발 파이프라인 - 작물생육촉진 및 병 방제, 가축설사병 예방 및 면역증진, 면역원성증가, 기억력 개선 5) 의료기기소재연구개발 파이프라인 - 작물생육촉진 및 병 방제, 가축설사병 예방 및 면역증진, 면역원성증가, 기억력 개선

<table>
<tr><td>업체명</td><td colspan="3">(재)순천바이오헬스케어연구센터</td></tr>
<tr><td>대표자 성명</td><td colspan="3">노관규</td></tr>
<tr><td>전화번호</td><td>061-742-5448</td><td>팩스번호</td><td>061-742-5449</td></tr>
<tr><td>홈페이지</td><td colspan="3">www.sbrc.kr</td></tr>
<tr><td>이메일</td><td colspan="3">semi-kim@sbrc.kr</td></tr>
<tr><td>주소</td><td colspan="3">전라남도 순천시 역전광장 3길 54(풍덕동)</td></tr>
<tr><td>주요기술
및
취급품목</td><td colspan="3">◎ 주요기술
- 전라남도의 유전·생명자원의 발굴 및 활용을 통해
산업적 가치 창출

① 중소기업지원
: 창업자 기술 지원 및 맞춤형 마스터플랜 컨설팅
: 시제품 제작 지원
: 기술이전을 통한 기업가치 제고
② 연구개발사업 수행
: 자체 및 국가연구개발사업 수행
: 공동연구 및 신규 연구과제 발굴
: 신소재 및 바이오 기술 연구개발
③ 산·관·학·연 협력
: 지역인재 양성 및 발굴을 위한 연구협력
: 신규 연구개발 프로젝트 발굴
④ 바이오헬스케어 그린바이오 소재 및 기술 개발
: 생명자원의 발굴 및 소재화
: 생물전환 기반 바이오소재 개발</td></tr>
</table>

주요기술 및 취급품목	◎ 취급품목 ① 아이케어 홍삼아로니아 : 자체 개발 제품으로 관련 특허 보유(제10-2078671호, 제10-2180527호, 제10-2330845호, 제10-2557702호, 제10-2585641호)하고 있으며 농림축산식품부 기술혁신제품 등록 제품 ② 아이케어 뷰티 안티폴A(혁신제품 제2023-026호) : 100% 국내산 아로니아 및 돌배 원료를 사용한 기능성 음료 : 아로니아 효능을 극대화하도록 설계된 특허 조성물(제10-2078671호, 제10-2557702호, 제10-2585641호)을 기반으로 개발된 제품으로 농림축산식품부 기술혁신제품 등록 제품 ③ 댕댕 멀티 케어 스틱밤 : 반려동물 대상 3중 피부 개선(보습·속보습·장벽) 기능 검증 제품 ④ 댕댕 위드 개비자 트리플 솔루션 샴푸 : 반려견 전용 샴푸로 3중 견체 적용시험(피부 보습 개선, 피부 장벽 개선, 윤기개선)을 통해 기능성과 안전성을 검증한 제품 ※ ③·④ 공통사항 : 전남 자생 개비자나무 추출물 기반 성분의 염증 개선 효과 관련 특허 출원[제10-2022-0054113호] ⑤ 닥터 강 댕댕 멀티 케어 솔루션 트릿 : 가수분해 연어와 단백질을 사용하여 식이 부담을 최소화한 제품 : 특허원료(MWF-BP, MWF-01, 새싹삼박, 고들빼기 추출물) 4종 및 기능성 성분 10종 함유

업체명	재단법인 남원시바이오산업연구원		
대표자 성명	최경식		
전화번호	063-633-8600	팩스번호	063-633-8610
홈페이지	https://nbn.re.kr		
이메일	soon90@nbn.re.kr		
주소	전북특별자치도 남원시 시묘길 43, A동 (재)남원시바이오산업연구원		
주요기술 및 취급품목	● 설립연혁 - 2014.06. : 「남원시화장품산업진흥조례」 제정 - 2014.12. : (재)남원시화장품산업지원센터 설립 - 2015.12. : 남원시화장품제조시설(CGMP) 완공 | 보건복지부 - 2017.09. : 남원시화장품산업지원센터(NCN) 완공 | 보건복지부 - 2019.09. : 천연물화장품원료생산시설(IGMP) 완공 | 보건복지부 - 2021.12. : 유전자변형생물체 2등급 연구시설 허가 | 과학기술정보통신부 - 2022.07. : 남원코스메틱비즈센터(NCBC) 완공 | 중소벤처기업부 ※「남원코스메틱비즈센터」→ 「남원첨단산업비즈센터」로 명칭 변경(2025. 05. 21.) - 2023.04. : (재)남원시바이오산업연구원(NBN) 법인명 변경 - 2023.11. : 「남원시바이오산업진흥조례」 전부개정 - 2024.11. : 이영철 연구원장 취임 - 2025.04. : 남원첨단산업비즈센터(前 남원코스메틱비즈센터) 창업보육센터 지정 - 2026. : 천연물 화장품 시험검사·피부임상센터(바이오테스팅센터) 준공 | 보건복지부 - 2027. : 첨단바이오소재 생태환경기반조성 사업(바이오소재융합센터) 완공 예정 | 전북특별자치도, 남원시 ● 설립근거 및 목적 - 설립근거 : 민법 제32조(비영리법인의 설립과 허가), 남원시화장품산업진흥조례(2014.04.)		

