Board No.	1
Author Name	Sajid Maqsood
Organisation	United Arab Emirates University
Country	United Arab Emirates
Title	Novel Probiotic Lactobacillus Reuteri Fortified Camel Milk Infant Formula: Effect Of Encapsulation, Digestion and Storage on Probiotic Cells Viability
Abstract Text	*Lactobacillus reuteri* fortified camel milk infant formula (CMIF) was produced. The effect of encapsulation in different matrices (sodium alginate and galacto-oligosaccharide) via spray drying, simulated infant gastrointestinal digestion (SIGID), and storage conditions (temperature and humidity) on the viability of *L. reuteri* in CMIF and the physicochemical properties of CMIF were evaluated. Compared to free cells, encapsulated cell viability was significantly enhanced against SIGID conditions. However, *L.reuteri* viability in CMIF decreased after 60 days, prominently at higher storage humidity and temperature levels. At the end of storage period, significant changes in the color values were observed in all CMIFs with reduction in their greenness, increase in yellowness, and a wide variation in their whiteness. Over 30 days storage at lower humidity conditions (a_w=0.11 and 0.33) and room temperature (25°C), no significant increase in CMIFs rancidity rates was noted. FTIR analysis showed that, compared to the other storage conditions, CMIFs experienced fewer changes in functional groups when stored at a_w=0.11. Overall, camel milk fortified with encapsulated *L.reuteri* can be suggested as a promising alternative in infant formula industries, potentially able to maintain its physicochemical characteristics along with the probiotic cells viability, when stored for 60 days at a_w=0.11 and temperature (25 °C).
Categories	Food Processing and Engineering
Other Authors	Name: Mariam Rashed Alghaithi Organisation: United Arab Emirates University City: Al-Ain Country: United Arab Emirates Name: Priti Mudgil Organisation: United Arab Emirates University City: Al-Ain Country: United Arab Emirates

Board No.	2
Author Name	Javier Parada
Organisation	Universidad Austral de Chile
Country	Chile
Title	Anti-Alzheimerâ€™s disease potential of seaweed Durvillaea incurvata extract obtained by ultrasound-assisted extraction (UAE).
Abstract Text	*Durvillaea incurvata* is endemic edible Chilean seaweed. The present research explored the anti-Alzheimer's disease potential of this seaweed, related with its polyphenolic content. Phenolic compounds were extracted by Ultrasound Assisted Extraction (UAE) using ethanol/water 70% (v/v). Extraction process was optimized by using Response Surface Methodology (RSM). Total Phenolic Content and Antioxidant capacity were the dependent variables. After the optimal condition of UAE was obtained, the inhibitory activity of cholinesterase enzymes (AChE or BChE) was measured to such extract. Through optimization analysis of multiple responses the best combination of factors levels was achieved: 50°C, 80.8min, and 8s pulse cycle of ultrasound. At such condition, the estimated values for response variables were 1259 mg EAG/100g (TPC), 2851 µmol ET/100g (DPPH), and 42834 µmol ET/100g (ORAC). Compared with control method, the UAE generated extracts having similar TPC ($p>0.05$), but higher antioxidant capacity (~60% higher for DPPH and ~33% higher for ORAC; $p<0.05$). The extract obtained at optimal conditions showed capacity to inhibit both AChE and BChE: 35.4 and 14.3 % of inhibition, respectively (5 µg/mL). So, seaweed *Durvillaea incurvata* could be considered as an interesting raw material to develop anti-Alzheimer ingredients for food application.
Categories	Food Processing and Engineering
Other Authors	Name: Romina Montecinos Organisation: Universidad Austral de Chile City: Valdivia Country: Chile Name: Mario J. Simirgiotis Organisation: Universidad Austral de Chile City: Valdivia Country: Chile

Board No.	3
Author Name	Chi Nhan Tran
Organisation	Can Tho university
Country	Vietnam
Title	Factors affecting hydrolysis conditions of partially hydrolyzed milk for allergy
Abstract Text	*Milk is widely known as a source of the most essential and balanced nutrient necessary for humans of all ages. However, many people could not consume milk because of its allergic ingredients (α-LA, β-LG) and absorption difficulty (mainly lactose). The study focused on investigating factors affecting the hydrolysis of enzyme β-galactosidase and papain: (1) the change in enzyme β-galactosidase as concentrations (0÷5 IU/ml), temperature (32÷42^{o}C), time (0÷210 min), pH (6,0÷7,5); (2) the change in enzyme papain as concentration (0÷13 mIU/mg protein), temperature (40÷70°C), time (0÷45 min), and pH (8,0÷9,5). The results showed that the most appropriate concentration for β-galactosidase hydrolysis was 4 IU/ml, at a temperature of 37°C in 180 minutes and pH 7.0. In addition, the highest value of %DE (51,25%) was also obtained. Moreover, enzyme papain proved the most increased activity at 10 mIU/mg proteins, temperature 60°C in 30 minutes, pH 8,0 with 2,09% %DH. In this condition, the product showed the highest sensory values, and the allergic components (α-LA, β-LG) were mostly hydrolyzed.* **Keyword**: *milk, lactose, protein, monoglyceride, hydrolysis milk*
Categories	Food Processing and Engineering
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Board No.	4
Author Name	Zun Wang
Organisation	University of Melbourne
Country	Australia
Title	Chitosan nanoparticles enhance the performance of cellulose-based edible coatings applied to achieve defined quality attributes of deep-fried meatballs
Abstract Text	Deep-frying of foods enhances taste and flavor thus making these foods appealing to people globally. However, regular consumption of deep-fried foods is strongly linked to negative health impacts such as obesity and cardiovascular disease, due to the high oil intake, particularly if the oil is chemically degraded to trans fatty acids and other undesirables during the high temperature cooking. Cellulose-based edible coatings can be used in oil-cooked products to reduce oil absorption due to their excellent barrier properties to water and oil. Recent studies suggested that the addition of chitosan nanoparticles could further enhance the mechanical properties and reduce the water vapor permeability of edible films. This paper investigated the effect of adding chitosan nanoparticles to cellulose-based edible coatings on the food quality of deep-fried beef meatballs. Three common cellulose derivates, methylcellulose, hydroxypropyl methylcellulose and carboxymethyl cellulose, were used as coating materials. The coating pick-up, cooking yield, water loss, oil uptake, color and texture of deep-fried meatballs were analyzed. The results indicated that the addition of chitosan nanoparticles reduced water loss and oil uptake of the coated deep-fried meatballs, and the meat balls were more tender without compromise of color.
Categories	Food Processing and Engineering
Other Authors	Name: Ken Ng Organisation: University of Melbourne City: Melbourne Country: Australia Name: Robyn Dorothy Warner Organisation: University of Melbourne City: Melbourne Country: Australia Name: Regine Stockmann Organisation: CSIRO Agriculture & Food City: Melbourne Country: Australia Name: Zhongxiang Fang Organisation: University of Melbourne City: Melbourne Country: Australia

Board No.	5
Author Name	Lee Suyeon
Organisation	Gachon University
Country	South Korea
Title	Analysis of physiochemical characteristics and structures of pulverized oyster shell thermal processed and citric acid added for food grade applications
Abstract Text	Oyster shell, a waste of marine industry causing environmental pollution, has been drawing interest as a rich source of calcium supply. Since pulverized oyster shell shows poor characteristics for biological utilization, an effective process has long been required to enhance water solubility and applicability. Here, we investigated the physiochemical properties and structural analysis of thermal processed pulverized oyster shell (TPOS) and citric acid treated TPOS (TPOSc) for possible food applications in comparison with those of commercial food grade calcium products from coral (CC) and fibrous calcium carbonate (FC). The water solubility was 0.78 mg/mL, 0.5 mg/mL, 0.4 mg/mL, and 0.1 mg/mL for FC, TPOS, TPOSc and CC, respectively. The observation was highly related with the particle sizes which were analyzed as an average of 476 nm for FC, 1000 nm for both TPOS and TPOSc, and 1981 nm for CC. SEM and XRD informed that only calcium carbonate which was calcite crystal structure was found in CC, but other samples contained all calcium compounds of lime cycle. Consequently, we supposed that the thermal process improves solubility by converting calcium carbonate into calcium oxide, and TPOS is the most effective in possible food grade calcium products.
Categories	Food Processing and Engineering

Board No.	6
Author Name	Erich J. Windhab
Organisation	ETH Zurich; Food Process Engineering Laboratory (FPE)
Country	Switzerland
Title	Advanced Tailoring of textural and nutritional characteristics for plant protein-based meat alternatives by novel HMEC Micro-foam Processing
Abstract Text	High moisture extrusion cooking (HMEC) is a technology to create fibrous structures from plant proteins resembling the texture of meat. High Moisture Meat Analogues provide similar textural mouthfeel to meat but are an alternative with only a fraction of the massive environmental impact of meat. During high moisture extrusion cooking plant protein containing raw materials are typically hydrated, sheared and heated up to 160°C. In an attached cooling die, the mass is cooled to a temperature below 100°C to avoid flash evaporation at the die exit. During such thermal and mechanical processing, proteins go through structural changes and phase transitions and reassemble in a shear and elongational flow-induced structure which is stabilized by the formation of crosslinks. To adjust tailored textural and nutritional characteristics in a customized consumer-relevant range, innovative processing steps such as (i) micro-**F**oaming, (ii) **P**ore-**O**pening and (iii) Pore-**F**illing were integrated into the newly introduced HMEC-FPOF meat analogue processing technology. Refined flow management in the extrusion die entrance and distinct cooling die sections was mastered taking the viscoelastic rheology of the pressure-aerated protein melt for pore structure formation and pore-opening/filling into account. Scaling rules derivation and pilot scale demonstration were successfully executed.
Categories	Food Processing and Engineering
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Board No.	7
Author Name	Phunsiri Suthiluk
Organisation	Research Group of Postharvest, School of Industry, Mae Fah Luang University
Country	Thailand
Title	Bioactive compounds in pineapple juice as affected by high hydrostatic pressure (HHP)
Abstract Text	The effect of high hydrostatic pressure (HHP) on bioactive compounds in pineapple juice was clarified in this study. The amount of vitamin C, total phenolic compounds (TPC), total carotenoid content (TCC), protein content, proteolytic activity, antioxidant activity (FRAP assay) as well as aerobic plate count (APC) were determined after HHP treatment at 600 MPa, 10°C for 5 min. The results were compared with untreated pineapple juice (fresh) and conventioanl heat treated sample (CHT, 65°C for 10 min) at 0, 5 and 10 days of storage at 4±1°C. It was found that TPC, FRAP value, protein content and proteolytic activity in HHP treated pineapple juice were not significantly difference compared to untreated pineapple juice after 10 days storage. Moreover, less change in color difference (âˆ†E) was obtained in HHP treated sample as 0.54 - 1.40 during storage. The lowest value of TCC, FRAP value and protein content was found in CHT as 0.36 mg/100 ml, 2061.46 uM $FeSO_4$/100 ml and 19.50 mg/100 ml, respectively. In addition, HHP treatment reduced APC similar to conventional heat treatment. Therefore, HHP could be alternative technology for preserving some bioactive compounds and providing fresh-like product of pineapple juice.
Categories	Food Processing and Engineering
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Board No.	8
Author Name	Maribeth A. Saporas, Prof. Maria Christina B. Ramos, Dr. Anthony Sales
Organisation	Food Processing Innovation Center – Davao
Country	Philippines
Title	Development and Marketability of a Spray-dried Young Coconut Water with Young Coconut Meat
Abstract Text	The Philippines is the second world's largest producer of coconut products. Fresh coconut water or juice, often added with bits of coconut meat, is sought for its thirst-quenching property, and as a natural source of electrolytes. However, it has a limited shelf life and its preparation is inconvenient. This study aimed to develop an instant young coconut water powdered drink, as well as determine its market potential. The product was subjected to the iterative process of design, development, and testing using the voice of customers. The fourth iteration of the spray-dried young coconut juice has a white, fine powdery color, and texture. It is soluble in water by merely shaking the powder in a container with a lid. It contains magnesium, calcium, protein, potassium, and sodium-based on the nutritional analysis conducted. Furthermore, the financial and market studies showed that the product is feasible for commercial production and the highest potential market and age group were the physically active individuals and an age group of 26 to 35 years old, respectively. Results of this study showed its potential for commercial production, offering a convenient on-the-go product and assuring the preservation of its electrolytes by the use of spray drying technology.
Categories	Food Processing and Engineering
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Board No.	9
Author Name	Yujia Liu
Organisation	University of Auckland
Country	New Zealand
Title	Daylight-driven photodynamic activity of food-grade colorants for reducing food spoilage
Abstract Text	Photodynamic inactivation (PDI) is a promising strategy to overcome the challenges associated with microbial contamination. Current PDI techniques in clinical applications involve energy-intensive and expensive lasers or UV lamps and the used photosensitisers are not suitable for food products. The present study investigated the synergistic antimicrobial activity of daylight-LED combined with food-grade colorants for inactivating food spoilage bacteria. The photodynamic activity of the selected photosensitisers was evaluated by quantifying the cytotoxic reactive species (ROS). The results show that the ROS production of curcumin, erythrosin B, and chlorophyllin under 1-hour illumination were 5.23, 0.75, and 19.00 times higher than those in the dark. Combinations of 250 uM curcumin – blue LED (12.74 mW/cm^2), 10 uM erythrosin B - green LED (5.56 mW/cm^2), and 10 uM chlorophyllin sodium copper salt - red LED (11.05 mW/cm^2) inactivated approximately 3.99, 6.69, 7.20 Log CFU/mL of Gram-positive *Bacillus cereus* after 1-hour illumination, respectively. However, less than 1-log reduction of Gram-negative *Pseudomonas fluorescens* was observed under the same treatment. Additionally, the curcumin combined with blue-LED can inhibit the growth of *P. fluorescens* after 30-min irradiation. In summary, this research presents a green, cost-effective, food-safe method for reducing spoilage microbes in foods.
Categories	Food Processing and Engineering
Other Authors	Name: Kang Huang Organisation: University of Auckland City: Auckland Country: New Zealand

Board No.	10
Author Name	Chou, Yu-Jou
Organisation	National Taiwan University
Country	Taiwan
Title	Reaction mechanism of atmospheric cold plasma on seed germination and increase Î³-Aminobutyric acid.
Abstract Text	ACP is a non-thermal processing technology that has many applications due to its high reactive species, which promote seed germination without by-product. Mung bean sprouts are common sprouts with low calories, high dietary fiber, and high vitamin and mineral content. This study hopes to understand the role of ACP in promoting the germination mechanism of mung bean, and observing that ACP gives plants a kind of adversity, can promote the synthesis of GABA by mung bean. Mung bean was treated with ACP which can promote GABA biosynthesis, and cultured for 72 hours to produce mung bean sprouts. Then, the effects of ACP on its mechanism were studied by seed vigor index, appearance and enzyme change. The results showed that the treatment of mung bean by plasma can effectively improve the seed vigor index and significantly increase the GABA biosynthesis content. The treatment of plasma by seed can be divided into surface and internal action, wherein the etching of the plasma can effectively change the permeability of the seed coat, and the active substance penetrates into the cell to react with it thereby promoting the growth of mung bean sprouts and increasing the content of bioactive component.
Categories	Food Processing and Engineering
Other Authors	Name: James Swi-Bea Wu Organisation: National Taiwan University City: Taipei Country: Taiwan Name: Yu-Wen TING Organisation: National Taiwan University City: Taipei Country: Taiwan

Board No.	11
Author Name	Jian-Yong Chua
Organisation	National University of Singapore
Country	Singapore
Title	Soy (tofu) whey as a novel source of fermentation substrate for alcoholic fermentation
Abstract Text	Soy (tofu) whey is a liquid by-product generated from tofu production. It is often discarded as wastewater after it is generated due to its perishable nature and a lack of knowledge to utilize this by-product. However, it has been found that soy whey contains sufficient nutrients to support the growth of different microorganisms, and this led to the discovery of using the entirety of soy whey as a fermentation substrate for alcoholic fermentation. Soy whey supplemented with only sucrose and malic acid had been found to support the growth of different *Saccharomyces cerevisiae* strains and non-*Saccharomyces* yeasts, particularly *Torulaspora delbrueckii* and *Lachancea thermotolerans*. Even though the yeasts were able to ferment the supplemented sucrose into ethanol, it was found that soy whey is deficient in yeast assimilable nitrogen. Valine, leucine, isoleucine and phenylalanine were then supplemented individually to the soy whey to improve the nitrogen content. The four amino acids sped up the overall fermentation speed, lowered the residual sugar content and each amino acid led to the increased production of corresponding higher alcohols and esters. Therefore, with proper nitrogen supplementation and yeast selection strategy, a unique soy alcoholic beverage with distinct characteristics can be produced from soy whey.
Categories	Food Processing and Engineering
Other Authors	Name: Shao-Quan Liu Organisation: National University of Singapore City: Singapore Country: Singapore

Board No.	12
Author Name	Ricco Tindjau
Organisation	National University of Singapore
Country	Singapore
Title	Evaluation of potential of probiotic Bifidobacterium animalis subsp. lactis to valorize tofu (soy) whey: Growth, survival, and metabolic activities
Abstract Text	Although bifidobacterial strains are common components of the probiotic repertoire, their use in food fermentation is not as prominent as lactic acid bacteria. In this work, probiotic *B. animalis* subsp. *lactis* Bl-04 was used to ferment tofu whey, a side-stream product from tofu manufacturing. Tofu whey was supplemented with various nutrients (glucose, G; glucose + cysteine, GC; glucose + cysteine + yeast extract, GCY) and evaluated as substrates for bacterial growth. Bl-04 was able to grow on average by 1.5 log(CFU/mL) within 48 hours, while CN (control, non-supplemented), G and GCY supplementations were able to sustain live bifidobacteria for 4 weeks at 4 °C. Metabolic activities led to decrease in sucrose, cysteine, and succinic acid with formation of acetic and lactic acid in the range of 1.5-3 mg/mL, and vitamin B_{12} at 13-30 ng/mL. PCA analysis of volatiles shows a distinct clustering between fermented and unfermented samples due to the formation of short-chain fatty acids (acetic, butyric and isovaleric acid), 2,3-butanedione (acetoin), and 3-methylthiophene. Overall, this study demonstrated the possibility of using *B. animalis* subsp. *lactis* Bl-04 in valorization of tofu whey with high live counts and improved bioactive components.
Categories	Food Processing and Engineering
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Board No.	13
Author Name	Sofía Belén González Lezana
Organisation	Universidad de La Frontera
Country	Chile
Title	Formulation of emulgel systems based on defatted potato starch/laccase gum with encapsulated astaxanthin
Abstract Text	Combining natural polymers' elaboration of O/W emulgel favors the encapsulation of lipophilic/phobic bioactive compounds. The objective of the study was to evaluate the effect of process variables (gelling agent content, potato starch/degreased shellac (PS/SD) mixture, temperature, time, and agitation) affecting the emulgel formulation (O/W) on the encapsulation efficiency of astaxanthin ($_{AX}$EE). For this purpose, at 2^5 factorial design was performed, using PS gelling agent as a control. The results showed that the $_{AX}$EE ranged from 76.4± 0.7 to 95.8±0.5%. ANOVA of the experimental design showed that the variables gelling agent content (10-20 % w/w), PS/SD mixture (100/0-25/75 % w/w), time (5- 10 min) and the interactions AP/SD ratio - temperature and AP/SD ratio - time had a significant effect ($p<0.05$) on the $_{AX}$EE. Optical microscopy showed tiny oil droplets containing AX with low agglomeration. SEM microscopy revealed that the emulgel structure presented tiny pores on the emulgel surface. Confocal microscopy showed a homogeneous distribution of oil droplets containing AX in the emulgel system. The results showed that variables and working levels of the selected factorial design significantly ($p<0.05$) increased the $_{AX}$EE in the emulgel system. In addition, the PS/SD mixture was the most influential variable on the $_{AX}$EE.
Categories	Food Processing and Engineering

Board No.	14
Author Name	Heng Hui GAN, Andrea Ng
Organisation	Nanyang Polytechnic
Country	Singapore
Title	A Novel Taste of Asian
Abstract Text	When World Health Oganization (WHO) declared the coronavirus disease outbreak to be global health emergency at the end of January 2020, partial or total lockdown in many countries resulted. Supply network at the source and destination had extreme effects on global supply chain, and production process was badly disrupted. Sustainability is imperative for long-term food security as the environment and availability of natural resources are essential for supplying food and preserving biodiversity. Alternative foods like plant-based products and novel food processing thus become solutions to food security and sustainability, since they have less negative impact on the environment and fewer resources are required to manufacture them. In a country like Singapore, where land is scarce, it is essential to use novel ingredients that require little land for the mass production of food. The objective of this project is to develop a ready-to-eat, value-added plant-based soup dumplings with zero-waste, that are high in protein and fibre; low in fat and sodium, with the taste and mouthfeel of the all-time favourite animal version, suitable for the mass market. Data from consumer sensory evaluation and microbial analysis demonstrated the acceptance and safety of these dumplings as a palatable alternative.
Categories	Food Processing and Engineering
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Board No.	15
Author Name	Setya Budi Muhammad Abduh
Organisation	Department of Food Technology, Universitas Diponegoro
Country	Indonesia
Title	Effect of Pulsed Electric Fields Processing on Potato: Starch Granule Properties and Kinetic of Colour Development During Frying
Abstract Text	The use of pulsed electric fields (PEF) technology in potato industry is gaining attention and hence exploring whether PEF influence the physicochemical properties and processing characteristics of potatoes has become important. This research investigated the effect of PEF on the starch granule properties (i.e. birefringence, gelatinisation behaviour and thermal properties) and colour development of potato slices during frying. All tubers were treated with PEF at 1 kV/cm at either 50 or 150 kJ/kg specific energy input. Using a kinetic approach and four industry-relevant potato cultivars, the rate constant (k) of the change in the lightness (L*) for untreated and PEF-treated potato slices during frying (150–190°C) was estimated. All fried samples followed a first-order reaction of L* reduction. Based on Arrhenius equation, a lower activation energy (by 3 to 19 %) was predicted for samples from 'Russet Burbank' and 'Crop77' PEF-treated at both 50 and 150 kJ/kg suggesting their rate constant of the change in L* became more temperature stable during frying. Overall, this study demonstrated that PEF posed negligible impact on potato starch granule properties and PEF-treated samples developed minimal change in L* over a broad range of frying temperatures compared to their untreated counterparts.
Categories	Food Processing and Engineering
Other Authors	Name: Sze Ying Leong Organisation: Department of Food Science, University of Otago City: Dunedin Country: New Zealand Name: Chun Zhao Organisation: Department of Food Science, University of Otago City: Dunedin Country: New Zealand Name: Samantha Baldwin Organisation: The New Zealand Institute for Plant and Food Research Limited City: Lincoln Country: New Zealand Name: David J. Burritt Organisation: Department of Botany, University of Otago City: Dunedin Country: New Zealand Name: Dominic Agyei Organisation: Department of Food Science, University of Otago City: Dunedin Country: New Zealand Name: Indrawati Oey Organisation: Department of Food Science, University of Otago City: Dunedin Country: New Zealand

Board No.	16
Author Name	Manoj Ramkrishna Sawale
Organisation	Purdue university
Country	USA
Title	E. faecium as a surrogate organism for the microbiological validation of popcorn popping in commercial manufacturing
Abstract Text	Corn is a major cereal crop globally. Worldwide, the direct consumption of corn as food reached 150 million tons in 2018. Popcorn is a trendy snack prepared by food manufacturers. However, little research had been carried out regarding food safety aspects of the popping process. A popcorn kernel is a low moisture product with water activity around 0.65. The objective of this study was to evaluate the microbial inactivation of pathogenic microorganisms on corn using different popping methods such as air-popping, microwave, and conventional methods at a consistent water activity of 0.65. Five log reduction was achieved for *E. coli, L. monocytogenes, E. faecium,* and *Salmonella spp.* The air popping method was further explored for the kinetic parameter or inactivation for all pathogens and the surrogate organism. The D value of *E. coli, L. monocytogenes, Salmonella, and E. faecium* was 19.82, 22, 22.62, and 25 sec, respectively. According to thermal kinetic data of air popping on the popcorn kernel, *E. faecium* showed more resistance than other pathogens. Hence, *E. faecium* can be used as a surrogate organism in popping validation tests.
Categories	Food Processing and Engineering
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Board No.	17
Author Name	Bhesh Bhandari
Organisation	The University of Queensland
Country	Australia
Title	Non-conventional application of membrane technology for emulsification and nano-bubble generation
Abstract Text	Membrane technology is conventionally applied for the separation of food components or the concentration of solids. This presentation will provide the non-conventional use of membrane modules for novel processing purposes. This technology was applied for emulsification process such as to prepare single or double emulsions. The emulsification by membrane method was done for both water-in-oil and oil-in-water, and their double emulsions. In addition, the membrane module was used to diffuse the gases into food liquids or for the generation of nano-bubbles on them. Commercial membrane systems (ceramic or porous glass membranes) were used to generate nanobubbles of carbon dioxide gases and incorporate them into the liquid food products, such as concentrated fruit juice, palm oil and milk concentrate to influence their physical properties: viscosity, crystallisation and textural attributes as relevant. This presentation will describe the continuous membrane design, methodology, and obtained results from this research work.
Categories	Food Processing and Engineering
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Board No.	18
Author Name	Fabrizio Sarghini
Organisation	University of Naples Federico II
Country	Italy
Title	Microencapsulated secoiridoids of Gentiana lutea root extract in ethylcellulose: effect of processing parameters in gastric resistance and controlled release
Abstract Text	The intake of secoridoids at intestinal level has shown inhibitory properties of the stimulus to hunger and for this reason they can represent an interesting tool in the fight against obesity. Ethyl cellulose microparticles were developed for *Gentiana lutea* root extract (GE) controlled delivery system to mask bitterness in the mouth and to prevent the release of secoiridoids in the acidic environment of the stomach, while allowing the release in the intestine. Microspheres were prepared by solvent extraction/evaporation technique by dissolving the bioactive compound in system containing the ethyl cellulose carrier material. In this work the effect of processing parameters (Reynolds number, loading content and tensioactive percentage) on final microparticles' dimension and gastric resistance is investigated. The effect of loading content (4, 6, 7.75, 10 and 12.5 solid percentage) on entrapment efficiency (EE) was evaluated for total phenolic content determination. The results showed high holding rates of microencapsulated phenolics with EE from 47.2–87.2%. The increase of the quantity of GE caused decreasing the loading efficiency. The obtained release profiles were characterized by a burst effect leading to higher load release rate at the early stages presumably due to high amount of GE adsorbed at the surface of microsphere.
Categories	Food Processing and Engineering
Other Authors	Name: Angela De Vivo Organisation: University of Naples Federico II City: Portici Country: Italy

Board No.	19
Author Name	Elisa Julianti
Organisation	Department of Food Science, Faculty of Agriculture, Universitas Sumatera Utara
Country	Indonesia
Title	Chemical and Functional Properties of Nanocrystal Starch from Purple Sweet Potato var. Ayamurasaki
Abstract Text	Purple sweet potato variety Ayamurasaki is one type of sweet potato that is widely cultivated by farmers, especially in North Sumatra, Indonesia. Its high starch content has the potential to be used as a food ingredient, especially as a source of starch. The use of natural starch from purple sweet potato as a food ingredient has limitations, so that in this study, starch modification was carried out to form nanocrystal starch. The modification was carried out by acid hydrolysis using 3 types of acids, namely acetic acid, lactic acid, citric acid with a concentration of 7.5% (w/V) and a ratio of starch and acid 1: 5 (w/w). The resulting nanocrystals starch have higher total sugars and reducing sugars than natural starch. The nanocrystal starch produced from the hydrolysis process using lactic acid had the highest dextrose equivalent value of 29.50%. Acid hydrolysis increased the solubility and swelling power of nanocrystalline starch compared to natural starch. The highest solubility of starch nanocrystals was obtained from the hydrolysis process with acetic acid, which was 61.31%, and the lowest was obtained from the hydrolysis process with lactic acid, which was 58.96%.
Categories	Food Processing and Engineering
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Board No.	20
Author Name	Vinayak Ghate
Organisation	National University of Singapore
Country	Singapore
Title	A comparison of germination methods to sensitise Bacillus amyloliquefaciens endospores to high pressure processing
Abstract Text	Currently, high pressure processing (HPP) cannot be used to produce shelf-stable juices because of its inability to kill bacterial endospores. The elimination of bacterial endospores by can be enabled by germinating them prior to HPP. Therefore, this study tested three methods of germinating Bacillus amyloliquefaciens endospores - mechanical abrasion, nutrient-induced germination and activation of cortex lytic enzymes (CLEs). Germination by mechanical abrasion using 0.1 mm glass beads in a BeadBeater machine for 60 s resulted in an insignificant level of germination but attained significant endospore killing of 81.5%. Incubating the spores with a nutrient - 10 mM each of L-arginine, D-glucose, D-fructose and KCl (AGFK) in a buffer for 2 h achieved a statistically significant but a relatively low level of germination of 35.1%. The most effective method was observed to be the activation of CLEs, achieved by the addition of 60 mM of 1:1 calcium dipicolinic acid (Ca-DPA). This resulted in germination of more than 99.99%, a major improvement over the other two methods. Hence, future research should focus on identifying food-grade activators of CLEs. Developing mechanical abrasion as a unit operation for spore killing also merits attention.
Categories	Food Processing and Engineering
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Board No.	21
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Organisation	Kyung Hee University
Country	South Korea
Title	Effect of insoluble glucans on preparation and physicochemical properties of short chain glucan aggregates (SCGAs)
Abstract Text	The effect of insoluble glucans on the physicochemical properties of SCGA and the effect of insoluble glucans on the physicochemical properties of SCGA was investigated. The insoluble glucans contributed to the rapid formation and crystallization rate in SCGA possibly due to their role as an initiator in both formation and crystallization. In HPSEC data, SCGA with insoluble glucans (SCGA-IS) showed higher molecular weight (MW), degree of polymerization (DP), and peak area of peak 1 than those of SCGA without insoluble glucans (SCGA-S). Insoluble glucans with high MW fractions act as nuclei or templates, resulting in rapid formation and crystallization. Although both SCGAs are spherical, the average particle size of SCGA-IS was bigger than that of SCGA-S. Both SCGAs showed B-type crystallinity, but SCGA-IS had higher relative crystallinity than SCGA-S. Opposite to XRD, DSC enthalpy, which expresses the amount of double helix, was higher at SCGA-S. This suggests that SCGA-IS has less amount of double helix but more packed double helix. The RS contents of SCGA-IS were higher than that of SCGA-S, possibly due to its higher crystallinity and larger size. Consequently, the constituents of SCGA such as insoluble glucans is an important factor which characterizes the physicochemical properties of SCGA.
Categories	Food Processing and Engineering
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Board No.	22
Author Name	Rakesh Singh
Organisation	University of Georgia
Country	USA
Title	Improving aflatoxin detoxification efficiency of UV treatment in contaminated peanuts by selected wavelength or additional free radical source
Abstract Text	Effect of UV on aflatoxin degradation has been widely studied, yet the reduction rate was still slow and hence limits its practical use. A conventional UV treatment employs the radiation in UV-C range and takes several hours to obtain acceptable aflatoxin reduction. This study aimed at enhancing the aflatoxin reduction rate by using the effective wavelength or adding H2O2 as a free radical source. The aflatoxin reduction rate of radiation in UV-A range (24%) was significantly higher than that of UV-B (8%) and UV-C (7%) in a half-hour irradiation. The oil quality of peanuts was affected under UV-C radiation but not influenced by UV-A. These results justified the use of solar radiation, which is rich in UV-A, in aflatoxin detoxification. Adding 1 g/hg H2O2 into peanuts followed by a 1-h UV-C irradiation enhanced the aflatoxin reduction from 21% to 33%. The degradation compound observed in a conventional UV process, aflatoxin B2a, was not found with the presence of H2O2. The oil quality was slightly deteriorated by the combination treatment but was not significantly different from that of using only UV-C radiation. The residual H2O2 in treated peanuts was removed by drying at 35°C for 12 h.
Categories	Food Processing and Engineering
Other Authors	Name: Ming-Hsun Shen Organisation: University of Georgia City: Athens Country: United States

Board No.	23
Author Name	Chunsen Wang
Organisation	Department of Food Science and Technology, Tokyo University of Marine Science and Technology
Country	Japan
Title	Improvement of OH pasteurization processes of liquid eggs by computer simulation models including reaction kinetic and flow analysis
Abstract Text	Non-uniformities in the temperature distribution of ohmic heated liquid eggs (egg white, egg yolk, and whole egg) have been reported specially using high frequency ohmic heating (OH) systems which compromises the degree of pasteurization and quality retention. In this study, 3D computer simulation models were developed using COMSOL Multiphysics, for static and agitated systems, combining the electric current, heat transfer, fluid flow, chemical species transport and mathematics modules to visualize the distribution of temperature, pasteurization degree, and thermal protein denaturation during the OH processes. The heating conditions were optimized according to a high constant thermal protein non-denaturation ratio (X value), a low total color difference value ($\Delta E < 3$), and certain pasteurization standards for each sample. For static OH treatments, the addition of concurrent external heating reduced the process time and prevented local overheating. For agitated OH systems, a more uniform temperature distribution of liquid eggs during processing has been obtained by simulation analyzing the flowing behavior, sample properties as viscosity, and processing parameters such as rotation speed, mixer material and size. Liquid eggs could achieve better the pasteurization requirements while keeping high quality after a short time processing under the optimized conditions.
Categories	Food Processing and Engineering
Other Authors	Name: Yvan Llave Organisation: Department of Food Science and Technology, Tokyo University of Marine Science and Technology City: Tokyo Country: Japan Name: Noboru Sakai Organisation: Department of Food Science and Technology, Tokyo University of Marine Science and Technology City: Tokyo Country: Japan Name: Mika Fukuoka Organisation: Department of Food Science and Technology, Tokyo University of Marine Science and Technology City: Tokyo Country: Japan

Board No.	24
Author Name	Wen Guo
Organisation	Department of Food Science and Technology, Tokyo University of Marine Science and Technology
Country	Japan
Title	Ohmic cooking of salmon fillets at high frequencies â€“ Analysis of the muscle tissue arrangement on the electrical behavior
Abstract Text	To deal with non-uniformities in temperature distribution in layered structure foods, as in the case of salmon fillets, the heating characteristics, and properties of several muscle parts were evaluated during ohmic cooking at 20 kHz. In salmon muscle tissue, the rearrangement of myotome and myoseptum sections might be the origin of hot/cold spots occurrence during ohmic heating (OH) treatment. The electrical conductivities (EC) of five salmon muscles (top lion, lion, belly, second cut, and tail) were measured considering the applied frequency (between 50 Hz and 20 kHz), temperature (10 to 90 ℃), the direction of the electric current (parallel, series and bias) in relation to the myotome geometrical arrangement, and the chemical composition of the salmon muscles. The effect of myoseptum presence on the electric current behavior was analyzed by magnetic resonance imaging and differential scanning calorimetry measurements for the micro-structure and protein denaturation, respectively. The influences of the presence and arrangement of myoseptum in salmon fillets, the EC values and chemical composition of each evaluated muscle on electrical behavior have been identified and used to heat more uniformly during OH process. Evaluated approaches might be extended to other muscle and layered foods.
Categories	Food Processing and Engineering
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Board No.	25
Author Name	Lee Hye Won
Organisation	Seoul Women's University
Country	South Korea
Title	Microbial decontamination of mixed vegetables by cold plasma-hydrogen peroxide in-package treatment
Abstract Text	In-package cold plasma (CP) treatment developed as a method to decontaminate fresh produce. However, the effects of CP on microbial inactivation in food are often limited. To enhance its antimicrobial efficiency, the concept of the hurdle technology was applied to CP treatment. Thus, the objectives of this study were to evaluate the effects of the CP treatment integrated with hydrogen peroxide (H2O2-CP) treatment on the inactivation of indigenous mesophilic aerobic bacteria and Listeria monocytogenes in mixed vegetables. The mixed vegetables consisted of twenty cabbage slices, nine paprika slices, and two kale pieces. Mixed vegetables were placed in the polyethylene terephthalate (PET) container attached with a polypropylene pad in which 1 mL of 20% (w/w) H2O2 was absorbed on the inner top of the container. CP treatment was applied to the packaged mixed vegetables at 24.5 kV for 3 min. H2O2-CP treatment significantly inactivated aerobic bacteria and L.monocytogenes inoculated on mixed vegetables by 0.9 and 1.2 ± 0.1 log CFU/g, which was higher than the inactivation levels achieved by individual CP and H2O2 treatment. The study demonstrated the potential of applying H2O2-CP treatment for microbial decontamination of fresh ready-to-eat vegetable packaged in PET containers.
Categories	Food Processing and Engineering
Other Authors	Name: Sea C. Min Organisation: Seoul Women's University City: Seoul Country: South Korea

Board No.	26
Author Name	Maduebibisi Ofo Iwe
Organisation	Michael Okpara University of Agriculture Umudike
Country	Nigeria
Title	Functional properties and nitrogen solubility indices of extrudates from Ighu and broad bean (Vicia faba)
Abstract Text	Extrusion cooking is a useful process where a food material or a mixture of ingredients (feed) is forced to flow under various conditions of mixing, heating and shearing through a die which is designed to form and/or puff dry the extrudate . A proper manipulation of feed composition (Ighu and Broad bean flour) and feed moisture in addition to die diameter in an extruder may provide an improved ready to eat blends of Broad bean / Ighu product. Ighu is a low protein pre-gelatinized cassava product obtained from washing fresh cassava tuber, steaming, peeling and shredding into thin slices, which are soaked in water for 1 to 3, washed, sun dried and consumed as a snack or main meal. Consumption of Ighu and broad bean is an age-long diet of Igbos in Nigeria. Extrusion variables (die diameter, feed moisture and feed composition) has significant effects on responses such as water absorption capacity (WAC), water solubility index (WSI), bulk density (BD), and nitrogen solubility index (NSI) showing R2 of 0.82, 0.25, 0.69 and 0.82, respectively, indicating the adequacy of the model to predict the experimental data of the prepared extrudates. WAC, WSI, NSI increased (3.80-7.00; 5.0-9.0;12.43-18.19) while BD decreased (0.55-0.76) when compared to the raw blends (1.82-2.82;1.36-1.27;9.17-18.41 and 0.87-0.94). A die of 1.5mm, 16% feed moisture and 25% feed composition had the highest NSI of the extrudates. Hence, the extrusion of blends of broad bean flour and Ighu improved the nitrogen solubility index and functional properties of the extrudates.
Categories	Food Processing and Engineering
Other Authors	Name: E.N. Odimegwu Organisation: Federal University of Technology Owerri City: Owerri Country: Nigeria

Board No.	27
Author Name	Laras Cempaka
Organisation	Universitas Bakrie
Country	Indonesia
Title	The Use of Backslope Culture In The Laboratory Scale Cocoa Bean Fermentation Process
Abstract Text	Cocoa bean fermentation plays a role in improving the quality of taste and aroma of the final product. There are many studies that modify the fermentation process, one of which is the addition of starter culture in the fermentation process. The purpose of this study was to use a starter obtained from cocoa bean dregs as a backslope culture for subsequent cocoa fermentation. Laboratory-scale fermentation was carried out in this study using Trinitario cocoa pods. Three types of backslope culture were used in this study, namely the second day (D2), the third day (D3) and the fifth day (D5) by fermenting cocoa beans for 117 hours. The results showed that the final pH of control cocoa beans was lower than that of cocoa beans added with backslope culture. The cut test showed that the sample of cocoa beans with the addition of 100% chocolate backslope D5 culture was perfect brown with the highest fermentation index 1.222 + 0.186. The total phenol content of cocoa beans with the addition of D5 backslope culture had the highest value of 3.06 + 0.78 mg GAE/g with an antioxidant activity value (IC 50) of 398.72 + 51.69.
Categories	Food Processing and Engineering
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Board No.	28
Author Name	Hidefumi Yoshii
Organisation	Setsunan University
Country	Japan
Title	Flavor retention in the emulsified d-limonene powder during spray drying
Abstract Text	Flavor encapsulation by spray drying is an important technique to prevent its deterioration owing to various factors. This encapsulation contains two steps, the emulsification of flavor oil and spray drying of the emulsified flavor-oil solution. In this study, the effect of the average diameter of the reconstituted emulsified oil droplets and wall material such as sucrose, lactose, and maltodextrin were investigated on the retention of *d*-limonene in spray-dried powder after spray drying. *d*-Limonene was dissolved in medium chain fatty acid oil (MCT oil) at a weight ratio of 0.2. Sucrose, lactose, or maltodextrin (MD, DE = 25, and 19) were used as wall material, and hydrolyzed whey protein as an emulsifier. Solid content was 60%, and solid percentages were core oil content, 53.9%, hydrolyzed whey protein 7.0 wt%, and sodium ascorbate 3.4 wt%. This mixed solution was homogenized with the mechanical homogenizer and high-pressure homogenizer (the microfluidizer or Starburst mini high-pressure homogenizer). Emulsified solution was spray-dried at 140º with the atomizer speed, 10,000 rpm. The oil-droplet size in the feed solution significantly affected *d*-limonene retention and surface-oil content in spray-dried powder. Types of wall material did not influence the retention of *d*-limonene.
Categories	Food Processing and Engineering

Board No.	29
Author Name	Miguel Angel Ballesteros Martinez
Organisation	Institute of Process Engineering in Life Sciences, Chair of Food Process Engineering, Karlsruhe Institute of Technology
Country	Germany
Title	Computational-Aided Investigation of Multiphase Flow inside Spray-Drying Atomizers to Surpass Nozzle Limitations in Powder Production and Encapsulation
Abstract Text	Spray drying is a popular technique that can produce large quantities of low-moisture and high-bulk-density food powders and microcapsules. This helps to increase product shelf life and reduce storage costs, while still protecting heat-sensitive nutrients and probiotic compounds. However, spray drying is limited by the narrow droplet size distribution necessary for a controlled product quality and by the feed solid content that can be managed by the spraying atomizer, since this affects liquid viscosity and therefore atomizer performance. How these factors relate to each other is highly dependent on the nozzle design and the internal multiphase flow that occurs inside the nozzle. This is where tools like Computational Fluid Dynamics (CFD) can offer an advantage, by enabling the calculation and visualization of the complex flow behaviour that cannot be feasibly measured in an experimental facility. With that in mind, CFD modelling is currently being utilized for the investigation of our in-house design, the ACLR-atomizer, that is tailored for high-viscosity liquid feeds, and could be further adapted for spraying pastes and suspensions. It has also been invaluable in analysing the process-functions of existing pressure-swirl nozzles used by industry partners to understand the relation and limitations between process parameters and powder quality.
Categories	Food Processing and Engineering
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Board No.	30
Author Name	Dr. Valerie Louise Pietsch
Organisation	Thermo Fisher Scientific
Country	Germany
Title	High moisture extrusion of plant-based meat: A small-scale approach to analyze the technological properties of plant proteins
Abstract Text	While the global demand for plant-based meat alternatives continues to grow rapidly, many consumers still lack diversity in marketed products, especially in terms of meat types and variety of protein sources. To meet consumers' demands, new products need to be developed that mimic taste, aroma and texture of meat as authentically as possible. Generally, high moisture extrusion is considered as key technology for continuous production of plant-based meat. However, mechanisms involved in structure formation are not fully understood and individual for every protein source. This contribution addresses the application of a lab-scale twin-screw extruder as solution approach to gain insights into structuring mechanisms, facilitate product innovations and test novel protein sources at early development stages. Since typical product characteristics of plant-based meat such as anisotropy and fibrousness are imparted into plant proteins by the flow pattern in the extruder die, a modular die was designed. Results show, how parameters such as die length and die entrance flow profile allow adjusting the die flow pattern and lead to different product structures. The influence of these parameters on product structure were evaluated using electron microscopy and image analysis. To asses mouthfeel, rheological measurements and texture analysis were performed and compared to meat.
Categories	Food Processing and Engineering

