

Abstracts of the 10th IUFoST-Japan International Webinar
Japan-Taiwan International Joint Symposium on Food Science:
Co-hosted with two academic societies

Mar. 11th, 2026



**10th IUFOST-Japan International Webinar
Japan-Taiwan International Joint Symposium on Food Science:
Co-hosted with two academic societies**

Date: March 11th, 2026 (Wed) 15:15~17:45 (JST) (Onsite + Online [Zoom webinar])

Organizer: IUFOST-Japan, Japan Society for Bioscience, Biotechnology, and Agriculture (JSBBA)

Supporter: The society for Biotechnology, Japan

Chair: Kaeko Murota, Jun Inoue, Junji Terao, Haruko Takeyama,

Cochair Yasuki Matsumura, Kentaro Matsumiya

Program

15:15-15:20

Opening remarks

Mariko Uehara (President of JSBBA, Tokyo Univ. Agric.)

15:20-15:55

Artificial intelligence assisted technology in precision fermentation for functional foods development

Kuan-Chen Cheng (National Taiwan Univ.)

15:55-16:30

Advanced Raman Spectroscopic Metabolomics for Food Quality Assessment and Microbial Metabolite Monitoring

Masahiro Ando (Res. Org. Nano Life Innov., Waseda Univ.)

16:30-17:05

The Beneficial Effects of Tetrahydrocurcumin in Reproductive and Metabolic Health with Phthalate Exposure.

Ching-Shu Lai (National Kaohsiung University of Science and Technology)

17:05-17:35

Oxidative transformation induces a gain of function in curcumin

○Fumie Nakashima, Takahiro Shibata (Nagoya Univ.)

17:35-17:40

ICPH&ICoFF2026 Trailer

Naomi Osakabe (Shibaura Inst. Tech.)

17:40

Closing remarks

Yasuki Matsumura (President of IUFOST Japan, Kyoto Univ.)

講演番号 : 3JS01S1-01

講演日時、会場 : 3月11日 15:20~ S1会場

Artificial intelligence assisted technology in precision fermentation for functional foods development

○Kuan-Chen Cheng (National Taiwan Univ.)

Microbial fermentation has long been adopted for value-added products production. To improve production yield and to achieve desired quality of target products. Our group aims to utilize the fermentation experience including bioreactor design, strain selection, and microbiological engineering to enhance the production of value-added products such as antimicrobials, organic acids, polysaccharides, and enzymes.

When it comes to food fermentation, we would concentrate on the development of new food ingredients with enhanced health and functional properties. With our experience on fermentation, food chemistry, microbiology, and animal cell culture, I am confident of developing strategic methods for both functional food production and its function evaluation.

Our research team has investigated the health effects of fermented foods made from domestic crops while also using artificial intelligence (A.I.) technology in the precision fermentation of bioactive compounds. Current achievements include the physiological effect of allicin in black garlic, study of reduced salt miso and its inhibition on body fat formation, *Chenopodium formosanum* fermented beverages and their inhibiting roles in PM_{2.5}-induced inflammation, body fat formation and delayed aging, rice screening for fermentation studies with koji bacteria, anti-inflammatory and antibacterial properties of hops, etc.

In the future, our team will continue to utilize agricultural crops with local characteristics to develop fermented products with personalized health benefits and provide value-added food materials for the elderly.

講演番号 : 3JS01S1-02

講演日時、会場 : 3月11日 15:55~ S1会場

Advanced Raman Spectroscopic Metabolomics for Food Quality Assessment and Microbial Metabolite Monitoring

○Masahiro Ando (Res. Org. Nano Life Innov., Waseda Univ.)

Raman spectroscopy offers unique advantages for non-destructive, label-free molecular analysis in food science and biotechnology applications. Recent technological advances have dramatically transformed the field, with significant improvements in instrument miniaturization and sensitivity enhancement over the past decades. Modern portable Raman systems can now perform measurements within seconds, making the technology practical for routine food analysis and industrial applications. This presentation introduces the development of advanced Raman spectroscopic techniques and their applications in comprehensive food quality assessment and real-time monitoring of microbial metabolite production, demonstrating how these technological advances have opened new possibilities for food science.

We have established a Raman spectroscopic metabolomics platform that combines multivariate curve resolution (MCR) analysis with spectral decomposition algorithms. This approach enables simultaneous identification and quantification of multiple biomolecules from complex spectral data without sample pretreatment. The technology provides detailed molecular fingerprinting capabilities spanning from bulk analysis at the centimeter scale to single-cell imaging at the micrometer scale.