	- 설립목적 · 천연물 바이오산업육성 및 기술기반 바이오산업 성장 지원 전문 출연기관 · 대학, 연구기관, 기업, 지방자치단체 간의 유기적인 협조체계 구축하여 곤충·천연물 등 바이오소재의 연구개발 및 산업화를 지원하고, 화장품·식품·제약 등 바이오산업 육성을 통해 지역 경쟁력 강화와 경제 활성화에 기여
주요기술 및 취급품목	● 주요사업 - 바이오소재개발 및 바이오소재 가공연구 · 바이오작물 성분 기반 재배기술 개발, 바이오작물 가공 기술 개발, 바이오작물 공급시스템 개발 등 · 남원·지리산권 생물자원 활용 화장품 소재개발, 화장품 처방 설계 및 제형개발, 화장품 브랜드 설계 및 전략 수립 등 · 곤충가공기술 개발, 곤충 기능성 소재화, 메디푸드 제품 개발 등 - 바이오 인증평가 시스템구축 및 운영(화장품 시험검사·피부임상센터) · 유통제품 품질관리 시험·검사(이화학, 미생물 시험분석) · 인체 안전성·유효성 평가(피부임상시험, 동물대체시험) · 전주기 통합 서비스 제공(개발·시험·인증·임상) - 바이오기업육성 및 기술지원 · 바이오기업 기업지원을 통한 사업화 및 마케팅 지원, 기술 개발 지원, 창업보육 지원, 바이오산업 맞춤형 교육 프로그램 설계 및 지원을 통한 전문인력 양성 등 · 바이오기업 네트워크 구축 및 협업 촉진, 바이오기업 성장 클러스터 구축 등

<table>
<tr><td>업체명</td><td colspan="3">서가 농업회사법인 주식회사</td></tr>
<tr><td>대표자 성명</td><td colspan="3">염미숙</td></tr>
<tr><td>전화번호</td><td>010-2104-0680</td><td>팩스번호</td><td>054-624-0680</td></tr>
<tr><td>홈페이지</td><td colspan="3">https://seoga.co.kr/</td></tr>
<tr><td>이메일</td><td colspan="3">seoga0680@naver.com</td></tr>
<tr><td>주소</td><td colspan="3">경상북도 경주시 외동읍 전곡길 37</td></tr>
<tr><td>주요기술
및
취급품목</td><td colspan="3">- 서가는 국산 도라지 및 지역 농산물을 활용한 전통 가공식품 제조 기술을 보유하고 있으며, 전통 궁중 레시피를 현대적으로 재해석한 프리미엄 건강 간식을 개발·생산하고 있습니다.

- 주요 기술로는 도라지의 쓴맛을 줄이고 식감과 풍미를 높이는 100시간 공정과 5단계 제조공법(유삭, 백침, 증문, 가건, 휴연)이 있으며, 이를 통해 도라지정과, 도라지청 등 차별화된 고부가가치 제품을 생산하고 있습니다. 또한 특허(플라티코딘 D 함량이 증진된 도라지 가공 방법 및 이에 의해 제조된 도라지정과)를 출원하였으며, HACCP, ISO22000, 전통식품 품질인증, FDA Food Facility Registration 등을 기반으로 품질 및 안전성을 확보하고 있습니다.

- 취급품목으로는 한입 도라지정과, 콩고물도라지정과, 도라지청, 배도라지청, 사과생강청, 금귤정과, 꿀호두정과, 선물세트(산서함 시리즈), 쌀콩단백바, 레몬생강샤등이 있으며, 전통 간식, 건강 간식, 선물용 상품, 웰니스 음용 제품까지 폭넓은 제품군을 운영하고 있습니다.
</td></tr>
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<tr><td>업체명</td><td colspan="3">주식회사 오그래 농업회사법인</td></tr>
<tr><td>대표자 성명</td><td colspan="3">장종현</td></tr>
<tr><td>전화번호</td><td>010-2813-3340</td><td>팩스번호</td><td>054-956-7272</td></tr>
<tr><td>홈페이지</td><td colspan="3">https://ograemall.com/</td></tr>
<tr><td>이메일</td><td colspan="3">ograe@ograe.co.kr</td></tr>
<tr><td>주소</td><td colspan="3">경상북도 성주군 월항면 유월2길 40-15</td></tr>
<tr><td>주요기술
및
취급품목</td><td colspan="3">○ 단백질 쉐이크 비롯한 식사 대용식 및 다이어트 간편식 제품
○ 현미, 귀리와 같은 통곡물을 주원료로 사용한 곡류가공품류 시리얼과 그래놀라
○ 동/식물성 단백질 분말을 주원료로 사용한 즉석섭취식품, 체중조절용 조제식품류의 단백질 쉐이크
○ 20 ~ 40대 여성들을 주 타켓층으로 설정한 식단조절용, 간식용 섭취 간편식
○ 유탕처리 대신 열과 압으로 곡물을 팽화하는 방식인 ‘퍼핑공정’을 사용하여 영양성분의 파괴를 최소화하고, 바삭한 식감은 더욱 부각
○ 곡류의 산패를 방지하기 위해 자사 기업부설연구소에서 개발한 ‘산화방지제’ 포장
○ 사탕수수 원당인 천연당으로 코팅하여 체내 흡수 속도를 완화
○ 여러 종류의 대체당을 사용하여 당 함량 및 칼로리를 최소화

[자사제품]