Board No.	31
Author Name	Sebastian Hoehne
Organisation	Karlsruhe Institute of Technology
Country	Germany
Title	Encapsulation of oil droplets by Spray-Drying: Opportunities of process intensification for the production of oily powder products
Abstract Text	The spray-drying of emulsions is a widely used encapsulation technique to produce a variety of powdered products. In this process, an oil-in-water emulsion is atomized into fine droplets, which are dried into particles by contact with a hot air stream. The size of the encapsulated oil droplets in the resulting powder product is crucial for encapsulation and thereby final product quality, as it determines sensorial aspects, as well as release kinetics and bioavailability of active compounds. The desired oil droplet size (ODS) is usually adjusted in an emulsification step prior to the spray-drying process, under the assumption that it remains unchanged in the subsequent atomization and drying steps. However, during atomization, the emulsions are subjected to high stresses and a breakup of the oil droplets can be expected. In this work, the theorems of emulsification theory were successfully applied to the atomization step to achieve an overall process intensification. By taking into account the specific impact of the atomization on the ODS, the end-product-specific ODS can be set far more accurately. This offers the possibility of adding larger feed oil droplets to the atomization step and thus to reduce the energy input in the emulsification step prior to the spray-drying.
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Board No.	32
Author Name	Sneha R Iyer
Organisation	Indian Institute of Technology Bombay
Country	India
Title	Agitated thin film drying of Non-centrifugal sugars: Impact of processing parameters on the crystallinity and powder quality
Abstract Text	Agitated thin film dryers (ATFD) have applications in handling viscous slurry feed and converting it to solid powder. The understanding of ATFD is limited to the drying process. However, in the present work, we investigate the crystallization phenomena and the drying process in ATFD. Non-centrifugal sugar (NCS) powder is made in ATFD by processing clarified sugarcane juice as feed. Non-centrifugal sugar, popularly known as jaggery, is an unrefined form of sugar. The NCS powder obtained through ATFD is extremely dry (moisture content < 3%) and has a semi-crystalline form (< 50% crystalline). The critical process parameters like juice feed concentration and feed flowrates were experimented with to get different crystalline properties of the NCS powder. The crystalline properties of the NCS powder were analyzed using X-ray diffraction and sorption isotherms. The advantage of using ATFD is the development of a unique fast-dissolving NCS powder by altering crystallinity. The fast-dissolving NCS can be an alternative sweetener in beverages, pre-mixes, and confectioneries.
Categories	Food Processing and Engineering
Other Authors	Name: Prof. Sanjay M. Mahajani Organisation: Indian Institute of Technology Bombay City: Mumbai Country: India

Board No.	33
Author Name	Zhongli Pan
Organisation	UC Davis
Country	USA
Title	Energy Consumption and Product Quality of Off-ground Harvested Almonds under Hot Air Drying
Abstract Text	This study was to develop an efficient drying method for off-ground harvested almonds. The whole almonds of three varieties (Nonpareil, Monterey and Fritz) were dried in a column dryer at different temperatures (45, 50, 55 and 60 ^{o}C) and air velocities (1.0 and 2.0 m/s). The drying time ranged from 2.5 to 6 hours. No cavity, no color change, no significant concealed damage and no deterioration of oil quality were observed under the tested conditions ($p < 0.05$). Page model was used to standardize the initial and final moistures of almonds for energy consumption calculation. The specific energy consumption of the drying process ranged from 7.01 to 19.05 MJ/kg under the tested conditions. The energies for drying different almond components were calculated based on the moisture removal during the drying of the mixture of in-hull almonds, in-shell almonds, kernels and loose hulls, which showed more than 60% of energy was consumed for drying the hulls, and only 20% was used for kernel drying. Therefore, freshly harvested almonds should be sorted based on their moisture levels and dried separately. The findings provided an important guidance for drying off-ground harvested almonds with improved efficiency and ensured product quality.
Categories	Food Processing and Engineering

Board No.	34
Author Name	Jaroslaw Kowalik
Organisation	University of Warmia and Mazury in Olsztyn
Country	Poland
Title	EFFECT OF COLD MICROFILTRATION PROCESS ON PHYSICOCHEMICAL PROPERTIES OF MILK
Abstract Text	The aim of this study was to compare the physico-chemical composition, gelling properties and texture profiles of the following variants of milk: thermized (65^{o}C, 20s), pasteurised (72^{o}C, 15s), and microfiltered (1.4 μm) membranes for bacteria removal, as well as the retentates from those milks. Microfiltration process was carried out with ceramic membrane (0.1μm) at 7^{o}C. Analysis of SDS-Page indicated that the casein present in the permeates was β-casein. The MF process (CF- 1.5X), resulted in similar β-casein removal for all 3 treatment, however, slightly higher β-casein content was found in the permeate from milk thermized. Gels were produced with rennet. The gels from retentate of pasteurised milk were characterized by the best water holding capacity and protein hydration. The shortest rennet coagulation time was observed for retentate from milk MF for bacteria removal (no thermal treatment). Properly selected parameters of MF process enable to optimize composition and properties of cheese. The content of ionic, total and soluble calcium was also determined in the tested samples depending on the milk pretreatment and also in the retentates. Project financially supported by Minister of Education and Science in the range of the program entitled "Regional Initiative of Excellence" for the years 2019-2022, Project No. 010/RID/2018/19, amount of funding 12.000.000 PLN
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Board No.	35
Author Name	Jaroslaw Kowalik
Organisation	University of Warmia and Mazury in Olsztyn
Country	Poland
Title	Effect of protein addition to milk on the development of probiotic bacteria Lactobacillus acidophilus LA-5
Abstract Text	The aim of the study was to determine the effect of functional additives derived from milk on the survival of yoghurt bacteria and probiotic strain *Lactobacillus acidophilus* LA-5 . Six yoghurt variants were produced with 2% addition of: skimmed milk powder (C), micellar casein concentrate (MCC), serum protein concentrate (SPC), whey protein isolate (WPI), whey protein concentrate (WPC) and native casein (CN). The standardized milk was pasteurized (90^{o}C/2 min) and inoculated with starter cultures (FD-DVS YF-L811 - Yo-Flex, Chr. Hansen) and probiotic strain (nu-trish, LA-5, Chr. Hansen). *Lactobacillus cells* (MRS (Merck)) and *Streptococcus thermophilus* (M17 (Merck)) were determined after incubation and storage (after 3, 14, 21 days) at 6°C. The number of *S. thermophilus*, independently of the additives used, were in the range from 7 to 10 log cfu/ML (after 21 days). Higher level were observed for LA-5 (from log 6 to log 9 cfu/ML) in samples with C, WPC and CN. The storage time and protein content influenced the microstructure (SEM, QUANTA 200 (FEI)) of the yoghurts. The addition of WPI had the biggest impact on protein matrix. Yoghurt with CN addition after 21 days was characterized by dense protein network with small pores. The addition of protein preparations is very good prospect for the production of dairy fermented beverages, with high level of probiotic bacteria. Project financially supported by The National Centre for Research and Development, Project No. WPC1/DairyFunInn/2019, amount of funding 1.950.000,00 PLN.
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Board No.	36
Author Name	Jeon-Uk Kang
Organisation	Sejong University
Country	South Korea
Title	Enhancing turanose yield by site-directed mutagenic engineering of amylosucrase from Bifidobacterium thermophilum
Abstract Text	Amylosucrase (ASase) is an effective biocatalyst for synthesizing a sucrose isomer of turanose with low calorigenicity and strong acid tolerance, by utilizing sucrose as sole substrate. In this study is site-directed mutagenesis of a relatively thermostable amylosucrase originated from *Bifidobacterium thermophilum* (*Bt*AS) was performed to improve production yield of turanose. The gene encoding the *Bt*AS was cloned in the pBT7-N-His vector and was expressed in *E. coli* BL21 (DE3) strain. The size of *Bt*AS protein was confirmed by the SDS-PAGE analysis after affinity chromatographic purification. Based on the predicted 3D structure of *Bt*AS enzyme with the SWISS-MODEL and PyMOL programs, an amino acid residue of glycine 374 was selected for site-directed mutagenesis. The *Bt*AS$_{G374S}$ mutant displayed approximately 52% of turanose yield at 50â„ƒ with 2.0 M sucrose as a substrate, which was at least 2-fold higher than 25.0% of wild-type. As a result of searching optimum conditions for turanose production, the greatest yield of 81.9% was obtained at pH 6 and 50â„ƒ for 12 h with the reaction mixture composition of 1.0 M sucrose and 0.75 M fructose.
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Other Authors	Name: Sang-Ho Yoo Organisation: Sejong University City: Seoul Country: South Korea

Board No.	37
Author Name	Lucia Schuch Boeira
Organisation	IFAM
Country	Singapore
Title	Development of biscuit with Amazonian fruits
Abstract Text	Pupunha (Bactris gasipaes Kunth), buriti (Mauritia flexuosa L.f.) and tucumã (Astrocaryum aculeatum Meyer) are fruit species endemic and abundant in the Amazon region. These fruits are characterized by a high content of vitamin A, lipids and carbohydrates, including high fiber content, in addition to minerals and phenolic compounds. The chemical composition of these fruits makes them ingredients with potential for the development of bakery products and to naturally implement their nutritional and functional value. The biscuits were prepared with dehydrated pulp of the fruits in an oven with air circulation for 24 h at 60°C and the processing followed the steps of ingredients weighing, mixing, molding, baking, cooling and packaging. The ingredients of the biscuits formulations prepared with each of the three fruits were established through sensory analysis using the preference test. The preferred pupunha, buriti and tucumã biscuits presented in their formulation 37%, 39% and 29% of dehydrated pulp, respectively. The results obtained in the biscuits acceptance test showed acceptability indices above 75%. The proposed technology follows the precepts of the bioeconomy, stimulating the production chain, agroecological cultivation and sustainable extractivism of traditional fruit trees in the Amazon, fruits still underused and neglected by the food industry.
Categories	Food Processing and Engineering

Board No.	38
Author Name	Lucia Schuch Boeira
Organisation	IFAM
Country	Singapore
Title	Development of wine from native mapati (Pourouma cecropiifolia Martius) - fruit known as the Amazon grape
Abstract Text	The need to value Amazon native species through technology addition and development of new food products were the reasons to study the adequacy of native mapati for wine production. Mapati is a fruit with 2 to 4 cm in diameter, produce bunches with fruits that have shape and color similar to red grapes and are rich in antioxidant compounds. This summary presents the studies carried out for the preparation of the must using native fruits from Tabatinga and São Gabriel da Cachoeira, interior cities of Amazonas. Tests were carried out using different variables, such as the use of skin in maceration during fermentation, the pulp and skin and only the skins with or without processing in a blender and with or without heating in order to maintain satisfactory sensory characteristics such as color, aroma and flavor and antioxidant capacity measured by DPPH assay in the wine. The fermentations were conducted at 25ºC by different commercial yeasts in glass bottle stoppered with airlock. Considering the results obtained, for the elaboration of mapati wine, the wort must be prepared using 40% of skins and 10% of pulp, heating in boiling water for 5 min and with or without processing in a blender.
Categories	Food Processing and Engineering

Board No.	39
Author Name	Maturada Jinorose
Organisation	King Mongkut's Institute of Technology Ladkrabang
Country	Thailand
Title	Influence of assumed shape of droplet on its evolutions of mass, volume and density during anti-solvent drying
Abstract Text	Shape change information is significant when accurate numerical simulation of droplet drying is to be conducted. Conventionally, tear-drop or spherical shape is assumed for droplet; such shape is also assumed to remain unchanged. Practically, however, this assumption is in many cases invalid, leading to inaccurate calculations of droplet mass, volume and density. Here, *in situ* image acquisition was conducted to capture shape change of single droplet undergoing test drying process viz. anti-solvent drying under air-ethanol environment; 2% maltodextrin was used as test material. Image analysis was conducted to identify shape change behavior of the droplet, which could be divided into two periods. In the first period, the droplet took on tear-drop shape; in the latter period, the droplet took on red-bean shape. Evolutions of mass, volume and density of the droplet were calculated based on such described shapes. The results were compared with those obtained when assuming tear-drop or spherical shape at all times. Calculated mass fitted the measured one satisfactorily even when spherical shape was assumed. However, significant variations with the assumed shape in terms of calculated volume and density were noted, with results obtained using image-depicted shapes being uch more physically realistic.
Categories	Food Processing and Engineering
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Board No.	40
Author Name	Masakaze Imamura
Organisation	Kagoshima University
Country	Japan
Title	Effect of the combination of high hydrostatic pressure and food emulsifiers on the reduction of heat resistance of bacterial spores
Abstract Text	We investigated that the effect of high hydrostatic pressure processing (HPP) combined with various emulsifiers on the reduction of heat resistance of bacterial spores. Significant decreases in heat resistance were observed by HPP combined with Tween20 or sucrose fatty acid ester (O-1570). Release amount of dipicolinic acid (DPA) which is a chemical compound, and it plays a role in the heat resistance of bacterial spores, was measured to assess damageã€€€of inner membrane. When HPP was performed with emulsifier which was effective in the reduction of heat resistance, approximately 60% reduction of DPA release was obtained comparing with control sample or other emulsifiers which did not have any enhanced effect of reduction of heat resistance. A 6 hours shortening of the lag phase in growth curve of bacterial spores treated by HPP with Tween20 was observed when the treated samples were cultured in the recovery medium supplemented with lysozyme. These results suggest that the presence of emulsifiers in HPP reduced inner membrane damage and DPA release, however it caused sublethal damage to the spores and inhibited their normal germination.
Categories	Food Processing and Engineering

Board No.	41
Author Name	Cristina L. M. Silva
Organisation	Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia
Country	Portugal
Title	Impact of thermosonication on kiwi juice quality
Abstract Text	Traditional heat treatments such as pasteurization are usually used in fruit juice preservation. However, due to undesirable quality changes, industries seek other processing technologies that can retain the fruit juices' quality. This study aims to develop a high quality and safe-to-drink kiwi (*Actinidia deliciosa* cv. Hayward) juice throughout the application of thermosonication treatments (TS). *Listeria innocua* (a surrogate of the pathogenic *L. monocytogenes*) was used as a safety indicator. pH, SSC, colour, cloud value, phenolics, chlorophylls, and minerals were evaluated as quality parameters. TS was carried out with an ultrasound homogenizer at a constant frequency of 20 kHz, 80% amplitude and discontinued pulsation (10s on, 5s off). The juice samples were submitted to TS at 45, 50 and 55°C for 15, 10 and 3 minutes, respectively. Thermal treatments (HT) were performed at the same temperatures for 60, 25 and 10 minutes. Juices' quality and safety were evaluated before and after treatments. All the treatments fulfil the FDA recommendation of 5-log microbial reduction. Most of the quality parameters were retained after both processes. These results proved that a mild heat process could be applied to fruit juices, allowing the obtention of a safe and improved final product's quality.
Categories	Food Processing and Engineering
Other Authors	Name: Sharayu Bhutkar Organisation: Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia City: Porto Country: Portugal Name: Teresa R. S. Brandão Organisation: Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia City: Porto Country: Portugal Name: Fátima A. Miller Organisation: Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia City: Porto Country: Portugal

Board No.	42
Author Name	Cristina L. M. Silva
Organisation	Universidade Católica Portuguesa - Centro de Biotecnologia e Química Fina
Country	Portugal
Title	Influence of Processing Temperature on Quality and Drying Kinetics of a Mixed Fruit Leather
Abstract Text	A mixed fruit leather was developed with no chemical additives using five basic ingredients: pears, bananas, strawberries, honey, and lemon. The fruit puree was subjected to convective air drying at 60 ºC, 70 ºC, and 80 ºC and then packaged with a reversible metallized polypropylene foil and stored at 25 ºC for seven weeks. Different drying models were adjusted to the experimental data, with the Page model presenting the best fit. The obtained product was evaluated for nutritional and physical parameters. The values of phenolic compounds, water activity and water content were stable within the storage period, and the tested drying temperatures showed no impact. However, colour darkening occurred after the first month of storage. Regarding texture, adhesiveness did not seem to have a clear pattern over storage. The higher values of hardness and chewiness obtained at 60 ºC in comparison to 80 ºC are probably associated with the slightly lower water activity of the batches produced at 60 ºC. This natural fruit leather that combines the benefits of different fruits can be an option for the increasing consumers' demand for healthier and more natural snacks.
Categories	Food Processing and Engineering
Other Authors	Name: Sofia Gkatzoni Organisation: Universidade Católica Portuguesa - Centro de Biotecnologia e Química Fina City: Porto Country: Portugal Name: Inês N. Ramos Organisation: Universidade Católica Portuguesa - Centro de Biotecnologia e Química Fina City: Porto Country: Portugal

Board No.	43
Author Name	Tomochika Sogabe
Organisation	Hiroshima University
Country	Japan
Title	Effect of gelation on the physical properties of freeze-dried soup products
Abstract Text	Structural deformation (i.e., collapse) during freeze-drying causes undesirable appearance and poor rehydration for freeze-dried soup products. The structural deformation of freeze-dried soup products can be prevented by the addition of food polymer because the structure is physically enhanced. The purpose of this study was to understand the effect of polymer addition on the physical properties of freeze-dried soup products. Food polymers (gelatin, starch, and maltodextrin) were added to soup models at 1 or 3% (w/v). The sample was freeze-dried at 25 or 50ºC for 24h. Thermal properties of the soup models under freeze-concentrated state were investigated differential scanning calorimetry. The drying rate, apparent volume, physical strength, and dissolution of freeze-dried solid were evaluated. The soups models showed freeze-concentrated glass transition and/or eutectic melting under freeze-concentrated state. Gelatin enhanced the physical strength of the freeze-dried soup solid more than starch and maltodextrin because the system was solidified by the gel-network structure of gelatin. The 3% gelatin resulted in poor dissolution ratio due to the high viscosity. It was concluded that 1% gelatin-added soup solid freeze-dried at 50ºC was the optimum condition for the freeze-dried soup models.
Categories	Food Processing and Engineering
Other Authors	Name: Kiyoshi Kawai Organisation: Hiroshima University City: Higashi-Hiroshima Country: Japan

Board No.	44
Author Name	Yun Jo Jung
Organisation	Department of Food Science and Biotechnology, Chungbuk National University, Cheongju 28644, Korea
Country	South Korea
Title	Quality Characteristics of Korean Traditional Rice Beverage with Rice Type
Abstract Text	This study is conducted to evaluate the quality characteristics and to manufacture Korean traditional rice beverage "Sik-hye'' with different rice type of glutinous, aromatic, black, red, and high-yielding. The soluble solids content ranged from 5.83% of red rice to 10.08% of aromatic rice type. The total sugar content ranged from 29.68 mg/ml of glutinous to 104.52 mg/ml of at aromatic rice type. The color a-value was high value of 14.00 in black rice, and b-value was high in black rice. The free sugar content was the highest value of 91.87 mg/ml in high-yielding rice type. In the beginning saccharification, the reducing sugar content was low value of 8.90 mg/ml in red rice type and after saccharification, aromatic rice was the highest value of 83.81 mg/ml. As a result of sensory evaluation, overall preference was high in high-yielding rice type and black rice was low. Considering the above results, it can be produced high quality “Sik-hye”with high-yielding rice and aromatic rice type.
Categories	Food Processing and Engineering
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Board No.	45
Author Name	Jang Keun Son
Organisation	Depatment of Food Science and Biotechnology, Chungbuk National University, South Korea.
Country	South Korea
Title	Quality Characteristics of bread made from Korean Wheat Flour with Sowing Time and Cultivar
Abstract Text	This study was conducted to investigate the processing characteristics of three Korean wheat cultivar according to the sowing period and to select wheat cultivar suitable for baking. The crude protein content of flour was in the range of 10.21-16.02%, and the crude ash content was in the range of 0.41-0.71%. The amylose content was in the range of 24.56-29.82%. Wheat sown in autumn had a higher moisture absorption index than wheat sown in spring, and the volume and specific volume were larger in wheat sown in autumn, especially in the *Baekgang*. In both sown in spring and autumn, the cross sections of bread made with *Taejoong* and *Dajoong* cultivar were rougher than the *Baekkang* cultivar. The bread hardness of the *Baekkang* sown in autumn was 402.28±10.39g, the most similar value to the control group, and the hardness value of bread made from wheat sown in autumn was lower than that of wheat sown in spring. Therefore, wheat sown in autumn is more suitable for baking because of larger and smaller hardness value on sown in autumn and *Baekkang* has the largest volume after baking and a soft texture next to control, so it is considered suitable for baking.
Categories	Food Processing and Engineering
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Board No.	46
Author Name	Sang-Beom Park, Seung-Hyeon Cha, Se-Lim Bak, Shangle Jiang, Keum-Il Jang
Organisation	Chungbuk National University
Country	South Korea
Title	Quality Characteristics and Antioxidant Activities of Water Spinach (Ipomoea aquatica Forsk.) by Various Cooking Methods.
Abstract Text	This study compared and analyzed the quality characteristics and antioxidant activities of water spinach (*Ipomoea aquatica* Forsk.) among various cooking methods. The composition of water spinach (WS) leaves was approximately 83.20% moisture, 4.51% crude protein, 2.07% crude ash, 0.78% crude lipid, and 9.45% carbohydrate. Meanwhile, the composition of WS stems was 93.69% moisture, 0.72% crude protein, 1.56% crude ash, 0.21% crude lipid, and 3.81% carbohydrate. Antioxidant activities were higher in the leaves than in the stems. Among cooking methods, the total polyphenolic content of WS was the highest in the microwaving sample. The total flavonoid content of WS leaves was similar in most of the samples, but it conspicuously increased in the microwaving sample. However, the total flavonoid content of WS stems decreased in all the samples. The DPPH radical scavenging activity of WS leaves and stems was higher in the microwaving and boiling samples. The ABTS radical scavenging activity of WS leaves and stems were higher in the microwaving sample. The selection of cooking method is important because the nutrient content and antioxidant activities can decrease, remain unchanged, or increase with different cooking methods. This study provides basic information for improving the utilization of WS as food material.
Categories	Food Processing and Engineering

Board No.	47
Author Name	Seung-Hyeon Cha
Organisation	Chungbuk National University
Country	South Korea
Title	Functional Characteristic of White and Black Soybean Powders Prepared under Drying Conditions After Soaking
Abstract Text	Isoflavones found in soybeans are present as glycosides and aglycones, which differ according to their chemical structure. The absorption rate and bioavailability of aglycones are greater than those of glycosides. It is known that aglycone isoflavones in soybean was converted from glycoside isoflavones by activating of endogenous β-glucosidase under drying (40-60°C) conditions after soaking. In this study, we compared and analyzed the proximate composition and functional (isoflavone contents) characteristic of soybean powders dried after soaking were analyzed. In the comparison of the proximate compositions, the moisture contents of white soybean powder dried after soaking (WSPDS) and black soybean powder dried after soaking (BSPDS) were decreased as compared with those of the control white soybean powder (CWSP) and control black soybean powder (CBSP). Whereas the contents of other proximate compositions were increased. The aglycone isoflavone contents were higher in WSPDS and BSPDS than in CWSP and CBSP, respectively. In conclusion, we thought that the availability of soybean powder as a material for food processing seems to have increased because the aglycone isoflavone contents of white and black soybean powders has been improved under drying conditions after soaking.
Categories	Food Processing and Engineering
Other Authors	Name: Sang-Beom Park Organisation: Chungbuk National University City: Cheongju Country: South Korea Name: Se-Lim Bak Organisation: Chungbuk National University City: Cheongju Country: South Korea Name: Shangle Jiang Organisation: Chungbuk National University City: Cheongju Country: South Korea Name: Keum-Il Jang Organisation: Chungbuk National University City: Cheongju Country: South Korea

Board No.	48
Author Name	Changheon LEE, Seung Min Moon
Organisation	Changwon National University
Country	South Korea
Title	Effect of Inulin as Prebiotics, on Encapsulation of Lactic Acid Bacteria derived from Kelp Kimchi
Abstract Text	Aim of this study was to evaluate effect of inulin as prebiotics and wall material of synbiotics on encapsulation of *Lactobacillus plantarum* D-12 derived from kelp Kimchi using spray drying. An Inulin (INL) is known as beneficial to probiotics to improve viability and storage stability. The INL was mixed with commercial wall material (maltodextrin, MD) with various ratios (MD:INL = 10:0, 7:3, 5:5, 3:7, 0:10) as a wall material. Experiments were carried out by applying the optimal condition of encapsulation of *L. plantarum* D-12 obtained from our previous experiment: wall material concentration of 10% and inlet temperature of 86°C. Encapsulation of *L. plantarum* D-12 with INL 3 (MD:INL 7:3) showed the highest yield(78.57 ± 1.64 %) and survival rate(97.70 ± 0.30 %). During storage at 25â„*f* for 50 days, survival rate of encapsulated *L. plantarum* D-12 with INL 3 was 8% higher than that with MD 10 (MD:INL = 10:0). *In vitro* digestion condition, survival rate of encapsulated *L. plantarum* D-12 with INL 3 was 10% higher than that with MD 10. For these reasons, using of INL for encapsulation of *L. plantrum* D-12 improved survival rate during storage and *in vitro digestion* condition, which could be to make a great contribution to field of synbiotics production.
Categories	Food Processing and Engineering
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Board No.	49
Author Name	Eunsong Cha
Organisation	Changwon National University
Country	South Korea
Title	Encapsulation of Lactic Acid Bacteria derived from Sea Tangle Kimchi with Tragacanth Gum by spray drying
Abstract Text	Aim of this study was evaluate effect of tragacanth gum as prebiotic and wall material on probiotic characteristics of *Lactobacillus plantarum* D-12 derived from sea tangle kimchi after encapsulation using spray drying. Tragacanth gum (TG) is known as advantageous for probiotics by enhencing viability and storage stability. The TG was mixed with maltodextrin (MD) and inulin (INL) with various ratios (MD:INL:TG = 7:3:0, 7:2.9:0.1, 7:2.8:0.2, 7:2.7:0.3, 7:2.6:0.4) as a wall material for encapsulation of *L. plantarum* D-12. Experiments were carried by applications of optimum conditions of encapsulation of *L. plantarum* D-12: wall concentration of 10% and an inlet temperature of 86°C. Encapsulated *L. plantarum* D-12 with TG 0.3 (MD:INL:TG = 7:2.7:0.3) showed the highest viability(103.36 ± 0.65 %). Viability of encapsulated *L. plantarum* D-12 with TG 0.3 was 15% higher than that with MD 10 (MD:INL:TG = 10:0:0) during storage at 25°C for 50 days. *In vitro* digestion conditions, viability of encapsulated *L. plantarum* D-12 with TG 0.3 was 20% higher than that with MD 10. Based on the results, applying TG for encapsulation of *L. plantarum* D-12 enhanced viability during storage and *in vitro* digestion condition, which would be great contribution to probiotics industry.
Categories	Food Processing and Engineering
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Board No.	50
Author Name	Vasiliki Oikonomopoulou
Organisation	National Technical University of Athens
Country	Greece
Title	Ultrasonic assisted extraction of plant proteins from lupin and split pea
Abstract Text	Nowadays there is a rising trend in consumption of vegan products with ingredients of plant origin. Legumes are characterized by high protein content and can be utilized for the production of plant protein isolates or concentrates that can improve the functional and nutritional quality of such food products. In the current study, a green extraction technology, Ultrasonic Assisted Extraction (UAE), is investigated regarding the isolation of proteins from lupin and split peas. For this purpose, UAE was applied and compared to Conventional Alkaline Extraction (CAE). Water (pH=9.5) was used as extraction solvent. The processing parameters, including ratio of solvent to raw material, ultrasonic power, extraction time and extraction temperature were investigated in order to determine the optimal extraction conditions. The extraction efficiency was determined via Bradford Analysis; the extracted protein fractions were, also, evaluated regarding their water and oil holding capacity and their solubility. The results demonstrated that UAE extraction is a sustainable approach for the extraction of plant proteins, that achieves reduction of extraction time and improvement of extraction efficiency; the optimal extraction conditions were determined as follows: ultrasonic power 750 W, raw material:solvent ratio 1:10, extraction time 10 min.
Categories	Food Processing and Engineering
Other Authors	Name: Alexandra Mari Organisation: National Technical University of Athens City: Athens Country: Greece Name: Georgia Frakolaki Organisation: National Technical University of Athens City: Athens Country: Greece Name: Sofia Papadaki Organisation: National Technical University of Athens City: Athens Country: Greece Name: Magdalini Krokida Organisation: National Technical University of Athens City: Athens Country: Greece

Board No.	51
Author Name	Karen Louise Lacey
Organisation	University of Parma
Country	Italy
Title	Effect of high-pressure processing and thermal treatments on colour and viscosity in strawberry nectar
Abstract Text	Colour and viscosity have been identified as important quality attributes valued by consumers of juices and nectars. Viscosity is also related to physical stability and shelf-life. In this study, the impact of High-Pressure Processing (HPP) (400, 500 and 600 MPa for 20 min) and thermal treatments (TT) (90 °C, 23 s and 95 °C, 5 s) on strawberry nectar colour and viscosity were investigated. Nectar was formulated with 40% fruit puree. An untreated sample was used as a control. Colour difference (ΔE) and CIE Lab parameters: Lightness (*L) and redness (*a) were used to estimate the colour changes. TT cause significant losses in the colour parameters. The 95 °C, 5 s sample has a loss of 29.5% in *L value, while all the HPP-treated samples did not have significant differences from the control. Viscosity on all HPP samples was appreciable higher than the control, at 100 s^{-1}, the 600 MPa 20 min had 101.46±4.78 mPa·s while the control 19.54±1.25 mPa·s. TT samples had no significant change in viscosity. Flow behaviour of HPP samples tends to be more non-Newtonian after treatment. These results could contribute to optimising the processing conditions for the colour quality and sensorial attributes improvement.
Categories	Food Processing and Engineering
Other Authors	Name: Dario Pavon Organisation: CFT City: Parma Country: Italy Name: Prof. Massimiliano Rinaldi Organisation: University of Parma City: Parma Country: Italy Name: Luca Cattani Organisation: University of Parma City: Parma Country: Italy

Board No.	52
Author Name	Carolina Herrera-Lavados
Organisation	Universidad del BÃo-BÃo
Country	Chile
Title	Development of bean protein emulsion gels for 3D printing applications
Abstract Text	Emulsion gels (EGs) can use proteins both as emulsifier and gelling agents, and this protein-gel interaction can regulate the gelation process and gel strength. They are a promising material for 3D printing as a result of their improved physical stability and the opportunity to control their structures. Five concentrations of gelatin on a stable bean protein emulsion were analyzed by testing rheological properties, Fourier transform infrared spectroscopy (FTIR) spectrum, and printing process parameters (nozzle size and extrusion speed) on printing stability. The bean protein-gelatin interaction strengthened the ink network by increasing the C = O interactions and their G' and G'' modulus. The emulsion gelled with 0.8% gelatin but was only self-supportable for 3D printing at gelatin concentrations > 1.5% and G' > 300 Pa. The minimum printing deviation was obtained with 2.5% gelatin, 0.5 mm nozzle size, and 0.24 mL/min extrusion speed. All EGs were stable for more than 14 days with no water/oil loss or phase separation. In conclusion, bean protein EGs can be used in 3D printing. They provide an opportunity to design new colloidal food systems with customized textures and nutritional properties to meet new consumer diet trends.
Categories	Food Processing and Engineering
Other Authors	**Warning**: foreach() argument must be of type array|object, null given in **D:\xampp816\htdocs\paperbrochure\posteroutput.php** on line **98**

Board No.	53
Author Name	Eduardo Morales
Organisation	Universidad de La Frontera
Country	Chile
Title	Effect of alginate/shellac combination as wall material on the encapsulation efficiency of oil by ionic gelation using co-extrusion
Abstract Text	Co-extrusion has been regarded as a promising encapsulation technology for producing oil core-shell microcapsules with high oil encapsulation efficiency (EE). The oil core is enclosed within a polymeric shell or wall material (WM). The objective of this study was to evaluate the effect of alginate/shellac (AL/SH) combination as WM on the EE of oil by ionic gelation using co-extrusion. The WP was prepared by mixing AL (20g/L) and SH (250g/L) in proportions of 100/0 (AL), 95/5, 90/10, and 85/15 (%v/v). The AL/SH mixture and sunflower oil were co-extruded through a 200 µm inner nozzle and a 600µm outer nozzle using a vibration frequency of 150 Hz. The results showed that the oil EE of all the AL/SH mixtures was significantly higher ($p<0.05$) than with the alginate solution. However, among the AL/SH mixtures, there were no significant differences ($p>0.05$) in the oil EE. Therefore, the 95/5 (%v/v) of the AL/SH mixture with an oil EE of 98±0.38% was selected compared to AL with 95± 0.36%. These results demonstrated that the AL/SH combination as a WP in capsules by co-extrusion improves oil EE compared to AL.
Categories	Food Processing and Engineering
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Board No.	54
Author Name	Nikolaos Prinos, Vasiliki Oikonomopoulou
Organisation	NATIONAL TECHNICAL UNIVERSITY OF ATHENS
Country	Greece
Title	Proteins recovery from breweries spent grains by microwave and coupled microwave-ultrasound assisted extractions using deep eutectic solvents and alkaline medium
Abstract Text	Brewing results in the generation of large amounts of solid wastes and by-products. Especially, the brewers' spent grains (BSG) rise up to 85% of the total amount of by-products with a remarkable protein content at approximately 20%. The ever-growing demand to minimize waste from food industries as well as their valorization has resulted in the development of various methods for recovering functional components. Nowadays, research has been focused on optimizing the extraction processes either by utilizing novel solvents or by reducing the energy consumption and the extraction time. Deep eutectic solvents represent a new generation of solvents that are non-toxic, economic and have presented promising results in the field of protein recovery. Microwave extraction is regarded as an appealing alternative method to the conventional extraction, because it requires shorter extraction times and exhibits an increase in extract yield. Moreover, reports have indicated that the combination of microwave and ultrasound-assisted extractions leads to more positive results, thus making it a method worth investigating. The primary scope of the present research was to study the recovery of proteins from brewer's spent grains using alkaline medium or deep eutectic solvent via microwave and a combination of microwave-ultrasound assisted extractions.
Categories	Food Processing and Engineering
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Board No.	55
Author Name	Kuan-Chen HSIEH
Organisation	Institute of Food science and Technology, National Taiwan University
Country	Taiwan
Title	Utilizing atmospheric cold plasma treatment to reduce peanut allergen by inducing structural changes
Abstract Text	Peanut allergen Ara h 1, is one of the most common food allergen in the world, and it is highly allergenic due to its stable structure. Atmospheric cold plasma (ACP) is an non-thermal processing technology that generates reactive species allowing rapid degradation of protein through chemical reactions. As different processing gas will produce distinctive composition of reactive species, we aim to investigate the efficiency of plasma from different gases to inhibit allergenicity. Peanut protein was treated by ACP generated from air, nitrogen and argon. The antigenicity of peanut protein was evaluated using IgG-binding assays. The protein structure was also assessed in fluorescence emission and circular dichroism. The reactive species and oxidation generated in plasma were also analyzed. The results showed that Ara h 1 was oxidized, resulting in destroyed the α-helix structure and reduced the antigenicity by 55% after ACP treatment for 13 minutes. However, air plasma treatment caused browning and badly oxidation of protein. In conclusion, cold plasma could be a potential method to reduce peanut allergen through oxidation and chemical alteration, moreover, nitrogen could be a better option to be used as the processing gas, while maintain high product quality during the cold plasma treatment.
Categories	Food Processing and Engineering
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Board No.	56
Author Name	Yunjiao LIU
Organisation	National University of Singapore
Country	Singapore
Title	Spent coffee grounds-derived beverage by biotransformation with non-Saccharomyces yeasts and Oenococcus oeni
Abstract Text	This study explored the effects of yeast extracts addition on the growth of non-*Saccharomyces* yeasts (*Lachancea thermotolerans*, *Torulaspora delbrueckii* and *Pichia kluyveri*) and *Oenococcus oeni* in mono- and co-fermentation of spent coffee grounds (SCG) hydrolysates and the associated changes of chemical compositions. Monocultures of three yeasts grew well in the SCG hydrolysates added with yeast extracts. Enhanced production of organic acids (e.g. succinic acid) and aroma compounds (e.g. 2-phenylethyl alcohol and ethyl octanoate) were observed in the fermented SCG with monocultures of the three yeasts. In addition, *L. thermotolerans* showed more complex flavor compound varieties and was selected to co-ferment with three *O. oeni* strains, respectively. *O. oeni* Lalvin 31 and *L. thermotolerans* grew well in co-cultures, but the yeast died early in the co-cultures with *O. oeni Enoferm* Beta and *O. oeni* PN4. Furthermore, compared with the yeast monoculture only, co-fermentation with *O. oeni* did not significantly affect sugar catabolism but reduced ethanol production and generated higher levels of methyl acetate and acetoin. These results indicated that SCG fermented with monocultures of non-*Saccharomyces* yeasts and cocultures of yeast and *O. oeni* may provide new strategies to develop SCG into novel beverages.
Categories	Food Processing and Engineering
Other Authors	Name: Yuyun LU Organisation: National University of Singapore City: Singapore Country: Singapore Name: Shao Quan LIU Organisation: National University of Singapore City: Singapore Country: Singapore

Board No.	57
Author Name	Zhou Yinglan
Organisation	National University of Singapore
Country	Singapore
Title	Potential of biotransforming salted soy whey into a soy sauce-like condiment using wine yeast Torulaspora delbrueckii and soy sauce yeasts Zygosaccharomyces rouxii and Candida versatilis
Abstract Text	Salted soy whey, a salted tofu processing by-product, is often disposed of as wastewater due to its high salt content and limited scope for valorization. Yet, soy whey still holds many valuable nutrients. The study aimed to investigate the feasibility of using different yeasts (*Zygosaccharomyces rouxii*, *Candida versatilis*, and *Torulaspora delbrueckii*) to biotransform salted soy whey into a soy sauce-like condiment. This study focused on the growth of the yeasts in soy whey added with different levels of NaCl and the physicochemical changes of salted soy whey after fermentation. It was found that all three yeasts were able to grow in soy whey with 2% and 10% salt. Nonetheless, different fermentation metabolites profiles were observed among the three yeasts. *T. delbrueckii* utilized sucrose and glucose while *Z. rouxii* and *C. versatilis* only consumed glucose. Also, different yeasts exhibited different β-glucosidase activities in hydrolyzing isoflavone glycosides to aglycones (conversion efficiency: 6.96 - 23.04%). In terms of aroma compounds profiles, soy sauce yeasts produced more isobutyl alcohol, isoamyl alcohol and volatile phenols while *T. delbrueckii* generated more ethanol and esters. Therefore, selection of appropriate yeasts to biotransform salted soy whey could be used to develop a tasty soy sauce-like condiment.
Categories	Food Processing and Engineering

Board No.	58
Author Name	CHEN SHUOYU
Organisation	Nestlé R&D Centre Singapore and National University of Singapore
Country	Singapore
Title	Flavour impact on fermented wheat-gluten sauce by the single inoculation of Latilactobacillus sakei, Pichia kluyveri or Saccharomyces boulardii
Abstract Text	Wheat-gluten, the protein-rich portion of wheat, can be processed to produce a highly savory sauce product after solid and liquid-state fermentation (SSF and LSF) with the inoculation of selected lactic acid bacteria (LAB) under salt free condition. However, limited research has been done on the impact of different types of microbes in this process. This work studied the flavour impact on fermented wheat-gluten by the single inoculation of *Latilactobacillus sakei* or one yeast (*Saccharomyces boulardii* or *Pichia kluyveri*). Glucose was depleted during LSF in all trials. Acetic and lactic acid production increased over time in *L. sakei* fermented samples but not in yeast-fermented samples. Cysteine, serine and arginine remained low over LSF in *L. sakei*-fermented samples but increased in yeast-fermented samples. More fruity esters such as isoamyl acetate and ethyl isovalerate were detected in samples fermented by *P. kluyveri*, while *S. boulardii* boosted the production of alcohols such as 3-methyl butanol and phenylethyl alcohol. Principal component analysis (PCA) revealed a clear difference in volatile profiles of the samples fermented with different strains. Therefore, the fermented sauce can potentially be processed into different flavor directions, and based on the flavor profile, be used in different food applications.
Categories	Food Processing and Engineering
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Board No.	59
Author Name	CHEN SHUOYU
Organisation	Nestlé R&D Centre Singapore and National University of Singapore
Country	Singapore
Title	Co-inoculation of Latilactobacillus sakei with Pichia kluyveri or Saccharomyces boulardii improves flavor profile of salt-free fermented wheat-gluten
Abstract Text	A wheat-gluten fermentation process with the inoculation of different strains under salt free condition has been shown to produce varying flavor profiles at the end of solid and liquid-state fermentation (SSF and LSF) in a previous study. As research on the co-fermentation of two strains in this process is scarce, this work studied the flavour impact on fermented wheat-gluten by the co-inoculation of *Latilactobacillus sakei* with one yeast (*Saccharomyces boulardii* or *Pichia kluyveri*). The results show that all strains were able to grow to comparable counts after SSF. Similar glucose and organic acid levels were detected throughout LSF, but the growth of yeasts was suppressed during LSF in co-cultured fermentations. The concentrations of most free amino acids were comparable. Volatile analysis shows synergistic effects in co-cultured fermentations for the production of some compounds such as isoamyl acetate. Principal component analysis (PCA) has also revealed clear difference in terms of volatile profiles of co-cultured and single-inoculated samples. Therefore, the co-culture of *L. sakei* and selected yeasts can boost the production of some fruity aroma compounds. A fermented sauce product with a new, more fruity flavor direction can potentially be produced for food application.
Categories	Food Processing and Engineering
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Board No.	60
Author Name	Pei-Ju Chung, Yu Wen Ting, Kuan-Chen Hsieh
Organisation	Institute of Food science and Technology, National Taiwan University
Country	Taiwan
Title	Enhancement of polyphenolic compounds from cold-brewed Biluochun green tea by cold plasma pretreatment
Abstract Text	Biluochun is one of the highest yield green tea leaves in Taiwan, which is non-fermented tea and famous for its unique aroma of ripe fruits flavour. Most of the biological activities of green tea are believed to be mediated by polyphenols and its potent antioxidant capacity. Low yield of bioactivity compounds with cold extraction is the most prominent limiting factor in its industrial adoption. Cold plasma (CP) is an electrically energized matter and is composed of highly reactive species including gas molecules, charged particles in the form of ions, free radicals, electrons and ultraviolet photons at near-room temperature. The evidences showed that the diffusion of reactive species on the plant surface causing cellular damages and surface modifications, which indicate its potential for decreasing the resistance and facilitating the diffusion of internal molecules from plant interior. The objective of this study is to increase the extraction efficiency of phenolic compounds, especially catechins, from cold-brewed tea by CP pretreatment. Biluochun fresh tea leaves from Sanxia as raw material, which are treated by nitrogen or argon CP with different parameters (time, power) before brewing. Chemical compounds such as catechins, caffeine, free amino acids, flavonoids will be measured.
Categories	Food Processing and Engineering