Our research demonstrates that this analytical platform successfully enables real-time, non-destructive quantitative analysis of various functional food components without requiring sample preparation or extraction. The technology also provides real-time monitoring capabilities for fermentation processes, allowing visualization of substrate consumption and product formation dynamics throughout the process. Furthermore, we have achieved single-cell level analysis of microbial metabolism, revealing intracellular distribution and temporal changes of both primary and secondary metabolites. These capabilities offer transformative potential for the food industry, enabling rapid quality control, optimization of traditional fermentation processes, and the development of novel functional foods through enhanced understanding of microbial metabolite production dynamics.

講演番号 : 3JS01S1-03

講演日時、会場 : 3月11日 16:30~ S1会場

The Beneficial Effects of Tetrahydrocurcumin in Reproductive and Metabolic Health with Phthalate Exposure

○Ching-Shu Lai (National Kaohsiung University of Science and Technology)

The plasticizer di(2-ethylhexyl)phthalate (DEHP) is a well-known endocrine-disrupting chemical (EDC) that has been linked to reproductive toxicity and metabolic dysfunction, including obesity and type 2 diabetes mellitus (T2DM), highlighting its potential health impacts on humans. DEHP exposure not only causes testicular tissue impairment and spermatogenic dysfunction through ROS and inflammation but also involves dysregulated adipokines.

Tetrahydrocurcumin (THC) is a major metabolite of curcumin and is also naturally occurring in Chinese herbs. THC is recognized as a superior antioxidant with less biotoxicity and displays better bioavailability than curcumin. Here, we demonstrate that exposure to an environmentally relevant dosage of DEHP causes impairment of glucose homeostasis, adipocyte, and testicular dysfunction by deregulating the production of adipokines (leptin and adiponectin) in mice. THC alleviates DEHP-induced testicular dysfunction by not only attenuating inflammation, oxidative stress, and apoptosis but also involving white adipose tissue (WAT)-derived adiponectin signaling in the testis.

This work demonstrated for the first time the potential of THC in the amelioration of WAT and testicular dysfunction during DEHP exposure, revealing the promising candidate of THC targeting EDC exposure on human health.

講演番号 : 3JS01S1-04

講演日時、会場 : 3月11日 17:05～ S1会場

Oxidative transformation induces a gain of function in curcumin

○Fumie Nakashima, Takahiro Shibata (Nagoya Univ.)

A diverse range of food-derived low-molecular-weight compounds have been recognized for their various beneficial bioactivities, including anti-inflammatory, antioxidant, and anti-tumor effects. Throughout history, it has been well-recognized that specific foods can contribute positively to human health; however, the precise molecular mechanisms underlying the bioactivities of these compounds remain largely unclear.

Our research has focused on the electrophilic properties of food-derived compounds, leading to the identification of several proteins that serve as target molecules for the anti-inflammatory effects of these low-molecular-weight compounds. In this presentation, the anti-inflammatory mechanisms of curcumin will be described.

Curcumin is a yellow polyphenolic compound abundantly contained in the root of turmeric (*Curcuma longa*). Our study has focused on the anti-inflammatory activity of electrophilic curcumin metabolites formed through oxidative transformation under physiological conditions. This oxidative conversion is crucial for the anti-inflammatory activity of curcumin, as evidenced by the fact that the oxidized curcumin metabolites exhibit stronger anti-inflammatory effects than original curcumin. Furthermore, mass spectrometric analysis has revealed that electrophilic oxidized curcumin metabolites react with low-molecular-weight thiol compound. These findings suggest that the covalent modification of proteins by oxidized curcumin metabolites may alter their functions, thereby contributing to anti-inflammatory activity. The modification of curcumin metabolites to proteins related to inflammatory responses is currently under analysis.

polyphenol, oxidative metabolite, protein modification

IUFoST-Japan

構成学協会

(公社) 日本農芸化学会

(公社) 日本食品科学工学会

(公社) 日本栄養・食糧学会 日本動物細胞工学会

日本動物細胞工学会

日本フードファクター学会

IFT ジャパンセクション

(一社) 日本食品工学会

賛助会員

キッコーマン株式会社

高砂香料工業株式会社

株式会社 日清製粉グループ本社

不二製油株式会社

(五十音順)

特別賛助

山崎製パン株式会社

本セミナーは、(公財) 飯島藤十郎記念食品科学振興財団および
(一財) 杉山産業化学研究所より助成を受けて開催するものです。