[주요 OEM/ODM 생산 제품]</td></tr>
</table>

<table>
<tr><td>업체명</td><td colspan="3">한울푸드</td></tr>
<tr><td>대표자 성명</td><td colspan="3">최윤지 외 1명</td></tr>
<tr><td>전화번호</td><td>053-214-5000</td><td>팩스번호</td><td>054-332-5006</td></tr>
<tr><td>홈페이지</td><td colspan="3">https://smartstore.naver.com/deli-hanwool
https://www.deli-hanwool.com/</td></tr>
<tr><td>이메일</td><td colspan="3">hanwool5000@hanmail.net</td></tr>
<tr><td>주소</td><td colspan="3">경상북도 영천시 청통면 월성길 7-3</td></tr>
<tr><td>주요기술
및
취급품목</td><td colspan="3">국내 최초 고구마스틱 제조 기술 특허 보유
RTE 채소 가공 기술

스틱류
- 고구마스틱
- 단호박스틱
- 롱스틱 말랑구마
- 샌드스틱 (비건육포)

채소 RTE류 (바로먹는 채소)
- 옥고감 (옥수수, 고구마, 감자)
- 바로먹는 고구마 (슬라이스, 하프)
- 맛있는 찰옥수수/흑찰옥수수
- 바로먹는 비트
- 바로먹는 감자

쿠키 과자류
- 스틱약과
- 쿠키약과
- 마카다미아 쿠키 (딸기, 초코, 말차)
- 통아몬드 고구마 쿠키
- 이집트 대추야자 초콜릿

말랭이류
- 고구마 말랭이
- 청도 감말랭이
- 무농약 국내산 진짜 고구마말랭이</td></tr>
</table>

업체명	농업회사법인 주식회사 시그널케어		
대표자 성명	양동섭		
전화번호	070-4776-0166	팩스번호	054-373-4763
홈페이지	www.signalcarecorp.com		
이메일	ceo@signalcarecorp.com		
주소	경상북도 청도군 청도읍 청매로 136-15		
주요기술 및 취급품목	시그널케어는 버려지는 자원에 새로운 가치를 부여하고, 지속 가능한 단백질 공급 체계를 구축하고자 하는 발효 기반 바이오 플랫폼 기업입니다. 농수산 부산물, 식물성 원료 및 식용곤충 등 다양한 생물자원을 고부가가치 단백질 소재로 전환하여 미래 식량자원 부족과 환경 문제에 대응하는 제품 개발을 추진하고 있습니다. 주요 기술은 곤충 유래 단백질 원료의 전처리, 추출, 분말화, 발효, 배합 및 제형화 기술이며, 천연 곤충단백질 함유 기능성 사료 제조방법(특허 제10-2416692호), 발효사료 대체 원료 제조 시스템 및 이를 이용한 대량 생산 제조 방법(특허 제10-2801114호), 곤충 발효물 및 이를 포함하는 반려동물 사료용 조성물, 곤충 단백질의 제조방법(출원번호 10-2024-0096300) 등 특허 기반 기술을 보유하고 있습니다. 또한 곤충 원료의 확보부터 전처리, 가공, 최종 제품 개발까지 전 과정을 연계하여 관리함으로써, 안정적인 품질과 제품화 경쟁력을 확보하고 있습니다. 전시 예정 품목인 시그널알파플러스는 곤충 BCAA 추출 분말을 소량 적용한 스틱형 영양 케어 3종 제품으로, 중장년 남성 고함량 스틱, 중장년 여성 고함량 스틱, 중장년 데일리 스틱 등 대상별 맞춤형 라인업으로 기획되었으며, 제품별 목적에 맞는 원료 배합을 통해 활력 증진, 피로 개선, 면역 관리, 항산화, 집중력 및 컨디션 유지, 영양 보충을 고려한 제품군입니다. 향후 키즈·청소년 제품군으로도 확장 출시를 계획하고 있습니다.		

주요기술 및 취급품목	에코퓨전은 곤충 단백질을 기반으로 한 시그널케어의 식품 브랜드로, 대표 제품인 나츄프로믹스(NATUPROMIX)를 중심으로 곤충 유래 단백질의 영양적 가치와 미래 대체단백질 식품 소재로서의 가능성을 소개하고자 합니다. 나츄프로믹스는 탈지 가수분해 밀웜분말을 활용한 고단백 프로틴 제품으로, 초콜릿맛과 바나나맛 등 소비자 기호를 고려한 맛 구성과 간편한 섭취 편의성을 갖춘 제품입니다. 이를 통해 곤충 단백질 원료에 대한 소비자 진입장벽을 낮추고, 운동 후 단백질 보충, 일상 속 영양관리, 지속 가능한 대체단백질 섭취를 원하는 소비자에게 새로운 선택지를 제안합니다. 본 전시에서는 시그널알파플러스 및 에코퓨전 나츄프로믹스 제품 샘플, 제품 소개자료, 곤충 기반 단백질 원료화 기술, 특허 기반 제조공정 및 제품화 기술, 미래 대체단백질 식품 소재로서의 활용 가능성을 함께 소개할 예정입니다.