Board No.	61
Author Name	Anet Režek Jambrak
Organisation	Faculty of Food Technology and Biotechnology, University of Zagreb
Country	Croatia
Title	Sustainable ultrasound processing of tomatoes in development of functional products
Abstract Text	Tomato juice and sauce was produced in conventional way, by cold pressing, and homogenisation. Alternative to thermal treatment, sustainable low energy consumption technique, high power ultrasound was used. Thermosonication method (power ultrasound and heating up to 60°C) was used in order to prepare safe products and to minimise effects on the physical and nutritional quality of the products. Raw materials and juices and sauces were tested in terms of ºbrix, the amount of total soluble phenolics and antioxidant activity. Functional products were prepared with addition of RuBisCo protein powder and olive powder. Testing of the thermosonification on the by-products valorisation and development of the functional products showed that thermosonification can be efficiently used to prepare safe product, and also high power ultrasound extraction can be efficiently used to achieve better antioxidant properties of obtained product. This work was financed by the ongoing project PRIMA H2020 GA2032, FunTomP—Functionalized Tomato Products (https://funtomp.com/), a multidisciplinary project that aims to reformulate traditional Mediterranean tomato products into different functional foods by using novel and eco-friendly processing technologies that will minimally affect nutrients, with extra health benefits while keeping a sustainable product and process cycle and by valorizing agricultural waste.
Categories	Food Processing and Engineering
Other Authors	Name: Josipa Dukić Organisation: University of Zagreb, Faculty of Food Technology and Biotechnology City: Zagreb Country: Croatia

Board No.	62
Author Name	Adam Glowacki
Organisation	Zentis Polska sp. z o.o.
Country	Poland
Title	The effect of process factors on the dehydration rate of the black-currant extracts by means of the forward osmosis
Abstract Text	The innovative continuous forward osmosis (FO) process was applied for dehydration of water extracts from blackcurrant skins (BCSE) using the pilot scale system with the *OsmoF$_2$O^{TM}* membrane as the separation unit. The water extract from BCS was produced in the counter-current process. The raw extract was purified by ultrafiltration (450 kDa) and initially concentrated by nanofiltration (350Da) to 12.4-15.2 °Brix. Two draw solutions (DS) were tested – syrups called *Invert* with sugars content 69.5°Brix and *Isoglucose* 74.5°Brix at the start of the FO process. The independent variables considered were process time, DS type and pressure difference (Δp=35 and 75 kPa) between concentrate leaving and DS entering the system. The dependent variable was permeation rate (J) of water from circulating BCSE to flowing DS. Dehydration processes lasted from 14 to 19 hrs and final concentrations achieved were 66.7-68.4°Brix with *Invert* and 65.7-69.0°Brix with *Isoglucose.* The average dehydration rate with *Invert* (J=0.86 LMH) was significantly greater than with *Isoglucose* (J=0.68 LMH). The effect of Δp on the osmosis rate was insignificant. The results of experiments performed were utilized to design and develop the industrial scale system for production of natural food colorants concentrates.
Categories	Food Processing and Engineering
Other Authors	Name: Ireneusz Lichota Organisation: Zentis Polska sp. z o.o. City: Siedlce Country: Poland Name: Marek Szczepaniak Organisation: Zentis Polska sp. z o.o. City: Siedlce Country: Poland Name: Lidia Zander Organisation: Zentis Polska sp. z o.o. City: Olsztyn Country: Poland

Board No.	63
Author Name	Mehrsa Emkani
Organisation	Agrosupdijon
Country	France
Title	How fermentation with lactic acid bacteria impact pea protein extraction
Abstract Text	In this study, we presented an alternative extraction method based on alkaline solubilization/isoelectric precipitation resulting in the production of globulin-rich and residual albumin-rich fraction. The reduction of pH was achieved through fermentation by lactic acid bacteria instead of mineral acid addition. Two lactic acid bacteria strains (*Streptococcous thermophilus* and *Lactiplantibacillus plantarum*) have been used, either alone or in co-culture, and the results were compared with the conventional acidification. Also, pea varieties (Assas, Ascension, Cartouche) have been selected for their initial contrasted protein profiles. Extraction assisted by fermentation led to the increase in protein content of albumin fraction, which means the solubility of pea protein increased. This can be explained by the proteolytic activity of bacteria. Therefore, the differences in the chromatogram of the albumin fraction, measured by size exclusion chromatography (SEC-HPLC), could explain the differences in the proteolytic activity of bacteria. In particular, higher amounts of peptides (<10kDa) produced in samples fermented with co-culture are observed compared to the subcultures and conventional acidification. Also among varieties, Assas showed the most protein enrichment of albumin fraction.
Categories	Food Processing and Engineering
Other Authors	Name: Bonastre Oliete Organisation: Agrosupdijon City: Dijon Country: France Name: Rémi Saurel Organisation: Agrosupdijon City: Dijon Country: France

Board No.	64
Author Name	Keum-Il Jang
Organisation	Chungbuk National University
Country	South Korea
Title	Quality and Storage Characteristics of Green Juice Supplemented with Centella asiatica Powder
Abstract Text	*Centella asiatica* (CA) has anti-inflammatory, antibacterial, antioxidant, anticancer, and whitening effects. In this study, we explored its potential to increase the storability of green juice, which is very low and needs to be improved to increase shelf life. In particular, we analyzed the storability of green juice supplemented with CA powder during storage. First, CA was dried (cold air, hot air, or freeze drying) and pulverized to prepare a powder, for which the proximate composition and antioxidant and antibacterial properties were analyzed. Under optimal antibacterial conditions, CA powder (CP), CA juice (CJ), and CA extract (CE) were added to green juice and their proximate composition, quality, and antibacterial properties were analyzed during storage for 48 hours. Although the proximate composition of CPs prepared with different drying methods were similar, the antioxidant and antibacterial properties were the highest upon cold air drying. The proximate composition, quality, and storage characteristics of green juice supplemented with CP, CJ, or CE were similar during storage. However, the antioxidant and antibacterial properties were the highest in green juice containing CP. Therefore, we believe that the addition of CP to green juice will increase its shelf life, which will further stimulate the green juice industry.
Categories	Food Processing and Engineering
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Board No.	65
Author Name	Eunice Ngozi Ezembu
Organisation	Nnamdi Azikiwe University Awka
Country	Nigeria
Title	Proximate, micronutrients and sensory properties of breakfast flakes from OFSP-cocoyam composite flour sweetened with date palms.
Abstract Text	Proximate, micronutrients and sensory properties of breakfast flakes from Orange fleshed sweet potato (OFSP)-cocoyam composite flour sweetened with date palm was studied. Six flakes sample ratio (50:50, 60:40, 70:30, 80:20, 90:10 and 100:0; OFSP:cocoyam) were randomly generated, produced and analyzed using a standard conventional methods. The results findings ranged from 2.52 to 7.18, 1.74 to 2.61, 3.10 to 6.28, 6.58 to 9.36, 1.79 to 2.76 and 78.10 to 82.69%; 2.03 to 3.09, 1.00 to 5.50, 4.50 to 7.50, 2.90 to 7.50 and 1.80 to 3.70 mg/g for protein, ash, fat, moisture, crude fiber and carbohydrate content; vitamin A, D, E, C and K, respectively with appreciable levels of potassium, calcium, magnesium, sodium, phosphorous, iron and zinc. Flakes sample 70:30 had the highest values of vitamin A and C (3.09 and 7.8mg/g, respectively); and zinc (0.75mg/g) with good level of protein (2.91%) and fiber (2.65%); and liked moderately on the basis of crunchiness and overall acceptability (9-point Hedonic scale). This proved the feasibility of an acceptable flake production from OFSP-cocoyam composite flour, thus an addition to cheap, accessible and nutritious breakfast food to the available existing list of convenient foods. Keywords: Flakes, date palm, OFSP-cocoyam composite flour, proximate, micronutrients, sensory properties.
Categories	Food Processing and Engineering
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Board No.	66
Author Name	Kim Anh Hoang, Kim Yen Le, Ngoc Hieu Tran, Thi Thuy Linh Le, Anh Tung Le
Organisation	Food Technology Faculty, Saigon Technology University
Country	Vietnam
Title	EFFECT OF THE ADDITION OF GERMINATED MUNGBEAN IN SAUSAGE WITH FAT REDUCTION ON THE PHYSICOCHEMICAL AND SENSORY PROPERTIES
Abstract Text	Sausage is one of the meat products most consumed in Vietnam because of their convenience and high nutritional value. Due to the association between meat product consumption and a number of chronic diseases, there is a growing demand for healthier, low-fat, low-cholesterol, reduced-calorie meat products. The aim of this study was to evaluate the addition of germinated mung bean as a fat substitute in sausage on physicochemical properties and sensory acceptance. The analyses performed were proximate composition, cooking quality, emulsion stability, instrumental color, texture profile analysis and sensorial acceptance of the product. The results showed that there was a significant difference between samples C1 (100% fat) and C2 (50% fat reduction) in terms of physicochemical and structural properties. The addition of germinated mung bean flour as fat replacer positively influenced the reduction of caloric value, emulsion stability, colour parameters and texture profile analysis. All samples of low-fat sausages supplemented with germinated mung bean were well accepted by the consumer. The use of germinated mung bean to replace fat in sausages reduced calorie value, increased protein, fiber and total polyphenol content, while not affecting the sensorial and physicochemical properties, showing it to be a promising ingredient in the production of healthier meat products.
Categories	Food Processing and Engineering

Board No.	67
Author Name	Ngo Trinh Tac Dat
Organisation	Saigon Technology University
Country	Vietnam
Title	STUDY ON CELLULASE ASSISTED EXTRACTION POLYPHENOL FROM WATERMELON RINDS
Abstract Text	Watermelon products are mainly made from sweet flesh, and the underutilized by-product of the production is the rind, and the portion of rind entails from 20 – 30% of the produce. By-products are promising sources that recently raised scientists' attention because they possess many bioactive compounds. These compounds include polyphenols with the antioxidant activity that hinder the radical species formation; furthermore, this property reduces the risk of chronic diseases due to oxidative stress. In this study, the polyphenol from rinds was obtained by cellulase-assisted extraction, and the enzyme conducted in this study was Celluclast 1.5L (Novozyme). The factors that affect the extraction were studied, which are solvent to material ratio, temperature (^{o}C), pH, enzyme concentration (%), and extraction time (mins); the one factor at a time (OFAT) experimental design was employed to determine the optimal extraction parameters. This study showed that the total flavonoid compounds comprised approximately 80 % of the total phenolic compounds. Under the extraction condition of 17:1 (solvent:material), pH 4.5, enzyme concentration 1% and 55 minutes of extraction, the total phenolic compounds, the total flavonoid compounds and the antioxidant capacity were 689.682 $\pm$ 15.609 mgGAE/100g_{dw}, 563.697 $\pm$ 2.955 mgQE/100g_{dw}, and 7762.512 $\pm$ 122.784 µmolTE/100g_{dw}, respectively.
Categories	Food Processing and Engineering
Other Authors	Name: Hoang Kim Anh Organisation: Saigon Technology University City: Ho Chi Minh Country: Vietnam

Board No.	68
Author Name	Min Young Kwak
Organisation	Seoul Women's University
Country	South Korea
Title	Microbial decontamination of Vienna sausages using in-package ultraviolet-C-light emitting diode treatment
Abstract Text	Ultraviolet-C light emitting diode (UV-LED) treatment is a non-thermal microbial decontamination method with high energy efficiency. UV-LED treatment can be applied to packaged food products as an in-package treatment that prevents cross contamination. The objective of this study was to explore the potential for UV-LED treatment as an in-package treatment to decontaminate ready-to-eat (RTE) sausages. The Vienna sausages (3 pieces) with and without inoculation with Salmonella, E. coli O157:H7, and L. monocytogenes were packaged in a polypropylene bag (PP; 13 × 4 cm, 47 mL) and treated with UV-LED (275 nm, 1.5 m W/cm2, 21.0 V) for 5 min while the bag was rotated (80 turns/min). UV-LED treatment decreased the levels of indigenous bacteria, Salmonella, E. coli O157:H7, and L. monocytogenes in Vienna sausages in PP bags by 2.0, 2.3 Est, 1.0, and 1.1 Est log CFU/sample, respectively. In addition, the treatment did not alter the color of the sausages. UV-LED treatment shows potential for inactivating foodborne pathogens from cross contamination in Vienna sausages and possibly other RTE foods in packaged in plastic bags.
Categories	Food Processing and Engineering,Food Safety & Regulatory Science
Other Authors	Name: Ga Eun Myung Organisation: Seoul Women's University City: Seoul Country: South Korea Name: Sea C. Min Organisation: Seoul Women's University City: Seoul Country: South Korea

Board No.	69
Author Name	Xiaowei Lou
Organisation	National University of Singapore
Country	Singapore
Title	Metabolic and protein expression responses of Shewanella baltica in fish broth extracted from golden pomfret (Trachinot
Abstract Text	Slightly acidic electrolysed water (SAEW) has been widely applied as a sanitising agent for spoilage and pathogenic bact tRNA biosynthesis and carbon metabolism. Overall, this study enhances the understanding of metabolic and protein resp
Categories	Food Processing and Engineering,Food Safety & Regulatory Science
Other Authors	Name: Weichen Shu Organisation: National University of Singapore City: Singapore Country: Singapore Name: Hongshun Yang Organisation: National University of Singapore City: Singapore Country: Singapore

Board No.	70
Author Name	RAMA CHANDRA PRADHAN
Organisation	National Institute of Technology, Rourkela
Country	India
Title	Impact of consolidated stresses on wall friction behavior of processed Kodo (Paspalum scrobiculatum) millet flour
Abstract Text	Corresponding variations in Kodo millet flour wall friction behavior with respect to consolidated stress (0.25-5.0 kPa) were studied using powder flow tester for roasting, microwave, steaming, hydrothermally, and germination processes. At consolidated stresses, for particle size (3.65-9.35μm), irreversible correlation was established amongst cohesion and angle of internal friction in decreasing order: Native flour (0.164kPa, 23°) > Germination (0.112kPa, 16.34°) > Microwave (0.082kPa, 17.4°) > Steaming (0.045, 14.4°) > Hydrothermally (0.054kPa, 14.02°) > Roasting (0.042kPa, 16.3°) at moisture content 8.7-9.4% d.b. Roasted Kodo flour exhibited lowest cohesion (0.042 kPa) at angle of internal friction (16.3°) exerting depreciation in cohesion behavior at maximum consolidation stress (5kPa), owing to hollow and expanded morphology of particulate flour (9.35μm). Thus compared to varied processes roasted Kodo flour depicted lower tapped density (534 kgm^{-3}) since the particles attain loose matrix, enhancing inter-particle void fraction (0.77), diminishing superficial contact with adjoining irregular octahedral particles, rendering lowest powder cohesiveness. The compressibility indices (36.67-24.35)% for above processes, were found inversely proportional to particle size (3.65-9.35μm). Particulars on wall friction are helpful in modeling heat and mass transfer, drying quality, predicting diffusional properties of cellular foods, fabrication of silos, and hopper angle.
Categories	Food Processing and Engineering,Future of Food Manufacturing

Board No.	71
Author Name	Lin Yuting, Yu-Wen Ting
Organisation	National Taiwan University
Country	Taiwan
Title	Effect of cold plasma pretreatment on green tea drying
Abstract Text	Green tea is one of the most famous beverages in the world, which contains lots of phytochemicals such as amino acids, polyphenol, vitamin and alkaloids. Traditionally, the processing of green tea including withering, blanching, rolling and drying. The purpose of the drying process is to reduce the water content and prolong the tea shelf life. However, the high temperature during drying process could lead to the degradation of phytochemicals like catechins, yet few studies discuss this issue. Hence, our aim is to investigate a pretreatment to reduce the drying time, maximizing the nutrition retention and maintain the green tea quality as well as save the energy use. In this study, we will use Argon and Nitrogen as a pretreatment gases on fresh green tea leaves with different power, frequency and pretreatment time to figure out the influence of etching effect from cold plasma on green tea leave and its drying time change. After tea processing, the moisture ratio, drying rate, diffusion constant, activity energy will be calculated. Moreover, physicochemical analysis like SEM, color, pH value, TCC, TPC, antioxidant activity will also be measured and GC-MS for further analysis to inspect the main volatile compounds in the green tea samples.
Categories	Food Processing and Engineering,Future of Food Manufacturing
Other Authors	**Warning**: foreach() argument must be of type array|object, null given in **D:\xampp816\htdocs\paperbrochure\posteroutput.php** on line **98**

Board No.	72
Author Name	Edwin Hlangwani
Organisation	University of Johannesburg
Country	South Africa
Title	An AI-Hybrid Bioprocessing Approach for The Production of High-Quality Umqombothi (South African Sorghum Beer)
Abstract Text	Bioprocess development for umqombothi (a South African traditional beer) as with other beer products is complex. Thus, bioprocess development is shifting towards new systematic protocols of experimentation. Traditional optimization methods such as response surface methodology (RSM) require support from a relevant machine learning (ML) system. Artificial neural networks (ANN) are an effective non-linear multivariate tool with enormous generalization, prediction, and validation capabilities. Bioprocess development and optimization of umqombothi were done using RSM and ANN. The optimum condition values were 1.1 h, 29.3 ℃, and 25.9 h for cooking time, fermentation temperature, and fermentation time, respectively. The coupled approach was an effective tool for the optimization of umqombothi's bioprocessing parameters. RSM significant parameters: alcohol content, total soluble solids (TSS), and pH had R2 values of 0.94, 0.93, and 0.99 respectively while the constructed ANN significant parameters: alcohol content, TSS, and viscosity had R2 values of 0.96, 0.96, and 0.92 respectively. Thus, the correlation between experimental and predicted values suggested that this approach was suitable for bioprocess development and optimization as shown by R2 values closer to 1. Given this level precision, the obtained optimal conditions can be used in a smart-factory concept for the production of umqombothi on a commercial scale.
Categories	Food Processing and Engineering,Future of Food Manufacturing
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Board No.	73
Author Name	Andrea Gomez-Maqueo, Amy Lin
Organisation	Singapore Institute of Food and Biotechnology Institute, Agency for Science, Research and Technology (A*STAR), Singapore 117609, Singapore
Country	Singapore
Title	Up-to-date Progress in Applying High-Pressure Processing to Foods for Improving Health Conditions in Clinical Studies
Abstract Text	The long-term consumption of overprocessed foods is a contributing factor to the high incidence of non-communicable diseases worldwide. High pressure processing (HPP) is a non thermal technology for achieving food safety while preserving the sensory and nutrition quality of foods. In this review, we hypothesize the healthy effects of HPP could go beyond conventional nutrition. The aim of this review is to discuss how HPP foods contribute to health as evidenced by clinical trials, to highlight the mechanisms behind, and to identify the gaps in research and application that are missing to go that extra mile. We provide critical analysis and current progress of its effects on diabetes, gut health, muscle health, immune system, cardiovascular health, obesity, osteoporosis, and brain cognition and mental health. Use of HPP has shown mechanisms such as change the structure of dietary fibre and lower postprandial glycemia, induce denaturation in proteins which improves their bioavailability, increase the bioaccessibility of antioxidants leading to lower oxidative stress and inflammation, among others. However, understanding the relationship between pressure conditions and physiological outcomes requires further research. With this review, we expect to contribute to the further exploration of this technology for producing the novel healthy foods of the future.
Categories	Food Processing and Engineering,Nutrition & Health
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Board No.	74
Author Name	Kuan-Chen Cheng
Organisation	National Taiwan University
Country	Taiwan
Title	Fermented Chenopodium formosanum sprout polar-solvent extraction attenuates PM2.5-induced alveolar macrophages inflammation
Abstract Text	Particular matters 2.5μm (PM 2.5) are a group of suspended particles with a diameter less than 2.5μm, which are loaded with metals, nitrates, and sulfates are able to be accumulated in the windpipe or alveoli to enter the human body. Alveolar macrophage (AM) can phagocytose PM 2.5 then rise the level of free radical, which may induce apoptosis protease activity to cause cell apoptosis and respiratory tract inflammation. Previous studies indicated that fermented *Chenopodium formosanum* from fungi can yield hydrolase to release free phenolics and enhance anti-oxidant ability, which is capable of decreasing the production of active oxygenates and improving the potential of cells to against free radical damage. In this study, we focus on developing the new approaches to extract fermented *C. formosanum* sprout products, we use polar-solvent partition to get the good anti-oxidant ability extraction. We find fermented *C. formosanum* sprout product extractions, that may regulate NFkb pathway to mitigate AM inflammation induced by PM2.5.
Categories	Food Processing and Engineering,Nutrition & Health
Other Authors	Name: Chen-Che Hsieh Organisation: National Taiwan University City: Taipei Country: Taiwan Name: Shu-Han Yu Organisation: National Taiwan University City: Taipei Country: Taiwan

Board No.	75
Author Name	Pin-Xuan Yu
Organisation	National Taiwan Ocean University
Country	Taiwan
Title	Ameliorative Effects of Phosphatidylserine-Strontium citrate Composite (PS-SrC) on Osteoarthritis in Obese Male Rats
Abstract Text	Osteoarthritis (OA) is a chronic joint disease that influences people life quality. Obesity is recognized as the highest risk factor for OA. Some studies focused on the natural substances for OA treatments. Strontium Citrate (SrC) is derived from the mineral strontium promotes chondrocyte anabolism and phosphatidylserine (PS), known for anti-inflammatory properties. The purpose of this study which investigates the effect of PS-SrC on alleviating osteoarthritis. In LPS-stimulated RAW264.7 cells, PS-SrC decreased levels of reactive oxygen species (ROS), nitric oxide (NO), and interleukin-1β (IL-1β). Additionally, it increased anti-inflammatory cytokines and transforming growth factor-β (TGF- β). PS-SrC also shows increased alkaline phosphatase (ALP) production in MG-63 cells, enhanced the level of collagen II, and lowered the level of matrix metalloproteinase-13 (MMP-13) in SW-1353 cells. *In vivo* study, rats were given a 40% high-fat diet and induced OA by the anterior cruciate ligament tearing and injuring the meniscus on the right knee joint. Rats were treated with samples for 8 weeks. PS-SrC shows lower levels of NO, malondialdehyde, leptin, adiponectin, MMP-13, type II collagen C-terminal cross-linked telopeptides, and IL-1β while increasing levels of TGF-β. This study showed that PS-SrC inhibits inflammation and enhances osteogenic-related factors.
Categories	Food Processing and Engineering,Nutrition & Health
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Board No.	76
Author Name	Pei-Yu Wang
Organisation	National Taiwan Ocean University
Country	Taiwan
Title	Effects of Zinc-chelating Sturgeon Collagen Peptide on Osteoarthritis Induced by Anterior Cruciate Ligament Transection and Medial Meniscectomy Obese Male Rats
Abstract Text	Dietary zinc is required for growth and development and cell-mediated immunity. Insufficient zinc intake or zinc absorption inhibitors in food cause zinc deficiency. Stable peptide-zinc complexes may increase duodenal soluble zinc. Osteoarthritis (OA) is arthritis characterized by degenerative articular cartilage and joint dysfunction. Zinc may be used as a preventative supplement for OA in humans. As a result, the purpose of this study was to determine the effect of sturgeon collagen peptide chelated with zinc (SPZ) using the SW1353 *in vitro* and the Sprague Dawley rat *in vivo* models. The results showed that MIA increased oxidative stress in SW1353 cells and that SPZ could counteract these effects. Male Sprague-Dawley rats were domesticated for one week and then placed on a high-fat diet for six weeks to induce obesity prior to surgery to induce osteoarthritis. Oral administration was used for six weeks before euthanasia. A rat model produced similar results to cell culture. SPZ slows OA progression by reducing pro-inflammatory cytokines such as COX-2, MMPs, and CTX-II. It also shows that treated rats have less cartilage breakdown. These findings suggest that SPZ may act as a preventative measure against the progression of OA.
Categories	Food Processing and Engineering,Nutrition & Health
Other Authors	Name: Jerrell Felim Organisation: National Taiwan Ocean University City: Keelung Country: Taiwan Name: Zwe-Ling Kong Organisation: National Taiwan Ocean University City: Keelung Country: Taiwan

Board No.	77
Author Name	Daiva LeskauskaitÄ—
Organisation	Kaunas University of Technology
Country	Lithuania
Title	Development of foods for elderlies with swallowing disorders using 3D printing technology
Abstract Text	Older adults require a higher and specific nutrient intake. Since swallowing disorders are common in this age group of consumers, they should receive modified- textured foods in the form of puree, mince, or bite-sized foods. Such foods can be nutritionally diluted causing high risk of nutrient deficiencies in protein, calories, minerals and vitamins for these consumers. This study aimed to develop a nutrients dense, high-energy 3D pritable meat pastes for elderies with swallowing disorders. The printability and textural attributes of cooked meat pastes containing 20 g/100g proteins and 4 g/100g of dietary fibers with oil, vitamins and minerals added individually or in the solidified form of bigels were analysed. Bigels were comprised of the gelled oil phase enriched with vitamins A and D and gelled water phase enriched with Se, Fe and Zn, and vitamins B6, B12, C. Meat pastes displayed viscosities at rest ranging from to 294.33 to 412.00 Pa.s and showed high printing accuracy (98.33 - 99.17 %) and printing stability (97.90 – 99.00 %). The kinetics of the release of nutrients during the in vitro digestion of 3D printed meat pastes demonstrated controlled release of all vitamins and minerals added in the pastes in the form of bigel.
Categories	Food Processing and Engineering,Nutrition & Health
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Board No.	78
Author Name	Daiva Leskauskaitė
Organisation	Kaunas University of Technology
Country	Lithuania
Title	Powdered vitamins and mineralsâ€“loaded double emulsions with control release of nutrients during digestion
Abstract Text	Water in oil in water (W1/O/W2) double emulsion is one of the most attractive systems for the encapsulation of various nutrients. The advantage of this system comes from its unique morphology, as it is a general multifunctional carrier able to encapsulate different hydrophilic and lipophilic molecules in the same particle. Short shelf life and rapid fat oxidation are cited as major disadvantages of nutrient loaded W1/O/W2. This study investigated the feasibility of W1/O/W2 loaded with vitamins B6, B12, and C, minerals Zn, Fe and Se in the W1 phase and vitamins A and D3 in the O phase for freeze-drying to obtain dispersible powders. All nutrients remained entrapped in the inner phases of W1/O/W2 during the freeze-drying of emulsions. Reconstituted emulsions obtained after the rehydration process showed monomodal droplet size distribution, decent creaming stability (~95%) and good encapsulation efficiency (94.51%). The controlled release of all vitamins was recorded during in vitro digestion of powdered W1/O/W2. At the end of the duodenal phase, approximately 100 % of the vitamins were released from the loaded emulsions. However, the major amount of minerals was released at the end of gastric phase with the further decrease at the end of the duodenal phase.
Categories	Food Processing and Engineering,Nutrition & Health
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Board No.	79
Author Name	Jihun Jang
Organisation	Dept. Food and Biotechnology, Korea University
Country	South Korea
Title	Whey Protein Isolate Fermented with Lactobacillus gasseri IM13 Prevent Dexamethasone-Induced Muscle Atrophy in C2C12 muscle cell
Abstract Text	The objective of this study was to evaluate the preventive effect of fermented whey protein isolate (F-WPI) on dexamethasone-induced muscle atrophy in vitro. Whey protein isolate (WPI) were fermented with 9 isolates (*L. reuteri* 3B03, *L. gasseri* 5R01, 5R13, IM13, IR13, *L. plantarum* 11B02, *L. rhamnosus* IM14, IM18, IM19) with high tolerance to acid and bile salts and ability to adhere to the intestine. Functional properties of WPI fermented by 9 *Lactobacillus* strains such as anti-oxidation and proteolytic activity were evaluated. The antioxidant activity and proteolytic activity of WPI were synergistically improved by fermentation. In particular, WPI fermented by *L. gasseri* IM13 showed the highest reducing power, scavenging and proteolytic activity. Furthermore, whole genomes of *L. gasseri* IM13 was sequenced and the comparative genomic analyses were carried out. To investigate the preventive effect on muscle atrophy, F-WPI was treated to C2C12 skeletal muscle cell before dexamethasone treatment. F-WPI increased myotube viability, cell diameter and nuclei formation with dose-dependent manner. Moreover, F-WPI significantly prevented the release of muscle atrophy gene (MuRF1, MAFbx, BNIP3, cathepsin-L) and suppression of myogenesis gene (Myogenin, MyoD). Therefore, these findings suggest that F-WPI has the potential to play preventive and therapeutic roles in the management of sarcopenia.
Categories	Food Processing and Engineering,Nutrition & Health
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Board No.	80
Author Name	Dr. Mahesh Gupta
Organisation	CSIR-Institute of Himalayan Bioresource Technology, Palampur (H.P.) India
Country	India
Title	Study the effect of soluble dietary fiber incorporated in pea protein on physicochemical, textural and rheological properties of gel matrix
Abstract Text	Soluble dietary fiber an essential constituent that inherits putative health attributes, particularly for diseases associated with the large intestine. Consequently, there has been persistent question for utilization of soluble dietary fiber in food formulation generating avenue for functional foods. Similarly, protein an essential macronutrient also known to modulate essential physiological functions in body. Black pea, an efficacious crop of Himalayan region, India, contains high amount of protein. Thereby, present study attempted to determine the physicochemical, textural and rheological properties of soluble dietary fiber (0.5-2.0% concentration from mango peel) incorporated pea protein based food matrix. Result revealed increasing trend in proximate composition after incorporating soluble dietary fiber with maximum amount of protein from 05.10%-05.91%. Contrary, textural attributes as hardness and resilience exhibited decreasing trend with increased incorporation of soluble dietary fiber. Similarly, the techno-functional and rheological properties also improved with increased incorporation of soluble dietary fiber. Gel matrix with soluble dietary fiber incorporation exhibited enhanced overall acceptability compared to control whereas the color values showed scant darkness. Fascinatingly, soluble dietary fiber incorporated gel matrix with enhanced characteristics exhibited profound efficacy in management of ulcerative colitis. Therefore, the present study emphasizes on utilization of fruit peel to form value-added functional food ingredient.
Categories	Food Processing and Engineering,Nutrition & Health
Other Authors	Name: Shriya Bhatt Organisation: CSIR-Institute of Himalayan Bioresource Technology, Palampur (H.P.) India City: Palampur Country: India Name: Rashim Kumari Organisation: CSIR-Institute of Himalayan Bioresource Technology, Palampur (H.P.) India City: Palampur Country: India

Board No.	81
Author Name	Maria Leonora dL. Francisco
Organisation	University of the Philippines-Diliman
Country	Philippines
Title	A Consumer Analysis on the Knowledge, Attitude, and Perceptions of Filipinos towards Food Irradiation
Abstract Text	Demand for fresh, healthy, convenient, and safe food has prompted emerging novel non-thermal processing technologies. In the Philippines, the status of food irradiation is still in the pilot stage; therefore, consumer education and market promotion of irradiated foods require more investment. This study provided an updated baseline data regarding the knowledge, attitudes, and perception of Filipino consumers towards irradiated food. Data were obtained through a facilitated online survey questionnaire (n=199). Questions include demographics, awareness of food irradiation, consumer's attitudes, and sources of information. Consumers' current reluctance towards irradiated food is comparatively lower than the previous local study conducted in 1995 (n=210). Consumers' perceived risk is higher in canning and addition of food additives compared to food irradiation. However, consumer awareness of food irradiation is still low (28.6%), specifically, the nature of the process, safety, health effects, and inaccurate belief regarding radioactive food. Knowledge sources utilized by consumers are the internet, school, and scientific journals. Specific factors influencing consumer's acceptance and purchasing intent of irradiated food include food product safety, consumer health concerns, and personal preferences. Majority of the consumers (97%) are willing to learn more about food irradiation through food labels, health or food professionals, and the internet.
Categories	Food Processing and Engineering,Sensory & Consumer Science
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Board No.	82
Author Name	Madhuresh Dwivedi
Organisation	National Institute of Technology Rourkela
Country	India
Title	Development of non-destructive method for the assessment of storage quality of small onion (A. ascalonicum)
Abstract Text	The storage qualities of small onion (A. ascalonicum) during storage was assessed using hybrid electronic nose (e-nose)–fuzzy logic approach, beyond conventional tests. Fuzzy logic was used to rank and screen best responsive metal-oxide semiconductors (MOS) sensors (total 18) to detect global volatile odors from small onion. Using e-nose data, an odor index (OI) was estimated and correlated with the aroma, flavor, and tearing effect of onions. Multiple linear regressions (MLR) were used to predict the storage time and sulfur indices of onion using response data of sensors. Inaddition, it predicted the change in sulfur indices with accuracy (R 2 = 0.995). E-nose data closely predicted the storage time of onions relative to order indices (R 2 , 0.993; RMSE, 3.31 vs. R 2 , 0.985; RMSE, 4.57) (p > 0.05). In addition, it predicted the sulfur indices with accuracy (R 2 = 0.995, RMSE = 0.29). Order Indices (OI) of onions was highly correlated with aroma and color. Their estimated discard time was calculated by 99 d (e-nose) vs. 97 d (conventional tests). The presented approach could be adopted as non-destructive alternative to conventional tests toassure post-harvest quality of small onion at agro-industrial settings.
Categories	Food Processing and Engineering,Supply Chain Management

Board No.	83
Author Name	Mahsa Majzoobi
Organisation	RMIT University
Country	Singapore
Title	Tackling the global issue of food waste and loss; Strategies to reduce grain waste
Abstract Text	Food waste is a global issue. One-third of all food produced is lost or wasted causing huge economic loss, environmental impact, malnutrition and food insecurity. This is especially of great importance during the post-Covid era with numerous economical issues and the Europe war causing food shortages. Grains including cereals and legumes are the staple food around the world and Australia is one of the world-famous producers and exporters of high-quality grains. However, dealing with huge waste and loss across the grain supply chain has remained a major issue. Thus, introducing applicable strategies to reduce grain waste is of great value. This research aims to discuss the main reasons for grain waste and loss in Australia and then to introduce some of the novel and applicable value-addition and upcycling strategies to reduce grain wastage. Examples of these strategies include producing value-added food products from grain processing wastes and under-utilised grains in production of healthy foods such as high fibre, gluten- and sugar-free products; increasing the functionality and value of starch using green and clean modification methods; production of healthy rice with reduced glycaemic index and also grain processing optimisation to improve quality and reduce waste.
Categories	Food Processing and Engineering,Supply Chain Management

Board No.	84
Author Name	Karol Banaś
Organisation	Wrocław University of Economics and Business
Country	Poland
Title	Agar in oleogelation
Abstract Text	Oleogelation allows changing the functional form of liquid plant oils providing properties which make oils similar to solid fats while preserving their nutritional profile. Unfavourable saturated fatty acids and lipids with trans double bond configuration are absent in oleogels. One of the methods of obtaining oleogels involves emulsion formation using so-called oleogelator. Oleogelators can be divided into two groups according to their molecular weight, i.e. Low Molecular weight Oil Gelators (LMOG) and High Molecular Weight Oil Gelators (HMOG). An interesting HMOGs are natural biopolymers such as alginates, xanthan gum, pectin, gellan gum, carob or agar. Agar is used as a thickener, stabiliser and emulsifier. It is commonly used in the food industry as a substitute for gelatine, e.g. in the production of sweets (jams, jellies). The results show a significant effect of agar hydration on the texture profile of resulting oleogels. Oleogels made with hydrated agar are 44%, 39% and 35% softer than those made with non-hydrated agar when measured after 2h, 24h and 48h, respectively. Project is financed by the Ministry of Science and Higher Education in Poland under the programme Regional Initiative of Excellence" 2019 - 2022 project number 015/RID/2018/19 total funding amount 10 721 040,00 PLN.
Categories	Food Processing and Engineering,Traditional & Future Food
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Board No.	85
Author Name	Alexandra Mari, Magda Krokida
Organisation	National Technical University of Athens
Country	Greece
Title	Optimization of gentle processing methods for the development of innovative blueberry products with increased shelf-life and superior quality characteristics
Abstract Text	Berries, such as blueberries, are fruits with a high nutritional value and increased bioactive ingredients' content, leading to increasing demand by consumers. However, their seasonality and sensitivity during transport and storage, is an obstacle to the availability of fresh fruit. Therefore, it is necessary to dehydrate and process the fruit, making it available all year round. The aim of this work is to develop blueberry products with increased shelf-life and improved quality characteristics using mild treatment methods, such as osmotic dehydration. Alternative osmotic agents (apple juice, glycerol and combination of apple juice with glycerol) were studied and compared with conventional sucrose agent, in order to reduce the amount of sugars used. Osmotic dehydration process was optimized regarding various parameters, such as osmotic concentration, temperature and duration of treatment, as well as pre-treatment method (freezing). Apple juice led to improved water loss, while freezing pre-treatment enhanced the osmotic dehydration of berries treated with glycerol. The products developed under the optimum conditions, were then evaluated regarding their quality properties (color, antioxidant activity, total acidity, sensory characteristics).
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Board No.	86
Author Name	Yusuf Olamide Kewuyemi
Organisation	University of Johannesburg
Country	South Africa
Title	Comparable proximate composition and improved structural properties of 3D printed biscuits from biomodified wholegrain edible inks
Abstract Text	The poor aesthetic attributes of traditionally prepared gluten-free baked snacks rendered them inferior to the gluten-containing ones. Three-dimensional (3D) food printing is an evolving and effective processing approach that can systematically modify desirable and personalized features in derived products. This study examined the proximate composition and structural properties of traditional and 3D printed biscuits from biomodified food inks. The preliminary quality evaluations merited the selection of cowpea sourdough (CS), and germinated quinoa (GQ) flours as food inks. Traditional and 3D printed doughs were prepared using wholegrain, multigrain flours (80/60% CS and 20/40% GQ), and basic biscuit ingredients. The prepared doughs were baked at 180 ^{o}C for 15 ± 2 min and cooled to obtain biscuits. The proximate and structural properties of the biscuits were subsequently examined. The data showed insignificant differences ($p \leq 0.05$) in the ash, fibre, and protein contents of the biscuits. The automated printing of replicated dough strands in layers might have facilitated the consistent structural design of the 3D printed biscuits. The multigrain biscuits had a proportional share of CS and GQ biscuits' cellular characteristics. The comparable nutritional component and improved appearance of the multigrain 3D printed biscuits can enhance the acceptability of gluten-free baked snacks.
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Board No.	87
Author Name	Karin Schroen
Organisation	Wageningen University and Research
Country	Netherlands
Title	Micro- and nanotechnology for sustainable food production
Abstract Text	Micro- and nanotechnology both hold great promises to achieve sustainable food production. Due to the very small scale at which they can probe phenomena, this leads to insights that otherwise could not be achieved. In this presentation, I will give a flavor of the multitude of applications in which micro- and nano technology are used. Examples will be taken from sensing: on the land (tailored nutrient delivery for optimized growth), or in the factory (minimize food waste), or even at the consumers level who could benefit from freshness sensors on food packages. Also, tools to analyze e.g. protein functionality as part of the proteins transition, will be presented in detail. In doing so, it is possible to improve current food production processes greatly. Away from current options, I will address options that are further into the future, such as measurement of digestion on chip, which would allow reversed food design. This can be taken even one step further when analyzed within organs on chip, leading to analysis of health effects. These are futuristic perspectives that may ultimately lead to the design of food that is healthy on a personalized level, based on nano- and micrometer insights.
Categories	Food Processing and Engineering,Traditional & Future Food

Board No.	88
Author Name	Syazana Abdullah Lim
Organisation	Universiti Teknologi Brunei
Country	Brunei
Title	Effects of modified atmosphere packaging on storage qualities of fresh-cut fruits using low-cost and commercially available films: a practical case study on â€˜Arusâ€™ Muskmelon (Cucumis melo L.)
Abstract Text	Modified atmosphere packaging (MAP) technology is an effective preservation method for perishables. Choosing a suitable packaging material for MAP is an important factor that determines the effectiveness of this method. In developing countries, packaging specifically made for MAP can be difficult to acquire and considerably expensive. Therefore, this work investigates the effects of active (MAP) on quality characteristics of fresh cut 'Arus' muskmelon for 15 days at 5^{o}C (80% RH) using commercially available films. Films of 0.21mm polyethylene (PE) bags and 0.24 mm ziplock (ZL) bags for MAP application were assessed in three gas compositions; control (no gas inserted), 3% O_2 + 7% CO_2 and 5% O_2 + 10% CO_2. Results have demonstrated that the ZL film performed better than PE film and was able to maintain a close to an ideal gas composition throughout the storage period. ZL 5% O_2 +10% CO_2 treatment had successfully enhanced the fruit quality especially in maintaining the moisture content, texture, titratable acidity, and microbial safety although the PE film prevented visual deterioration of the melons. This study shows the potential of using widely available packaging as a cheap alternative in maintaining the quality of fresh-cut fruits using MAP.
Categories	Food Packaging & Material Science
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Board No.	89
Author Name	Ronald B. Pegg
Organisation	Department of Food Science & Technology, University of Georgia
Country	USA
Title	Inshell versus Shelled Storage of Almonds for Shelf-life Extension
Abstract Text	Raw inshell and shelled almonds were stored at varying temperatures and percent relative humidities (%RH) in environmental chambers for up to 24 mo. Every 2 mo, test samples were randomly analyzed for selected chemical and physical indices including peroxide values (PVs), percent free fatty acids (%FFAs), moisture contents (MCs), water activities (a_ws) and 'crunchiness'. PVs >2.0 meq. active O_2/kg oil, or an average crunchiness reading that deviated >15% from the baseline value (at day 0), triggered consumer acceptance panels (n≥85) to occur. Because of Covid-19, these panels became in-house panels, which dictated whether a sample continued in the study. Resultant slopes of modeled linear regressions, based on PV, %FFA, MC and aw/mo data, were used to infer the generalized rates at which chemical and physical markers tracked in stored almonds changed, and are referred to as "proliferation rates"; the models had adjusted R^2 values ≥70.9%, thereby demonstrating strong relationships. Whether the almonds were stored inshell or shelled was a critical factor determining almond quality. Statistical analyses showed that stored inshell samples were more oxidatively and hydrolytically stable than their shelled counterparts.
Categories	Food Packaging & Material Science
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Board No.	90
Author Name	Lotta Kuuliala
Organisation	Ghent University
Country	Belgium
Title	Cross-disciplinary communication in intelligent packaging technology development
Abstract Text	The demand for novel packaging technologies for perishable food products like meat, fish and vegetables has provoked a constantly increasing interest towards intelligent quality monitoring solutions. The development of this kind of technologies is a highly multidisciplinary effort and thus calls for efficient communication between the project partners. In this presentation, a food scientist's perspective into cross-disciplinary communication in intelligent packaging technology development is discussed, focusing on projects aiming at non-destructive monitoring of spoilage-indicating volatile compounds. Firstly, a process mapping approach - a formal representation of information flow from the initial concept level to a validated proof-of-concept – is used for identifying the key stages in the development process as well as their central requirements. Secondly, the risks and challenges associated with communication in these stages are discussed. Finally, summarizing guidelines are given for boosting communication in the entire development chain, optimally benefitting both the scientific community and the global food packaging industry.
Categories	Food Packaging & Material Science
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Board No.	91
Author Name	Nandan Sit
Organisation	Tezpur University
Country	India
Title	Modification of potato starch by annealing and heat-moisture treatment and the effect of native and modified starches on properties of prepared films
Abstract Text	This study investigated the effect of annealing and heat-moisture treatment on the physicochemical and functional characteristics of potato starches in addition to properties of developed potato starch films. Annealing treatment (ANN) was performed in presence of ample water at 60°C for a day. For heat-moisture treatment (HMT), native starch was exposed to heat treatment about 110â °C maintaining at 20% moisture content for 8h. Potato starch-based films (native and modified) were prepared by solution casting method (5.0g/100mL) using glycerol (40mL/100g) as a plasticizer. The swelling power, solubility, freeze-thaw stability, color parameters, pasting and rheological behaviors of the native (NPS), annealed (ANN) and heat-moisture treated (HMT) starches were evaluated. The films made of native, annealed and heat moisture treated starches were characterized by thickness, solubility, opacity, WVP, mechanical properties, sealability and biodegradability. The modified starches had lower swelling power, solubility, freeze-thaw stability and lower viscosity comparatively. The HMT starch films had decreased solubility, WVP in addition to enhanced mechanical properties. The ANN starch films increased the elongation with lower solubility and WVP compared to the native starch. The potato starch-based films were biodegraded within 15days. The developed film can be used as a potential packaging material to meet various food packaging requirements.
Categories	Food Packaging & Material Science
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Board No.	92
Author Name	Horman San
Organisation	Kasetsart University
Country	Thailand
Title	Biodegradable film of poly (lactic acid) based incorporated with triethyl citrate and orange peel essential oil for food packaging
Abstract Text	Bio-based materials are the main priorities for development and enhancement of food packaging to fulfill ecofriendly policy. This study aimed to improve biodegradable film properties by incorporating plasticizer and natural essential oil. The polylactic acid (PLA) film has been prepared via cast extrusion. Triethyl citrate (TEC) and orange peel essential oil (OPEO) at different concentration (5%, 7%, 10%) were compounded with PLA polymer. Result showed decreased tensile strength with increasing concentration of TEC whereas OPEO showed insignificant effect. Combination of TEC and OPEO (PLA/TEC/OPEO 90/5/5) increased elongation at break and decreased Young's modulus value due to raised polymer chain mobility, flexibility, and decreased stiffness. Fourier-transform infrared spectroscopy data showed shifting of C=O vibration in carbonyl group of PLA by adding OPEO compound, suggesting their interaction via carbonyl groups. Moreover, surface hydrophobicity of incorporated films was slightly increased with addition of TEC. Blended films showed ultraviolet light blocking effect while maintaining good transparency in visible spectra region. TEC and OPEO had least effect on crystallinity of PLA polymer as determined by X-ray diffractogram. Finally, combined TEC and OPEO improved better properties of PLA film especially flexibility, hydrophobicity and ultraviolet blocking properties which suitable for food packaging application.
Categories	Food Packaging & Material Science
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Board No.	93
Author Name	khwanchat Promhuad
Organisation	Kasetsart University
Country	Thailand
Title	Characterization of Ethyl Maltol Incorporated Biodegradable Films for Functional Active Food Packaging
Abstract Text	Ethyl maltol (EMA) is a volatile flavoring chemical that has antimicrobial properties and can be used in bakery products. Addition of ethyl maltol to a package possibly produced functional active packaging to extend shelf life of packaged bakery. The aim of this study was to develop biodegradable films that incorporated with ethyl maltol and determined the effects of active films on quality of packaged bakery. Biodegradable blend films containing 40% polybutylene adipate terephthalate (PBAT) and 60% polybutylene succinate (PBS) were produced via extrusion with different EMA contents (0, 3, and 6%). The results showed that PBAT and PBS blends represented IR absorption peaks between 1700 and 1780 cm^{-1} for C=O stretching vibration at identical wavenumbers. The C=O stretching slightly shifted to higher intensity when EMA was incorporated into the PBS/PBAT blend. The formation of network interactions between polymer and ethyl maltol decreased oxygen permeability (OP) and water vapor permeability (WVP). Ethyl maltol significantly increased contact angle in PBAT/PBS films, indicating improved surface hydrophobicity due to the hydrophobic acetyl groups present in ethyl maltol. Films were converted and heat sealed into bags for packaging of butter cake. The films with EMA effectively delayed fungal growth in butter cake, resulting in more than 2-fold increase of the shelf life. Accordingly, functional packaging for shelf-life extension of bakery products was achieved by incorporations of EMA into biodegradable PBAT/PBS films via extrusion showed promise as an active biodegradable food packaging technology.
Categories	Food Packaging & Material Science
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Board No.	94
Author Name	Shammi U. Hettiarachchi
Organisation	Department of Food Science and Technology, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka
Country	Sri Lanka
Title	Characterization of Polymer Structure and Evaluation of Techno-Functional Properties of Bioplastic films from Red Seaweed (Kappaphycus alvarezii)
Abstract Text	Bioplastics derived from renewable biomass resources such as seaweed have gained much attention as alternatives to conventional plastics. Polymer characterization is an important aspect to enhance the performance of bioplastics. In this study *Kappaphycus alvarezii* seaweed-based bioplastic films plasticized with 10%, 20%, and 30% V/W glycerol were developed, material characterizations were performed (FTIR-ATR spectroscopy, XRD, TGA, UV-Vis spectrophotometry, colorimetry) and selected techno-functional properties were investigated [tensile properties, water vapor permeability (WVP) and water solubility]. Further, the applicability of the developed bioplastic films and the film-forming solution as a wrapping and coating for selected fruits (fresh-cut watermelons and cavendish bananas) was investigated. FTIR spectra revealed the presence of characteristic seaweed functional groups chlorophyll a, carotenoids and phaeophytin with C-O and C-C stretching of 3,6-anhydrogalactose and D-galactose-4-sulfate. X-ray diffractograms revealed the amorphous nature of the films. TGA revealed type 04 curves with multiple-stage decomposition. The films showed an acceptable transparency and whiteness index. Both glycerol content and RH impacted the WVP. The tensile strength of the films showed a decreasing pattern when increasing glycerol concentration while water solubility showed an increasing pattern. The film-forming solution plasticized with 20% glycerol was found to be the most effective coating for bananas. The findings of the study suggest that red seaweed would be a potential source for bioplastic production.
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Board No.	95
Author Name	Yeyen Laorenza
Organisation	Department of Packaging and Material Technology, Faculty of Agro-Industry, Kasetsart University
Country	Thailand
Title	Comparison of Ginger and Lime Peel Oil Loaded in Biodegradable Packaging and Application on Chilled Pacific White Shrimp
Abstract Text	Ginger and lime are the spices and natural preservatives that contain beneficial antimicrobials, particularly for food packaging applications. This research investigated effects of ginger oil (GO) and lime peel oil (LPO) on properties of poly(butylene adipate terephthalate) (PBAT) and poly(lactic acid) (PLA) films produced via cast extrusion at 160-175â—¦C. Essential oils decreased tensile strength and Young's modulus of the films. However, PLA70/PBAT30 containing GO showed elongation at break improvement which was higher than LPO-loaded films. The intensity of asymmetric C-H group in PLA was increased possibly due to polymer and essential oil interaction. The C=O bond in carbonyl group of PBAT and PLA is located at 1712 and 1755 cm^{-1}, respectively with peak intensity depending on the polymer ratio. Essential oils increased surface hydrophobicity (75.14-83.79â—¦) and oxygen permeability (19.72-49.86 cc.mm/m2.day.atm) of the films. PBAT70/PLA30 showed a greater mass fraction of volatile release than PBAT30/PLA70. GO tend to release and provides a greater inhibition of *Bacillus cereus* than LPO. The films containing both essential oils effectively inhibited the blackspot of packaged chilled shrimp. The packaging containing essential oils especially GO effectively enhanced functional properties and are promising for seafood packaging.
Categories	Food Packaging & Material Science
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Board No.	96
Author Name	Priyanka Chakraborty
Organisation	North Eastern Hill University
Country	India
Title	Nanocomposite food packaging films from banana flour/cellulose nanoparticles/betel leaf extract
Abstract Text	The heavy use of petrochemical-based food packaging systems and their associated environmental pollution have motivated researchers to develop sustainable and environment-friendly solutions. In this work, food packaging films were formulated by loading cellulose nanoparticles alone (CNP: 2 and 4% w/w), betel leaf extract alone (BLE: 10 and 20% w/w) and combination of CNP and BLE (CNP: 4% and BLE: 20% w/w) within banana flour (BF) matrix by solvent casting technique. The thickness, moisture content, water solubility, and water vapor transmission rate (WVTR) of the prepared films significantly increased with the addition of BLE. The BLE-loaded films demonstrated robust antimicrobial activity against Bacillus cereus, Listeria monocytogenes, Escherichia coli, and Salmonella Typhimurium. In the case of CNP-loaded films, the WVTR reduced but the tensile strength of the BF films improved with the increase in CNP concentration. SEM studies suggested an increase in surface roughness with the increase in CNP content. FTIR studies indicated interactions between CNP and banana flour starch via hydrogen bonding. The film with a combination of CNP and BLE demonstrated improved mechanical properties as well as antimicrobial activity. Therefore, the films prepared from BF, CNP, and BLE can be an ideal candidate for food packaging application.
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Board No.	97
Author Name	Preetam Sarkar
Organisation	National Institute of Technology Rourkela
Country	India
Title	Fabrication of jackfruit seed starch/tamarind kernel xyloglucan/zinc oxide nanoparticles-based biodegradable films for food packaging applications
Abstract Text	Globally, the accumulation of plastic packaging materials in the environment and insufficient waste processing streams are the major challenges of food industries. Valorizing these byproducts to develop biodegradable food packaging materials could be a sustainable solution. The current study explores the extent of film-forming abilities of jackfruit seed starch (JSS) and tamarind kernel xyloglucan (TXG) composites with varying concentrations of zinc oxide nanoparticles (ZNPs). The water solubility and contact angle measurements showed that incorporated ZNPs reduced the hydrophilicity of the films due to the increased interfacial adhesion between biopolymers and nanofillers. The FTIR interferogram confirms the formation of strong intermolecular interactions via increasing intensity at O—H stretching vibrations. Moreover, the mechanical attributes demonstrated that incorporating ZNPs led to effective stress transfer at the interface and improved the film's tensile strength and firmness. The stress relaxation profile showed that the addition of ZNPs altered the viscoelastic nature of the films by increasing elasticity and providing resistance to polymer chain breakage under stress conditions. In addition, the DSC thermograms showed that the addition of ZNPs decreased the polymer chain mobility and enhanced the thermal stability of nanocomposites. Overall, the results indicated that the prepared nanocomposites are promising materials for food packaging.
Categories	Food Packaging & Material Science
Other Authors	Name: Santhosh R Organisation: National Institute of Technology Rourkela City: Rourkela Country: India

Board No.	98
Author Name	Thilini Dissanayake
Organisation	University of Manitoba
Country	Canada
Title	Improving hydrophobic properties of canola protein-based food packaging films using oleic acid conjugated nanocrystalline cellulose
Abstract Text	Canola protein isolate is an excellent source for biodegradable food packaging applications due to its high availability at a low cost and proven film-forming properties. However, canola films show poor water barrier properties due to the inherent hydrophilic nature of the proteins. The current study aimed to improve the film properties using oleic acid-nanocrystalline conjugates (OA-NCC). Oleic acid (OA) was introduced to the nanocrystalline cellulose (NCC) using an ethanol-mediated reaction, and results showed an 8.08 ± 1.52 % of weight gain percentage for NCC after modification. The films were fabricated using OA-NCC and unmodified NCC (U-NCC) at the levels of 0, 1, 3, 5, 7, and 9% (w/w of protein). The films with OA-NCC 9% showed the significantly lowest water vapor permeability (0.062 g mm/m2 KPa h), and after 3%, films with OA-NCC showed significantly lower water vapor permeability values than the films with the same amount of U-NCC. This result is explained by the enhanced films' hydrophobicity and the compatibility of OA-NCC in the polymer matrix. Moreover, a significant improvement was reported in the tensile strength, elongation at break percentage, and thermal stability of the films with OA-NCC due to the enhanced cohesiveness and flexibility.
Categories	Food Packaging & Material Science
Other Authors	Name: Nandika Bandara Organisation: University of Manitoba City: Winnipeg Country: Canada

Board No.	99
Author Name	Ho Hyun Chun
Organisation	World Institute of Kimchi
Country	South Korea
Title	Combined effect of nano-foamed structure film packaging and supercooled storage on shelf life extension of Korean cabbage (Brassica pekinensis L.) kimchi
Abstract Text	Commercial kimchi products are characterized by limited shelf life, which spans approximately 30 days under refrigeration without preservatives. This study aimed to evaluate the combined effect of a nano-foamed structure (NFS) film packaging and supercooled (−3 °C) storage on the quality characteristics and packaging stability of Korean cabbage kimchi (KCK) and develop quality prediction models during storage using machine learning techniques. The total lactic acid bacteria (TLAB) count and titratable acidity (TA) of KCK was maintained at the level recorded during initial storage through 36 days of storage at −3 °C, irrespective of the packaging type. The O2 and CO2 composition in the packaging headspace affected the KCK TLAB growth dynamics during storage. No significant O2 reduction or CO2 accumulation was observed in the headspace of the NFS film-packaged KCK during storage at −3 and 4 °C. The XGBoost model was more effective than a linear regression model in predicting changes in pH, TA, and reducing sugar content throughout storage, with root mean square error and mean square error below 0.56. These results indicated that NFS film packaging combined with supercooled storage can ameliorate KCK over-ripening and package swelling, which inevitably occurs in the distribution environment.
Categories	Food Packaging & Material Science
Other Authors	Name: So Yoon Park Organisation: World Institute of Kimchi City: Gwangju Country: South Korea Name: Mi Ran Kang Organisation: World Institute of Kimchi City: Gwangju Country: South Korea

Board No.	100
Author Name	Teoh Ru Wei
Organisation	Monash University Malaysia, School of Science
Country	Malaysia
Title	Migration of rosemary from gellan gum/ zein-based active food packaging film into food stimulants
Abstract Text	Plastic food packaging is harmful to our environment and human health. Food packaging developed from a biodegradable source is critical to minimize plastic usage. In this study, gellan gum/zein-based active film was added with rosemary extract to improve its antioxidant properties. Characterization studies were conducted to elucidate the antioxidant activity, water resistance and migration of rosemary from active film into fat and aqueous food stimulant. Molecular interactions were investigated through FESEM, AFM and FTIR. The protective effects of active film on sunflower oil were studied by immersing film into oil and oil quality was monitored for 28 days. Active film showed excellent antioxidant activity, with high DPPH activity (243mM TEAC/g film), FRAP (36mg GAE/g film) and TPC (15.47mg GAE/g film) obtained with 20% rosemary addition. The active films with rosemary had lower swelling ratio, resulting in less water uptake. The migration of rosemary from film to fatty food stimulant is higher as compared to aqueous food stimulant, presumably attributed to the hydrophobicity of rosemary. Active film also exhibited excellent protection to sunflower oil by reducing 12.4% oxidation throughout 28 days. This active film has great potential for packaging food with high oil content and extending shelf-life.
Categories	Food Packaging & Material Science
Other Authors	Name: Dr. Thoo Yin Yin Organisation: Monash University Malaysia, School of Science City: Bandar Sunway Country: Malaysia Name: A.P. Ting Su Yien, Adeline Organisation: Monash University Malaysia, School of Science City: Bandar Sunway Country: Malaysia

Board No.	101
Author Name	Ang Wei Min
Organisation	Singapore Food Agency
Country	Singapore
Title	A focus study on migration of harmful chemical contaminants from reusable bamboo fibre cups
Abstract Text	Reusable bamboo fibre cups have been gaining popularity as an alternative to disposable cups as they are usually marketed as being environmentally friendly. However, this may not be true as they are made of melamine formaldehyde resin (MFH) with bamboo fibre used as fillers. Mislabelling of items has taken place in this scenario as consumer are misled into the purchase of items that is different from what is stated on the packaging. A survey was carried out on reusable cups made from different materials such as bamboo fibre, melamine and bamboo that can be purchased by consumer either from physical stores or online. The cups were exposed to migration at different temperature and duration to mimic the different uses before analysis of formaldehyde and melamine were conducted. At higher temperature and duration, there is a higher percentage of bamboo fibre cup that exceeded the specific migration limit of formaldehyde and melamine when compared to cups made of other materials such as melamine and bamboo. Consumers are advised to follow the instructions stated on the products to use it safely.
Categories	Food Packaging & Material Science
Other Authors	Name: Travin Heng Pei Shan Organisation: Singapore Food Agency City: Singapore Country: Singapore Name: Serene Toh Hwee Khim Organisation: Singapore Food Agency City: Singapore Country: Singapore Name: Wu Yuansheng Organisation: Singapore Food Agency City: Singapore Country: Singapore Name: Shen Ping Organisation: Singapore Food Agency City: Singapore Country: Singapore

Board No.	102
Author Name	RUBEN ALDACO GARCIA
Organisation	CANTABRIA UNIVERSITY
Country	Spain
Title	Sustainable packaging solutions for fish and seafood
Abstract Text	Food packaging is an important industrial sector that has great influence on food loss and waste. The search of optimal conditions to minimize the negative impacts of food packaging on the environment must promote the selection of the best available packages. This work has evaluated the environmental impact of the distribution of fish and seafood in the Spanish peninsular context using reusable plastic crates, single-use cardboard and expanded polystyrene boxes. Discussion and decision at each phase and step of the methodology were provided, being an example to follow for similar studies in the future. For the analysis, five different impact categories were considered: global warming potential, acidification potential, eutrophication potential, ozone depletion potential and photochemical oxidant creation potential. In addition, energy and water consumption were taken into account. According to the results of the analysis, the use of reusable plastic crates should be selected, since the values of all impact categories and energy consumption indicators were higher in the case of single-use cardboard and expanded polystyrene boxes. This work demonstrates that plastic packaging should not be totally excluded or banned, since it can be the most environmentally friendly option in certain applications.
Categories	Food Packaging & Material Science

Board No.	103
Author Name	Pui Liew phing
Organisation	UCSI University
Country	Malaysia
Title	Development of chitosan-sodium caseinate composite edible film incorporated with probiotic Lactobacillus fermentum for food packaging application
Abstract Text	The addition of probiotics into edible film could improve the shelf life of packaged food and human health upon consumption. This study aimed to develop an edible film incorporated with *Lactobacillus fermentum.* Different edible films are produced with 2% (w/v) chitosan, 4% (w/v) sodium caseinate, and chitosan-sodium caseinate (CS/NaCas) (1:1 ratio), respectively. The edible films are evaluated in terms of their thickness, moisture content, water-solubility, color, opacity, tensile strength, elongation at break, and Young's modulus. The *L. fermentum* was then added to the chitosan-sodium caseinate composite film and tested in physicochemical properties, viability, and antibacterial activity against *Escherichia coli* and *Staphylococcus aureus*. The composite edible film was chosen as it displayed moderate moisture content, lower water solubility, and high elongation at break. The addition of *L. fermentum* into the composite film had lowered the tensile strength and increased Young's modulus. Furthermore, the *L. fermentum*-composite film displayed an inhibitory effect against *E. coli* and *S. aureus* with the inhibition zone. Moreover, the *L. fermentum* was able to retain 6 $\log_{10}$ CFU/g of viable cell count in the CS/NaCas composite film. In conclusion, *L. fermentum*-CS/NaCas composite film with antibacterial properties has the potential to be applied in food packaging.
Categories	Food Packaging & Material Science

Board No.	104
Author Name	Patthrare Inthamat
Organisation	Program in Biotechnology, Faculty of Science, Chulalongkorn University
Country	Thailand
Title	Coating of Kraft paper with an active chitosan-based coating to enhancing the functional properties
Abstract Text	Chitosan, as a natural biodegradable coating, was used to enhance the performance of Kraft paper. Chitosan (1.5 g /100 mL aqueous solution containing lactic acid at 2% (w/w)) incorporated with 0 and 1% (w/w of chitosan) astaxanthin (CS and CSA, respectively) and crosslinked at 1.5% (CS-1.5G) and 1% (CSA-1G) (w/w of chitosan) genipin was used as a solution to be coated on the surface of Kraft paper (at 5 g/m^2). The effect of the chitosan-based coating on the barrier and mechanical properties of the Kraft paper was investigated, especially water and oxygen permeability (WVP and OP, respectively), water contact angle, tensile strength (TS) and burst strength. On the one hand, the results showed that coating Kraft paper with CS-1.5G and CSA-1G significantly decreased the WVP by two times compared to uncoated paper and displayed rather hydrophobic surface. On the other hand, the OP of coated paper was not significantly changed compared to the uncoated paper. Regarding mechanical properties, the coated paper showed better mechanical resistance than the uncoated paper, with a significant increase in TS and burst strength. Keywords: active coating, Kraft paper, chitosan, heat curing, functional properties
Categories	Food Packaging & Material Science
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Board No.	105
Author Name	Nayeong Kim
Organisation	Seoul Women's University
Country	South Korea
Title	Deodorization of kimchi in bottles using a low-density polyethylene lid film incorporating zinc oxide and zeolite
Abstract Text	Although the export of kimchi is steadily increasing, the strong smell coming from kimchi products during storage and distribution reduces consumer acceptance. The objective of this study was to develop a lid film to be used in plastic bottles for packaging kimchi, which adsorbs volatile sulfur compounds from kimchi using zinc oxide (ZnO) and zeolite as deodorizing agents and low-density polyethylene as a base material (ZnO-zeolite-LDPE film). Polyethylene (PE) containers containing homogenized kimchi were sealed with ZnO-zeolite-LDPE film lids, capped with PE lids, and stored at 24 â„ƒ for 3 days. The film lid containing ZnO at 11% (w/w zeolite) adsorbed allyl methyl sulfide (AMS), allyl methyl disulfide (AMDS), and diallyl disulfide (DADS) more than the lid without ZnO or zeolite (control) by 36.3%, 7.8%, and 3.7%, respectively, while the lid containing ZnO at 14% adsorbed AMS more than the control by 40.7% and AMDS and DADS less than the control by 2.3% and 2.8%, respectively. The incorporation of ZnO and zeolite did not alter the tensile properties, thermal stability, oxygen transmission rate, and surface chemical composition significantly. The ZnO-zeolite-LDPE film lid shows potential for effective control of volatile sulfur compounds of kimchi packaged in plastic bottles.
Categories	Food Packaging & Material Science
Other Authors	Name: Sea C. Min Organisation: Seoul Women's University City: Seoul Country: South Korea

Board No.	106
Author Name	Rita Pinheiro
Organisation	Politechnic Institute of Viana do Castelo
Country	Portugal
Title	Effect of different preservation and packaging methods on industrial bread dough texture, color and microbiological properties during storage time
Abstract Text	Consumption of bread made from preserved dough is increasing in bakeries, supermarkets and restaurants all around the world, because of the ease of producing freshly baked product, at any time of the day. The aim of this work was to study the behaviour of wheat bread dough during storage time under different preservation/packaging methods. Industrial wheat bread dough was packed into polyethylene bags (40g portions) and storage with partial vacuum (50%) and modified atmosphere (MAP) (50%CO_2/50%N_2). Samples were storage at 4ºC during 15 days. A control with air was also made to simulate industrial production. Dough and bread texture, color, moisture content, water activity and pH were determined during 15 days. Through the results obtained in the microbiological analysis it was concluded that dough and bread are according with the quality and food safety parameters required. Texture results showed that hardness of bread crumb and crust increased over storage time. However, for bread packaged with MAP the hardness scored the lowest values. There were no significant differences in water activity and moisture content during storage time, regardless of the preservation method. Concerning color results, luminosity of dough and bread crumb decreased during storage time for all the conditions studied. It was concluded that wheat dough bread storage under MAP conditions could be a viable solution for the industry in order extend shelf-life, while assuring consumers a quality product at any time of the day, enabling greater efficiency to the bakeries.
Categories	Food Packaging & Material Science
Other Authors	Name: Helder Ferreira Organisation: Politechnic Institute of Viana do Castelo City: Viana do Castelo Country: Portugal

Board No.	107
Author Name	Joseph Merillyn Vonnie
Organisation	Universiti Malaysia Sabah
Country	Malaysia
Title	Physicochemical Characterization of Eggshell-Orange Peel Blend Film as A Low-Cost Biosorbent
Abstract Text	The production of large amounts of food biowaste contributes to environmental pollution. The aim of this work is to study the physicochemical characteristics of eggshell-orange peel blend film. In this work, the blend films were prepared by the solution-casting method using banana starch as a carrier. The physical properties of films include thickness, density, moisture content, water solubility, water absorption, and swelling index were characterized. The morphology of films was characterized using Transmission Electron Microscopy while the chemical properties were characterized using Fourier Transformed Infrared Spectroscopy. The incorporation of eggshell and orange peel has increased the thickness and density, and decreased the solubility, absorption and swelling of films. The morphology of film was shown the rough surface and transparent which contains of various functional groups such as alkane (C-H), hydroxyl (O-H), carbonyl (C=O), carbonate (CO_3^{2-}), and carboxylic acid (-COOH) groups that has ability as biosorption materials. Thus, biowaste material from food processing and agriculture industries has potential as a biosorbent for removal of toxic substances such as heavy metals, pesticides and synthetic food coloring.
Categories	Food Packaging & Material Science
Other Authors	Name: Kobun Rovina Organisation: Universiti Malaysia Sabah City: Kota Kinabalu Country: Malaysia

Board No.	108
Author Name	Sera Im
Organisation	Seoul Women's University
Country	South Korea
Title	Development of zeolite-based antibacterial materials
Abstract Text	The zeolites combined with silver, calcium, or cupper ions (Ag-, Ca-, or Cu-zeolite, respectively) and the Ag-zeolite incorporated with citric acid (CA-Ag-zeolite) were evaluated as antimicrobial agents to be embedded in packaging materials to produce antimicrobial films. Zeolite was dispersed with AgNO3, CaO, or Cu in water, followed by filtration and drying to produce Ag-zeolite, Ca-zeolite, or Cu-zeolite powder, respectively. To prepare CA-Ag-zeolite powder, Ag-zeolite powder was added into a citric acid solution and subsequently filtered and dried. Ag-zeolite was most effective among Ag-, Ca-, and Cu-zeolites in inhibiting the growth of Escherichia coli and Staphylococcus aureus. CA-Ag-zeolite showed a higher antibacterial activity than Ag-zeolite. The pH of water decreased from 7.1 to 2.0 after the addition of citric acid (0.5%), while that of Ag-zeolite was lowered from 6.2 to 4.3 by the citric acid addition, suggesting that citric acid molecules were partly incorporated in the porous structure of zeolites. The Ag contents were 0.45, 12.64, and 6.43% and the C contents were 14.11, 13.63, and 29.78% in the XPS results of zeolite, Ag-zeolite, and CA-Ag-zeolite, respectively. The results showed potential of applying Ag-zeolite and Ag-zeolite incorporating citric acid to packaging materials to produce antimicrobial films.
Categories	Food Packaging & Material Science,Food Safety & Regulatory Science
Other Authors	Name: Hyemin Jeong Organisation: Seoul Women’s University City: Seoul Country: South Korea Name: Sea C. Min Organisation: Seoul Women’s University City: Seoul Country: South Korea

Board No.	109
Author Name	Pedro Dinis Gaspar
Organisation	University of Beira Interior
Country	Portugal
Title	Computational tool to support the sustainable selection of films and/or packaging for fruits
Abstract Text	A computational tool is developed to help select the best film and/or packaging for fruits for simultaneously extending the shelf-life extension and reducing the environmental impact. A literature review of the state-of-the-art supports the interdisciplinary assessment of packaging sustainability. Indicators that best describe the shelf-life extension of fruits and environmental impact are defined. These indicators are: water vapour permeability, thickness, tensile strength, and environmental impact. Criteria based on membership functions were developed resulting in equations for each type of objective (shelf-life extension and/or environmental impact). The multi-criteria analysis is performed considering different weighting functions applied to indexes in order to assess the abovementioned parameters. For the case test scenarios it was concluded that the best type of packaging is edible packaging. However, sugarcane bagasse packaging shows better results regarding environmental impact. This work has a great environmental and social impact since it helps to reduce the loss or waste of fruits as well it contributes to reducing the environmental impact of packaging. The computational tool helps producers and retailers to select the option of film and/or packaging that suits their needs taking into account safety, quality, and environmental concerns, contributing to sustainable development by helping decision-making.
Categories	Food Packaging & Material Science,Supply Chain Management
Other Authors	Name: Beatriz Moreira Organisation: University of Beira Interior City: Covilhã Country: Portugal Name: Tânia Miranda Lima Organisation: University of Beira Interior City: Covilhã Country: Portugal

Board No.	110
Author Name	Shin-Ping Lin
Organisation	Taipei medical university
Country	Taiwan
Title	Production of foam bacterial cellulose with different additives and its material property analysis
Abstract Text	Bacterial cellulose (BC) is a nano-scale fibrous structural component of biofilms and only *Komagataeibacter xylinus* that considered as a common use microbe in BC production at commercial levels. Due to its unique properties such as forms a mechanically strong hydrogel with high water adsorption capabilities and biocompatible, BC is potential interest for skin regeneration and wound healing applications. In this study, a foaming system was established using cremodan and xanthan to produce foam BC *in situ*. Different charged additives such as microcrystalline cellulose, carboxymethylcellulose, and chitosan were also added into the production system to modified the foam BC during production. The material properties were characterized using fourier transform infrared spectroscopy (FTIR), scan electron microscopy (SEM), X-ray diffraction (XRD) and thermogravimetric analysis (TGA). In FTIR and TGA results provided evidences that the additives were incorporated into the foaming BC. The SEM images observation confirmed that foaming technique not only modified the morphology of BCs but also increased the incorporation of additives into the fibers network of BCs. Finally, cell-based analysis including cell cytotoxicity, cell proliferation and cell adhesion will be performed to understand and confirm the biocompatibility of foaming BC.
Categories	Future of Food Manufacturing,Food Packaging & Material Science
Other Authors	Name: Stephanie Singajaya Organisation: National Taiwan university City: Taipei Country: Taiwan Name: Kuan-Chen Cheng Organisation: National Taiwan university City: Taipei Country: Taiwan

Board No.	111
Author Name	Hyun Woo Kim, Jung A Ko, Byung Chan Cho, Hyun Jin Park
Organisation	Korea University
Country	South Korea
Title	Production of plant-based meat analogs with muscle fiber structure using coaxial 3D food printing
Abstract Text	Production of plant-based meat analogs with muscle fiber structure using coaxial 3D food printing. Hydrocolloid-based muscle fiber simulation material was prepared in 2.5–5 % solutions with different formulations of kappa and iota carrageenan (CG), sodium alginate (SA), and glucomannan (GM). During the coaxial nozzle-assisted 3D food printing process, all samples were cured using K+ and Ca2+. The fiber solution before post-processing formed a gel by SA ionic bonding; subsequently, the gel strength increased due to CG structural changes and the synergy between CG and GM. However, concerning the texture properties, only CG(1.5)GM(1.5) and CG(2.5)GM(1.5) displayed an elastic strength comparable to that of actual meat due to GM elastic gel formation, and CG(2.5)GM(1.5) displayed a highest hardness. Post-processing the product quality was investigated by determining shrinkage and cooking loss. These results were visibly related to the final gel strength. In this study, we successfully tested the embodiment of texture, which is a challenge for alternative meat, using a coaxial nozzle-assisted 3D food printer. This system uses hydrocolloids as a carrier to insert functional materials, and we confirmed the possibility of applying it to other foods that require texture embodiment.
Categories	Future of Food Manufacturing,Traditional & Future Food

Board No.	113
Author Name	Suyong Lee
Organisation	Sejong University
Country	South Korea
Title	Machine learning classification of wheat flour varieties based on their physicochemical features over the past two decades
Abstract Text	Machine learning has been extensively utilized as state-of-the-art powerful technology in order to make predictions and the food industry is no exception. The physicochemical features of US wheat flours harvested from 1999 to 2020 were subjected to machine learning analysis for classifying wheat flour varieties, and classification performance was evaluated depending on four different machine learning algorithms. Principal component analysis demonstrated that 79.9% of the total variability were explained by two principal components that seemed to be related to protein content and water absorption. The multilayer perceptron neural network was the most effective in correctly classifying the wheat flour varieties, followed by the support vector machine with radial basis kernel, k-nearest neighbor, and decision tree algorithms. The same trends were clearly observed in terms of F1-score. Bayesian optimization algorithm demonstrated the superb performance of the multilayer perceptron neural network with tuned hyperparameters by showing a classification accuracy of 98.91%. The results of this study may provide the potential to be introduced as a novel technology to control the qualities of wheat flours and related products in the food industries.
Categories	Future of Food Manufacturing
Other Authors	Name: Sungmin Jeong Organisation: Sejong University City: Seoul Country: South Korea

Board No.	114
Author Name	SUSHREE TITIKSHYA
Organisation	INDIAN INSTITUTE OF TECHNOLOGY DELHI
Country	India
Title	Novel Techniques for extraction of Natural Food Pigment from floral wastes: Sustainable Zero Waste Management
Abstract Text	Major problem in the world now-a-days is the disposal of wastes. In India, floral wastes produced every day is near about 3.5–4.0 ton which are left behind at every religious place, wedding ceremonies etc. These wastes are either thrown or dumped into water bodies which results in environmental degradation. The current research work aims to create a sustainable closed loop system for zero waste processing through systematic utilization of the floral wastes, i.e., from extraction of the natural food pigments to utilization of the residue (waste to wealth). The floral wastes (*Tagetes erecta*) were procured from a nearby temple. Novel techniques i.e. Ultrasound Assisted Extraction and Microwave Assisted Extraction were used for the extraction of pigments. The total phenolic content, total flavonoid content, antioxidant activity and the carotenoid content were calculated, and the processes were optimized using response surface methodology. Both the novel techniques shown good results as compared to the Soxhlet extraction technique in terms of time consumed, quality of the extract, energy utilized, and amount of solvent used in the processes.
Categories	Future of Food Manufacturing
Other Authors	Name: MONALISA SAHOO Organisation: INDIAN INSTITUTE OF TECHNOLOGY DELHI City: NEW DELHI Country: India Name: S.N. NAIK Organisation: INDIAN INSTITUTE OF TECHNOLOGY DELHI City: NEW DELHI Country: India Name: VIVEK KUMAR Organisation: INDIAN INSTITUTE OF TECHNOLOGY DELHI City: NEW DELHI Country: India

Board No.	115
Author Name	Lakshmishri Roy
Organisation	Techno Main Salt Lake
Country	India
Title	Bioremediation of edible oil mill effluent for contributing towards a sustainable circular bioeconomy while addressing global waste management issues
Abstract Text	Environmental sustainability and food security are two major issues that are of global concern. Circular bioeconomy is a plausible strategy for addressing these. Utilization of food and agro-industrial wastes generated in corpus amounts can help to maintain the energy–environment nexus while also substituting for food and feed shortages. The aim of this research is to treat edible oil (palm oil) mill effluent using indigenously isolated microbial strains for nutritive value addition and produce high protein animal feed. Optimization of pretreatment conditions and subsequent fermentation resulted in protein enhancement. The final recovered and dried product recorded about 35 – 40% w/w of final protein (initial protein content – 14% w/w). Also, the amino acid profile showed presence of several amino acids including methionine and valine which are absent in normal soybean meal-based feedstuff. Therefore, dried and fermented palm oil mill effluent has the potential to partially or fully replace soy feed. Hence this process can help the edible oil mill industries to achieve the goal of "zero waste" production process while acting as a sustainable source of animal feed. Thus, incorporation of biowaste into the cutting-edge circular bioeconomy has the potential to dramatically boost the creation of sustainable bioproducts.
Categories	Future of Food Manufacturing
Other Authors	Name: Sreemoyee Chakraborty Organisation: Department of Food Technology & Biochemical Engineering, Jadavpur University City: Kolkata Country: India Name: Debabrata Bera Organisation: Department of Food Technology & Biochemical Engineering, Jadavpur University City: Kolkata Country: India

Board No.	116
Author Name	Lana Chung
Organisation	Kyung Hee University
Country	South Korea
Title	A study on consumer perception and behavioral of sustainable protein intake
Abstract Text	The Sustainable Development Goals(SDGs), also known as the Global Goals, were adopted by the United Nations in 2015. The term “sustainability” was first defined in 1987 Brundtland Report, and sustainability was defined as giving equal importance to the environment, society, and economy. However, many people are not properly aware of what sustainability means exactly. Today, food sustainability is related to the impact on expected climate change, such as ecological footprints. Food choices, especially meat consumption, have a big impact on the environment. Under such premises, a study was carried out in Korea and the United States in January 2022. Participants were asked questions about general sustainability awareness and behavior related to sustainable protein intake. These findings are suitable for better understanding of the position of sustainability motives in consumers food choice and sustainability awareness can be used for country comparisons.
Categories	Sensory & Consumer Science
Other Authors	Name: Hyeyun Kang Organisation: Kyung Hee University City: Seoul Country: South Korea Name: Sean C Kim Organisation: Tenafly High School City: New Jersey Country: United States

Board No.	117
Author Name	Susana Mendes
Organisation	MARE, ESTM, Polytechnic of Leiria
Country	Portugal
Title	Attitudes and determinants of purchase, consumption and risk perception regarding bivalve consumption
Abstract Text	Health status of bivalves reflects the microbiological contamination and toxic metal content of the areas where they are located, and may even contain levels higher than those existing in the environment. The objective of this investigation was to collect information on the determinants and individual practices of bivalve's consumption, characterizing the relationship between consumption, knowledge of their origin (wild or aquaculture) and the risks associated with consumption. A survey was carried out, applied in Portugal to a sample of 803 individuals. The results showed that the consumer's perception of the consumption of bivalves from aquaculture is influenced by their sociodemographic characteristics, which play a fundamental role in buying and consuming. Also, consumers consider price, freshness, taste and the fact that it is a safe food are very important for the consumption of bivalves. Regarding the hazards known, the most mentioned were toxic metals, microbiological hazards and marine biotoxins. Therefore, it is necessary to encourage the consumption of bivalves from aquaculture, with a view to disseminating the quality of products from aquaculture. It is essential to contribute positively to the appreciation of aquaculture bivalve's species as a safe and sustainable food alternative, compared to wild bivalves.
Categories	Sensory & Consumer Science
Other Authors	Name: Eva Fronteira Organisation: ESTM, Leiria Polytechnic City: Peniche Country: Portugal Name: Maria Manuel Gil Organisation: MARE, ESTM, Polytechnic of Leiria City: Peniche Country: Portugal Name: Paulo Maranhão Organisation: MARE, ESTM, Polytechnic of Leiria City: Peniche Country: Portugal

Board No.	118
Author Name	Susana Mendes
Organisation	MARE– Marine and Environmental Sciences Centre, ESTM, Polytechnic of Leiria
Country	Portugal
Title	Consumer perception towards innovative healthier food products using marine-based ingredients as alternative salt source
Abstract Text	Excessive salt consumption increases the risk of high blood pressure, heart disease, and stroke, as well as other health problems. To address this, several initiatives from different organizations recommend reducing the amount of sodium consumed by developing new products with no added salt, in order to guarantee a more healthier diet. The main aim of this study was to assess the perception of consumers towards healthier and innovative food products and the use of marine-based ingredients as alternative salt source. A questionnaire survey was applied (in Portugal) to a sample of 478 individuals. The results indicated that 52.3% of the sample claims to consume innovative foods. Individuals who are not in the habit of consuming these foods, mostly do not do so because they doesn´t like it or due to lack of knowledge. Most respondents (63.2%) admit that they are concerned about the amount of salt they consume daily, as well as that they would be willing to consume an innovative product that replaces salt and incorporates seaweed or bivalves. However, foods that contain algae were perceived negatively by consumers. In addition, individuals showed difficulties in classifying "traditional" foods, evidencing confusion with what is tasty and internationally known.
Categories	Sensory & Consumer Science
Other Authors	Name: Maria Piló Organisation: ESTM, Polytechnic of Leiria City: Peniche Country: Portugal Name: Sónia Barroso Organisation: MARE– Marine and Environmental Sciences Centre, ESTM, Polytechnic of Leiria City: Peniche Country: Portugal Name: Maria Manuel Gil Organisation: MARE– Marine and Environmental Sciences Centre, ESTM, Polytechnic of Leiria City: Peniche Country: Portugal