<table>
<tr><td>업체명</td><td colspan="3">Anton Paar Korea</td></tr>
<tr><td>대표자 성명</td><td colspan="3">Lamperstorfer Ingrid</td></tr>
<tr><td>전화번호</td><td>02-6747-5771</td><td>팩스번호</td><td>02-6747-5772</td></tr>
<tr><td>홈페이지</td><td colspan="3">https://www.anton-paar.com/kr-kr/</td></tr>
<tr><td>이메일</td><td colspan="3">info.kr@anton-paar.com</td></tr>
<tr><td>주소</td><td colspan="3">경기도 성남시 분당구 양현로 240 (이매동, 13566)</td></tr>
<tr><td>주요기술
및
취급품목</td><td colspan="3">Anton Paar Korea

Anton Paar는 고정밀 실험실 분석 장비와 공정 계측 시스템을 개발, 생산 및 공급하는 글로벌 측정 기술 선도 기업으로, 고객의 요구에 최적화된 자동화 및 로봇 솔루션을 제공합니다.
특히 밀도, 농도 및 CO_2 측정 분야와 유변물성 측정 분야에서 세계적인 기술력과 전문성을 바탕으로 업계를 이끌고 있습니다.
오스트리아 그라츠에 본사를 둔 Anton Paar는 전 세계 40개 이상의 판매 법인과 110개국 이상의 글로벌 네트워크를 통해 고객에게 신속하고 전문적인 기술 지원 및 서비스를 제공하고 있습니다. 또한 4,500명 이상의 임직원이 연구개발, 생산, 영업 및 서비스 분야에서 활동하며 Anton Paar만의 높은 품질 기준과 우수한 브랜드 가치를 실현하고 있습니다.

[취급 품목]
밀도계, 레오미터, 마이크로파 분해 시스템, 점도계,
공정 센서, FTIR 기기, 입도 분석기, 라만 분광기, 굴절계,
열 분석기, 흡착 분석기, 압출기</td></tr>
</table>

업체명	영인에스티(주)		
대표자 성명	배병술		
전화번호	02-6190-9855	팩스번호	02-6190-9878
홈페이지	www.younginst.com		
이메일	bgyu@younginst.com		
주소	서울특별시 강남구 압구정로 28길 22 구정빌딩 4층		
주요기술 및 취급품목	방사능 측정기기 TOC 분석기 PMS 분석기 외 전시 계획 제품 : 1) 방사능 측정기 2) 온습도 데이터로거 3) TOC 4) 탁도계 5) IMR-MS 등		

<table>
<tr><td>업체명</td><td colspan="3">㈜바이오메드</td></tr>
<tr><td>대표자 성명</td><td colspan="3">손현민</td></tr>
<tr><td>전화번호</td><td>031-707-3450</td><td>팩스번호</td><td>031-707-3451</td></tr>
<tr><td>홈페이지</td><td colspan="3">www.bio-med.co.kr</td></tr>
<tr><td>이메일</td><td colspan="3">info@bio-med.co.kr</td></tr>
<tr><td>주소</td><td colspan="3">경기도 성남시 분당구 판교로 744 분당테크노파크 C동 202호</td></tr>
<tr><td>주요기술
및
취급품목</td><td colspan="3">1. Romer Labs
- ELISA: 곡류, 견과류, 배합사료 내 곰팡이 독소 및 식품 중 다양한 알레르기 유발 물질(Allergen)을 효소면역측정법(ELISA)을 통해 신속하고 정밀하게 정량 분석합니다.

- STRIP: Lateral Flow기술을 적용한 스트립 타입 제품으로, 식품공전 및 사료관리법 규격에 따른 곰팡이 독소와 알레르기 유발 물질의 정성 검사가 가능합니다.

- 13C동위원소 표준물질: Biopure의 안정화된 13C동위원소 표준물질은 LC-MS/MS분석의 정밀도를 높이는 핵심 역할을 수행하며, 회수율 손실 방지를 위한 다성분 분석법에 널리 사용됩니다.


2. Biomed Genelix™
Genelix™ Q16 Real Time PCR System : 합리적인 가격과 콤팩트한 설계를 바탕으로 공간 효율성을 극대화하였으며, 초당 7°C이상의 초고속 PCR기술을 통해 70분 이내에 정밀한 결과 확인이 가능합니다.

- 4채널 형광 분석 가능한 일체형 형광 모듈 적용
- 저소음 설계, 16개 샘플 동시 실험 및 PCR 튜브 뚜껑 라벨링 지원
- Genelix™전 제품군 호환 가능</td></tr>
</table>

주요기술 및 취급품목	3. NAVIGEN 별도의 조제 과정 없이 즉시 실험에 적용 가능한 생배지로, 사용자의 편의를 위해 용도별 맞춤형 제조 및 포장 서비스를 제공합니다. - Broth타입: 미생물 증식에 최적화된 균질한 액상 배지 - Agar타입: 한천(Agar)을 이용해 플레이트 형태로 제작된 고품질 고체배지  4. Compact Dry - 냉장보관이 불필요한 미생물 검사용 간이 배지 

업체명	㈜씨엠코퍼레이션에이티		
대표자 성명	모호열		
전화번호	02-451-9001	팩스번호	02-451-8991
홈페이지	www.cm-corp.co.kr		
이메일	info@cm-corp.co.kr		
주소	서울특별시 송파구 법원로 11길 7 현대지식산업센터 C동 624~626호		
주요기술 및 취급품목	[식품 분석 관련 기기] - 킬달 - 듀마스 질소분석기 - 조지방/조섬유 추출기 - 가수분해기		