Board No.	119
Author Name	Yue He
Organisation	Zhejiang Gongshang University
Country	China
Title	Aerosol as an Alternative Mechanism of Flavor Diffusion and Retro-nasal Sensation During Food Oral Processing
Abstract Text	Retro-nasal sensation is a key factor in our appreciation of food. Extensive research has been performed on what aroma compounds arouse specific olfaction, and how their distribution within oral- and nasal- cavity can be linked to their sensation. This was mainly done on the basis of a consensus that volatile compounds are released during food destruction and mixing inside the oral cavity and then diffused to the pharyngeal region where they are taken into the nasal cavity by exhaled air from the lung. However, there are accumulating evidences indicate that non-volatile compounds (e.g., sucrose) can also be "smelled". Here, we show that non-volatile compounds can be transported to the nasal cavity in the form of aerosol and arouse the retro-nasal sensation. Fluorescence image of olfactory cleft and the nose-exhaled air demonstrated that the oral ingested non-volatile compounds can move and deposit on olfactory cleft and also being expelled outside the nasal cavity. The aerosol formation during oral processing was analyzed by a customized high-speed camera. The retro-nasal sensation of the in vitro prepared aerosol was evaluated. Our results extend the existing theory of aroma diffusion and sensation and pave the way for more accurate understanding of food sensory.
Categories	Sensory & Consumer Science
Other Authors	Name: Jianshe Chen Organisation: Zhejiang Gongshang University City: Hangzhou Country: China Name: Xinmiao Wang Organisation: Zhejiang Gongshang University City: Hangzhou Country: China

Board No.	120
Author Name	Syazana Abdullah Lim
Organisation	Universiti Teknologi Brunei
Country	Brunei
Title	Learning from COVID-19 experience: Developing efficient and cost-effective alternative methods for sensory evaluation
Abstract Text	At the point of writing, many countries have eased restrictions due to COVID-19 with life slowly returning to normal. Learning from Covid-19 experience, this study investigates the efficiency of alternative methods employed during Covid-19 lockdown for sensory testing in food product development. The objective of this work is to compare alternative methods (remote, online, Flash Profiling (FP) and Ranking Descriptive Analysis (RDA)) with traditional sensory methods. Remote and online session is compared with face-to-face traditional laboratory session whereas FP and RDA are evaluated against the conventional Quantitative Descriptive Analysis (QDA). Seafood products are used as samples. In a remote study format, participants are sent with samples and performed sensory assessment using paired comparison test at home. The process is then repeated but in a laboratory setting. For descriptive analysis, two groups are formed where one group performs FCP and second group uses QDA. Results are then analysed to observe any significant differences in sample discrimination between these methods. The proposed alternative methods have the potentials to be implemented post Covid-19 as these techniques are convenient, time-saving and cost-effective for researchers that still provide comparable results and level of engagement as with traditional methods.
Categories	Sensory & Consumer Science
Other Authors	Name: Uzma Syaza Binti Othman Organisation: Universiti Teknologi Brunei City: Brunei Muara Country: Brunei Name: Anastasia Binti Rosli Organisation: Universiti Teknologi Brunei City: Brunei Muara Country: Brunei

Board No.	121
Author Name	Sangeeta Prakash
Organisation	The University of Queensland
Country	Australia
Title	Consumer perception of 3D printed food constructs
Abstract Text	Food product development is highly dependent on the consumer perception and acceptance and it is only appropriate to include consumers during the development process to minimize chances of failure. 3D food printing is an emerging processing technology capable of driving food innovation and functionality for the future generation with the ability to serve personalised food controlling the portion size based on individual’s genetic information. However, there is a misconception surrounding 3D printed food product as an artificial plastic type of product. Issues such as misconceptions, a lack of knowledge, and a negative attitude could be a barrier for consumers to accept 3D printed food. Research related to appearance, microstructure, texture and nutrition have been explored but there are very limited information on sensorial acceptability of 3D printed food products by consumers. This presentation will explore the consumers' attitude toward 3D printed food that have been collated through surveys and sensory evaluation with specific examples from 3D printed confectionery (chocolate) and red meat (beef).
Categories	Sensory & Consumer Science

Board No.	122
Author Name	Casiana Blanca J. Villarino
Organisation	University Of The Philippines
Country	Philippines
Title	Effect of heating temperature on the perception of aroma and flavor attributes of selected Philippine virgin coconut oil (VCO)
Abstract Text	Perception of key relevant aroma compounds in oils increase when subjected to mild heat resulting in more perceivable the aroma and flavor attributes. Selected virgin coconut oil (VCO) samples from fermentation, expeller and centrifugation processes were evaluated by trained panelists (n=10) to determine the effects of heating temperature (i.e. 30, 35 and 40°C) of VCO on the perception of aroma and flavor attributes. The panelists ranked the heated and unheated samples in terms of nutty, latik, acid, rancid aromas and flavors. Results revealed that heated and unheated samples did not significantly ($p>0.05$) differ across all attributes regardless of the process except for centrifuged samples. Although there were no notable differences in the perception of aroma and flavor attributes, mean ranks of almost all samples showed that VCO heated at 30°C obtained the highest score in terms of the predominant attributes in the sample produced from a specific process e.g. latik aroma was more perceived in expeller-pressed samples heated at 30°C compared to higher temperatures (i.e., 35 and 40°C) or that of the unheated sample. Our initial findings was useful in the revision of the established method for the descriptive evaluation of VCO.
Categories	Sensory & Consumer Science
Other Authors	Name: Ma. Concepcion C. Lizada Organisation: Food Application and Sensory Laboratory, Department of Food Science and Nutrition, College of Home Economics, University of the Philippines-Diliman, Quezon City City: Quezon City Country: Philippines Name: Patricia Karol A. Ong Organisation: Food Application and Sensory Laboratory, Department of Food Science and Nutrition, College of Home Economics, University of the Philippines-Diliman, Quezon City City: Quezon City Country: Philippines Name: Airisse Rae P. Basinang Organisation: Food Application and Sensory Laboratory, Department of Food Science and Nutrition, College of Home Economics, University of the Philippines-Diliman, Quezon City City: Quezon City Country: Philippines

Board No.	123
Author Name	Yeji Kwon
Organisation	Department of Food Science and Biotechnology, Andong National University
Country	South Korea
Title	Evaluation of physicochemical and sensory properties of honey from different origins
Abstract Text	The present study investigated physicochemical and sensory characteristics of 7 different honey samples (chestnut, coffee, acasia, poly-flower, artificial, jujube, and manuka). The physicochemical qualities of the honey samples were determined by °Brix, titratable acidity(TA), pH, colors and sugar contents. The sensory properties of the sample were assessed by hedonic perception and flavor descriptive profiling by consumers and trained panels, respectively. The results showed that the TA and color were significant difference between the different samples. Sugar contents varied from 59.10±18.26 g/100 g (coffee) to 84.39±2.48 g/100 g (manuka), which were mainly constituted by fructose and glucose in all honey. The results of sensory evaluation indicated that the overall liking was significantly higher in the artificial, acasia and poly-flower honey than other samples, which might be due in part to high sweetness and low bitterness and astringency. However, manuka, coffee and chestnut honey had high flavor intensities of earth, pungent, sweaty and woody, leading to the low overall liking of honey. Overall linking of honey was positively correlated with flavor familiarity($r=0.65$, $p<0.01$). These findings suggest that hedonic perception of honey might be responsible for the specific taste and flavor qualities.
Categories	Sensory & Consumer Science
Other Authors	Name: Keup-rae Kim Organisation: Department of Food Science and Biotechnology, Andong National University City: Andong, Gyeongbuk Country: South Korea Name: Keono Kim Organisation: Department of Food Science and Biotechnology, Andong National University City: Andong, Gyeongbuk Country: South Korea Name: Chuleui Jung Organisation: Industry-Academy Cooperation Foundation, Andong National University City: Andong, Gyeongbuk Country: South Korea Name: Jeehye Sung Organisation: Department of Food Science and Biotechnology, Andong National University City: Andong, Gyeongbuk Country: South Korea

Board No.	124
Author Name	Maria Manuel Gil
Organisation	MARE, ESTM, Polytechnic of Leiria
Country	Portugal
Title	Pasta consumer behaviour: identification and evaluation of consumption determinants based on consumers' dietary pattern
Abstract Text	The consumption of marine based food products is gaining attention, as people become more aware of the relation between diet and health. Innovative dry pasta, supplemented with marine resources (macroalgae, microalgae, bivalves) can help to increase the range of products available on the market. However, studies that allow us to understand individual consumption determinants, in order to know the habits of consumers are extremely important to leverage the product development and formulation. The main objective of this work was to carry out a questionnaire aimed at consumers of dry pasta, residing in Portugal. The sample included 631 validated responses. The frequency of pasta consumption is regular, being considered important to integrate the usual diet. Innovation, aimed at transforming pasta into a healthier choice, is a factor valued by consumers (54.8%). Additionally, it was observed that the consumer is motivated to replace the consumption of traditional pasta with pasta perceived as healthier, namely with the integration of marine resources (58.8%), even if it is only in some of their meals (51, 5%). It is also considered important to apply marine resources to the pasta for adults (61.6%) and children (60.2%), being eventually willing to pay more for this new product (53.4%).
Categories	Sensory & Consumer Science
Other Authors	Name: José Pedro Romão Organisation: ESTM, Polytechnic of Leiria City: Peniche Country: Portugal Name: Frederica Silva Organisation: MARE, ESTM, Polytechnic of Leiria and MARE—Marine and Environmental Sciences Centre, Faculdade de Ciências, Universidade de Lisboa City: Peniche Country: Portugal Name: Filipa R. Pinto Organisation: MARE, ESTM, Polytechnic of Leiria City: Peniche Country: Portugal Name: Ana Marta Duarte Organisation: MARE, ESTM, Polytechnic of Leiria City: Peniche Country: Portugal Name: Susana Mendes Organisation: MARE, ESTM, Polytechnic of Leiria City: Peniche Country: Portugal

Board No.	125
Author Name	Maria Manuel Gil
Organisation	MARE, ESTM, Polytechnic of Leiria
Country	Portugal
Title	Consumer perception of food products with an expiration date close to the end
Abstract Text	Food waste is a worldwide problem, which has gained relevance in recent years, as it is not only an ethical and economic issue but it also depletes the environment of limited natural resources. There are numerous initiatives to mitigate food waste. Among them is the awareness of the final consumer for a more sustainable consumption, as this is responsible for a large part of wasted food. Therefore, studies on consumer behaviour are extremely relevant for the definition of new policies and strategies. The objective of this work was to study the consumption of food products with an expiration date close to the end, in order to understand and characterize the consumer's perception of this type of products. To achieve the objective, a questionnaire was applied s (in Portugal) to 380 individuals who make their purchases in three of the most important commercial areas in the country. The results showed that respondents who are in the habit of buying products with an expiration date close to the end are mostly female, with a high level of education, regardless of age and household composition. Additionally, it was found that consumers motivated to purchase this type of product are loyal to the brand.
Categories	Sensory & Consumer Science
Other Authors	Name: Margarida de Sousa Organisation: ESTM, Polytechnic of Leiria City: Peniche Country: Portugal Name: Filipa R. Pinto Organisation: MARE, ESTM, Polytechnic of Leiria City: Peniche Country: Portugal Name: Susana Mendes Organisation: MARE, ESTM, Polytechnic of Leiria City: Peniche Country: Portugal

Board No.	126
Author Name	Won-Seok Choi
Organisation	Korea National University of Transportation, Department of Food Science and Technology
Country	South Korea
Title	Differences in texture sensitivity for cooked rice by age
Abstract Text	Using cooked rice, which is a representative food that values texture and is a staple food in Asian countries, sensory tests were conducted three times over 3 years on 520 panels of persons of various ages to examine differences in the perception of texture by age group. Panels in their 70s did not recognize the significant difference in texture between the different cooked rice in each of the three experiments, whereas, in the case of panels in their 50s and 60s, the significant difference in texture between the samples was recognized in all three times. For panels in their 30s and 40s, it was mentioned that there was a significant difference in texture between the samples in two out of three sensory tests, and in case of panels in their 20s, it was mentioned that there was significant difference in texture between the samples only once out of three times. In conclusion, the panels in their 70s seem to have lost their sensitivity for texture such that they cannot recognize the significant difference in the texture of the different cooked rice, while the panels in their 50s and 60s seem to have the most sensitivity for texture in cooked rice.
Categories	Sensory & Consumer Science

Board No.	127
Author Name	Anna Zulkifli
Organisation	Malaysian Palm Oil Council
Country	Malaysia
Title	Is palm oil the most hated?: Understanding consumer knowledge, perception and preference for edible oils in Malaysia
Abstract Text	Palm oil is a versatile ingredient used in many food and non-food applications, and yet is most controversial due to its alleged health and environmental effects. To better understand the extent of consumer knowledge, perception and preference for edible oils, standardized questionnaires were used to collect data from 10,453 Malaysian consumers. Results revealed that majority of households have at least two types of cooking oil. Palm oil was the most popular cooking oil (46.6%) while non-palm oil users preferred sunflower oil (37%). Health and quality were the most important aspect in choosing their preferred cooking oil. Although Malaysians perceived palm oil to be superior to other oils in terms of health except for olive and sunflower oil, palm oil was also perceived to cause obesity. Knowledge on the nutritional values of palm oil including on its cholesterol, vitamin E and trans-fat content seem to be lacking. The negative sentiments of palm oil in the media particularly on its impact on the environment has influenced the perception of consumers with 40% of respondents perceived palm oil having an impact on the environment. Despite the negative sentiments, 61% of Malaysians still have a positive perception towards palm oil in general.
Categories	Sensory & Consumer Science

Board No.	128
Author Name	Poornima Vijayan
Organisation	NUS Singapore
Country	Singapore
Title	Fish Fingers or Fishless Fingers â€”â€”Comparative Consumer Study and Physicochemical Analysis
Abstract Text	In order to compare and understand the current gaps in terms of available plant-based fish products and real fish products, we conducted a study amongst Singaporean consumers (n = 99) to understand the general perception and drivers of purchase-related to plant-based meat and plant-based fish products. Quorn Vegan Fishless Sticks® (QFF) and Pacific West Natural Cod Fingers® (CFF) were selected. The study involved consumer surveys, sensory evaluation,s and sample analysis for both products. We found that the consumers' expectations regarding 'taste' and 'nutrition' aspects are of utmost importance while consuming plant-based meat or plant-based fish product. The study analyses the consumer perception and expectations regarding plant-based fish alternatives in the market which can further aid the development of acceptable plant-based fish alternatives suitable as per consumer's preference.
Categories	Sensory & Consumer Science

Board No.	129
Author Name	Nur Hafizah Mohamed Yusri
Organisation	National University of Singapore
Country	Singapore
Title	Acceptance of novel staple foods by adult diabetics in Singapore
Abstract Text	Novel staple foods are staple foods that are modified with the purpose of improving their nutritional properties. The objective of this study was to explore diabetics' attitudes and perceptions towards novel staple foods. An understanding of the perceptions and expectations of diabetics on these alternatives is crucial in order for these foods to be incorporated regularly into their diet. We conducted a 5-week within-subject crossover study among 17 adult diabetics where three novel staple foods (i.e., anthocyanin-fortified bread, microfluidic noodles, and fibre fortified white rice) and their control counterparts (i.e., white bread, *beehoon* noodles, and jasmine white rice) were consumed in mixed meals for breakfast, lunch, and dinner. Participants were interviewed before and after each intervention on their experiences with the foods. Preliminary results from thematic analysis indicated that while appearance of the foods was the main factor influencing their pre-perceptions, post-interventions revealed that the novel foods are generally more accepted if they are comparable in taste and texture to the controls. Though a higher pricing was postulated for the novel foods, participants are still inclined to purchase them if their health benefits are proven. Results from this study may provide insights for the design of future novel foods.
Categories	Sensory & Consumer Science
Other Authors	Name: Sean Jun Leong Ou Organisation: National University of Singapore City: Singapore Country: Singapore Name: Dimeng Yang Organisation: National University of Singapore City: Singapore Country: Singapore Name: Mei Hui Liu Organisation: National University of Singapore City: Singapore Country: Singapore

Board No.	130
Author Name	Shashya Diyapaththugama
Organisation	Wayamba University of Sri Lanka
Country	Sri Lanka
Title	Knowledge, attitude and behavior on functional food among young adults
Abstract Text	**Background:** Functional ingredients including, polyphenols, dietary fiber, fatty acids, probiotics, etc. are either naturally present in food or purposely added. They provide health benefits in addition to basic nutrition. **Objectives:** To determine, the levels of knowledge, attitude, behavior (KAB); and effect of socio-demographic factors on KAB of functional foods. **Methodology:** Paper-based, pre-tested, content validated questionnaire was distributed among students of Wayamba University and selected Agriculture Schools (n=760) in Sri Lanka. Exploratory and confirmatory factor analysis were performed by SPSS and AMOS. Model fit indices were obtained as CMIN/DF 2.761, NFI 0.795, RFI 0.768, CFI 0.858, RMSEA 0.049. **Results**: Only 13, 59 and 73% of participants had scored adequate marks (>=50% marks) for knowledge, attitudes and behavior questions, respectively. Gender and income level act as moderators at $p<0.01$ and $p<0.05$, respectively, to the effect of attitude on usage behavior of functional foods. Educational institute acts as moderators to the effects of both knowledge ($p<0.05$) and attitude ($p<0.01$) on behavior. **Conclusion:** Knowledge levels of majority were inadequate, while attitude and behavior were adequate. Gender, educational institute and income level act as moderators for KAB of functional foods. **Significance:** Approaches can be planned to enhance functional food usage to obtain health benefits.
Categories	Sensory & Consumer Science
Other Authors	Name: Liyakath Ali Organisation: Wayamba University of Sri Lanka City: Makandura, Gonawila Country: Sri Lanka Name: Anoma Chandrasekara Organisation: Wayamba University of Sri Lanka City: Makandura, Gonawila Country: Sri Lanka

Board No.	131
Author Name	Shashya Diyapaththugama
Organisation	Wayamba University of Sri Lanka
Country	Sri Lanka
Title	Knowledge, attitudes and behavior (KAB) on consumption of tuber crops by Sri Lankan young adults; an online survey
Abstract Text	**Background and Objectives**: Tuber crops are second only in importance to cereals as global sources of carbohydrates. They add variety to the diet and provide several health benefits, as sources of preventive and therapeutic agents. This study aimed to determine tuber crops related knowledge, attitudes and behavior (KAB) of young adults. **Method (s) & Results:** A self-administered online questionnaire was pretested, and used for data collection. A total of 432 responses of Sri Lankan young adults (18-26y) were used for the analysis using SPSS and AMOS software. Majority had high level of positive attitudes, moderate level of knowledge and behavior towards tuber crop consumption (TCC). Significant correlations were obtained between behavior and TCC and attitudes and TCC. The highest education level correlated significantly with knowledge on tuber crops. Monthly income and marital status were significant moderators on behavior on TCC. **Conclusions:** majority of young adults have high level of positive attitudes on tuber crops, but their knowledge and behavior levels are at a moderate level. **Significance and Impact of the Study:** It is warranted to make aware of specific health benefits, their identification and diversified usage of tuber crops in novel product development among Sri Lankan young adults.
Categories	Sensory & Consumer Science
Other Authors	Name: Chamodi Thilakarathne Organisation: Wayamba University of Sri Lanka City: Makandura, Gonawila Country: Sri Lanka Name: Rupika Abeynayake Organisation: Wayamba University of Sri Lanka City: Makandura, Gonawila Country: Sri Lanka Name: Anoma Chandrasekara Organisation: Wayamba University of Sri Lanka City: Makandura, Gonawila Country: Sri Lanka

Board No.	132
Author Name	Lana Chung
Organisation	Kyung Hee University
Country	South Korea
Title	Quantitative Descriptive Analysis and Principal Component Analysis for Sensory Characterization of Wanja
Abstract Text	Quantitative descriptive analysis (QDA) is used to describe the nature and the intensity of sensory properties from a single evaluation of a product. QDA was used to describe the key attributes of six Wanja of various meat, including three meat alternative products, from three different country. Six Wanja samples (Beef Wanja (BW), Pork Wanja (PW), Chicken Wanja (CW), Meat Alternative Wanja 1 (AW1), Meat Alternative Wanja 2(AW2), Meat Alternative Wanja 3(AW3)) were analyzed for their sensory properties. Sensor profiles of the samples were determined by eight trained panelists, by applying the Quantitative Descriptive Analysis(QDA). QDA revealed that the six Wanja had 33 sensory attributes, including "redness", "artificial odor", "smoky odor", "spice smell", and "hardness" etc. Collected data were analyzed by Principal Component Analysis (PCA). These findings demonstrate the utility of quantitative descriptive analysis for identifying and measuring meat alternative product attributes that are important to consumer.
Categories	Sensory & Consumer Science
Other Authors	Name: Hyeyun Kang Organisation: Kyung Hee University City: Seoul Country: South Korea Name: Bora Lee Organisation: Kyung Hee University City: Seoul Country: South Korea

Board No.	133
Author Name	Balamurugan Krishnaswamy
Organisation	ALAGAPPA UNIVERSITY
Country	India
Title	Importance of neuronal receptors on selecting aroma and taste of food- A study implemented in the model organism, Caenorhabditis elegans
Abstract Text	Food acts as one of the highest rewards in the construction of behaviour and inhabitations of animal kingdoms. The desire for food includes preference, selection and motivation to eat. Impact of aroma and taste on appetite sensation and food intake either independently or in combination is important for short term satiety. To understand the above, few food materials were selected by categorizing them into odourless, pungent odour, smoother/creamier aroma and slight pungent with spicy odours. Similarly, tastes includes sweet, salt, sour, bitter, umami, abrasion, savory, sour umami and volatile flavour were selected. Food preferences were investigated by using a model organism, *Caenorhabditis elegans* which intakes *E.coli*OP50 as food source. Chemosensation is the major sensory modality in the organism which lacks vision and hearing for adaptation and survival. Despite less in sensory neurons, *C.elegans* has sensory receptors to differentiate the odours. For monitoring food preference, chemotaxis assay was performed. We observed wildtype *C. elegans* preferred pungent odour when compared to others. Any mutation in serotonergic/dopaminergic neuronal receptors alters the preference and modifies behavioural responses. Preliminary studies with mutated neuronal receptors showed involvement of neuronal receptors in selecting the food material based on aroma and alters regulatory molecules associated with behavioural responses. *Key words*: Food preference, odour, *Caenorhabditis elegans*, chemosensation, and behaviour.
Categories	Sensory & Consumer Science
Other Authors	Name: MUTHUBHARATHI BALASUBRAMANIAN CHELLAMMAL Organisation: ALAGAPPA UNIVERSITY City: KARAIKUDI Country: India

Board No.	134
Author Name	Doan Nguyen Thuy Quynh
Organisation	Saigon Technology University
Country	Vietnam
Title	APPLICATION OF CHECK-ALL-THAT-APPLY (CATA) QUESTIONS FOR LEARN ABOUT DIET CAKE PROFILING FOR CONSUMERS AGED 18 – 25 IN HO CHI MINH CITY
Abstract Text	Nowadays, the youth aged 18-25 have a very high need for self-care. One of the prominent trends is the use of diet cakes to control weight, so understanding the concept of diet cakes is essential. The focus group technique was used in 3 sessions with the participation of 30 consumers to construct the term list. The CATA questionnaire was used with the participation of 106 consumers to learn about the profiling of diet cake. The results obtained five groups of diet cake concepts according to each type of cake: cracker, milk biscuit, crunchy biscuit, cookie, and energy bar. The ideal diet cake profiling for the consumers in this research is described as round shape, crispy, sweet taste/after taste, melting quickly in the mouth, and the cake should not be hard and sticky.
Categories	
Other Authors	**Warning**: foreach() argument must be of type array|object, null given in **D:\xampp816\htdocs\paperbrochure\posteroutput.php** on line **98**

Board No.	135
Author Name	H.G. Wanigasinghe
Organisation	Department of Food Science & Technology,Wayamba University of Sri Lanka
Country	Sri Lanka
Title	Synbiotic microencapsulation of corncob xylooligosaccharide and in vitro study for bioactivity & stability upon digestion & storage
Abstract Text	Xylooligosaccharides (XOS) are emerging prebiotic that improve the viability of probiotics & gastrointestinal health. XOS derived from corncob was evaluated for its prebiotic activity with three different probiotic strains & Lactobacillus rhamnosus (LGG) showed the highest viability 9.86 ± 0.04 log CFU/mL upon XOS. Three different carrier types were tested as encapsulation materials for XOS ; sodium alginate (SA) showed the highest encapsulation efficiency 87.6 ± 0.1%. The present study focused on XOS & SA to co-encapsulate LGG and explore its in vitro survival & stability upon digestion and storage through structural interactive optimization of encapsulation materials . M_2 (2% SA + 3% XOS) was considered as the best formulation with highest encapsulation efficiency 92±1, maximum viability in simulated gastric juice 8.7±0.1 log CFU/mL and bile solution 8.6±0.2 log CFU/mL, resulting in significantly ($p < 0.05$) improved survival compared to free bacteria. The microcapsules were incorporated into yoghurt and there was an increased survival of probiotics due to the protection of cells by microencapsulation and the growth promoting eï¬€ect of XOS. The XOS extracted from corncob was successfully incorporated as a co- encapsulation material for safe delivery of LGG and to produce beads with better structure & protection.
Categories	Food Processing and Engineering
Other Authors	Name: O.D.A.N.Perera Organisation: Department of Food Science & Technology, Wayamba University of Sri Lanka City: Colombo Country: Sri Lanka

Board No.	136
Author Name	Marbie Alpos, Sze Ying Leong and Indrawati Oey
Organisation	University of Otago
Country	New Zealand
Title	Pulsed electric field (PEF) treatment enhanced uptake of calcium in cooked black beans: Effect on texture, in vivo mastication behaviour, and in vitro starch and protein digestibility
Abstract Text	Novel processing strategy that can leverage the inclusion of legume in daily diet is worth exploring. This study investigated the effect of calcium chloride addition (up to 300 ppm $CaCl_2$), combined with pulsed electric field (PEF) treatment (electric field strengths 1–2 kV/cm, specific energy 9–127 kJ/kg), on the (i) texture, (ii) in vivo mastication behaviour of cooked black beans (1 h, 70–90°C), and (iii) in vitro starch and protein digestibility of in vivo-generated oral bolus (n=17 consumers). $CaCl_2$ promoted formation of cross-linkages with demethoxylated pectins to preserve beans' texture during cooking. When combined with PEF application at high energy, thermally-induced texture degradation was further minimised with addition of low $CaCl_2$ amount at 100 ppm. Cooked beans pre-treated with PEF were found chewier and the outer seed coats were masticated easily to smaller and uniformly distributed particles. In vivo masticated oral bolus of beans added with $CaCl_2$ and pre-treated with PEF showed significant ($p<0.05$) improvement of in vitro protein digestibility, without considerably increasing the starch digestibility. These findings demonstrated that PEF application could potentially modify the texture and food structure of cooked black beans, improve its particle breakdown during mastication and enhance bioavailability of protein for gastrointestinal digestion.
Categories	Food Processing and Engineering,Nutrition & Health
Other Authors	Name: Sze Ying Leong Organisation: University of Otago City: Dunedin Country: New Zealand Name: Indrawati Oey Organisation: University of Otago City: Dunedin Country: New Zealand

Day 2 - 1 November 2022

Board No.	1
Author Name	Mónica Rubilar
Organisation	Universidad de La Frontera
Country	Chile
Title	Effect of the oleogelation process between vegetable oils and beeswax/shellac mixtures on texture and oxidative stability
Abstract Text	Oleogelation is a fat substitute alternative due to its effect on food textures. This study evaluated oleogelation on the texture and oxidative stability of oleogels formulated with linseed and canola oils (LO and CO) and beeswax/shellac (BW/SW) oleogelator. A Taguchi experimental design (TED) was used. The variables were: oleogelator percentage (4, 7, and 10%), temperature (85, 92, and 100°C), time (20, 30 and 40 minutes), and BW/SW mixture (70:30, 50:50 and 30:70 %w/w). The optimal oleogels were stored for 35 days at 25°C and peroxide value (PV) was measured. The optimum conditions were: 70:50 (w/w), 10% (w/w), 20 minutes, 92°C (LO), and 100°C (CO). The LO oleogel presented a solid texture with a firmness value of 424±2.81 g, similar to commercial shortening (CS) with 419±3.78 g. However, the CO oleogel presented a firmness of 288±2.99 g, lower than CS. Additionally, both oleogels presented PV lower than the maximum (10 meqO_2/Kg oil) established in the Codex Alimentarius. These results confirmed that the LO oleogel formulation presented a firmness similar to CS and stability against lipid oxidation.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Eduardo Morales Organisation: Universidad de La Frontera City: Temuco Country: Chile Name: Nicole Iturra Organisation: Universidad de La Frontera City: Temuco Country: Chile

Board No.	2
Author Name	Ralf Greiner
Organisation	Max Rubner-Institut
Country	Germany
Title	Characterization of the food additive calcium carbonate (E 170)
Abstract Text	In the food industry, titanium dioxide (TiO_2) is used as a food additive (E 171) due to its white-coloring properties in many products since decades. In 2022 the European Commission withdrew the approval for the use of E 171 in food in the EU based on an EFSA opinion because a concern for genotoxicity could not be ruled out. Calcium carbonate (E 170) can be an alternative substitute as whitening food colorant. In this study, several food grade $CaCO_3$ products were investigated. Size measurements were carried out with scanning electron microscopy combined with energy-dispersive X-ray spectroscopy (SEM/EDX), inductively coupled plasma mass spectrometry in single particle mode (spICP-MS) and dynamic and static light scattering (DLS and SLS). Various dispersing conditions were tested and optimized for the best possible dispersion of the particulate materials. Therefore, an ultrasonic cup booster and different dispersing agents were used. DLS/SLS and spICP-MS are useful as fast screening methods, but they cannot distinguish between $CaCO_3$ particles and aggregates/agglomerates. Furthermore, it is not possible with SLS/DLS to distinguish $CaCO_3$ particles from other particulate substances in the sample (e. g. starch particles). SEM/EDX is capable of determining both the morphology and size of individual particles and their elemental composition. Therefore, it is the most reliable method for the characterization of $CaCO_3$ particles in the nano- and micro-range which can also provide a particles size distribution. This study helps to evaluate whether or not E 170 needs to be labelled as engineered nanomaterial according to the 'Food Information to Consumers' regulation (EU 1169/2011).
Categories	Food Chemistry & Ingredients
Other Authors	Name: Volker Gräf Organisation: Max Rubner-Institut City: Karlsruhe Country: Germany Name: Birgit Hetzer Organisation: Max Rubner-Institut City: Karlsruhe Country: Germany Name: Elke Walz Organisation: Max Rubner-Institut City: Karlsruhe Country: Germany Name: Alexandra Müller Organisation: Max Rubner-Institut City: Karlsruhe Country: Germany Name: Ann-Katrin Meinhardt Organisation: Max Rubner-Institut City: Karlsruhe Country: Germany

Board No.	3
Author Name	Natsuko Tsurudome
Organisation	The United Graduates School of Agricultural Sciences, Kagoshima University
Country	Japan
Title	Use of fisetin and mulberry leaves as nutraceuticals to prevent vascular abnormal contraction
Abstract Text	Vascular abnormal contraction is one of the leading causes of death in various vascular diseases. Our goal was to identify a suitable food to prevent vascular abnormal contraction: accordingly, we found mulberry leaves to be useful. This study aimed to identify the active compounds in mulberry leaves and detect the active sites. The preventive effect was evaluated based on the morphology of the vascular smooth muscle cells, where vascular abnormal contraction occurs, by fluorescence microscopy. We fractionated, purified, and identified the active component by mass spectrometry, high-performance liquid chromatography, and nuclear magnetic resonance spectroscopy. We identified the active sites of the mulberry leaf component by comparison with similar structures. Mulberry leaves of more than 20-years-old-trees exerted a strong preventive effect on vascular abnormal contraction. We identified fisetin as an active component in mulberry leaves and the hydroxyl group at the C-3 position of fisetin as the active site. In conclusion, fisetin, which is abundant in old mulberry tree leaves, prevents vascular abnormal contraction. Mulberry leaves are an excellent source of compounds with health benefits for the vascular tissue, thus contributing to the extension of human life span and reducing medical costs.
Categories	Food Chemistry & Ingredients
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Board No.	4
Author Name	Dr Jessica Pahl
Organisation	University of Southern Queensland
Country	Australia
Title	Easily distributable, rapid analysis tool to indicate anthocyanin content in plums
Abstract Text	Anthocyanins are water-soluble flavonoids that confer purple, blue and red colour to fruits such as plums and berries. They have garnered considerable interest due to their anti-inflammatory, antioxidant and cardioprotective effects, and this has led to the development of an anthocyanin functional food and nutraceutical industry worth an estimated $USD611 million. As this industry grows, there is a need to ensure that anthocyanin content of the fruits/products is compliant with labelling and consistent between batches, and this is currently a challenge due to natural variation of anthocyanin content in fruit. For example, the anthocyanin content of Queen Garnet plums grown in an orchard at the same time can vary from 85 – 175 mg anthocyanin/100g. Previous work has identified that anthocyanin content can be correlated to CIELAB colour parameters L*, a* and b*, but this used laboratory grade colourimeters that are not suitable for wider distribution to many growers and producers. The findings of this current study highlight that an affordable colourimeter ($550~) can be used to predict anthocyanin content of Queen Garnet plum. This has implications for use as a rapid quality control tool to track anthocyanin content across the fruit supply chain from fruit onset to harvest through to processing.
Categories	Food Chemistry & Ingredients

Board No.	5
Author Name	Achala Gupta
Organisation	Food Customization Laboratory, Centre of Rural Development and Technology, Indian Institute of Technology Delhi, New Delhi, 110016, India
Country	Singapore
Title	Fermentation kinetics and Physiochemical composition of reduced alcohol Madhuca Longifolia (Mahua) based Nutra-Beverage fermented with Saccharomyces cerevisiae
Abstract Text	Consumption of energy drink has been increasing aggressively causing adverse health effects hence alarming researchers to find natural prospects. *Madhuca Longifolia* (Mahua)*,* a non-timber nutrient potent produce is extensively rich in sugar (47.35-54.06/100g) making it a competent indigenous crop for the production of fermented nutra beverage. For this, mahua flower juice was fermented using yeast *Saccharomyces cerevisiae* (0.2%w/v) at 30±2°C. Fermentation was monitored by estimating °Brix (4.3-4.5), pH (3.8-4.5) and specific gravity of drink. After 6^{th} day of fermentation alcohol content was found to be constant at 9.6±0.2%. GC-MS profiling indicated the presence of higher alcohols such as 3-methyl-2-butanol, 1, 2, 3-Butanetriol, 2-Pentanol etc. Further, sugar kinetics also revealed continuous degradation of sugars (Fructose, Glucose, Sucrose) in a ratio of 2.5:2.0:1.0. Fermentation under different shaking speeds (0, 150, 250 rpm) showed negative effect of increased mechanical agitation on the viability of *Saccharomyces cerevisiae,* however 150rpm was found to be the optimum condition for ethanol production (75.96g/L). The prospect of mahua as nutra-beverage was evaluated on the basis of total phenolic and flavonoid content ranging from 111.34±25.3-245.56±16.7mgGAE/gDW and 123.11±23-185.5±15.3mgQuercetin/gDW respectively. Increased radical scavenging capacity of 87% was found using DPPH assay. The results demonstrated that there is an opportunity to accommodate the underutilised Mahua as a commercial value-added nutra beverage.
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Board No.	6
Author Name	Lijing Ke
Organisation	Food Nutrition Sciences Centre, Zhejiang Gongshang University
Country	China
Title	Maillard Reaction Products in Baguette Crust and Crumb Exhibited Different Antioxidant Activity and Modulated Proinflammatory Cytokines in RAW264.7 Macrophages
Abstract Text	Baguette has crispy crust and soft crumb. Maillard reaction not only shapes baguette's sensory attributes, but also modifies its biological activities. Here we investigated the chemical profiles of Maillard reaction products and the bioactivities of aqueous extracts of the crust and crumb of baguettes. Their chromatic value, chemical compositions, advanced glycation end products (AGEs), antioxidant capacity, and influences on the cytosolic reactive oxygen species (ROS), cell membrane potential and mitochondrial superoxide of RAW264.7 macrophages were determined. The browning intensity, ORAC/ABTS/FRAP activities and AGEs content of the crust are significantly higher than those of the crumb. The progression of Maillard reaction was positively correlated to the browning intensity and the antioxidant activities. The ORAC activity gradually increased from the inside (crumb) to the outside (crust) of baguettes, which was consistent with their cellular antioxidant activities. Both crust and crumb extracts exerted influence neither on the cytosolic membrane potential (V_{mem}) nor mitochondrial superoxide of normal macrophages. The crust extracts mitigated the peroxyl radical induced cell membrane hyperpolarization by 91% and the suppression on the oxygen respiration in mitochondria by up to 100%, showing higher activities than the crumb extracts. The crust extracts induced TNF-α expression in the normal macrophages, while the crumb extracts more sufficiently inhibited the LPS-induced expression of IL-1β, IL-6 in the macrophages. It provides the fundamental data and cell-based approach for investigating the biological impacts of bread on mucosal immune responses.
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Board No.	7
Author Name	Lim Su Hui
Organisation	Singapore Institute of Food and Biotechnology Innovation (SIFBI)
Country	Singapore
Title	Colon-targeted Microcarriers that Promote Daidzein Bioaccessibility
Abstract Text	Daidzein, an isoflavone found in legumes, can be converted to its end metabolite equol based on the presence of certain intestinal bacteria. Equol has potential for significant health benefit such as alleviate osteoporosis, menopausal symptoms, and lower risk of prostate cancer. However, unprotected daidzein is subject to upper gut degradation and small intestinal absorption, which reduces its bioaccessibility to the colonic microbiota for metabolism into equol. One approach to overcome this problem is encapsulation of daidzein using suitable carriers. In this work, we tested enzyme-based colonic microcarriers made of commercial glycoproteins, which have carbohydrate corona resistant to human α-amylase but cleavable by colonic microbiota enzymes to trigger daidzein release. Special efforts will be made to maximize microcarrier loading capacity with daidzein. In vitro digestion in simulated upper intestinal and colonic conditions is used to assess microcarrier stability and daidzein release. Suggested microcarrier system has great potential for functional food providing daidzein or other colonic bioactive delivery.
Categories	Food Chemistry & Ingredients

Board No.	8
Author Name	Anna Iwaniak
Organisation	University of Warmia and Mazury in Olsztyn, Faculty of Food Science, Chair of Food Biochemistry, Pl. CieszyÅ„ski 1
Country	Poland
Title	BIOPEP-UWM database - a tool for prediction of the potential of food proteins as the sources of biopeptides
Abstract Text	Progress in the development of computer technologies contributed to the elaboration of tools that are useful in the theoretical prediction of the properties of food components, including bioactive peptides derived from foods. Such methodologies are called an in silico analyses and became a part of the three approaches applied in studying proteins and peptides. The aim of the study was to present the options available in BIOPEP-UWM® database that are useful in the evaluation of the protein(s) as the source(s) of bioactive peptide(s). Such options will be exemplified on any protein sequence available in BIOPEP-UWM database. They include the elaboration of the profile of potential biological activity of protein, the frequency of the occurrence of peptides with given activity in a protein, the prediction of enzymatic release of biopeptides from protein using qualitative and quantitative criteria. Moreover, the search options of this database as well as new updates are going to be presented. Project financially supported by Minister of Education and Science in the range of the program entitled "Regional Initiative of Excellence" for the years 2019-2022, Project No. 010/RID/2018/19, amount of funding 12,000,000 PLN and University of Warmia and Mazury grant No. 17.610.014-110.
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Board No.	9
Author Name	Jannelle D. Cruz
Organisation	Monde Nissin Corporation
Country	Philippines
Title	Protein-saccharide complexation: Effects on functional properties of lupin protein isolates
Abstract Text	Lupin is a protein- and fiber-rich legume which has high potential as an alternative protein source for food and beverage applications. However, its functional properties are reported to be inferior to other legume proteins such as soy. Modification of lupin protein's structure through crosslinking and formation of protein-saccharide complexes by Maillard reaction may improve its functional properties. This study evaluated the effects of protein-saccharide complexation on the functional properties of lupin protein isolates (LPI). Different types of saccharides such as glucose (G), maltodextrin (MD), and acacia gum (AG) were explored and the resulting complexes and untreated LPI (control) samples were evaluated for gel strength, emulsifying properties and foaming properties. LPI complexed with acacia gum (PP-LPI-AG) showed the highest gel strength and emulsifying properties amongst all samples. PP-LPI-AG and PP-LPI-MD both showed significant improvement on foaming properties compared to the control sample. Glucose, on the other hand, did not render any improvement on all functional properties, despite indicating a faster rate of Maillard reaction through apparent browning of the sample. Optimization of the LPI-saccharide complexes can be done to provide opportunities and create new plant-based protein ingredient per specific functionality requirement for different product applications
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Board No.	10
Author Name	Petras Rimantas VENSKUTONIS
Organisation	Kaunas University of Technology
Country	Lithuania
Title	Phytochemical composition, antioxidant and enzyme inhibitory activities of Dioscorea caucasica leaves and tubers
Abstract Text	Dioscorea caucasica Lipsky is a rare tertiary relict endemic plant naturally growing in the Western part of Transcaucasia regions. The plant has been successfully adapted and grows in the temperate regions of Europe as well. Ethnopharmacological information about health benefits ofD. caucasica preparations encourages more systematic studies about its chemical composition and bioactivities. This study reports phytochemical composition of hydroethanolic extracts of *D. caucasica* leaves and tubers, their antioxidant properties and effects on physiologically important enzymes, namely α-amylase, α-glucosidase, acetylcholinesterase and angiotensin converting enzyme. According to the results obtained by chromatography-mass spectrometry (UPLC-QTOF/MS), the leaf extract was rich in phenolic acids and flavonoids (mainly quercetin glycosides), while the tuber extract contained several tentatively identified hydroxylated long chain fatty acids and saponin glycosides. Leaf extracts, most likely, due to the presence of polyphenolic compounds, were remarkably stronger antioxidants and enzyme inhibitors than tuber extracts. Kinetics studies were performed to establish inhibition mode; for instance, leaf extract displayed a mixed-type non-competitive mode of α-glucosidase inhibition, while tuber extract competitevely inhibited this enzyme. In general, the results obtained substantially expand our knowledge on D. caucasica as a promising under-utilised crop in developing new health beneficial ingredients for functional foods and nutraceuticals.
Categories	Food Chemistry & Ingredients
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Board No.	11
Author Name	Zuzana Sediva, Prof. Erich Windhab
Organisation	ETH Zurich
Country	Switzerland
Title	Gas hydrates used as blowing agent for matrices based on biomass waste streams
Abstract Text	A 2019 patented technology of using gas hydrates for foaming of viscous matrices was upgraded and tested. Gas hydrates are crystalline inclusion compounds consisting of hydrogen-bonded, three-dimensional cages from water molecules, entrapping gas molecules. The upgraded technology consists of (i) an in-house gas hydrate formation reactor designed for up to 450 bar operational pressure and (ii) a high-pressure mixing homogenizing unit such as an extruder (200bar) or surface-scraped heat exchanger (80 bar). These pressure ranges cover the stability region of most gas hydrate formers. This study was focused on the formation of single-gas CO2 (formation pressure 15-55 bar), mixed gas CO2/N2 (formation pressure 15-450 bar) and single gas N2 (formation pressure 130-450 bar) hydrate crystalline slurries. The formed gas hydrate slurries were dosed into a high-pressure un-foamed product streamline using a pressure-controlled transfer unit. Foam formation was induced by expanding the gas hydrate slurry/product mix. The new technology is expected to offer great potential in facilitating micro-foam formation, in highly viscous matrix fluid systems since the gas hydrate crystals can be used as a "foaming ingredient" (propellant) which can be well dispersed before their gas load release is activated by pressure and/or temperature adaptation.
Categories	Food Chemistry & Ingredients