업체명	㈜에이에스피티		
대표자 성명	서철민		
전화번호	054-336-0701	팩스번호	054-336-0702
홈페이지	www.asptpack.com		
이메일	as3352@hanmail.net		
주소	경북 영천시 금호읍 영천산단로 172		
주요기술 및 취급품목	주요기술플라스틱 포장재 및 친환경 종이파우치 제품을 생산하는 다목적 제조기업 -다양한 포장재를 생산할 수 있는 제조 기술력과 공정 운영 능력 [특허 - 식품 포장 필름 제조용 무용제 타입 친환경 합지기] -수출입을 병행하는 영업 구조를 통해 국내외 시장 대응이 가능 -친환경 종이 포장재 및 관련 기술 개발에 지속적 투자, 신규 설비 도입으로 빠른 양산체계와 기술적 역량 [특허-택배용 종이봉투와 이의 제조 방법 및 장치] 취급품목 -식품파우치 (일반,냉동,진공 등) -건강기능식품 파우치(각종 자동롤, 액상 자동롤, 이지컷 자동롤 등) -음료파우치(스탠드, 스파우트 파우치 등) -레토르트 파우치-친환경 종이파우치		

업체명	㈜경한		
대표자 성명	한균식		
전화번호	053-856-8855	팩스번호	053-856-8859
홈페이지	www.retort.net		
이메일	ks.han@retort.net		
주소	경북 경산시 진량읍 공단8로 58		
주요기술 및 취급품목	1. ㈜경한 및 레토르트 솔루션 ● ㈜경한은 1975년 설립 이래 50년간 레토르트 멸균 장치를 국산화하고 관련 토탈 솔루션을 제공해 온 전문기업 ● 당사의 모든 레토르트 시스템은 실시간 공정 모니터링(온도, 압력, 멸균 치사율) 및 챔버 내 열분포 균일성 제어 기술을 공통적으로 탑재하여 제품의 미생물학적 안전성과 물리적 품질을 일관되게 보장함 2. 레토르트 시스템 라인업 ● 두가지 맞춤형 멸균 솔루션으로 제품 특성과 생산 환경에 따라 최적의 시스템을 선택할 수 있음 ① Injected Steam-air Retort - Injected Steam-Air 방식: 순환 공기를 가열해 스팀과 함께 챔버에 직접 분사함으로써 열 손실을 없애고 열전달 효율을 극대화 - 각형 챔버: 원형 구조에서 발생하는 공백을 원천 제거하여 불필요한 공백에 대한 가열 에너지를 차단하여 적재 효율과 에너지 효율을 극대화. - 시스템 확장성: 옵션으로 진공조리, 쉐이킹 기능을 추가할 수 있으며, 양문 타입 및 슬라이딩 도어 등 설치 환경에 맞춘 구성이 가능. ② Water spray Retort - 간접가열 방식(열교환기): 열교환기를 통해 공정수를 가열함으로써 증기 응축수가 제품에 직접 닿지 않아 외관 품질 유지에 유리. - 직접가열 방식(직분사): 기존 water spray 방식을 개선한 직분사 방식은 스팀을 직접 분사함으로써 열전달 효율을 높임. 3. 유틸리티 및 자동화 셋업 컨설팅(인프라 지원) ● 고객사의 생산 스케일과 최적의 운영 비용을 고려하여 맞춤형 인프라 솔루션을 제공 - 랩 스케일부터 양산형 시스템까지 다양한 용량의 시스템을 제공. - 순환 시스템을 통한 에너지 효율 확보: 열 매체 및 냉각수의 순환 및 재활용이 가능한 시스템을 구축하여 에너지 소비량을 최적화		

업체명	뷰키코리아		
대표자 성명	피우스 슐러, 토마스 마틴 브라운슈발리어		
전화번호	02-6718-7500	팩스번호	02-6718-7599
홈페이지	www.buchi.com/ko		
이메일	kr-sales@buchi.com		
주소	경기도 광명시 덕안로 104번길 17 광명역엠클러스터 520호		
주요기술 및 취급품목	BUCHI는 1939년 스위스에서 창립 이후 85년 이상 R&D, 품질관리 및 생산을 위한 실험실 기술을 전 세계에 제공하는 선도적인 역할을 하고 있습니다. BUCHI는 “Quality in your Hands”라는 이념으로 식음료, 사료, 환경, 제약, 화학 등 다양한 산업 분야와 학계에 최상의 제품과 솔루션을 제공합니다. [취급 품목] - 실험실 및 산업용 회전증발농축기 (Laboratory & Industrial Evaporation) - 병렬증발농축기 (Parallel Evaporation) - 분무건조기 및 캡슐화 장비 (Spray Drying & Encapsulation) - 융점측정기 (Melting Point) - 동결건조기 (Freeze Drying) - 분취 크로마토그래피 (Flash, Prep HPLC) - 초임계 유체 크로마토그래피 (SFC) - 질소/조단백 측정 장비 (Kjeldahl) - 추출 장비 (Extraction) - 근적외선 분광기 (NIR, Hand-held NIR) - 생산공정용 근적외선 분광기 (NIR-Online)		

업체명	(주)애니랩		
대표자 성명	조병호		
전화번호	02-2027-2626	팩스번호	02-2027-2629
홈페이지	www.anylab.co.kr		
이메일	Ys7066@naver.com		
주소	서울특별시 금천구 가산디지털1로2, 812(우림라이온스밸리 2차 812호)		
주요기술 및 취급품목	1. 자동 중량희석기 2. 자동 배지분주펌프 3. 건조필름배지 MCMP(식품공전 건조필름배지법 II 등재) 4. 회전농축기 5. 병렬식 진공 농축기 6. 자동 질소 농축기 7. 멀티볼텍스믹서 및 볼텍스믹서 8. 상하진탕기 9. 자동배지제조장치 및 자동배지분주장치 10. 금속이물채취기 11. SPE카트리지 및 퀘처스 킷트 12. 시린지필터 13. 바이알 및 캡 14. 마이크로피펫 및 마이크로피펫 팁 15. CRM급 표준품 16. 덕트레스 흄 후드 17. 파우더 웨잉 캐비넷 18. 자동 균수 계수기(Automatic Colony Counter) 19. 소형 저온 배양기		

업체명	㈜비오메리으코리아		
대표자 성명	김대환		
전화번호	02-2188-4726	팩스번호	02-553-6264
홈페이지	www.biomerieux.com/kr/ko		
이메일	ml-kr-ind-mkt@biomerieux.com		
주소	서울특별시 강남구 역삼로 121(역삼동, 유성빌딩 2,7,8,9층)		
주요기술 및 취급품목	비오메리으는 미생물 진단 분야에서 60년 이상의 축적된 경험을 바탕으로 제조 업계가 직면한 제품의 안전성과 품질 보장에 대한 어려움을 잘 이해하고 통합적인 솔루션을 제공하는 것을 목표로 합니다. 신속 정확한 검사방법, 실험실 워크플로우 최적화, 생산성 향상 및 재무 성과 개선에 도움이 되는 솔루션을 만들어 내는 것에 전념하고 있습니다. 간편한 PCR을 위한 초 간단 DNA 추출 키트 [GENE-UP® LYSIS KIT] GENE-UP® LYSIS KIT는 식품 미생물 검사에서 필수적인 DNA 추출 과정을 간소화한 솔루션입니다. 복잡한 시약 분주나 열처리 없이 1번의 피펫팅과 간단한 vortexing만으로 빠른 추출이 가능하며, 96개 샘플을 단 5분 내 처리해 실험 효율을 크게 향상시킵니다. 또한 inhibitor 제거에 최적화된 구조로 다양한 식품 매트릭스에서도 안정적인 결과를 제공하고, 기존 boiling 방식과 동등 이상의 검출 성능을 보입니다. 대량 샘플 처리가 필요한 환경에서 신속성과 신뢰성을 동시에 만족시키는 효율적인 DNA 추출 키트입니다.		

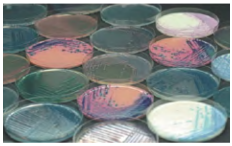
주요기술 및 취급품목	ISO 식품유래 바이러스 검출법의 PROCESS CONTROL [Mengovirus kit] Mengovirus는 식품 및 환경 시료에서 바이러스 검출의 신뢰성을 확보하기 위해 사용되는 대표적인 process control virus입니다. 실제 식품에는 존재하지 않지만 노로바이러스, A형 간염 바이러스와 유사한 특성을 가져, 시료 전처리부터 RNA 추출, PCR 증폭까지 전 과정이 정상적으로 수행되었는지를 확인하는 데 활용됩니다. 특히 ISO 15216 기준에서 권장되는 control 바이러스로, Mengovirus를 시료에 첨가하면 PCR 결과를 통해 검출 실패 원인이 분석 과정의 문제인지 여부를 명확히 구분할 수 있습니다. 이를 통해 복잡한 식품 매트릭스에서도 결과의 신뢰성과 정확성을 높일 수 있습니다. 대표 미생물 동정 솔루션 2 가지 [VITEK® COMPACT PRO] VITEK COMPACT PRO는 미생물 동정 및 항생제 감수성 검사 분야에서 ‘gold standard’로 인정받고 있는 솔루션입니다. 실험실 내 반복적이고 번거로운 작업을 자동화된 분석 시스템으로 간소화하고, 광범위한 데이터베이스를 기반으로 정확하고 신뢰할 수 있는 결과를 제공합니다. 식품, 축 산, 제약, 화장품 산업 등 다양한 분야에서 활용 가능하며, 미생물 검사 품질과 효율성을 동시에 만족시키는 업계 표준으로 자리잡고 있습니다. [VITEK® MS PRIME] VITEK® MS PRIME은 혁신적인 MALDI-TOF 질량분석 기술을 기반으로 한 미생물 동정 솔루션입니다. 박테리아, 효모, 곰팡이, 마이코박테리 아 등 다양한 미생물을 수 분 내에 정확하게 동정하며 견고한 데이터베이스와 사용자 친화적인 인터페이스를 통해 신뢰도 높은 결과와 효율적인 워크플로우를 제공합니다. 식품 및 제약 산업의 요구에 따른 규정 준수, 비용 절감, 공간 효율성까지 모두 갖춘 차세대 미생물 동정 솔루션입니다.

업체명	SCIEX		
대표자 성명	Chris Hagen		
전화번호	080-020-1000	팩스번호	02-2155-2150
홈페이지	Korean (South Korea) (sciex.com)		
이메일	sciexkorea@sciex.com		
주소	서울시 서초구 매헌로 16, 하이브랜드리빙관 15층 SCIEX		
주요기술 및 취급품목	"질량분석기 선도 기업" SCIEX는 세계적인 생명 과학 및 기술 혁신 기업인 Danaher의 일원이며, 획기적인 혁신과 뛰어난 신뢰성 그리고 고객 지원으로 50년 이상 LC-MS/MS 분야를 선도해 오고 있습니다. SCIEX는 미국에 본사를 두었으며, 생명 과학, 임상 의학 연구 및 의약품 산업 시장에서 약물 개발과 생산, 식품 및 환경 안전, 임상 연구에 사용되는 과학 기기 장비 및 소프트웨어와 서비스를 제공하는 글로벌 기업입니다. "Advances in human wellness depend on the power of precise science"SCIEX empowers our customers to solve the most impactful analytical challenges in quantitation and characterization. With groundbreaking innovation and outstanding reliability and support, SCIEX has led the field of mass spectrometry for 50 years. Since the launch of the first-ever commercially successful triple quadrupole in 1981, we continue to develop technologies and solutions that influence life-changing research and outcomes. That's why thousands of life science experts around the world choose SCIEX to get the answers they can trust. 대표 제품 및 솔루션 (Main Products and Solutions) Mass spectrometry(LC-MS/MS) and Consumables - Triple Quadrupole - QTRAP - QTOF - Capillary electrophoresis - Acoustic Ejection Mass Spectrometry (AEMS) - icIEF-UV/MS - HPLC - Software - Standards and reagent kits		