Board No.	12
Author Name	Jong-Bang Eun
Organisation	Chonnam National University
Country	South Korea
Title	Combined effect of sulfuric acid and ethanol to retain polysaccharide from Burdock (Arctium lappa L.) root
Abstract Text	Burdock (Arctium lappa L.) roots are valuable sources for fructan type fructooligosaccharide/polysaccharide which exerts various bioactivity. In this study, sulfuric acid was used in combination with ethanol hence, ultrasonic extraction parameters such as 70% ethanol content (20-40 g/ml), sulfuric acid (1-5 ml), sonication time (30-90 min), and sonication temperature (35-75 ºC) were optimized using response surface methodology (RSM). After multiple linear regression analysis, a second-order polynomial model was developed for response (yield of total polysaccharide). Results revealed that the ethanol content and sonication temperature and time have the significant effect ($p < 0.05$) on the extraction of polysaccharide from the burdock roots with the R2 value of 0.89. With the numerical optimization the polysaccharide yield was expected to 43.52% with 25.48 ml/g of ethanol, 4.0 ml H_2SO_4, 65°C temperature and time of 75 min. From this experiment, we observed that sulfuric acid can break down the lignin and other complex carbohydrate which may be extracted by effective solvents.
Categories	Food Chemistry & Ingredients
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Board No.	13
Author Name	Eunsu Song
Organisation	Myongji University
Country	South Korea
Title	Wound healing and skin protective effects of Xanthium Strumarium L. fruit extract.
Abstract Text	*Xanthium strumarium* L. (XS) fruit, as known as cocklebur, has been used as traditional herbal medicines in some countries due to its bioactivities. Despite its potential clinical use, most of the researches has been focused on its anti-cancer and anti-arthritis effects. According to our previous study, XS fruit extract (XSE) has not only anti-oxidant and anti-inflammatory activities, but also plays an important role in production of hyaluronan and collagen, which consist of extracellular matrix (ECM). The aim of this study is to determine whether XSE has properties of skin protection and barrier recovery or not. The cell migration assay and collagen (COL1A1) content were measured to figure out wound healing and skin protective effects of XSE in human dermal fibroblasts (HDF) and skin reconstructed human epidermis (RHE) models. XSE treatment increased COL1A1 production and mRNA level of *matrix metalloproteinase-1*. Moreover, XSE promoted wound closure and cell migration in both HDF and RHE models. The results suggested that XS fruit may be potentially applied in the area of cosmetic and pharmaceutical industries due to its wound healing and skin ECM protective effects.
Categories	Food Chemistry & Ingredients

Board No.	14
Author Name	Shweta Malik
Organisation	Central University Of Rajasthan
Country	India
Title	Isolation and Characterisation of Milk-derived Amyloid-like Protein Aggregates (MAPA) from Cottage Cheese
Abstract Text	Cottage cheese, extensively consumed worldwide, contains coagulated milk protein (casein), produced through boiling and acidification of milk. Casein forms amyloid or amyloid-like structures at high temperatures and low pH. Due to the similarities in the preparation of casein amyloids and cottage cheese, we hypothesized the presence of amyloid or amyloid-like protein aggregates in cottage cheese. To examine this hypothesis, cottage cheese was prepared from cow (*Bos indicus*) milk and isolated amyloids through a water extraction method. The isolated protein aggregates displayed typical characteristics of amyloids, such as a bathochromic shift in the wavelength of maximum absorption (λmax) of Congo red (CR), high thioflavin T (ThT) binding, increased surface hydrophobicity, and high β-sheet structure. However, they did not show antibacterial activity and toxic properties against erythrocytes. Our study revealed that the heat-treatment and subsequent acidification during cottage cheese preparation lead to the formation of non-toxic amyloid-like aggregates.
Categories	Food Chemistry & Ingredients

Board No.	15
Author Name	Zuzana Sediva, Prof. Erich Windhab
Organisation	ETH Zurich
Country	Switzerland
Title	Novel gas hydrates technology for upcycling matrices based on biomass waste streams
Abstract Text	Gas hydrates are crystalline inclusion compounds consisting of hydrogen-bonded, three-dimensional cages from water molecules, entrapping gas molecules. Our developed gas hydrate structuring technology for porous solids generation (HyPor) consists of (i) a continuous in-house gas hydrate formation reactor designed for up to 450 bar operational pressure and (ii) a high-pressure continuous mixing unit such as an extruder (200bar) or surface-scraped heat exchanger (80 bar). These pressure ranges cover the stability region of most gas hydrate formers. Our study focused on the formation of single-gas CO_2 (formation pressure 15-55 bar), mixed gas CO_2/N_2 (formation pressure 15-450 bar) and single gas N_2 (formation pressure 130-450 bar) hydrate crystal slurries. Such were dosed into a high-pressure non-foamed product streamline using a pressure-controlled transfer unit. Foam formation was induced by controlled expansion of the gas hydrate slurry /product mix. The new technology is expected to offer great potential in facilitating micro-foam formation, in highly viscous matrix fluid systems if the gas hydrate crystals are used as a "foaming ingredient" (propellant) which can be well dispersed before their gas load release is activated by pressure or temperature adaptation. Matrices based on biomass waste streams were upcycled to produce presented biodegradable packaging and carrier materials.
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Board No.	16
Author Name	Nursabrina Binti Mohd Hayat@Ahmad
Organisation	Malaysian Palm Oil Council
Country	Malaysia
Title	Red Palm Oil: The Lesser Known Nutritious Oil
Abstract Text	Red palm olein (RPO) is produced from a special refining technology of the oil palm fruit, *Elaeis guineensis,* which retains the carotenoids contents of crude palm oil (CPO) that explains its trademark of orangey red color. Composing of approximately 50% saturated fat, RPO exists as semisolid at room temperature and more stable to lipid oxidation than other oils. It also offers an interesting nutrient profile and contains a variety of carotenoids and antioxidants. For centuries, this vibrant tinted oil has been used for a dynamic range of culinary, cosmetic and medicinal applications because of its versatility. RPO also has been investigated as a fortification strategy to combat vitamin A deficiency in the developing world as it is known as a rich source of carotenes because it contains more carotene than tomatoes or carrots that are important for children's growth development. Approximately 70% of the vitamin E in RPO is in the form of tocotrienols, a powerful form of vitamin E which is more potent antioxidants and is thought to confer greater health benefits than tocopherols. These antioxidants helps to neutralize free radicals, a chemicals linked to a host of health issues, including skin aging, cancer, and numerous diseases. Therefore, this review will discuss the nutrient contents of RPO, its health benefits and effects of RPO consumption on human health. **Keywords: antioxidants, carotenoids, fortification, refining and tocotrienol**
Categories	Food Chemistry & Ingredients

Board No.	17
Author Name	Christos Soukoulis
Organisation	Luxembourg Institute of Science and Technology
Country	Luxembourg
Title	IMPACT OF ANIONIC (Linum usitatissimum L.) and NON-IONIC (Medicago sativa L.) MUCILAGES ON THE MICROSTRUCTURAL AND PHYSICOCHEMICAL CHANGES OF MILK PROTEINS UNDER IN-VITRO DIGESTION CONDITIONS
Abstract Text	Polysaccharides impart significant structuring, texturizing and interface stabilising techno-functionalities to processed food. Besides they serve as a natural source of soluble dietary fibres as well as modulators of the food matrix disintegration and digestibility throughout orogastrointestinal transit. The present work reports on the impact of the anionic (flaxseed) and non-ionic (alfalfa) plant seed mucilages (added at 0.1, 0.5 or 1% wt.) on the colloidal changes and digestibility of sodium caseinate and whey protein isolate dispersions (10% wt.) under in-vitro digestion simulating conditions. Based on the findings, food boluses exhibited a phase-separated microstructure, with their colloidal conformation being concomitantly influenced by the protein and mucilage type. The significant impact of both mucilages on the extent of intragastric induced protein aggregation was confirmed by CLSM and SLS measurements. From a mechanistic standpoint, acid protein aggregates formation was driven via segregative phase separation, complex coacervation and steric hindrance of gastric fluid mass transfer to the solid-liquid interface. The kinetic modelling of the data concerning the amount of residual intact proteins (SDS-PAGE densitometric data) and free amino acids (OPA assay) showed that the rates of intragastric and intestinal induced peptic cleavage of the milk proteins were significantly influenced by the mucilage type and content.
Categories	Food Chemistry & Ingredients

Board No.	18
Author Name	Shwu Fun Kua
Organisation	Sime Darby Plantation Technology Centre
Country	Malaysia
Title	Supercritical Fluid Chromatography-based Lipidomic Profiling of Cold Pressed Palm Oil Enriched with Phytonutrients and Antioxidant Properties
Abstract Text	Cold press technology is an increasingly popular technique in oil milling to preserve natural nutrients. This study aims to compare (i) phytonutrient content (ii) antioxidant capacity, and (iii) minor constituents of hot-pressed and cold-pressed crude palm oils (CPO). The hot-pressed CPO was significantly lower in carotene and squalene ($p<0.05$) than cold-pressed CPO, while tocotrienols, tocopherols, phytosterols, and Coenzyme Q10 were not significantly different ($p>0.05$). These results demonstrate that carotene and squalene with highly unsaturated chemical structure are more susceptible to thermal degradation. The cold-pressed CPO (Oxygen Radical Absorbance Capacity, ORAC = 1454.28 ± 328.88 μM TE) showed 2.8 times greater antioxidant capacity in comparison to the hot-pressed CPO (ORAC = 506.82 ± 33.98 μM TE), which coincided with a higher polyphenol content preserved by cold pressing. Upon further investigation into the presence of minor constituents of CPO using supercritical fluid chromatography (SFC), galactolipid and sphingolipid derivatives were found to be higher in the cold-pressed CPO. The cold-pressed palm olein fraction also exhibited similar lipid profiles with five flavonoid derivatives that were 10 times higher than those in the hot-pressed palm olein. Overall, this study suggests that the cold press technology preserves phytonutrients and minor lipids in palm oil and enhances its antioxidant properties.
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Board No.	19
Author Name	Artur Martins
Organisation	INL - International Iberian Nanotechnology Laboratory
Country	Portugal
Title	Effect of phytosterols on the microstructure, physical stability, and texture of an edible monostearate-polymeric fat-mimetic bigel system
Abstract Text	Bigels constitute a class of soft matter materials derived from the combination of edible oleogels and hydrogels capable of exhibiting specific structural properties (e.g., stability; mechanical resistance; high solvent retention rates). This work focused on oleogel-in-hydrogel bigels consisting of a biopolymeric hydrogel, formed by the combination of κ-carrageenan and locust bean gum, and a sunflower-based oleogel, structured by glyceryl monostearate (GM) or a combination of GM and phytosterols (Ph). Different hydrogel:oleogel ratios were evaluated along with the influence of the structuring agents. Results showed that phytosterols can act both as an emulsifier and/or crystallization modifier. Formulations 90:10 and 80:20 (hydrogel:oleogel) produced self-sustained bigels evidencing high solvent holding capacity. The indication of phase inversion was given for higher oleogel fractions and high GM content, resulting in lower hardness values. Phytosterols incorporation improved interfacial action in 80:20 bigels, affecting crystallization and increasing hardness from 20.3 to 30.6 N for samples with 5% (GM:Ph). Adhesiveness improved dramatically for samples with 20% GM:Ph, as larger particle-filled oleogel droplets turned into highly interfacially-stabilized oil droplets. In conclusion, the impact of phytosterols incorporation on the physical stability and functional properties of oleogels constitutes a relevant feature towards formulating healthier new food products. Work developed under project BetterFat4Meat (POCI-01-0247- FEDER-039718) co-financed by Compete 2020, Portugal 2020 and the European Union, through the European Regional Development Fund (ERDF).
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Board No.	20
Author Name	Elizabeth H. Arenas
Organisation	University of Santo Tomas
Country	Philippines
Title	Effects of Steeping Time and Temperature on the Antioxidant Activity and Phenolics of Pili (Canarium ovatum Engl.) Pomace Brew
Abstract Text	Pili (Canarium ovatum Engl.) pomace, a phenolic-rich material, is the principal by-product of fruit pulp oil production. Dried pili pomace powder was steeped in hot (80, 90 & 100°C at 2, 5, 8, 11, & 14 minutes) and cold (room temperature: 2, 4, 6, & 8 hours) water. Pili pomace brew samples were analyzed for pH, color values, total phenolic content and antioxidant property – FRAP, ABTS and DPPH. Infusions were found to be acidic with a pH ranging from 4.40 to 4.66. Colorimetric evaluation indicated dominant red (+a*) and yellow (+b*) colors in brewed tea liquors. Lightness (L*) values decreased as steeping time and temperature increased. Higher antioxidant activity was observed in tea infusions prepared using hot method. Generally, hot extraction resulted to greater quantities of condensed tannins, total phenolics, flavonoids, and anthocyanins compared to cold extraction. Levels of phenolic compounds and antioxidant activity increased with increasing extraction time and temperature. Pili pomace powder brewed at 100°C for 14 minutes was determined to yield the highest phenolic content and strongest radical scavenging activity.
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Board No.	21
Author Name	Xiaojuan Xu, Qi Xuan Yeo, Serena Wong Mun Rui, Weibiao Zhou
Organisation	Department of Food Science and Technology, National University of Singapore
Country	Singapore
Title	Identification, purification and bioactivity of betacyanins from red dragon fruit peel
Abstract Text	**Betacyanins are a class of water-soluble and red-violet pigments, similar to anthocyanins. However, they are less well-researched than anthocyanins due to limited sources and no commercial HPLC standards. Red dragon fruit peel (RDFP), rich in betacyanins, is usually discarded during processing and eventually becomes a source of waste and pollution. Herein, betacyanins were extracted from RDFP and five major betacyanin compounds were identified in RDFP extracts, namely betanin, iso-betanin, phyllocactin, iso-phyllocactin, and 6'-O-3-hydroxy-butyryl-betanin. Among them, betanin and phyllocactin account for around 85% of the total betacyanins in RDFP extracts. Through solid-phase extraction to remove impurities, semi-preparative HPLC to conduct separation, and ^{1}H NMR to determine purity, betanin and phyllocactin standards were successfully obtained from RDFP extracts. Both pure betanin and phyllocactin exhibited more potent antioxidant activities than gallic acid and Trolox. In addition, enzyme inhibition assays demonstrated that pure betanin and phyllocactin are mixed-type inhibitors of α-amylase and competitive inhibitors of α-glucosidase, suggesting that natural betanin and phyllocactin may be a potential long-term anti-diabetic agent. This study may provide better insights into the bioactivities of pure betacyanins and the method development for betacyanin standards could have implications for evaluating other biological activities of betacyanins.**
Categories	Food Chemistry & Ingredients
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Board No.	22
Author Name	Bernice Neo Hui Yi
Organisation	National University of Singapore (NUS)
Country	Singapore
Title	Evaluation of textural properties and microstructure of novel dried, low-starch noodles made using spent brewerâ€™s grains.
Abstract Text	Spent brewer’s grains (SBG) are a major by-product from beer. Commercial noodles have high glycaemic indexes, hence there has been interest in developing healthier noodle alternatives. Existing low-starch noodles are sold in wet-form and thus have short shelf-lives. Therefore, this study aimed to create a dried low-starch noodle using SBG and investigate how ingredients used affected the noodles’ texture and structure after rehydration. Various ingredients were tested and gluten and psyllium husk were selected. Wheat flour noodles were the control. Single factor optimisation was conducted for gluten and psyllium husk. Noodles were analysed for textural properties and microstructure observed with microscopy. Gluten optimisation showed 30% gluten was least different from control based on TPA parameters of hardness and elasticity. Psyllium husk optimisation showed 20% had a hardness not significantly different from control and an elasticity most similar to control. Results from confocal microscopy and scanning electron microscopy showed changes in noodle microstructure as gluten and psyllium husk was added, allowing for noodle rehydration. Findings showed how addition of gluten and psyllium can help SBG to form a noodle and improve its textural properties, suggesting potential for SBG to be developed as a healthier alternative to wheat flour noodles.
Categories	Food Chemistry & Ingredients
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Board No.	23
Author Name	Chih Yao Hou
Organisation	National Kaohsiung University of Science and Technology
Country	Taiwan
Title	Utilization of Response Surface Methodology in optimization of extracting the chitosan from cuttlefish bone
Abstract Text	Aquatic by-products from processed fish products cause environmental pollution and increase disposal costs. Cuttlefish bone is one of the by-products of cuttlefish, thus chitosan optimized extract conditions were developed in this study with Response surface methodology (RSM). In addition, FTIR, NMR, EDX, SEM, and antioxidant activity were also evaluated. The result shows that the optimal extraction conditions are 50% NaOH, 80°C, 6hr, and the extraction effect can be obtained at over 56.88%. The wavenumber to the wavelength at 600-1000 cm^{-1} of FTIR has the chitosan characteristic peaks, and the profile of ^{1}H NMR shows (400 MHz, D2O, δ, ppm): 1.97 (COCH3), 3.13 (H-2), 3.87 (H-5), 3.87 (H-3, H-4, H-6), 4.72 (H-3) -1) also demonstrated the structure of chitosan and purity. The DPPH antioxidant activity assay indicate at the concentration of 16 mg/mL, the scavenging ability of the extracts and the commercial sample tended to be similar (about 38%). The free radical scavenging capacity showed about 22% scavenging capacity at 8 mg/mL. Using the response surface methodology obtained optimal chitosan extract conditions to achieve the recycling and utilization of by-products, enhancing added value and industrial competitiveness, can also reach the purpose of resource sustainability.
Categories	Food Chemistry & Ingredients
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Board No.	24
Author Name	Mona Elena Popa
Organisation	University of Agronomic Sciences and Veterinary Medicine of Bucharest
Country	Romania
Title	SCREENING OF VALUABLE COMPOUNDS FROM ORGANIC APPLE PROCESSING BY-PRODUCTS
Abstract Text	Fruits could be very good sources of carotenoids, terpenoids, and polyphenols, making them appropriate candidates in the development of functional food. Fruit processing generate high amounts of by-products (peel, pulp, pomace, etc.) which still contain great amounts of bioactive compounds. Thus, the aim of this study was to characterize some side stream resulting from organic apple processing. Nine organic apple varieties were analyzed regarding their bioactive components. The fruits were processed into juice and the remaining waste was analyzed (whole fruit pomace, peel, and pulp pomace). Analysis like total phenolic content (TPC), antioxidant activity, ascorbic acid and anthocyanin quantification were performed. The obtained results showed that the greater values for total phenolic content, antioxidant activity and anthocyanin content were obtained for the peel of the fruits, rather than pulp or the whole fruit; part, which is often removed in apple processing, being categorized as waste. Furthermore, for the organic apple varieties ascorbic acid was determined only in the peel of the fruits except for Dalienette variety, for which ascorbic acid was also determined in the pulp. These results suggest that fruit by-products have great amounts of bioactive compounds and could be further used as valuable ingredients in food industry. This work was supported by contract 186/2020, project acronym MILDSUSFRUIT. The authors acknowledge the financial support for this project provided by transnational funding bodies, partners of the H2020 ERA-NETs SUSFOOD2 and CORE Organic Cofund, under the Joint SUSFOOD2/CORE Organic Call 2019. *Key words*: organic apple waste, by-products, bioactive compounds
Categories	Food Chemistry & Ingredients

Board No.	25
Author Name	Hee-Won Ahn
Organisation	Korea University
Country	South Korea
Title	Synthesis of Resveratrol Î±-Glucosides using Thermostable Î±-O-Glycoligase
Abstract Text	α-O-Glycoligases are catalytic general acid/base residue-deficient mutant derived from α-glycosidases which are capable of transglycosylation toward natural compounds bearing hydroxyl groups with pKa value lower than water molecules. In this study, resveratrol α-glucosides were synthesized using an activity-enhanced α-O-glycoligase variant dervied from a thermostable α-glucosidase from *Sulfolobus solfataricus* using α-D-glucopyranosyl fluoride and resveratrol as the substrates, resulting in the formation of three products, resveratrol-3-O-α-glucoside (R3G), resveratrol-4'-O-α-glucoside (R4'G), and resveratrol-3,4'-O-α-diglucoside (RDG). The optimal pH was pH 9.5 for the deprotonation of hydroxyl groups, which is a prerequisite for O-glycoligase-mediated transglycosylation. The more supplement of the donor substrate enhanced the second transglycosylation showing selective preference toward R3G as the acceptor substrate. The reaction with the donor and resveratrol in a molar ratio of 2:1 yielded only R4'G and RDG. The isolation yields using preparative HPLC were 35.1% and 45.6% for of R4'G and RDG, respectively.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Young-Wan Kim Organisation: Korea University City: Sejong Country: South Korea

Board No.	26
Author Name	WENYAN HUANG
Organisation	KOREA UNIVERSITY
Country	South Korea
Title	Citrus junos Tanaka wastes (by-products) attenuate PM10-induced inflammatory response by augmenting AKT, ERK, JNK, and NF-ÎºB expression in BALB/C mice
Abstract Text	Citrus fruit waste, a cost-effective source of bioactive compounds, has pharmacological importance; however, it has not attained commercial importance and is largely disposed of as municipal waste, creating a substantial challenge in processing industries as well as pollution monitoring agencies. Here, we assessed the ability of *Citrus junos* Tanaka (also known as yuzu) by-products (CJBs), considering the possible role of citrus fruit waste in inhibiting PM10-derived pulmonary damage using *in vitro* and *in vivo* approaches. CJB extract significantly attenuated PM10-induced pulmonary damage and inflammatory cell infiltration in a mouse model. Specifically, we confirmed that CJB treatment effectively prevented PM10-induced inflammatory responses by reducing the phosphorylation of AKT, ERK, JNK, and NF-κB and the secretion of cascaded pro-inflammatory cytokines. Furthermore, the CJB extract reduced the production of ROS and RNS in a dose-dependent manner. Collectively, CJBs were effective in reducing PM10-induced lung damage by suppressing pulmonary inflammation, potentially owing to their anti-inflammatory and antioxidant properties. Therefore, there is an urgent demand to study their use in early interventions for respiratory diseases, specifically pneumonitis and COPD. *Keywords: Citrus junos* Tanaka; waste; by-product; particulate matter 10; pulmonary; inflammation
Categories	Food Chemistry & Ingredients

Board No.	27
Author Name	Johannes Magpusao
Organisation	University of the Philippines Visayas
Country	Philippines
Title	Health-promoting properties of microalgae Arthrospira sp. and Nannochloropsis sp. treated with high pressure homogenisation
Abstract Text	Microalgae are a promising food source rich in macronutrients and bioactive compounds that have nutraceutical potential. This research investigated the health-promoting effects of high pressure homogenisation (HPH)-treated microalgal suspensions by their antioxidant and total phenolic contents. The bioprotective potential of the gastrointestinal digests from the microalgal suspensions on oxidative-stressed Caco-2 cells was also evaluated. The results show that HPH had minimal and no clear effect on the in vitro protein digestibility for all the microalgal species. Increased homogenising pressure resulted to significantly higher pigment amounts in both Arthrospira and Nannochloropsis species. Arthrospira sp. had the highest phenolic contents without the impact of HPH while Nannochloropsis sp. had improved yield of phenolics with HPH treatment. Similarly, only Nannochloropsis sp. suspensions showed higher antioxidant activity at 900 bar treatment. Exposure of oxidative-stressed Caco-2 cells to HPH-treated gastrointestinal digests of Arthrospira sp. treated at 600 bar and 900 bar showed recovery and improved cell viability. This study shows the potential of HPH in enhancing the health-promoting properties of antioxidant compounds in Arthrospira sp. suspensions because of the bioprotective effect in the Caco-2 cells. In contrast, there was no observable significant bioprotective effect from the HPH-treated Nannochloropsis digests.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Indrawati Oey Organisation: University of Otago City: Dunedin Country: New Zealand Name: Biniam Kebede Organisation: University of Otago City: Dunedin Country: New Zealand

Board No.	28
Author Name	Lorraine Jane Sanchez
Organisation	Malayan Colleges Mindanao, A Mapúa School
Country	Philippines
Title	Effect of storage on the metabolite composition of goat whole milk powder using 1H-NMR fingerprinting
Abstract Text	In this study, the complex metabolite changes occurring in goat whole milk powder during storage have been monitored and potential biomarkers were selected. Through an untargeted nuclear magnetic resonance fingerprinting approach, it was found that adenosine triphosphate, galactose, glycerophosphocholine, and methionine were important indicators of shelf life changes of the samples stored at 20 °C for up to 44 weeks. The significant changes in these metabolites were determined by calculating the VID coefficients using the data derived from PLS-R models. The markers have negative VID values which signify decreasing concentration throughout storage. Adenosine triphosphate showed the highest correlation with storage time (VID value = -0.834). This compound is known to be an essential component in milk and its concentration has been linked with nutrition. Thus, chemical deterioration of this compound may indicate loss of nutritive value in the milk powder. Furthermore, other metabolites belonging in the carbohydrates and amino acids group also showed a significant decrease in concentration. This can be correlated to Maillard degradation which affects the flavour quality in milk. Overall, the chemical changes occurring in these metabolites can provide insights on the quality and shelf-life of goat whole milk powder.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Biniam Kebede Organisation: University of Otago City: Dunedin Country: New Zealand

Board No.	29
Author Name	Ojo Tolulope Ibukun
Organisation	Lagos State Polytechnic
Country	Nigeria
Title	The Development of a Thermo-Resistant Chocolate Partially Substituting the Cocoa Solids with Roasted (Whole and Defatted) African Walnut (Tetracarpidium Conophorum) Flour
Abstract Text	Thermo-resistant chocolate (TRC) is a term that has been used to describe chocolate which does not melt, holds its shape, or resists deformation at temperatures above the melting temperature of chocolate at 32degC – 33degC. The development and production of TRC would allow chocolates to be enjoyed in tropical climates. This study therefore aimed at producing and evaluating the melting points and organoleptic properties of milk chocolate from roasted African walnut flour. The roasted Cocoa beans nib, the roasted African walnut flour, cocoa butter, the low-fat milk, sugar and lecithin were mixed in accordance with specific recipes to produce homogenous mass of Chocolate. The powders were used in the formulation of eight different samples of chocolate mixes with 100% milk chocolate as a control. The melting point profile showed that the melting point of the chocolates ranged from 33.9degC & 36.6degC. There was no significant difference at ($p < 0.05$). The sensory evaluation showed that there were significant differences at ($p < 0.05$) among the samples. In conclusion, the substitution of the cocoa solid with whole and defatted roasted African walnut elevated the melting temperatures and substitution up to 20% was well preferred in terms of sensory characteristics.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Ogunmoyela Olugbenga Ben Organisation: Bells University of Technology City: Ota Country: Nigeria

Board No.	30
Author Name	Lee Fong Siow
Organisation	Monash University Malaysia
Country	Malaysia
Title	Effect of Selected Alternative Sweeteners on the physicochemical and sensory properties of dark compound chocolate
Abstract Text	Sucrose-free chocolate has been increasingly popular due to the raising health awareness of consumers for healthier choice food options. Sucrose substitution in chocolate is challenging owing to the multi-functionality of sucrose. This study aimed to determine the physical and sensory properties, and the storage stability of sucrose-free dark compound chocolate by replacing sucrose with inulin, fructo-oligosaccharides (FOS), trehalose, or maltodextrin (M10 and M30) on a volume basis along with stevioside as a sweetening agent. Sucrose substitution had no significant impact on the melting and crystallization behaviour in a compound chocolate model system. However, all sucrose-free dark compound chocolate displayed lower Casson viscosity, yield value and hardness than sucrose-containing dark compound chocolate, which may be due to the weaker particle-particle interaction in sucrose-free dark compound chocolate. Sucrose-free dark compound chocolate had lower sweetness and stronger bitterness compared to the sucrose compound chocolate. Trehalose was the most suitable sucrose replacer in dark compound chocolate among the sucrose alternatives because it resulted in dark compound chocolate of similar rheological and sensory properties as the sucrose-containing dark compound chocolate. The trehalose-containing dark compound chocolate also exhibited greater resistance to bloom formation after 12 weeks of storage.
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Other Authors	Name: Pei Yiin Lim Organisation: Monash University Malaysia City: Bandar Sunway Country: Malaysia

Board No.	31
Author Name	Ulfah Najamuddin Ambo Rappe
Organisation	The University of Queensland
Country	Australia
Title	Effect of pH, temperature, and extraction time on the extractability, nutritional, and antioxidant properties of rice bran protein
Abstract Text	The protein from rice bran is a potential alternative source of proteins that is non-allergenic and well balanced in amino acids. Isoelectric precipitation is a well-known technique for protein extraction, however, variability in the conditions of extraction and precipitation can alter the yield of protein. This study used heat-stabilised and defatted bran and aimed to optimise the isoelectric precipitation of protein from the bran by carrying out the method at different pH, extraction times, and temperatures to obtain the maximum extractability and quality. The results showed that pH and extraction times had significantly affected protein extractability, whereas extraction temperatures did not give any significant effect on either protein yield or protein recovery. Most of the essential amino acids such as tryptophan, isoleucine, phenylalanine, histidine, methionine, valine, and leucine were strongly correlated to pH change. For antioxidant properties, pH negatively correlated with ABTS value, while extraction time positively correlated with ABTS and TPC. This study of extraction and nutritional properties of protein extract from stabilised rice bran will support the information on how to produce highly nutritional and non-allergenic products from rice bran protein
Categories	Food Chemistry & Ingredients
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Board No.	32
Author Name	Wong Keat Yi
Organisation	Monash University Malaysia
Country	Malaysia
Title	Effect of inulin and polydextrose on the moisture sorption behavior and thermal properties of sucrose replacer mixture
Abstract Text	Today majority of consumers started to adopt healthier choices with reduced sugar, driving the development of sucrose-free dark compound chocolate. Sucrose replacement can be achieved by using sucrose replacers as a sweetening agent, aided with low digestible carbohydrate (LDC) polymers as a bulking agent in chocolate. To date, a suitable sucrose replacement that could mimic the rheology and texture of sucrose-made chocolate is not available. This might be attributed to the moisture absorption behavior being affected by the molecular structure of the sucrose replacer and LDC polymer. Therefore, this study aimed to determine the effect of LDC polymers, namely inulin or polydextrose, on the moisture sorption behavior and thermal properties of polyols, monosaccharides, or disaccharides by using moisture sorption isotherm and differential scanning calorimetry. The result showed that the addition of LDC polymers could significantly ($p < 0.05$) increase the hygroscopicity and reduce the melting temperature of the samples due to their amorphous nature and large molecular structure. The samples containing polyols or monosaccharides have absorbed moisture less than 5% by mass at aw of 0.65, indicating their potential to replace sucrose in dark compound chocolate, especially in highly humid tropical countries with an average relative humidity of 65% RH.
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Board No.	33
Author Name	Rowena Grace R. SANCHEZ
Organisation	Department of Food Science and Nutrition, College of Home Economics, University of the Philippines, Diliman
Country	Philippines
Title	Nutritional, Phytochemical Components and Antioxidant Capacity of Philippine Sweet Potato Varieties
Abstract Text	Sweetpotato is a highly nutritious commodity and is the sixth most important food crop in the world after rice, wheat, potato, maize and cassava. In the Philippines, numerous varieties of sweetpotato exists. This study aims to characterize the nutritional and phytochemical components and antioxidant capacity of 19 sweetpotato varieties developed and are being maintained by the Institute of Plant Breeding at the University of the Philippines in Los Baños and cultivated under identical environmental conditions and field management. The samples exhibited varying moisture levels (56.49-72.89%, wb), low fat content (0.25-0.62%, db), low ash content (2.31-3.83%, db) and moderate protein content (3.97-10.96%, db, F=6.25). Total flavonoids content (TFC) varied between 4.82 and 136.59 mg catechin equivalent (CE)/ 100g sample (db) while total phenolic content (TPC) varied between 22.90 and 168.49 mg gallic acid equivalent (GAE)/ 100g sample (db). Antioxidant Capacity expressed as ORAC values ranged between 631.70 and 5788.33 µmol Trolox Equivalent (TE)/ 100g (db). Total antioxidant capacity using DPPH assay ranged between 437.28 and 5741.65 µmol TE/ 100g (db). The cultivar which consistently exhibited the highest TFC, TPC and antioxidant capacity was the purple variety, SG-08-09-11.
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Board No.	34
Author Name	Cai Ling Ang
Organisation	Massey University and Riddet Institute
Country	New Zealand
Title	New generation â€˜clean-labelâ€™ starch and its potential in food applications
Abstract Text	Starch serves as an important additive to enhance the physico-chemical properties of many food products. With the increased pursuit of natural products, there is an increasing demand for “clean-label” starches. In our study, we modified waxy potato starch physically at elevated temperatures of 120–150 °C for 30 min at 300 rpm, in a pressurized reactor. The modified starch samples exhibited a wide range of rheological properties including Newtonian, shear-thinning, shear-thickening and anti-thixotropy behaviours. In particular, 120 °C-treated starch showed interesting shear-induced gelation. Such shear-induced properties can potentially be exploited in food applications where improved structure upon shearing is desired, *e.g.* in enhancing the stability of whipping cream. In addition, a synergistic increase in gel hardness was noted in whey protein isolate (WPI) gels made with 140 °C-treated starch, such behaviour was absent in the control sample. The effect of salt was also studied. Unique soft and creamy gels were obtained for WPI gels containing 140 °C-treated starch at NaCl concentrations ≥ 0.25 M. These findings indicate that structuring a wide spectrum of textural attributes can be achieved by applying the treated starch in various foods systems including high-protein soft foods suitable for dysphagia.
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Board No.	35
Author Name	Anne Katrine Laursen
Organisation	University of Copenahgen
Country	Denmark
Title	Non-melting cheese - understanding the effect of acidification temperature on the structure of heat and acid induced milk gels
Abstract Text	Heat and acid induced milk gels, produced by rapid acidification of milk with weak acids at temperatures above 60 °C, have non-melting properties making them interesting products to replace meat in traditional recipes. However, knowledge about milk-coagulation at elevated temperatures is scarce and the structure of the gels is not clearly understood. To modulate the texture, and support the development of novel non-melting gels, it is crucial to understand the influence of acidification temperature (60-90°C) and pH (5.2-4.6) on the gel structure at molecular level. The structure of the protein network, characterised by chemical bonds, was related to the calcium content, water distribution and fat holding capacity of the gels. Independent of acidification temperature and pH, the protein structure was governed by calcium interactions. Calcium retention in the gel increased with the temperature and was significantly higher at pH 5.2. For acidification to pH 4.6, at 60°C and 70 °C, electrostatic and hydrogen bonds also had an important contribution to the network stabilization. Water distribution in the gel, determined by LF-NMR, and fat retention showed that increasing acidification temperature affects water distribution and fat retention increased as the gel network became denser with increasing acidification temperature at pH 4.6.
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Board No.	36
Author Name	Siyao Liu
Organisation	The University of Melbourne
Country	Australia
Title	Alginate-based microspheres alter metabolic fate of encapsulated quercetin, promote SCFA production and modulate gut microbiota
Abstract Text	Using dietary fiber as an encapsulation material not only has the potential to enhance the colonic delivery but also could exert additional or synergistic effects with core material in the colonic site for greater therapeutical benefits. In this study, ALINCH microspheres were fabricated with alginate, inulin and chitosan coating for controlled release. ALINCH-E (empty), ALINCH-Q (quercetin loaded), unencapsulated quercetin and Blank (with no substrate added) were subjected to in vitro simulated colonic fermentation using pig fecal material as microbiota source. Biotransformation of quercetin was investigated using LC-ESI-MS, short chain fatty acid (SCFA) production by GC-FID, and modulating effects on microbiota by 16s rDNA sequencing. ALINCH-Q could alter the quercetin biotransformation towards higher production of 3-hydroxyphenylpropionic acid and 3-hydroxyphenylacetic acid. In addition, ALINCH-Q significantly promoted SCFAs production suggesting a synergism between dietary fiber matrix and quercetin. Furthermore, ALINCH-Q microspheres altered the alpha diversity, changed the longitudinal microbial compositions, and increased relative abundance of Lactobacillus, Turicibacter, Eubacterium, and Clostridium which are further found to be positively associated with SCFA or phenolic metabolites production, while inhibiting potentially pathogenic Enterococcus. These results suggest that ALINCH-Q could be served as a potential delivery vehicle for quercetin that can exert biological functions in gut.
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Board No.	37
Author Name	Huiling HUANG
Organisation	The University of Melbourne
Country	Australia
Title	Comparing methods to assess water holding capacity of fresh pork
Abstract Text	Determining the water holding capacity (WHC) of different pig muscles is important for yield and eating quality. Yet methods for measuring WHC have variable precision hence this study aims to compare different WHC methods. *Biceps femoris*, *Longissimus lumborum* and *Triceps brachii* muscles were collected from 10 carcases at 24-48h post-slaughter. WHC methods investigated include Honikel-drip, EZ-drip (both weight loss over time), purge (weight loss during 12-day storage), FP-weight (weight of fluid loss on filter paper, FP), cooking-loss (weight loss during cooking) and press-weight or press-area (both fluid loss during application of pressure). Honikel-drip, EZ-drip, purge, FP-weight and press-weight were highly correlated ($r=0.90$-0.60; $P<0.001$ for all). Press-area had lower correlations with other WHC measurements ($r=0.32$-0.55; $P<0.05$ for all) and was the least sensitive one to detect WHC differences between muscles. Cooking-loss was not correlated to any other WHC measurements ($P>0.05$ for all). Although cooking-loss had the lowest coefficient of variation (CV, 7.0%), it cannot be compared to other methods which were on raw muscles. Apart from that, the CV varied from 21% for purge loss to 41 % for EZ-drip. Overall, this study shows variations between different WHC methods and their suitability for determining WHC in raw and cooked muscles.
Categories	Food Chemistry & Ingredients

Board No.	38
Author Name	Marie Bless B. Galang
Organisation	University of the Philippines Los Baños
Country	Philippines
Title	Assessment of Anthocyanin Content and Antioxidant Capacity of Flours from Philippine Purple Sweetpotato Hybrid Varieties
Abstract Text	Flour particularly from anthocyanin-rich purple sweetpotatoes is very promising as it can be utilized as a natural colorant, source of bioactive compounds and can be used as a functional ingredient. This study is conducted to assess the qualities of flour using thirteen purple sweetpotato varieties, three of which are released varieties in the Philippines and ten newly developed hybrids. The anthocyanin content of the flours was determined by the pH differential method while the antioxidant property was assessed by DPPH (1,1-diphenyl-2-picrylhydrazyl) assay. The CIE L*, a*, b*value for color was also measured. The anthocyanin content ranged from 20.24 to 237.51 mg cyanidin-3-glucoside/100 g dried extract and DPPH radical scavenging capacity values ranged between 1.10 and 6.01 mg TE/g dried extract. Color L*, a*, b* values ranged from 45.26 to 75.75, 1.50 to 20.34, -7.73 to 15.19, respectively. These values are comparable to reported ranges from various, purple-colored crops. It has also been observed that there are hybrids of purple sweetpotatoes that have higher anthocyanin and antioxidant activity with better color than the released varieties, thus becoming a potential for variety selection for the utilization of purple sweetpotato flour production.
Categories	Food Chemistry & Ingredients
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Board No.	39
Author Name	Xu Chunyuhang
Organisation	NUS
Country	Singapore
Title	HPLC method development for quantification of the active compounds in Antrodia cinnamomea and related food supplements.
Abstract Text	Edible mushroom *Antrodia cinnamomea* is distinctive for its use in health supplement products in relieving of diverse health-related conditions. *A. cinnamomea* contains large number (> 30) of bioactive terpenoids and our research found only a few of them have anti-inflammatory activity. The better evaluate the quality of *A. cinnamomea* based dietary supplements, we isolated the key bioactive compounds chemicals isolated from *A. cinnamomea* were listed as benchmark compounds, namely, (25R)-Antcin A, Antcin K, Antcin B, (25R)-Antcin C, (25S)-Antcin C, (25R)-Antcin H, (25S)-Antcin H, 15α-Acetyl-dehydrosulphurenic acid, Versisponic acid D, and Eburicoic acid. A HPLC UV method was developed and validated for quantification of these compound simultaneously with high sensivity, linearity and range, precision, and accuracy. Our method allows better quality control of the highly priced *A. cinnamomea* food and nutraceutical products for the respective industry.
Categories	Food Chemistry & Ingredients

Board No.	40
Author Name	Lee Hui Wen
Organisation	Singapore Institute of Food and Biotechnology Innovation (SIFBI)
Country	Singapore
Title	Carotenoids, tocopherols and phylloquinone content of 26 green leafy vegetables commonly consumed in Southeast Asia
Abstract Text	Carotenoids, tocopherols and phylloquinone are highly valued in vegetables due to their potential health benefits. The profile of eight carotenoids, four tocopherols, and phylloquinone in 26 green leafy vegetables (GLV) commonly consumed in Southeast Asia were analysed by high-performance liquid chromatography with atmospheric pressure chemical ionisation and tandem mass spectrometry (HPLC-APCI-MS/MS). Lutein, β-carotene and α-tocopherol were the predominant carotenoids and tocopherol in the GLV. Among 26 GLV, sweet leaf bush contained the highest amount of total carotenoids (494 ± 22 μg/g fresh weight (FW)), tocopherols (214 ± 60 μg/g FW) and phylloquinone (18 ± 2 μg/g FW). Other underutilised GLV, including wolfberry leaves, cassava leaves and moringa leaves, are also a rich source of fat-soluble micronutrients. Overall, this study enhanced the understanding of micronutrient composition in underutilised GLV in Southeast Asia. Data will be important for diet recommendations to promote the nutritional status of the population in the region.
Categories	Food Chemistry & Ingredients