<table>
<tr><td>업체명</td><td colspan="3">㈜진성유니텍</td></tr>
<tr><td>대표자 성명</td><td colspan="3">전성빈</td></tr>
<tr><td>전화번호</td><td>02-2219-5157</td><td>팩스번호</td><td>02-2219-5158</td></tr>
<tr><td>홈페이지</td><td colspan="3">http://jsunitech.com/</td></tr>
<tr><td>이메일</td><td colspan="3">foods012@jsunitech.com</td></tr>
<tr><td>주소</td><td colspan="3">경기도 고양시 덕양구 통일로 140 A동 443호(동산동, 삼송테크노밸리)</td></tr>
<tr><td>주요기술
및
취급품목</td><td colspan="3"><식품 안전성 실험 kit 전문>

- ㈜진성유니텍은 식품의 안전성을 검사하는 kit 및 장비에 초점을 맞추어 단순 판매를 넘어 꾸준한 연구와 교육을 병행하고 있습니다.

- 특히 신속진단 kit를 주력으로 하여 정확하고 빠른 분석을 통해 식품 위생과 안전성에 이바지하고 있습니다.

- 증균 배지, 선택 배지, CHROMagar
- 식품공전, FDA, USDA, EPA fomular
- [식품공전법에 의한 초보자 교육 자료] 배포 가능


- Bend에 의한 간단한 Screening kit
- Reveal mycotoxin
- Reveal allergene
- Reveal microorganism
</td></tr>
</table>

업체명	써모피셔사이언티픽코리아(주)		
대표자 성명	석수진		
전화번호	1661-9555	팩스번호	
홈페이지	www.thermofisher.com		
이메일	info.cmd.korea@thermofisher.com		
주소	서울특별시 강남구 광평로 281 수서오피스빌딩 12층		
주요기술 및 취급품목	써모 피셔 사이언티픽(Thermo Fisher Scientific Inc.)은 전 세계 약 12만 명의 직원들과 함께 연 매출 420억 달러(한화 약 58조원) 이상을 달성하는 세계적인 과학회사입니다. 써모 피셔 사이언티픽은 고객을 도와 세 상을 더욱 건강하고 깨끗하며 안전한 곳으로 만든다는 사명을 바탕으로, 생명 과학 분야 연구 촉진, 복잡한 분석 난제 해결, 환자 진단 개선 및 의약품 개발, 실험실 생산성 향상에 주력하고 있습니다. 크로마토그래피 ● 액체 크로마토그래피: Vanquish HPLC 및 UHPLC 시스템 ● 이온 크로마토그래피: Inuvion IC 시스템 ● 기체 크로마토그래피: TRACE 1600 시리즈 질량분석기 ● LC-MS 질량분석기 1. LC-MS/MS: TSQ Certis, TSQ Altis Plus, TSQ Quantis Plus 2. LC-HRMS: Orbitrap Astral Zoom, Orbitrap Excedion Pro ● GC-MS 질량분석기 1. GC-MS: ISQ 7610, GC-MS/MS: TSQ 9610 2. GC-HRMS: Orbitrap Exploris GC 3. DFS Magnetic Sector GC-HRMS		

주요기술 및 취급품목	미량 원소 분석 기기 ● ICP-OES: iCAP PRO 시리즈 ● ICP-MS: iCAP MSX, iCAP MTX 크로마토그래피 소모품 ● HPLC 및 UHPLC 컬럼, GC 컬럼, IC 컬럼 ● 시료 전처리: QuEChERS, SPE, 실린지 필터 ● 바이알 및 캡 크로마토그래피 분석을 위한 자동 시료 전처리 ● 완전 자동화 가속 용매 추출 시스템: EXTREVA ASE ● 가속 용매 추출 시스템: ASE 350 ● 자동 고체상 추출 시스템: AutoTrace 280 SPE

업체명	광주대학교 청년도약 인재양성 부트캠프		
대표자 성명	백지환		
전화번호	062-670-2445	팩스번호	
홈페이지	https://www.gwangju.ac.kr/		
이메일	jhback@gwangju.ac.kr		
주소	전남광주통합특별시 남구 효덕로 277		
주요기술 및 취급품목	광주대학교 「청년도약 인재양성 부트캠프」는 고용노동부와 한국산업인력공단이 지원하는 실전형 청년 인재양성 사업으로, 만 19~34세 일자리 밖(쉬었음) 청년을 대상으로 지역 라이프서비스 산업의 AI 전환(AX)을 선도할 실무형 인재를 양성합니다. 생성형 AI 기반 실무교육과 기업연계 프로젝트를 중심으로 K-FOOD AX, 라이프케어(통합돌봄) AX, 문화콘텐츠 AX 분야의 직무교육을 운영하며, AI 활용 역량과 현장 실무역량을 동시에 갖춘 인재를 육성합니다. 교육과정은 생성형 AI 활용 실습, 직무별 프로젝트 기반 학습(PBL), 현장실습, 전문가 멘토링, 기업연계 프로젝트, 포트폴리오 제작, 취·창업 지원 프로그램 등으로 구성되어 있으며, 교육생이 실제 산업현장에서 활용 가능한 실무역량을 갖출 수 있도록 운영됩니다. 특히 K-FOOD AX 분야에서는 커피·제과제빵을 비롯한 식품산업과 천연물 및 기능성 소재를 활용한 제품개발, AI 기반 메뉴·제품 기획 및 마케팅, 식품산업 디지털 전환 역량을 중심으로 교육을 운영하여 식품산업 분야의 AI 융합 전문인재를 양성합니다. 이번 부스에서는 2026년 청년도약 인재양성 부트캠프 교육생 모집과 함께 교육과정 안내, 참여 대상 및 신청 방법, 교육 혜택, 기업연계 프로젝트, 취업·창업 지원 프로그램 등에 대한 상담을 진행하며, 참여를 희망하는 청년과 산업체 관계자를 대상으로 1:1 맞춤형 상담을 제공합니다.		

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세계김치연구소
홈 페 이 지
김치산업의 미래
세계김치연구소가 키웁니다
과학기술정보통신부 산하 정부출연연구기관인 세계김치연구소는 김치 및 발효분야
연구개발과 기술지원 등으로 중소김치업체의 든든한 힘이 되고 있습니다
세계김치연구소는 다양한 연구와 혁신적인 기술로
김치의 가치를 세계적으로 키워나가겠습니다
세계김치연구소
KOLAS
2017 국제공인시험기관 인정
(국가기술표준원 KOLAS)
KELAF
2018 우수동물실험시설 지정
(식품의약품안전처)
김치분야 종합적 연구개발
김치 종주국의 위상 제고를 위한 연구
김치 우수성의 과학적 구명 연구
고품질 상품김치 생산기술 개발
김치세계화 연구
김치의 수출 촉진
해외 현지화를 위한 전략 개발
마케팅 지원 및 홍보
중소기업 지원
기술, 경영, 패밀리기업 지원
FDA 공장/공정 등록 지원
수출식품 영양표시 지원 등
대민지원서비스
김치자원은행 운영
영양성분, 미생물 등 시험분석 지원
전임상/동물실험 지원
WiKim 세계김치연구소
World Institute of Kimchi
광주광역시 남구 김치로 86 Tel. 062-610-1700

그린국제특허법률사무소는 20년 이상의 노하우를 바탕으로 종자산업 분야에 대한 높은 신뢰도의 서비스를 제공합니다.

사무소 강점

20년 이상의 전문분야 업력
- 바이오 등 관련분야 전문인력 77%
  (변리사 7명, 박사 6명, 석사 11명)
- 바이오 등 특허출원 비중 85%
- 발명자 아이디어 문서화 능력 우수

특허등록률·품질 특허업계 최고
- 장기 근속기반 안정적 특허관리
  (변리사 특허경력 28년/명세사 근속연수 11년)
- 특허등록률 80%(4,974건/6,214건)
- BT분야 특허품질(SMART3) 최고획득
  (경상국립대, 전체 5.43점 vs. 그린 5.92점)

품종보호 출원 전문 서비스 可
- UPOV 총회 의장 및 종자원 지원장 역임 최근진 이사 중심 컨설팅
- 품종보호 출원 및 기술이전 업무 위탁 가능

연구기관 특허 이해도 및 경험 高
- 대학 및 연구기관 전담사무소 수행경험 有
  (대학 7개 기관, 연구소 6개 기관)
- IP-R&D, IP분석 등 과제 다수수행
  ('23 차세대바이오그린21사업, 농과원, 원예원 등)
- 국유특허 특허출원, 기술이전 전문가 보유

기술이전·사업화 토탈 서비스 可
- 아이디어 상담부터 IP 창출 및 활용전략
  (기술이전, 사업화) 수립까지 전주기적 컨설팅
- 기술이전 및 사업화기관인 ㈜아이피온 및 투자회사 WP와 전략적 제휴 파트너 구축

대전지역 소재 등
- 연구자 원활한 대면 미팅 가능
- 특허청 인근 소재(도보 5분) → 심사관 면담 용이
- 특허청 심사관 출신 대표 변리사
  → 심판 등 중요사건 처리 용이

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- 2007 국가연구개발 특허기술동향조사사업 기관 선정
- 2011 식물분자육종사업단, 차세대유전체연구사업단 기술동향분석 수행기관 선정
- 2012 정부 R&D 골든씨드프로젝트사업 컨설팅 기관 선정
- 2014 국가특허전략 청사진사업 농림수산식품분야 수행기관 선정
- 2015 연구성과실용화진흥원 대형사업단 성과활용 지원사업 수행기관 선정
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- 2017 지역지식재산창출지원사업(특허-화학·바이오 분야) 수행기관 선정
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- 2018 스타트업 지식재산바우처 사업 IP 서비스 기관 선정
- 2018 식물분자육종사업단 연구과제 수행기관 선정
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- 2018 농업생명공학연구단 연구과제 수행기관 선정
- 2020 신육종기술실용화사업단 연구과제 수행기관 선정
- 2021 산업재산권 진단기관 선정
- 2021 수출지원기반활용사업 수출바우처사업 수행기관 지정

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- 2021 연구개발전담부서 지정

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The Korean Society of Food Preservation

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