Board No.	41
Author Name	Conrad O. Perera
Organisation	The University of Auckland
Country	New Zealand
Title	Stability of added vitamin D3 in whole milk powder
Abstract Text	Vitamin D3 (VD3) is an essential nutrient that plays a significant role in many biochemical functions and its deficiency is now a global public-health problem. VD3 is synthesized in the body through exposure to sunlight, however, factors such as seasonal changes, high latitude, and aging impair this process. Since only a limited number of foods contain vitamin D, fortification has been practiced for a long time. A fatty vehicle like whole milk is a good target for fat-soluble VD3 fortification. VD3 levels are known to decline in fortified milk powders, which could be due to its degradation, although the exact mechanism is unknown. In this study, the influence of processing and storage conditions on lipid oxidation and VD3 degradation was studied. Simulated whole milk powders with and without heat treatment were stored for 12 months at two different storage temperatures. Stored samples without heat treatment showed higher lipid oxidation as analyzed by PV and TBARS values compared to those with heat treatment. The concentration of VD3 was also analyzed using UHPLC-MS/MS after PTAD derivatization. An inverse relationship was observed between lipid oxidation products and VD3 content. Previtamin D3 and VD3 oxidation products were quantified in stored samples using MRM analysis.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Maddy Dabir Organisation: The University of Auckland City: Auckland Country: New Zealand

Board No.	42
Author Name	Young-Bo Song
Organisation	Gachon University
Country	South Korea
Title	Production of different structures of highly branched Î±-limit dextrins by various microbial sources of glycogen branching enzymes
Abstract Text	The current study focused to regulate the inner branched structure of highly branched α-glucans (HBαG) by altering the microbial sources of glycogen branching enzyme (GBE) for creating the different types of macro-sized branched α-limit dextrins (α-LDx). As the microbial source of GBE was different, the fine structural properties of HBαG such as branching degree, and molecular weight were changed. Notably, the branched α-LDx, which were produced from HBαG by α-amylase treatment, presented the hyper branching degree (from 26.6 to 30.9%) and large molecular weight (from 1.07 x 106 to 1.86 x 107 g mol-1). Moreover, the glucose generation rate at mammalian α-glucosidase level was dramatically moderated by converting the HBαG into macro-sized and hyper branched α-LDx via α-amylase treatment because of their large molecular size with high branching density. The branched α-LDx with different fine structural properties can be considered as a way to design the tailor-made slowly digestible branched α-LDx.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Moon-Gi Hong Organisation: Gachon University City: Seongnam Country: South Korea Name: Byung-Hoo Lee Organisation: Gachon University City: Seongnam Country: South Korea

Board No.	43
Author Name	Suzana Caetano da Silva Lannes
Organisation	Pharmaceutical Sciences School / University of SÃ£o Paulo
Country	Brazil
Title	Mayonnaises with high protein content and natural preservatives
Abstract Text	The objective was to prepare mayonnaises with natural preservatives and high protein content. Three formulations were developed (70% fat and varying protein content): F1 (whey powder) did not reach the structural standards of commercial mayonnaise; F2 (skimmed milk powder) reached standards equivalent to commercialized products; F3 (whey powder + skimmed milk powder) light mayonnaise pattern; F0 (control). The results over the 30 days evaluation: aw (0.934-0.941); texture F1 (1,035 N ±0,026 - 0,566 N ±0,024), F2(4,255 N ±0,160 - 3,218 N ±0,060) and F3 (3,198 N ±0,086 - 1,700 N ±0,044). Garlic and mustard powders favored the color (ΔE: F1 (11.31 ±0.04), F2 (2.65 ±0.14), F3 (1.65 ± 0.22), and pH, ensuring the products' useful life of 30 days at 9 °C; DPPH showed the difference of the products with natural preservatives in relation to the control (F0), F3 was favored. Thixotropy was found in all samples. DSC presented exothermic peak in F1 (6°C - 7°C), F2 (5°C - 7°C) and F3 (3°C - 4°C), indicating faster crystallization of the F3 structure (lipid-protein bond) and the decay and lower curve values. Whey and powdered milk as emulsifying and garlic/mustard powders as ingredients were approved, increasing the shelf life of mayonnaise.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Tiago Colombo Soares Organisation: Pharmaceutical Sciences School / University of São Paulo City: São Paulo Country: Brazil Name: Antonio Simplicio da Silva Filho Organisation: Pharmaceutical Sciences School / University of São Paulo City: São Paulo Country: Brazil

Board No.	44
Author Name	Keono Kim
Organisation	Department of Food Science and Biotechnology, Andong National University
Country	South Korea
Title	Relationship between flavor attributes and chemical composition of different apple cultivars
Abstract Text	The present study investigated the relationship flavor attributes and chemical composition of different Korean apple cultivars (‘Gamhong’, ‘Yangwang’, ‘Hongro’, and ‘Fuji’). The sensory properties of apple fruits were assessed by hedonic perception and flavor descriptive profiling with consumers and trained panels, respectively. The sugar and organic acid contents of the fruits were determined by HPLC and the volatile profiling of the samples were analyzed using HS-SPME-GC-MS. The results showed that ‘Gamhong’ and ‘Fuji’ had higher overall liking score with high intensities of sweetness, sourness and apple, pineapple, and fruity flavors compared to the other apples ($p<0.05$). The positive flavor of apples could be associated with fructose, sucrose, and malic acid, as well as fruity volatiles including hexyl butyrate, butyl butyrate, and amyl acetate. However, ‘Hongro’ and ‘Yangwang’ had low intensity of sweetness and higher intensities of cucumber/moss attributes than other samples, which could contribute to low hedonic rating of apple fruit. The negative flavor of apples might be related with green/cucumber volatiles such as (E)-2-nonenal, 2-pentylfuran and octanol. The present study provides a better understanding of framework for the relationship of the chemical factors and the flavor attributes of different apple cultivars.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Ik-Jo Chun Organisation: Department of Horticulture and Breeding, Andong National University City: Andong, Gyeongbuk Country: South Korea Name: Chuleui Jung Organisation: Industry-Academy Cooperation Foundation, Andong National University City: Andong, Gyeongbuk Country: South Korea Name: Jeehye Sung Organisation: Department of Food Science and Biotechnology, Andong National University City: Andong, Gyeongbuk Country: South Korea

Board No.	45
Author Name	Samuel Park
Organisation	Department of Food Science and Biotechnology, Andong National University
Country	South Korea
Title	Flavonoid composition and antioxidant properties of different types of apple juices
Abstract Text	Apple juice has recently great attention due to high polyphenol content and the related antioxidant capacity for health benefits. The present study investigated the flavonoid composition and antioxidant properties of different apple juices (3 cold filling (CF), 2 not from concentrate (NFC), and 2 from concentrate (FC)) according to various manufacturing processes. The flavonoid composition of apple juice was determined by UPLC-MS/MS and antioxidant activities were evaluated by ferric reducing power assay and ABTS, and DPPH radical scavenging assays. The results showed that CF and NFC apple juice indicated significantly higher total phenolic and flavonoid contents than FC juice. The flavonoids compounds including procycanidin, (-)-epicatechin, (-)-epigallocatechin, hesperitin, kaempferol, luteolin, myricetin, and phlorizin were identified and quantified in the apple juices. Procyanidin (5.21±0.67~6.41±0.70 μg/100 mL) and -)-epicatechin (0.72±0.18~2.84±0.55 μg/100 mL) were significantly higher than other flavonoids in both CF and NFC apple juices. In addition, the NFC apple juice exhibited a strong antioxidant activitiy as a potential radical scavenger and ferric ion reducer. Therefore, these results suggest that CF and NFC apple juices could be considered as safe, functional, and fresh products for a healthy life.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Keup-rae Kim Organisation: Department of Food Science and Biotechnology, Andong National University City: Andong, Gyeongbuk Country: South Korea Name: Yeji Kwon Organisation: Department of Food Science and Biotechnology, Andong National University City: Andong, Gyeongbuk Country: South Korea Name: Jeehye Sung Organisation: Department of Food Science and Biotechnology, Andong National University City: Andong, Gyeongbuk Country: South Korea

Board No.	46
Author Name	Oni Yuliarti
Organisation	Singapore Polytechnic
Country	Singapore
Title	Hydrocolloid-starch composites to delay the in vitro glucose release of starch: rheological and textural study
Abstract Text	The global prevalence of diabetes mellitus has risen in recent years and pose a global health crisis.As functional ingredients, hydrocolloids have viscosity-building ability constituent that thickens in the digestive system, shown previously to reduce the absorption of digestible carbohydrates. In this study, the starch encapsulation ability of pectin (PE) and sodium alginate (SA) gels, mediated by calcium ions, was investigated to develop low glycaemic index active ingredients (AI). PE, SA and their combination were added to wheat flour (WF) to develop AIs with different compositions: 0% PE & SA, 2% PE alone, 2% SA alone, and 1% PE & SA. The AI physicochemical properties, such as proximate composition, colour, pasting and rheological properties were evaluated. Incorporation of PE and SA in WF appeared to suppress the pasting and rheological profiles of WF due to the presence of SA and PE gel network. In vitro results of wheat noodle incorporated with AIs showed a significant effect in delaying glucose release, where the degree of glucose release was dependent on AI types and starch encapsulation properties. Overall, the results showed that the starch encapsulation by hydrocolloids is a useful technique for reduction of starch digestibility, to lower glycaemic index of food.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Daryl Ho Zi Hao Organisation: Singapore Polytechnic City: Singapore Country: Singapore Name: Muhammed Tariq S/O Dawood Batcha Organisation: Singapore Polytechnic City: Singapore Country: Singapore Name: Bek Rui Min Organisation: Singapore Polytechnic City: Singapore Country: Singapore

Board No.	47
Author Name	Suzana Caetano da Silva Lannes
Organisation	Universidade de São Paulo
Country	Brazil
Title	Fortified chocolate by iron and nutritional oil
Abstract Text	The fortification of dark chocolate (58%) with microcapsules of iron and Brazil nut oil (spray dryer) was conducted and evaluated. Controll formulation, with microcapsules (5% and 10%) were analysed, respectively: Ash content (%) 1.635 ± 0.006c; 1.650 ± 0.005b; 2.104 ± 0.002a); pH (6.640 ± 0.106a; 5.747 ± 0.076b; 5.477 ± 0.057c); aw (0.490 ± 0.009a; 0.391 ± 0.011b; 0.310 ± 0.005b); color (L*: 22,82; 26,38; 28,94, a*: 10,83; 14,43; 14,60, b*: 6,970; 9,530; 10,76; WI: 21,75; 24,34; 26,69, ΔE*: 6,33); rheology: Casson viscosity (Pa.s) (1.805 ± 0.647; 4.695 ± 0.316; 4.697 ± 1.792), Casson yield value (Pa) (39.85 ± 15.23; 48.06 ± 3.167; 67.67 ± 2.864), thixotropy (Pa.s-1x10-3) (5.655 ± 0.714; 13.85 ± 0.063; 21, 69 ± 9.536); texture (N) (17.963 ± 0.702b; 21.660 ± 1.89ab; 24.460 ± 2.480a). DSC: melting point (°C) (19.265 ± 0.050a; 19.930 ± 0.240a; 20.670 ± 1.230a), caramelization point (°C) (187.555 ± 0.544a; 187.760 ± 0.750a; 188.900 ± 0.636a), carbonization point (°C) (227.630 ± 0.113c; 228.880 ± 0.198b; 229.955 ± 0.021a); iron determination: 0.02%; 0.13%; 0.15%. The results were consistent. Both formulations should be accepted by consumers for quality, innovation and nutritional value.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Beatriz Lopes de Sousa Organisation: Universidade de São Paulo City: Sao Paulo Country: Brazil Name: Paulo Henrique da Silva Santos Organisation: Universidade de São Paulo City: Sao Paulo Country: Brazil

Board No.	48
Author Name	Michael Murkovic
Organisation	Graz University of Technology
Country	Austria
Title	Characterization of hydrophobic cyclic peptides in linseed oil
Abstract Text	Linseed is a cultivar of a spring flowering annual plant Linum usitatissimum. Hydrophobic cyclic peptides isolated from linseed oil, better known as the cyclolinopeptides (CLPs), are of interest because of their influence on osteoclast differentiation, or having antimalarial, immunosuppressive, and anti-tumour activities. This study describes the detection, identification, and measurement of CLPs in the samples obtained from different linseed oil manufacturers. For the first time Orbitrap MS-HPLC as well as HPLC_DAD/FLD were used for CLPs identification and characterization. In addition, existing protocols used for CLPs extraction were optimized and improved. Finally, the stability and degradation of individual CLPs in the respective flaxseed oil were examined over a period of 60 days at different temperatures. Using HPLC-MS 12 CLPs were identified in total in the different flaxseed oils. Peptides characterization via HPLC-MS highlighted two types of CLPs profiles and distinctive properties would be the absence of some CLPs in the oil and substantial variation in the concentration of CLPs i ndifferent products. Among the identified CLPs, CLP-M and CLP-I were the least stable CLPS among the identified peptides; while CLP-C and CLP-A were the most stable.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Adnan Fojnica Organisation: Graz University of Technology City: Graz Country: Austria Name: Hans-Jörg Leis Organisation: Medical University of Graz, Department of Paediatrics and Adolescent Medicine City: Graz Country: Austria

Board No.	49
Author Name	Suzana Caetano da Silva Lannes
Organisation	Pharmaceutical Sciences School / University of SÃ£o Paulo
Country	Brazil
Title	Production of microcapsules with obtained and characterized nutritional oil
Abstract Text	The goal was to produce and evaluate the characteristics of microcapsules produced from an emulsion containing Brazil nut oil obtained and characterized as a base to introduce other ingredients, to transform it into a functional ingredient that could supply nutritional deficiencies when added in food products. Brazil nut oil was extracted (calculated the oil extraction yield) and characterized by nutritional and quality aspects (physicochemical quality, fatty acids profile, functional quality of the lipid fractions, triacylglycerol composition). Emulsion was produced by homogenization (maltodextrin, Arabic gum, distilled water, Brazil nut oil) and characterized (pH before and after resting, oscillatory rheology). Microcapsules were produced by *spray drying* and characterized (Bulk/tapped density, aw, free oil, moisture). Brazil nut oil demonstrated the good quality, conservation and suitability for food use and application in formulations of food products. The nutritional and functional pattern of the oil is related to the presence of essential fatty acids with broad functionality to human health. The predominance in the composition of TAGs were followed for ECN52 ECN 54. The findings were according to standards established by the literature for the analyzed products, demonstrating the microcapsules has potential applications in food products industrialization and commercialization.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Orquidea Vasconcelos dos Santos Organisation: Science and Health Institute / Federal University of Para City: Belém- PA Country: Brazil

Board No.	50
Author Name	Alicia Theng
Organisation	Singapore Institute of Food and Biotechnology Innovation
Country	Singapore
Title	Effects of reducing sugars on the flavour volatiles of yeast hydrolysates developed after Maillard reaction
Abstract Text	Yeast extracts are widely used as natural flavour enhancers due to their ability to produce roasted meat-like aromas after thermal treatments with flavour precursors. Nutritional yeast, rich in amino acids, is popular among consumers because it imparts a cheese-like aroma in foods. However, volatiles generated using nutritional yeast as a substrate for Maillard reaction and the capability of nutritional yeast to produce meat-like aromas have not been well-studied. This study aimed to investigate the effects of reducing sugars with nutritional yeast hydrolysates on the volatiles generated after Maillard reaction. Flavourzyme® was used for enzymatic hydrolysis of nutritional yeast. Hydrolysates were mixed with various concentrations of hexoses (glucose and fructose) and pentoses (xylose and ribose) for the Maillard reaction. Results showed that pentoses generated a greater variety and higher concentrations of volatiles than hexoses, notably in the production of furans, Strecker aldehydes, and sulfur-containing compounds i.e. dimethyl disulfide. However, hexoses also produced higher concentrations of pyrazines. Strecker aldehydes and pyrazines are key aroma compounds in generating meat flavours. Sulfur-containing compounds play a significant role in meat aroma due to their lower detection threshold. In conclusion, nutritional yeast may be used effectively to produce key volatiles contributing to meat-like aromas.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Jie Hong Organisation: Singapore Institute of Food and Biotechnology Innovation City: Singapore Country: Singapore Name: Christiani Jeyakumar Henry Organisation: Singapore Institute of Food and Biotechnology Innovation City: Singapore Country: Singapore

Board No.	51
Author Name	Eunsu Song
Organisation	Myongji University
Country	South Korea
Title	Anti-oxidant activity and hyaluronic acid production of Xanthium Strumarium L. fruit extract.
Abstract Text	*Xanthium strumarium* L. (XS) has been traditionally used as an herbal medicine to treat nasal sinusitis, headache, and arthritis due to its bioactive compounds such as glycosides, phytosterols, and phenolic acids. Although XS has shown its bioactivities such as analgesic, antibacterial, and anti-inflammatory effects in many studies, there is no study focusing on production and degradation of hyaluronic acid, which consists of extracelluar matix molecules and plays an important role in wound healing and skin barrier. The aim of this study is to investigate the anti-oxidant and anti-inflammatory effects and hyaluronic acid production of XS fruit extract from different origins. Chlorogenic acid and ß-sitosterol are the main phenolic acid and phytosterol in both of origins, respectively. However, xanthatin was detected only in XS fruit from Korea (XS-K). XS-K showed significantly higher anti-oxidant activity than XS-C based on comparative methods of DPPH, ABTS and FRAP. Treatment with both XS-K and XS-C extract induced mRNA levels and contents of hyaluronic acid as well as mRNA levels of hyaluronic acid synthase-2 in dose-dependent manner in human dermal fibroblast. Collectively, our findings support that XS fruit extract could be a potential skin protective agent by its anti-oxidant capacity and synthesis of hyaluronic acid.
Categories	Food Chemistry & Ingredients

Board No.	52
Author Name	Wang Rong
Organisation	Singapore Institute of Technology
Country	Singapore
Title	Investigation of Cracking in Frozen Steamed Pau
Abstract Text	Pau is a popular type of steamed bun in the Asian cuisine. It is typically packed as a frozen product. However, it was frequently reported that the pau surfaces cracked after storage. In this study, the phenomenon of cracked pau was investigated. Pau (*shoutao*) filled with lotus seed paste was used. The pau was subjected to a series of treatment: chilled for 1, 4, and 7 days followed by frozen storage, over which freeze-thaw process was applied respectively for 0 to 3 cycles. At a fixed interval, the level of resistant starch (RS3) was measured. Results showed that RS3 increased with the increase of storage duration (4°C). Cracks on the pau's surface occurred and increased from 12.5% (1 Day) to 37.5% (7 Days). Under an extreme treatment (5 freeze-thaw cycles in two weeks), the intensity increased to 75%. Image analysis indicated the formation of ice crystals, and larger crystals were observed as the cracks intensified. In short, the cracking was caused by the ice formation (under prolonged frozen storage) and starch retrogradation (under prolonged refrigeration storage (4^{o}C)). To avoid this issue, it is recommended to minimize temperature fluctuation during transport and storage, or to incorporate a cryoprotectant in the product.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Wong Shin Yee Organisation: Singapore Institute of Technology City: Singapore Country: Singapore Name: Ong Si Pei Organisation: Singapore Institute of Technology City: Singapore Country: Singapore

Board No.	53
Author Name	Alexandra Obenewaa Kwakye
Organisation	United Graduate School of Agricultural Sciences, Ehime University
Country	Japan
Title	Effects of Rare Sugar D-Allulose on the Physical Properties of Starches from Different Botanical Sources
Abstract Text	D-allulose (a low-caloric rare sugar) has currently gained interest in the food industry due to consumers' demand for healthier, sustainable food options. From previous studies, D-allulose suppressed an increase in gelatinization temperature of glutinous rice flour while retarding recrystallization. D-allulose also improved the texture of food gels including rice flour. However, there is limited information on its effect when applied to starch gels from different botanical sources. The addition effect of D-allulose on the physical properties of potato, wheat, tapioca, corn, and rice starch gels was compared to those of glucose, fructose, and sucrose. D-allulose caused a minimum increase in the gelatinization temperatures of all the different starches. The addition of different sugars lowered the water activity of all the starch gels, with D-allulose being lower than sucrose but higher than fructose and glucose. D-allulose suppressed recrystallization in rice starch gel while accelerating it in potato, wheat, and corn at 4â °C storage. Also, D-allulose-containing starch gels had the lowest rigidity at 25â °C storage. The results suggested that D-allulose had the least effect on starch gelatinization and was most effective in suppressing the hardening of starch gels at 25â °C storage, compared to the other sugars.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Kazuhiro Fukada Organisation: Graduate School of Agriculture, Kagawa University City: Miki-cho Country: Japan Name: Masahiro Ogawa Organisation: Graduate School of Agriculture, Kagawa University City: Miki-cho Country: Japan

Board No.	54
Author Name	Sarafhana Dollah
Organisation	Malaysian Palm Oil Council
Country	Malaysia
Title	Trans-free shortenings from palm-based fat formulations
Abstract Text	Shortenings are fat from any sources that are solid at room temperature. Shortenings are widely used in the baking industry as a tenderizer which gives texture and mouthfeel for baked products. Without shortenings, baked products will become hard and tough when chewed due to the adhesion of the gluten and starch particles. In addition, shortening in pastry and cakes takes its role in entrapping air during mixing, enhancing the texture and prolong the shelf life of the final products. Shortenings are also suitable for frying applications because they allow for quick and uniform heat transfer. Palm stearin (PS) is a very useful source of fully natural hard fat for shortening formulation. PS is dominated by high melting triacylglycerols and is used as solid stock not only for shortening but also for the formulation of margarine and vanaspati. The issue of trans fatty acid makes hydrogenated fats undesirable. Palm products especially PS is the best replacer for those hydrogenated vegetable oils which it does not contain trans fatty acid. Hence, the objective of this paper was to discuss the physicochemical properties of palm fats and its advantages over partially hydrogenated fats for shortening formulation.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Ruslan Abdullah Organisation: Malaysian Palm Oil Council City: Petaling Jaya Country: Malaysia

Board No.	55
Author Name	Sang Hoon Lee
Organisation	Korea University
Country	South Korea
Title	Active Compound and Anti-inflammatory Activity of the Sword Bean (Canavalia gladiata (Jacq.) DC.) Pod extract in Ovalbumin-induced Lung Inflammation
Abstract Text	Immatured sword bean pod (ISBP) has been used as food ingredient and medicinal herb in East Asia. However, there have been few studies of the active components and physiological activity according to the extraction methods. For comparative analysis, ISBP was extracted with hot water and different concentrations of ethanol. A major indicatory compound was confirmed to be rutin which was highest at 30% ethanol extract. In antioxidant activity (DPPH and ABTS), total polyphenol, and total flavonoid contents of 30% extract was the highest value in other extraction materials. Therefore, 30% ethanol extract was used as the optimal extract. As a result of RAW264.7 cells induced with lipopolysaccharide (LPS) through the selected ethanol extract, the anti-inflammatory effect of ISBP was confirmed. Moreover, the nitric oxide production was suppressed in a dose-dependent in RAW 264.7 cells. Ovalbumin (OVA)-sensitized BALB/c mice were orally pretreated with ISBP before aerosol inhale. Upon ISBP treatment, the protein expression of p-ERK and p-JNK was more suppressed than the OVA group. This concerned that the expression of inflammatory cytokines may be regulated through the MAPK pathway. This study would provide useful information for using ISBP as a functional food material.
Categories	Food Chemistry & Ingredients

Board No.	56
Author Name	Saurel
Organisation	L'institut Agro Dijon
Country	France
Title	Does globulin composition influence surface properties of pea proteins ?
Abstract Text	Oliete, B.[1], Pereira, L.[1], Le Signeur, C.[2], Aimé, D.[2], Gallardo, K.[2], Saurel, R.[1]* [1] Université Bourgogne Franche-Comté, Institut Agro Dijon, PAM UMR A 02.102, F-21000 Dijon, France [2] Agroécologie, CNRS, INRAE, Pôle GEAPSI – Equipe FILEAS F-21000 Dijon, France Peas (*Pisum sativum* L.) are an interesting protein source due to its environmental, economic and nutritional characteristics. Globulins, the majority of pea proteins, are classified into 7S (vicilins and convicilins) and 11S (legumins) types according to their sedimentation coefficient. Differences in composition and structure among globulin types, may determine different physicochemical features and surface properties. In this work we studied the influence of 7S and 11S globulins on the physicochemical behavior of proteins and on their surface properties. Nine different pea varieties were classified according to their 7S/11S ratio into three different groups (3 varieties/group): low 7S/11S ratio (0.83 – 0.93), equilibrated 7S/11S ratio (1.33 – 1.39), and high 7S/11S ratio (1.72 – 1.92). Different pH and ionic strength were also analyzed. Surface tension was positively correlated with charge and surface hydrophobicity, and negatively correlated to solubility. Different behavior in surface properties was observed among groups and environmental conditions (pH – salt). Low 7S/11S ratio group showed the highest surface tension compared to the other groups, and high 7S/11S ratio group showed higher charge than the other two groups at pH 3. The analysis of a higher number of pea varieties will reveal interactions between protein composition and physicochemical and surface properties.
Categories	Food Chemistry & Ingredients

Board No.	57
Author Name	Saurel
Organisation	L'institut Agro Dijon
Country	France
Title	Colloidal interactions between pea globulins and purified egg white proteins
Abstract Text	**Colloidal interactions between pea globulins and purified egg white proteins** Jian KUANG[1,2], Rémi SAUREL[2], Valérie LECHEVALIER[1] 1 INRAE, Institut Agro Rennes, STLO, F-35042, Rennes, France 2 Univ. Bourgogne Franche-Comte, Institut Agro Dijon, UMR PAM A02.102, F-21000 Dijon, France, Corresponding author: remi.saurel@agrosupdijon.fr Partial substitution of animal protein by plant proteins is a new challenge in food formulation. In the present work, in order to demonstrate the interactions and association in mixed systems, aqueous suspensions of low denatured pea globulins (PPI) were prepared in admixture with purified egg white proteins (ovalbumin (OVA), ovotransferrin (OTA), and Lysozyme (LYS)). The aqueous mixtures were studied at pH 7.5 and pH 9 by isothermal titration calorimetry (ITC), zeta potentiometry, dynamic light scattering (DLS), laser granulometry, confocal laser scanning microscopy (CLSM) and optical microscopy. ITC demonstrated strong exothermic interactions of the mixture of PPI-LYS at both pH. In contrast, weak interactions were observed for PPI-OTA system at both pH and PPI-OVA system at pH 7.5. No interaction was detected in PPI-OVA system at pH 9. Zeta potential data showed that net positive charge of lysozyme promoted electrostatic interactions with negative charges of pea globulins. Furthermore, DLS and laser granulometry showed that the particle size of mixture increased with increasing LYS to PPI ratio up to 20-25 µm. In addition, the CLSM and optical microscopy images revealed that PPI-LYS system formed irregular aggregates as a function of molar ratio of LYS to PPI.
Categories	Food Chemistry & Ingredients

Board No.	58
Author Name	Clarence D. Sabocojan
Organisation	University of the Philippines Diliman
Country	Philippines
Title	Comparison of ABTS and DPPH Assays in Estimating the Total Antioxidant Capacity of Lemongrass (Cymbopogon citratus) Leaves
Abstract Text	Lemongrass has recently gained attention in ready-to-drink beverages due to its perceived health benefits and its potential as a natural antioxidant source in the food industry. Due to the complex mechanisms of antioxidants and the diversity of test conditions found in literature, assays need to be evaluated for fitness depending on their specific application. This study compared the ABTS and DPPH assays in estimating the Total Antioxidant Capacity (TAC) of lemongrass methanolic extracts. Both assays showed good linearity ($r^2 > 0.95$) with acceptable degrees of accuracy (80-120 % Trolox recovery), precision (RSD < 5%), and sensitivity (LOD, LOQ). The DPPH assay showed lower detection and quantitation limits while ABTS had high % Trolox recovery values, suggesting a possible lack of specificity for the ABTS assay. Although the TAC for lemongrass was significantly higher ($p < 0.05$) in DPPH, the ABTS assay showed a significantly higher ($p < 0.05$) % Scavenging Activity (% SA). This suggests that there may be compounds exhibiting ABTS radical scavenging activity but do not show DPPH activity. The Total Phenolic Content (TPC) showed a significant correlation ($p < 0.05$) with the TAC measured using the ABTS assay, but not with DPPH. No significant correlations were found between TPC and % SA.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Abigail S. Rustia Organisation: University of the Philippines Diliman City: Quezon City Country: Philippines

Board No.	59
Author Name	Jung A Ko
Organisation	Korea University
Country	South Korea
Title	Analysis of compositional changes in Katsuobushi during the smoking process using FT-IR, NIR spectroscopy and chemometrics
Abstract Text	Katsuobushi is made by repeated smoking and drying of boiled, deboned fillets of skipjack tuna. The quality of katsuobushi is determined by the ingredients changed during the smoking process. Therefore, in this study, samples of katsuobushi smoked 0, 3, 6, 9, 12 times were collected and investigated using infrared spectroscopy (ATR-FTIR, NIR), which is a quick and simple non-destructive analysis method. FT-IR and NIR spectral data were obtained for all samples, the raw spectra were normalized, baseline corrected and smoothed using Savitzky–Golay derivative function (SG). The discrimination of samples was achieved by using multivariate statistical analysis including principal component analysis (PCA), Hierarchical cluster analysis (HCA), and Partial Least Squares Discriminant Analysis (PLS-DA). All samples were classified according to smoke level by PCA, HCA, PLS-DA. The results of the study showed that ATR-FTIR and NIR spectroscopy techniques combined with chemometrics can be used to distinguish the quality of katsuobushi according to smoking.
Categories	Food Chemistry & Ingredients

Board No.	60
Author Name	Pattarasuda Rawiwan
Organisation	School of Chemical Sciences, The University of Auckland
Country	New Zealand
Title	Potential of selenium-enriched radish leaf protein as an alternative protein
Abstract Text	Given the demand for alternative proteins, the underutilized biomass could be upcycled into a sustainable food ingredient. A considerable amount of protein can be recovered from leaf wastes that are generated from food processing. Despite its limited use, leaf protein has been of interest for its nutrition and bioactivity for decades. However, very few research has been focused on leaf protein from selenium-enriched crops. In this study, protein extracted from Se-enriched radish leaf was assessed for its functional properties and selenium profiling. Se-enriched radish leaf protein (Se-RaLP) showed foaming and emulsifying properties similar to amaranth protein across a pH range of acidic and alkaline. More importantly, the presence of organic and inorganic selenocompounds in Se-RaLP and its gastrointestinal digest resulted in higher in vitro antioxidant activity than in their non-enriched counterpart. Based on the findings, Se-biofortification on crops could be a strategy for producing a sustainable protein with potentially superior health benefits while also addressing adverse health risks associated with Se deficiency.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Christian Hartinger Organisation: School of Chemical Sciences, The University of Auckland City: Auckland Country: New Zealand Name: Yongchuan Gu Organisation: Auckland Cancer Society Research Centre City: Auckland Country: New Zealand Name: Jiqian Xiang Organisation: Enshi Tujia & Miao Autonomous Prefecture Academy of Agricultural Science City: Enshi Country: China Name: Siew Young Quek Organisation: School of Chemical Sciences, The University of Auckland City: Auckland Country: New Zealand

Board No.	61
Author Name	Heeyoon Shin
Organisation	Kyungsung University
Country	South Korea
Title	Effect of roasting on the bioactive compounds and antioxidant activity of chicory root
Abstract Text	This study was aimed to evaluate the effect of roasting on the bioactive compounds and antioxidant activity of chicory root. Dried chicory root (DCR) was roasted at 200°C for 15 min to prepare the roasted chicory root (RCR). DCR and roasted chicory root (RCR) were extracted with various concentrations of ethanol (60, 80, and 100%) and distilled water. In the results, 100% ethanol extract of RCR showed the highest polyphenols contents (112.434 mg gallic acid equivalent/100 g). However, the flavonoids contents were not significantly different between DCR (13.591 mg catechin equivalent/100 g) and RCR (13.252 mg catechin equivalent/100 g). The highest radical scavenging activity was also found in 100% ethanol extract of RCR. In addition, a total of 46 phenolic compounds, including cyanidin, chlorogenic acid, and kaempferol-7-O-rutinoside, were tentatively identified in RCR, however, a total 30 phenolic compounds were found in DCR. These results suggested that roasting process in chicory root enhances antioxidants' content and antioxidant capacity.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Minguen Jin Organisation: Kyungsung University City: Busan Country: South Korea Name: Yoonjeong Kim Organisation: Kyungsung University City: Busan Country: South Korea Name: Jiye Pyeon Organisation: Kyungsung University City: Busan Country: South Korea Name: Younghwa Kim Organisation: Kyungsung University City: Busan Country: South Korea

Board No.	62
Author Name	Heeyoon Shin
Organisation	Kyungsung University
Country	South Korea
Title	Effect of blanching on water-soluble vitamins, bioactive compounds, and antioxidant activity of commonly consumed edible mushrooms in Korea
Abstract Text	This study investigated the effect of blanching on the contents of water-soluble vitamins, bioactive compounds, and antioxidant activities in fourteen commonly consumed mushrooms in Korea. In the results, the contents of vitamin B group were decreased or no difference after blanching except for *Grifola frondosa, Pleurotus eryngii*, *Pleurotus ferulea,* and *Pleurotus ostreatus*. In particular, the vitamin B5 and vitamin B6 contents were greatly decreased by 78% (*Sparassis crispa)* and 25% (*Pleurotus ostreatus)*, respectively after blanching treatment. The biotin content in most of the mushrooms was decreased with blanching as compared to uncooked except for *Grifola frondosa*. The folic acid content of all the samples was reduced by 50% after blanching, and vitamin C was not detected in all mushrooms. In addition, the contents of ergothioneine, polyphenols and flavonoids were decreased by blanching treatment, however, there was no difference in total glucan content. Also, the free radical scavenging activities were lower in blanched mushrooms compared to raw mushrooms. Taken together, the blanching treatment led to a decrease in the content of selected water-soluble vitamins and functional components versus the corresponding raw mushrooms.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Yoonjeong Kim Organisation: Kyungsung University City: Busan Country: South Korea Name: Youngmin Choi Organisation: National Institute of Agricultural Sciences City: Wanju Country: South Korea Name: Younghwa Kim Organisation: Kyungsung University City: Busan Country: South Korea

Board No.	63
Author Name	Mingeun Jin
Organisation	Kyungsung University
Country	South Korea
Title	Effects of domestic cooking on biotin content in agricultural products in Korea
Abstract Text	In this study, changes in biotin content of agricultural products according to domestic cooking methods (boiling, steaming, blanching, or roasting) were investigated. Biotin contents were determined by using immunoaffinity column in conjunction with high-performance liquid chromatography. Biotin contents were decreased in all the legumes after cooking. Raw soybean (yellow bean) showed the highest biotin content (9.913 μg/100 g) in the legumes, however, the content was decreased to 5.291 μg/100 g after boiling. The biotin contents in nuts were decreased after boiling, however, increased after roasting and steaming. In root vegetables, the biotin contents were decreased in all the samples after cooking. The contents of biotin in all the leafy vegetables were decreased with cooking as compared to uncooked leafy vegetables. Especially, the greatest decrease of biotin was observed in dried bracken after boiling (64%). In most of the fruit-vegetables, the biotin contents were decreased after blanching except for Daejeo tomato and black tomato. Taken together, our data provide reliable data on the biotin contents of frequently consumed agricultural products in Korea.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Jiye Pyeon Organisation: Kyungsung University City: Busan Country: South Korea Name: Heeyoon Shin Organisation: Kyungsung University City: Busan Country: South Korea Name: Yoonjeong Kim Organisation: Kyungsung University City: Busan Country: South Korea Name: Younghwa Kim Organisation: Kyungsung University City: Busan Country: South Korea

Board No.	64
Author Name	Hyo su Choi
Organisation	Korea university
Country	South Korea
Title	Purification and identification of antioxidant peptides derived from milk casein fermented with Lactobacillus gasseri KML39
Abstract Text	The aim of this study was to separate and identify bioactive peptides found in milk casein through microbial fermentation with *Lactobacillus gasseri* KML39. The biological activities were determined by the ferric reducing antioxidant power assay (FRAP), 2,2-diphenyl-1-picrylhydrazyl radical scavenging activity (DPPH) and 2,2′-azino-bis (3-ethylenzothiazoline-6-sulfonic acid) diammonium salt (ABTS). In a previous study, functional properties of fermented milk casein with three *Lactobacillus* strains, such as anti-oxidation and proteolytic activity were evaluated and KML39, which exhibited the highest antioxidant activity among these strains, was selected. Then, its peptide fractions were separated by preparative reversed phase liquid chromatography. A total of fifteen fractions were collected, and their antioxidant activities were measured. Four fractions (10, 12, 14, 18 min) showed the relatively higher biological activities. Further sequence analysis of the bioactive peptides was carried out using MALDI-TOF/MS/MS, six peptide sequences were identified from four fractions. Moreover, Peptide sequences were profiled by database search and most peptides originated from β-casein , followed by αs1-casein and κ-casein. In particular, two peptides(VPYPQRD, RELEE LN), which were mainly derived from β-casein, were newly identified in this study. Therefore, these findings suggest the bioactive peptides released through fermentation with KML39 improve the antioxidant activity of the fermented milk casein.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Hyun jin Bae Organisation: Korea university City: Sejong Country: South Korea Name: Nam su Oh Organisation: Korea university City: Sejong Country: South Korea

Board No.	65
Author Name	Jin Hwan Kim
Organisation	Dept. food and biotechnology, Korea university
Country	South Korea
Title	Screening of Isolated Potential Probiotic Lactic Acid Bacteria for Bioavailability of Dietary Phenolic compounds
Abstract Text	Phenolic compounds have been extensively researched for their beneficial properties such as antioxidative, neuroprotective and anti-inflammatory activities. 3-o-caffeoylquinic acid, epigallocatechin-3-gallate are the most abundant hydroxycinnamic acid and flavan-3-ols enriched in plant and large variety of food, respectively. In this study potential probiotic lactic acid bacteria were investigated for their hydroxycinnamic acid and flavan-3-ols metabolic activities. A total of 43 *Lactobacillus* strains from infant feces and fermented foods were assessed for their acid and bile tolerances. Furthermore, antioxidant activities of lactic acid bacteria were determined by measuring radical scavenging activity and reducing power. 15 strains showed that relatively higher antioxidant activities, then hydroxycinnamoyl esterase mediated biotransformation of 3-o-caffeoylquinic acid by lactic acid bacteria during fermentation was evaluated HPLC-ESI-MS/MS. Initially, 7 isolates(*L.gasseri* IM13, IR11, IR13, and IM07, *L.reuteri* IM17 and IR02, *L.fermentum* IM38) metabolized 3-o-caffeoylquinic acid, but the enzyme responsible for reducing hydroxycinnamic acids to caffeic acid was only characterized in *L.reuteri* strains (IM17 and IR02). Subsequently, 2 isolates(*L. rhamnosus* IM19 and *L. plantarum* DM15) exhibited the metabolism of galloylated catechins for releasing epigallocatechin and gallic acid from epigallocatechin-3-gallate.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Ji Seung Han Organisation: Dept. food and biotechnology, Korea university City: Sejong Country: South Korea Name: Nam Su Oh Organisation: Dept. food and biotechnology, Korea university City: Sejong Country: South Korea

Board No.	66
Author Name	Gilda Melanie O. Babaran
Organisation	University of the Philippines Los Banos
Country	Philippines
Title	Biocompounds and antioxidant attributes of bignay [Antidesma bunius (L.) Spreng] pomace as affected by drying methods
Abstract Text	Exploring the functional properties of *bignay* [*Antidesma bunius* (L.) Spreng] pomace is gaining interest since it involves the utilization of food processing by-products, thereby decreasing food waste. Reducing the moisture content of fresh pomace can prolong its shelf stability, but at the same time, the drying method must preserve its inherent desirable components. The bioactive compounds and antioxidant attributes of bignay pomace as influenced by drying methods were evaluated. The samples were processed using a convection oven dryer and a freeze dryer. Samples were analyzed based on its bioactive components (total phenolic, total flavonoid, total anthocyanin, condensed tannins) and antioxidant properties (DPPH$^{â— }$ scavenging activity, ferric reducing antioxidant power, ABTS$^{â— +}$ scavenging activity), along with an unprocessed (fresh) sample as control. Results showed that freeze drying resulted in significantly higher antioxidant capacity than cabinet-drying (DPPH: 1574.63mg vs. 1243.06mg TE×100g^{-1}; FRAP: 2142.51mg vs. 1578.54mg TE×100g^{-1}; and ABTS: 2207.91mg vs. 1648.33mg TE×100g^{-1}). Freeze-drying of *bignay* pomace also resulted in higher levels of bioactives than convection oven-drying (total phenolics: 1741.71mg vs. 1272.17mg GAE/100g^{-1}) and total anthocyanin content (496.01mg vs. 222.98mg cyanidin-3-glucoside eq 100g^{-1}). Hence, freeze-drying was found to be a better drying strategy to preserve the bioactives and antioxidant properties of *bignay* pomace.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Claire S. Zubia Organisation: University of the Philippines Los Banos City: Los Banos, Laguna Country: Philippines Name: Florencio C. Reginio Jr. Organisation: University of the Philippines Los Banos City: Los Banos, Laguna Country: Philippines Name: Lotis E. Mopera Organisation: University of the Philippines Los Banos City: Los Banos, Laguna Country: Philippines Name: Katherine Ann T. Castillo-Israel Organisation: University of the Philippines Los Banos City: Los Banos, Laguna Country: Philippines Name: Sheba Mae M. Duque Organisation: University of the Philippines Los Banos City: Los Banos, Laguna Country: Philippines

Board No.	67
Author Name	Wang Xiang
Organisation	Department of Food Science and Technology, National University of Singapore
Country	Singapore
Title	Structure-activity relationship (SAR) of flavones on their anti-inflammatory activity
Abstract Text	Flavones, found in various fruits and vegetables, benefit human health by their anti-inflammatory activity, yet their structure-activity relationship is not clear. Herein, we selected 15 flavones with the same backbone but different substituent patterns, and systematically assessed their anti-inflammatory activities on RAW 264.7 cell model in regard to cellular-Src kinase (c-Src) affinity, suppression activity of IκBα phosphorylation, inhibition of nitric oxide (NO) production, inducible nitric oxidase (iNOS) biosynthesis, and downregulation of genes related to pro-inflammatory cytokines interleukin-6 (IL-6), interleukin-1 beta (IL-1β), and tumor necrosis factor-α (TNF-α). Our results indicated that the double bonds between C2-C3, hydroxyl substituents on C3′ and C4′ promoted while hydroxyl group on C5′ and methoxy group on C4′attenuated the overall anti-inflammatory and antioxidant activities. Hydroxyl groups at other backbone carbon positions showed more complicated functions on different key nodes in inflammation cascade on top of their radical scavenging activity. Our work established the relationship between flavones' structure and their anti-inflammatory activity *in vitro* and provide important scientific support for the potential application of flavonoid aglycones as active constituents in fruits, vegetables, and herbal teas.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Cao Yujia Organisation: Department of Food Science and Technology, National University of Singapore City: Singapore Country: Singapore Name: Chen Siyu Organisation: Department of Food Science and Technology, National University of Singapore City: Singapore Country: Singapore Name: Lin Jiachen Organisation: Department of Food Science and Technology, National University of Singapore City: Singapore Country: Singapore Name: Yang Xin Organisation: Department of Food Science and Technology, National University of Singapore City: Singapore Country: Singapore Name: Huang Dejian Organisation: Department of Food Science and Technology, National University of Singapore City: Singapore Country: Singapore

Board No.	68
Author Name	Hang Liu
Organisation	National University of Singapore
Country	Singapore
Title	Protective effects of lutein against widescreen phone light-induced damages in 3D retinal pigment epithelial model
Abstract Text	Accumulative damages from screen light to retinal pigment epithelium (RPE) could induce age-related macular degeneration and cause blindness, and these injuries might be alleviated by the carotenoids, including lutein and zeaxanthin, presented in the human retina. This work applied a scaffold-based tissue engineering method to build 3D *in vitro* RPE models. The damages caused by widescreen phone light exposure (800 lux) on the 3D RPE models were evaluated. After exposure of 6 hours, the RPE monolayer cells significantly increased the production of reactive oxygen species (ROS) as reflected by the redox-sensitive molecular fluorescent probe. The presence of oxidative stress led to apparent cytotoxicity and inhibited cell metabolism. Pre-treatment (12 hours) of the cells with lutein (0.5 μM) reduced cellular ROS level and increased cell viability level. Moreover, the retinal protective effects of lutein against screen light damages were confirmed through testing the important RPE function and characteristics, including phagocytosis, permeability, and transepithelial electrical resistance. Taken together, these results showed that sufficient carotenoids in the retina are important to protect RPE from widescreen phone light-induced damages. Our model can be used for the evaluation of other antioxidants for their effectiveness in the protection of light-induced damages by cell phones.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Yanan Chen Organisation: National University of Singapore City: Singapore Country: Singapore Name: Renwei Chen Organisation: National University of Singapore City: Singapore Country: Singapore Name: Dejian Huang Organisation: National University of Singapore City: Singapore Country: Singapore

Board No.	69
Author Name	Cao Yujia
Organisation	National University of Singapore
Country	Singapore
Title	Assay-guided elucidation of anti-inflammatory compounds and their action mechanisms of papaya leaves
Abstract Text	*Carica papaya* leaves have long been used as folk herbal tea for effective treatment of dengue fever, a tropical inflammatory condition caused by virus infection via mosquitoes, but the scientific principle was not clear. Several *in vitro* and *in vivo* studies confirmed the anti-inflammatory effects of papaya leaves crude extracts, however, indispensable anti-inflammatory bioactive components in papaya leaves have not yet been fully elucidated. To fill the research gap, we utilized cell based anti-inflammatory assay as guide in rapid fractionation and identification of the anti-inflammatory phytochemicals. Fresh papaya leaves juice was extracted with hexane, diethyl ether, ethyl acetate, n-butanol sequentially and tested their nitrite oxide (NO) inhibitory effects on lipopolysaccharides (LPS)-stimulated murine macrophage RAW 264.7 cell line. Compound identification was carried out using analytical techniques including liquid chromatography hybrid quadrupole time-of-flight mass spectrometry (LC-qToF-MS). Some flavonoids and alkaloids unique to papaya leaves were tentatively identified in active fractions and were likely responsible for the anti-inflammatory effects of papaya leaves. The action mechanisms of the isolated alkaloids were investigated by molecular biology methods such as Western blotting assay. Our work pave the molecular foundation of papaya leaves as potential functional food for controlling inflammation caused by dengue fever virus.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Huang Dejian Organisation: National University of Singapore City: Singapore Country: Singapore Name: Wang Xiang Organisation: National University of Singapore City: Singapore Country: Singapore Name: Yang Xin Organisation: National University of Singapore City: Singapore Country: Singapore

Board No.	70
Author Name	Yi Lin
Organisation	National University of Singapore
Country	Singapore
Title	Pancreatic Lipase Inhibition Activity and Resin Glycoside Profiles in the Morning Glory Family Plants Analyzed by LC-Q-TOF-MS(n) Spectra
Abstract Text	Resin glycosides (RGs) are the secondary metabolites that unique to the morning glory family. They have been attracting increasing research interest due to their health promoting activities, such as anti-cancer, anti-diabetes and anti-obesity. Whereas, many RGs from Convolvulaceae plants own similar structures, and often present in a relatively low concentration. These bring the challenges in the rapid identification of active compounds in morning glory plants. Liquid chromatography-quadrupole time-of-flight tandem mass spectrometry (LC-Q-TOF-MS/MS) is considered as the golden technique for characterization of specialized metabolites in herbal medicines and crops in a high-throughput manner. However, there are very few literatures regarding to the application of LC-Q-TOF-MS/MS in profiling the structure of RGs. We present herein the development of a LC-Q-TOF-MS/MS method for rapid analyzing the RGs extracted from several edible morning glory plants, including *Ipomoea batatas*, *Ipomoea aquatica* and *Ipomoe pes-caprae*. Based on the unique fragmentation patterns of the secondary mass spectra, we were able to assign the structures to the individual RGs, which have different lipase inhibition activities. Our work provides a powerful tool to study the structure and lipase inhibition activity relationship for fast identification of new anti-obesity RG extracts.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Joanne Toy Organisation: National University of Singapore City: Singapore Country: Singapore Name: Zhixuan Song Organisation: National University of Singapore City: Singapore Country: Singapore Name: Dejian Huang Organisation: National University of Singapore City: Singapore Country: Singapore

Board No.	71
Author Name	Joanne Yi Hui Toy
Organisation	National university of Singapore
Country	Singapore
Title	Resin glycosides in aerial parts of Ipomoea batatas are potent pancreatic lipase inhibitors: potential upcycling of sweet potato by-products to combat obesity
Abstract Text	Sweet potato (*Ipomoea batatas*) is a staple food crop that is consumed globally. Although the tubers are widely utilised, 95 - 98% of sweet potato leaves (SPL) are disposed during harvesting. In this study, different varieties of sweet potato leaves (Blackie, Blackheart, Margarita) that were grown in Singapore were tested for their pancreatic lipase (PL) inhibitory activity using a high-throughput screening assay. Among them, Margarita showed the highest PL inhibition activity with an Orlistat equivalent (OE) value of $3.83 \pm 0.36 \times 10^{-4}$, making it a good candidate for the extraction of lipase inhibitors. Additionally, the kinetic study of Margarita extract showed a non-competitive inhibition mechanism. Overall, a series of resin glycosides (RG) with varying lipase inhibition activities were characterised and the results revealed that RG with a lower molecular weight had a higher PL inhibition effect. *In vitro* digestion also showed that the addition of RG extract significantly decreased lipolysis in a dose-dependent manner. These results suggested that RG was able to maintain the integrity and pancreatic lipase inhibition activity during gastrointestinal digestion. Therefore, these findings indicated that the aerial parts of *Ipomoea batatas* had great potential to be upcycled into functional food products to help combat obesity.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Dejian Huang Organisation: National university of Singapore City: Singapore Country: Singapore

Board No.	72
Author Name	GACEU LIVIU
Organisation	TRANSILVANIA UNIVERSITY OF BRASOV
Country	Romania
Title	RESEARCH ON THE USE OF SACCHARINA LATISSIMA SEAWEED AS A FUNCTIONAL INGREDIENT IN BAKERY INDUSTRY
Abstract Text	*Saccharina Latissima* seaweed is a sustainable food source in European countries because of its nutritional properties, especially due to high fibers and minerals content. The seaweed obtained from a Spanish ecological farm was dried at 5% humidity using microwave under vacuum and milled under the size of 30 microns. Moisture, Protein, Crude fiber content, Mineral content were determined using standardized methods. Four degrees of replacement of white wheat flour (type 480) from the bread recipe were used: 1.5%, 3%, 4.5%, and 6%. For these flour mixtures the main rheological characteristics were analyzed, and baking tests were performed by direct method. Analysis started with: bread specific volume, porosity and crust/crumb colour. Further, a panel test sensory analyses was performed, with a group of 10 specially trained panelist, with ages between 25 and 60, evaluated the bread samples, giving grades from 1 (lowest intensity) to 5 (highest intensity), for the main sensory attributions. The results show a good rheological behavior up to a 4.5% replacement degree, but due to the pronounced aftertaste, consumers indicated a maximum acceptable level of 3%. Other products developed and tested referred to snacks and biscuits, were after taste was reduced by using 2% of cumin seeds. Acknowledgement: This work was supported by contract 245/2021, project acronym SUMAFOOD. The authors acknowledge the financial support for this project provided by transnational funding bodies, partners of the ERANET BLUE BIO 2021.
Categories	Food Chemistry & Ingredients
Other Authors	Name: MICHAEL BANTLE Organisation: SINTEF ENERGY RESEARCH City: TRONDHEIM Country: Norway Name: OANA BIANCA OPREA Organisation: TRANSILVANIA UNIVERSITY OF BRASOV City: BRASOV Country: Romania

Board No.	73
Author Name	Hyun-Joon Cho
Organisation	Department of Food and Biotechnology, Korea University
Country	South Korea
Title	Production and secretion of a trehalose synthase in Bacillus subtilis using YwbN signal sequence
Abstract Text	Due to the safety grade and the ability to secrete proteins, Bacillus subtilis has been used as host bacteria for production of recombinant food-grade enzymes. In this study, we attempted to secrete a cytoplasmic trehalose synthase (TreS) in *Bacillus subtilis* by fusion of TreS with a signal peptide derived from YwbN, one of secretary proteins through Twin-Arginine Translocation system. The YwbN signal peptide-mediated TreS secretion in *B. subtilis* entirely depended on the presence of both phosphate ions and carbohydrates. There was no detectable TreS activity in culture broth using Luria-Berani media supplemented with only one of phosphate ion and maltose Upon varying phosphate concentration in Terrific Broth supplemented with maltose, the extracellular TreS activity reached 525 U/L at 350.67 mM phosphate ion. Of carbohydrates, lactose was selected as a C-source, leading to two-fold increased extracellular TreS activity at 25 g/L lactose compared to maltose, which translates into 8.37-fold improvement after modulating the medium composition. The purified extracellular TreS exhibited almost similar catalytic properties to the recombinant TreS produced in *Escherichia coli* as the host bacteria without the fusion with the signal peptide
Categories	Food Chemistry & Ingredients
Other Authors	Name: Young-Wan Kim Organisation: Department of Food and Biotechnology, Korea University City: Sejong Country: South Korea

Board No.	74
Author Name	WENYAN HUANG
Organisation	KOREA UNIVERSITY
Country	South Korea
Title	Anti-inflammatory effects and Metabolite analysis of Hot water extract of Immature Sword Bean (Canavalia gladiata (Jacq.) DC.) Pod in OVA-induced mouse model
Abstract Text	*Canavalia gladiata* (Jacq.) DC., known as sword bean, especially, immature sword bean pod (ISBP) has long been known to be effective against bronchial diseases and inflammation. Several studies have recently been focused on ISBP, but research on plasma metabolites has not been conducted. Here, we investigated the protective effects and plasma metabolite of ISBP hot water extract against OVA-induced asthma model. ISBP extract noticeably attenuated OVA-induced lung injury and inflammatory cell infiltration in a mouse model. The levels of histamine and IgE increased by OVA induction were decreased in a dose-dependent manner by ISBP treatment. The plasma metabolic classifications were performed by multivariate statistical analysis, PCA and OPLS-DA model from the plasma result generated by 1H NMR spectra. The level of creatine was decreased and that of citrate was increased in OVA group compared to the CON group, which may cause dysregulation in blood glucose and acidification. The level of lactate was elevated in the dexamethasone and ISBP group compared to the OVA group, which assumed to be related to reduced inflammation. Furthermore, the level of alanine was increased and that of lipids were reduced with ISBP treatment. Comprehensively, this study confirmed hot water extract of ISBP treatment reduced pulmonary inflammation and changed responsible metabolites. *Keywords: Canavalia gladiata* (Jacq.) DC, OVA, plasma metabolite, OPLS-DA, inflammation
Categories	Food Chemistry & Ingredients

Board No.	75
Author Name	Lusani Vhangani
Organisation	Cape Peninsula University of Technology
Country	South Africa
Title	Anti-browning properties of betacyclodextrin assisted extracts of green rooibos
Abstract Text	Native and betacyclodextrin (β-CD) encapsulated extracts of green rooibos were studied as inhibitors of non-enzymatic browning in canned apples stored at 23°C for six months. Inhibitors were added at 0.25 and 0.5%. Browning indices pH, Brix, lightness (L*) and colour difference (ΔE), as well as intermediate markers hydroxymethyl furfural (HMF) and furfural were assessed. No significant changes ($p > 0.05$) were observed in pH and Brix throughout storage. The rate of reaction in brown colour formation was higher ($p < 0.05$) for the control ($k = 3.87$) compared to samples with added green rooibos extracts (GRE) ($k = 2.13 – 3.30$). The order of inhibition of brown colour formation decreased from 47, 42, 18 and 17% for 0.5% β-GRE, 0.25% β-GRE, 0.5% GRE and 0.25% GRE, respectively. Moreover, correlation between L* and ΔE was observed. In terms of browning markers, the furfural content was on average four times higher than HMF, and their accumulation was characterised as both zero and first-order reaction kinetics. The order of inhibition of furfural and HMF formation followed a similar trend as that observed for browning indices. The highest furfural and HMF inhibition was reported at 45.26 and 45.34%, respectively for apples added with 0.5 β-GRE
Categories	Food Chemistry & Ingredients
Other Authors	Name: Jessy Van Wyk Organisation: Cape Peninsula University of Technology City: Cape Town Country: South Africa

Board No.	76
Author Name	Hui-Min David Wang
Organisation	Graduate Institute of Biomedical Engineering, National Chung Hsing University
Country	Taiwan
Title	Cordyceps militaris reduces oxidative stress and regulates immune T cells to inhibit metastatic melanoma invasion
Abstract Text	In this study, the water extract of Cordyceps militaris (Linn.) Link (CM) was used as a functional material to investigate the inhibitory mechanisms of B16F10 and lung metastatic melanoma (LMM) cells. Reducing power, chelating ability, and 2,2-diphenyl-2-picrylhydrazyl (DPPH) assays were applied for antioxidative capacities, and we obtained positive results from the proper concentrations of CM. To examine the ability of CM in melanoma proliferation inhibition and to substantiate the previous outcomes, three cellular experiments were performed via (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide, MTT, a tetrazole) assay, cell migration, and invasion evaluation. The addition of CM to the incubation medium increased the number of CD8+ T cells significantly, which improved the immunogenicity. This study showed that CM exhibits various biological capabilities, including antioxidation, tumor invasion suppression, and T cytotoxic cell activity promotion.
Categories	
Other Authors	**Warning**: foreach() argument must be of type array|object, null given in **D:\xampp816\htdocs\paperbrochure\posteroutput.php** on line **98**

Board No.	77
Author Name	QUANG HIEU TRAN
Organisation	Saigon Technology University
Country	Vietnam
Title	PREPARATION OF CURCUMIN NANO-EMULSION BY PHASE INVERSION TEMPERATURE METHOD AND PRODUCT DEVELOPMENT BY SPRAY DRYING METHOD
Abstract Text	Curcumin nanoemulsion was produced by PHASE INVERSION TEMPERATURE (PIT) and stirring method, two of the most used emulsification methods. The impact of the processing and formulation parameters on the mean droplet size, polydispersity index (PI), and zeta potential of the emulsions was evaluated. Among the parameters of concern are particle size, surfactant concentration (Tween 80). Stable sacha inchi oil-based oil in water nano-emulsion encapsulating curcumin was achieved at a droplet size of 40 ± 10 nm, PDI of 0.2- 0.4. The optimized conditions were sacha inchi oils 2%, and 11 wt% surfactants, 5000 rpm of capacity in 25 minutes at 80^0C, and PIT at 15^oC. Encapsulation of curcumin is essential to overcome curcumin's poor bioavailability through the formation of nano-sized droplets in order to harvest its outstanding anti-inflammatory and anti-cancer medicinal properties. Spray drying is a common process used for the encapsulation of pharmaceuticals. In view of the rapid progress of nanoencapsulation techniques in pharmaceutics. The spray dryer developed in recent years provides ultrafine powders at the nanoscale and high product yields. In this paper, after explaining the concept of nanospray drying, the influence of the process parameters on the properties of the final powder, like particle size, morphology, encapsulation efficiency was studied.
Categories	Food Chemistry & Ingredients
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Board No.	78
Author Name	Kim Anh Hoang, Minh Hai Nguyen, Quoc An Le Ta, Thi My Thuong To, Khac Huy Le
Organisation	Food Technology Faculty, Saigon Technology University
Country	Vietnam
Title	CHEMICAL COMPOSITION, PHYSICOCHEMICAL AND FUNCTIONAL PROPERTIES OF FLOUR FROM DIFFERENT VIETNAMESE RICE (O. SATIVA L) VARIETIES
Abstract Text	Rice flour from different rice varieties has different chemical compositions, physicochemical and functional properties, which affect the quality of the end product such as rice cake, vermicelli, and noodles. This study aimed to evaluate the properties of three different flours from *Indica* rice varieties (IR 50404, Ham Chau, OM 2517) and two types of flour from *Japonica* rice (DS1 and JO2). Except for starch contents, other chemical compositions (moisture, ash, crude fat, protein, and fiber contents) of all flour samples were significantly different ($p<0.05$). The average particle size of rice flours was from 40.38 µm to 68.12 µm. Polyhedral shapes with smooth surfaces were mainly found in the rice starch granules. The X-ray diffraction patterns of the rice flour samples were A-type, the percentage of crystallinity ranged from 34.0-36.2%. The highest amylose content (27.9%) was found in OM2517 rice flour. Low amylose and high protein contents in *Japonica* DS1 rice flour promoted high water solubility index, low gelatinization temperature, and soft gel structure. In contrast, high amylose content in *Indica* rice flours resulted in higher gelatinization temperature and percentage of crystallinity. The results obtained from this study provide useful basic information that is beneficial to select suitable rice flours in different industrial applications.
Categories	Food Chemistry & Ingredients

Board No.	79
Author Name	Joseph Robert Nastasi
Organisation	University of Queensland
Country	Australia
Title	Natural products extracted using glycerol and their application as a novel plasticiser in the fabrication of pectin films
Abstract Text	Plants extracts in biopolymer film formulations are unique as they can offer dual effects as bioactive food preservatives and plasticising agents. This is of great interest as it omits the need for additional ingredients in the formulation when constructing films as food packaging. Current research has investigated the addition of plant extracts as potential plasticisers in film formulation, but there is an absence of literature that effectively profiles the composition and metabolome of the extracts being used. Glycerol is the most common plasticising agent used in biopolymer films, but the application of glycerol as an extraction solvent to acquire plant metabolites and its use as a novel bioactive plasticising ingredient has not been studied previously. Furthermore, the role of individual plant metabolites with respect to their impact on mechanical properties of films has also not been investigated in depth. In this work, we investigate the application of plant metabolites extracted from Queen Garnet Plum using glycerol as a novel bioactive plasticising mixture for fabricating pectin films. To better understand this bioactive plasticising mixture, current untargeted metabolic techniques coupled with multivariate analysis are used to further understand the antioxidant activity of metabolites in the mixture and their impact on film properties,
Categories	Food Chemistry & Ingredients,Food Packaging & Material Science

Board No.	80
Author Name	Thewika Keeratiburana, Ph.D.
Organisation	Suranaree University of Technology
Country	Thailand
Title	Impact of ultrasonic and annealing treatments on physicochemical properties of green banana flour
Abstract Text	This study investigated the association of ultrasonic (US) and annealing (ANN) at four-time incubation (12, 24, 36 and 72 hr), separately or combined sequentially (US→ANN) and evaluated its effects on morphology and physicochemical properties of green banana flour. The results of Scanning Electron Microscopy indicated that US led to expose granular surface, providing individual starch granules. Compared to native flour, US and ANN treatments significantly increased amylose content. Moreover, ANN increased the amylose content with extended incubation time. US, ANN and US→ANN treated samples had lower solubility whereas swelling power had no significance compared to native flour. US increased peak viscosity, breakdown, final viscosity and setback whereas the opposite results were obtained for ANN. The US→ANN 72 sample decreased the peak viscosity and setback compared to native and corresponding control (ANN 72). Thermal analysis showed that US→ANN 72 had the highest onset, peak temperature and the enthalpy. Conversely, US treated sample exhibited lower transition temperature compared to native control. ANN treatments delay gelatinization temperature whereas the enthalpy was not different. The results demonstrate that US prior to annealing treatment offers an alternative method to modify banana flour with different properties, extending the range of application.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
Other Authors	Name: Sunanta Tongta Organisation: Suranaree University of Technology City: Nakhon Ratchasima Country: Thailand

Board No.	81
Author Name	Mark Turner
Organisation	University of Queensland
Country	Australia
Title	Exploring lactic acid bacteria for novel fermentations of plant-based dairy alternatives
Abstract Text	Plant-based milk alternatives (PBMAs) have grown in popularity due to increased interest in sustainability, vegetarianism and lactose-free options. Fermentation of PBMAs has the potential to lead to improvements in flavour, texture and nutritional value. However, starter lactic acid bacteria (LAB) cultures used in dairy fermentations can be inefficient in fermenting plant-based substrates. We explored plant-derived LAB as potential starter cultures of PBMA, using almond PBMA as a model, since Australia is the second largest producer of almonds worth around $1 billion. Here, a collection of ~600 LAB from vegetables and fruits were assessed for their ability to acidify almond PBMA. Several isolates, identified as *Lactococcus lactis*, were highly efficient and could lower the pH to <4.0. The main sugar in almonds is sucrose and genome sequencing revealed all strongly acidifying isolates carry a 4 gene cluster that encodes the sucrose metabolism pathway (which is absent in dairy *L. lactis* strains). We generated a spontaneous mutant that is unable to metabolise sucrose and showed that it has lost the ability to acidify almond PBMA. This work highlights the importance of aligning starter culture fermentation strains to substrates and demonstrate that value of strain screening approaches for novel foods.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering

Board No.	82
Author Name	Xianglu Zhu
Organisation	Teagasc food research centre
Country	Ireland
Title	Investigation of acoustic and hydrodynamic cavitation assisted polysaccharide extraction from Irish brown seaweed
Abstract Text	In Ireland, Seaweed grows in both great abundance and diversity, where over 570 species can be found. *Laminaria digitata* (also known as oarweed) is brown seaweed commercially harvested in Ireland. It is a promising source of nutrients for humans due to the promising macro and micronutrient content. Laminarin, as an algal polysaccharide, has been extensively investigated for potential biofunctional activities. Laminarin can be used to achieve theactivation of macrophages leading to immunostimulatory, antitumour and wound-healing activities. Non-thermal process techniques, acoustic and hydrodynamic cavitation, were employed in this study for laminarin extraction followed by membrane sparation for further isolation. Response surface methodology was used to optimize the extraction conditions. HPLC, FT-IR and cell line studies were employed to evaluate the purity and quality of extracted laminarin. In general, developed cavitation assisted extraction methods can achieve the final target compomd with the comparable purity as commercial laminarin with less extraction time and better biological activities.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering

Board No.	83
Author Name	Sainan Zhao
Organisation	School of Chemical and Biomedical Engineering, Nanyang Technological University
Country	Singapore
Title	Molecular size variations of xylo-polysaccharides and xylo-oligosaccharides produced by controlling autohydrolysis severities determine gut microbiota responses and metabolic fates
Abstract Text	Beechwood xylan (BWX) was hydrolyzed into xylo-polysaccharides and xylo-oligosaccharides through autohydrolysis reactions. The severities of the autohydrolysis reaction that combines parameters of temperature and holding time were controlled to degrade BWX partially at multiple levels. Five BWX-derived substrates, with average molecular sizes ranging from 800 to 6,500 Da, were prepared and tested with the human gut microbiota in an *in vitro* condition. Despite similarities among substrate glycosyl compositions, five substrates led to distinct fermentation kinetics and altered community structure of gut microbiota. The Shannon and Simpson diversity indices decreased when fermenting small-size BWX substrates (800 to 1500 Da) whereas no differences of observed species richness were detected among all treatments. The relative abundance of genera *Bacteroides*, *Bifidobacterium*, *Blautia*, *Fusicatenibacter*, *Megasphaera* was enriched in microbiota after treating with specific substrates. Although total short chain fatty acids were produced at the same levels, propionate and butyrate generation displayed substrate preferences. Further analyses of metabolite production and bacterial composition revealed *Bacteroides* and *Blautia* were positively associated with propionate, while *Bifidobacterium* and *Megasphaera* were associated with butyrate. These findings provided information connecting the manufacturing, structural properties, and function of xylan-derived dietary fibers in the human colonic environment.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
Other Authors	Name: Ming-Hsu Chen Organisation: Institute of Food Science and Technology, National Taiwan University & School of Chemical and Biomedical Engineering, Nanyang Technological University City: Taipei Country: Taiwan

Board No.	84
Author Name	Yui SAITO
Organisation	Tokyo University of Marine Science and Technology
Country	Japan
Title	Novel procedure for salt reduction of surimi gel using combined water immersion and setting
Abstract Text	NaCl is an essential salt additive for the preparation of surimi gels because it undergoes protein solubilization, leading to its gelation. Thus, low-salt surimi gels generally exhibit poor physical properties. Excessive salt consumption worsens a heart-disease or renal issues because of elevated blood pressure. Herein, surimi gel samples with 3% NaCl were prepared conventionally under three different heating conditions—direct (90 °C for 30 min), two-step (30 °C for 30 min; 90 °C for 30 min), and low-temperature (30 °C for 30 min) heating—and were subsequently immersed in water with agitation for 24 h. The salt content in all the gel samples decreased to 0.2% after water immersion. The breaking force and strain of the low-temperature-heated surimi gel increased with increasing water-immersion time because of protein polymerization (setting), and the breaking properties of the other gel samples were prevented from deteriorating. The expressible drips of the two-step- and low-temperature-heated samples negligibly changed, although their water contents increased after water immersion, suggesting entrapped water in their dense gel structures induced by setting at 30 °C. Therefore, the combination of water immersion and setting at 30 °C effectively produces low-salt surimi gel without deteriorating its physical properties.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering

Board No.	85
Author Name	Sukritta Anantawittayanon
Organisation	Hiroshima University
Country	Japan
Title	Effect of starch on the water sorption, glass transition, and caking properties of freeze-dried mango powder
Abstract Text	Fruit powders are commonly hygroscopic and readily caking during processing and storage. Caking is recognized initiated by forming the liquid bridges between particles, which may be prevented by completing water adsorption, physical surface separation, and increased glass transition temperature (T_g). Carbohydrate polymer is considered an anti-caking agent; however, its mechanism is still not understood enough. This study investigated the effect of corn starch on the water sorption, glass transition, and caking properties of freeze-dried mango powder. Freeze-dried mango powder was blended with corn starch at various weight ratios, then equilibrated under several water activity (aw) conditions. The degree of caking was evaluated using a sieving method. Water content was evaluated gravimetrically, while T_g was evaluated using differential scanning calorimetry (DSC). The degree of caking decreased with the 10% corn starch addition. Only negligible effect of corn starch revealed on the Tg measured at certain aw condition. Water sorption isotherms were analyzed using the Guggenheim-Andersen de Boer (GAB) and Brunauer-Emmett-Teller (BET) equation, and revealed a sigmoidal shape (Type II), showing monolayer water formation characteristic. Tg-curve was analyzed using the Gordon-Taylor (GT) equation. The effect of corn starch on stability of powder was discussed in monolayer water and glass transition temperature aspects.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
Other Authors	Name: Kiyoshi Kawai Organisation: Hiroshima University City: Hiroshima Country: Japan

Board No.	86
Author Name	Okeke, Udodinma Jude
Organisation	University of Urbino Carlo Bo, Italy
Country	Italy
Title	Modelling the Prediction of Rice Cooking and Eating Qualities as a Function of Total Amylose Content (TAC)
Abstract Text	***ABSTRACT*** Rice quality is basically a function of the starch content: amylose and amylopectin[1]. Amylose affects the physicochemical and functional properties of rice starch and hence the cooking and eating quality and consumers' buying preferences, and the market performance. The present study aims to develop models to predict the cooking and eating qualities (CEQ) of rice as a function of TAC and some physicochemical parameters of the rice starch. One hundred and four (104) rice samples from different geographic origins were obtained from the International Rice Research Institute, Philippines. TAC and physicochemical parameters were measured using modified ISO 6647:2012 protocol and rapid visco-analysis techniques respectively. The result shows TAC: 0.8 to 35.5%. Chemometric analysis of the principal components (PC) separated the samples into 5 groups: 0.8-3.5%, 4.0-12.0%, 12.5-20.0%, 20.5-25.0%, and 25.5%-35.5. Linear regression models by stepwise selection and backward elimination techniques were fitted to predict the TAC of samples as shown in equations (1) and (2): **TAC = 2.57 + 1.203GT- 0.002687FV----------(1)** **TAC= 4.3 + 0.9997GT- 0.002687TV----------(2)** Since the cooking and eating qualities of rice have a direct relationship with the TAC, the developed and validated models may be used to predict the cooking and eating qualities of rice.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
Other Authors	Name: Fitzgerald, Melissa Organisation: The University of Queensland, Australia City: Brisbane Country: Australia

Board No.	87
Author Name	Soohwan Lee
Organisation	Gachon University
Country	South Korea
Title	Exploring additives to improve the processability of propolis extract.
Abstract Text	Propolis from beehive is well acknowledged to exhibit numerous healthful benefits. However wide-ranging applications of conventional extract are limited for high ethanol concentration. During evaporation to remove ethanol, hydrophobic materials easily form an insoluble resin, which is inadequate to manipulate. Accordingly, to increase the processability of the propolis extract, technologies to produce water-soluble powder has been necessarily required. Here, we investigate a practical process to produce food-grade water-soluble powder of propolis from hydrophobic ethanol extract. Emulsifiers, starch, and milk were applied as additives. When emulsifiers applied, resin was produced during the drying process. The starch allows powder form, but propolis was separated during rehydration. The water diluted milk successfully produced water-soluble propolis powder, whose moisture content is 6% or less, and water activity is less than 0.6 Aw. or equal of water activity on average. The solubility tended to increase as the milk content increased. This study not only obtained propolis as a powder in a stable state, but also made it possible to rehydrate with a small amount of water. It is expected that the stabilization process of the polymer compound by using milk has the same effect not only on propolis but also on other polymer compounds.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering

Board No.	88
Author Name	Ladie Anne Conde
Organisation	Dept. of Food Science, University of Otago
Country	New Zealand
Title	Impact of high hydrostatic pressure and hydration level on the starch related properties of cassava flour
Abstract Text	Starch modification through high hydrostatic pressure processing (HPP) has garnered scientific interest due to its chemical-free and non-thermal approach. It has been shown that this technique could change the native starch properties without granular disintegration and shift the properties for a certain type of flour depending on the pressure level as well as the hydration level. So far very few studies were dedicated to flour and none that of starch rich cassava flour. The objective of this research was therefore to study the effect of pressure (300 - 600 MPa) and flour concentration (10, 20, and 30%) on starch related properties of cassava flour. Microstructural integrity, thermal properties, and starch susceptibility to digestive enzymes were determined. Results showed no difference between untreated and treated samples at 300 to 500 MPa with different flour concentrations. Microstructural integrity was however significantly (p<0.05) reduced at 600 MPa, as an impact of induced gelatinization. This was observed in the decreased relative crystallinity, birefringence, and gelatinization enthalpy. These changes at 600 MPa contributed to the enhanced susceptibility of cassava starch to digestive enzymes, but was flour concentration dependent. This research implies the possibility of using HPP to modify starch in cassava flour.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
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Board No.	89
Author Name	Gilda Melanie Babaran
Organisation	University of the Philippines Los Banos
Country	Philippines
Title	Effect of drying conditions on the phenolic profile of bignay [Antidesma bunius (L.) Spreng] pomace extracts
Abstract Text	*Bignay* [*Antidesma bunius* (L.) Spreng] is usually utilized as a raw material for wine making in the Philippines. Pomace is made up of fruit skin and seeds and accounts for 30% of the fruit. *Bignay* is known to be rich in phenolics and anthocyanins as exhibited by its dark purple color, in turn, a part of this is present in the pomace. This study presents the profile of phenolic compounds in fresh, convection oven-dried, and freeze-dried *bignay* pomace. Ethanolic extracts were analyzed using high performance liquid chromatography (HPLC) with photo diode array detection. Of the twelve phenolic standards tested, nine compounds were found to be present in all treatments at varying concentrations. Three phenolic acids (syringic acid, ellagic acid, and trans-ferulic acid) and six flavonoids (catechin, epicatechin, rutin, myricetin, resveratrol, and quercetin) were identified. Fresh samples exhibited significantly higher concentrations of the identified compounds compared to dried samples. Between the drying treatments, freeze-drying resulted in a significantly higher concentration of quercetin. While the drying process does not influence the phenolic profile, it significantly affected the concentration of phenolic compounds in *bignay* pomace extracts.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
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Board No.	90
Author Name	TeckAnn Ong
Organisation	Singapore Polytechnic
Country	Singapore
Title	In vitro digestibility of heat-moisture treated wheat starch and low-methoxyl pectin complexes
Abstract Text	Starch is commonly used in many food products and has been one of the primary carbohydrate sources in the human diet. However, the increasing prevalence of diabetes mellitus worldwide necessitates healthier alternatives. One possible direction is to subject the starch to physical modification, such as hydrothermal treatment of starch with hydrocolloids. Several studies reported that heat-moisture treatment (HMT) of starch with hydrocolloids enhanced the starch-hydrocolloid interactions. The starch-hydrocolloid complexes form a protective layer around the periphery of the starch granules that lead to improved physicochemical properties and reduced starch digestibility. In this study, wheat starch (WS) was heat-treated with low-methoxyl pectin (LMP) at various concentrations, moisture levels, pH levels, and heating temperatures. The preliminary result showed that WS-LMP complexes, prepared by heating for 1 h at 128 °C, decreased the slowly digestible starch fraction from 41.8 % to 12.2 % and increased the resistant starch fraction from 35.9 % to 85.4 %. Further discussions on the effect of treatment conditions on the *in vitro* digestibility and characteristics of the WS-LMP complexes, such as pasting profiles and thermal properties, will be presented.
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Board No.	91
Author Name	Jong-Bang Eun
Organisation	Department of Integrative Food, Bioscience and Biotechnology, Graduate School of Chonnam National University, S. Korea
Country	South Korea
Title	Effect of UV Irradiation on Physicochemical Characteristics and Antioxidant Activities of cold brewed coffee
Abstract Text	Cold brewed coffee (CBC) was irradiated with UV at flow rates of 50, 75, and 100% (2 L/min) for 1 to 3 minutes for sterilization. Since microorganisms were not detected the CBC before sterilization, the physicochemical characteristics and antioxidant activities were investigated to see the influences by UV irradiation in the CBC. Soluble solid contents, L^* and a^* values â€‹â€‹were all higher than those of the control, except for treated with flow rate 50% (2 L/min) for 3 minutes. The b^* and pH values increased as the flow rate became slower and time increased. Total phenolic and total flavonoid contents, and 2,2-diphenyl-1-picrylhydrazyl (DPPH), ferric reducing antioxidant power (FRAP), 3-ethyl-benzothiazoline-6-sulfonic acid (ABTS) for antioxidant activities increased as the flow rates decreased; however, as the irradiation time increased, those values decreased. In conclusion, there was a change in the value of physicochemical properties, but there was no significant effect, and it had a significant effect on the value of antioxidant activity. It is necessary to study sterilization effect of UV irradiation in CBC after inoculation of microorganisms on it in the future.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
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Board No.	92
Author Name	Jong-Bang Eun
Organisation	Department of Food Science and Technology, Chonnam National University, S. Korea, Department of Integrative Food, Bioscience and Biotechnology, Graduate School of Chonnam National University, S. Korea
Country	South Korea
Title	Changes in physicochemical characteristics of two types of ramen sauces during storage at different temperatures
Abstract Text	The physicochemical characteristics of the two types of sauces, spicy ramen sauce (SRS), and plain ramen sauce (PRS) were investigated during storage at 25°C, 35°C, and 45°C. While the pH and moisture contents of SRS and PRS decreased during storage, the total acidity of both products increased at all temperatures. Both SRS and PRS experienced an increase in viscosity until 40 days of storage at all temperatures, but they decreased after that time. In color, a* value of PRS increased and its L* and b* values decreased. In both sauces, maltose and glucose contents decreased as the storage period and temperature increased. The lactic acid and acetic acid contents, however, were not significantly changed at the beginning, but increased towards the end. TBARS increased in the both sauces with increasing in storage temperature and time. In conclusion, increase of rancidity, reduction of moisture and decrease of pH were shown during storage; therefore, packaging method for their storage should be investigated to prevent them in the future.
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Board No.	93
Author Name	Joanna Kobus-Cisowska
Organisation	Poznan University of Life Sciences
Country	Poland
Title	Effect of the addition of sunflower sprouts (Helianthus annuus L.) on the quality of vegan sausages in alginate casings
Abstract Text	The development of the vegan market is the result of the varied and changing consumer expectations of food. Consumers expect meat analogs with characteristics similar to meat products. The aim of this study was to evaluate the effect of a varied addition of sunflower sprouts preparation on the texture, functional properties and sensory qualities of vegan grill sausages. The sausages were produced on a semi-technical scale with the share of sunflower sprouts in the following amounts: 5, 7, 10 and 15%. The variant without the addition of sunflower preparation was a control sample. The texture parameters of the test material were determined instrumentally using the Texture Profile Analysis (TPA) made with the Brookfield Texture Analyser - CT3 texturometer. In addition, the color and activity of water were instrumentally determined. A sensory evaluation was made of consistency, juiciness, setting, taste, smell, color and overall desirability. It was found that the level of sunflower sprouts addition statistically significantly influences the assessed texture discriminants and the sensory quality of the products. The most favorable texture parameters were obtained in the test with 10% addition of sprouts. The increasing share of sunflower sprouts in the assessed sausages had a statistically significant effect on most of the parameters characterizing their sensory quality. The sausage test with 10% addition of sprouts was rated the best. The addition of sunflower sprouts increased the water activity and did not change the color of the sausages produced. It has been shown that sunflower sprouts at the level of 10% can be an additive in the production of grill sausages, improving sensory and physical properties.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering

Board No.	94
Author Name	Wiphada Mitbumrung
Organisation	Tokyo University of Marine Science and Technology
Country	Japan
Title	Coalescence stability of emulsions and nanoemulsions studied by a new methodology using fluorescence microscopy
Abstract Text	Coalescence is an undesirable destabilization in emulsion and the mechanism should be unraveled because it effects on quality in mechanical treatment and storage. The detection of coalescence in nanoemulsion is challenging. Macroscopic methods may not applicable to observe coalescence in nanoemulsions because very small nanoemulsions droplet may coalescence without changing physical properties. This study was aimed to develop methodology to investigate coalescence stability in emulsions and nanoemulsions using fluorescence microscopy. The fluorescence microscopy is a direct approach which can be used to observe droplet behavior. Oil-in-water emulsions and nanoemulsions containing fluorescent dyes, DiI (red fluorescence) or neuro-DiO (green fluorescence), were prepared separately. DiI emulsion and neuro-DiO emulsion were treated to induced coalescence using various forces, then samples were observed under fluorescence microscope. The particles were detected and took out from background to measure the fluorescence intensity which were used for calculation of mixing ratio (*M*). When *M* closes to 0 or 1, it indicates non-coalescence; DiI and neuro-DiO emulsions exhibit in different particles. When *M* appears around 0.5, it indicates coalescence; DiI and neuro-DiO emulsions exhibit within the same particle. This study revealed that fluorescence microscopy could be applied for understanding physical instability of emulsion and nanoemulsion in microscopic level.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
Other Authors	Name: Shingo Matsukawa Organisation: Tokyo University of Marine Science and Technology City: Tokyo Country: Japan

Board No.	95
Author Name	Sarah Giovani
Organisation	Universitas Al-Azhar Indonesia
Country	Indonesia
Title	Extraction and Functional Properties of Gelatin from Yellowfin Tuna (Thunnus Albacares) Skin and Its Application in Ice Cream
Abstract Text	Gelatin extraction had been carried out through the use of yellowfin tuna skin. This study aimed to study the effect of pretreatment conditions using variations in the concentration of acetic acid and soaking time on the functional properties of yellowfin tuna skin gelatin (GYF) and to investigate the effect of GYF application as a stabilizer/emulsifier on the physical and sensory properties of ice cream. The concentration of 0,05 mol/L acetic acid and soaking time of 18 hours was the optimum pretreatment conditions. Foam capacity, foam stability, and emulsion stability index of GYF increased as the concentration of GYF increased. GYF had higher emulsion activity index than GB (p<0,05). The water-holding capacity of GYF was lower than GB, but the oil-holding capacity of GYF was higher than GB. The application of gelatin as a stabilizer/emulsifier on ice cream showed an increase in overrun and viscosity of ice cream mix, as well as a decrease in the value of hardness and melting rate. The sensory evaluation of ice cream showed the highest score for sandiness and hardness obtained on ice cream without gelatin (p<0,05), while the highest score for smoothness and creaminess was obtained on GYF ice cream (p<0,05)
Categories	Food Chemistry & Ingredients,Food Processing and Engineering

Board No.	96
Author Name	Gourab Chatterjee
Organisation	Haldia Institute of Technology
Country	India
Title	Comparative Study on Process Optimization of Super-Critical CO2 Extracted Nigella sativa L. Seed Oil using a Linguistic Response Surface Methodology and Interval Type 2 Fuzzy Logic System and Characterization of Its Thymoquinone by GC-MS/MS
Abstract Text	Post COVID-19 pandemic, phytochemicals from *N. sativa* L. specially thymoquinone have been attributed for developing novel preventive and therapeutic applications. Optimal condition for *Nigella sativa* seed oil and its potential bioactive thymoquinone (TQ) were investigated using Supercritical CO_2 extraction (SCFE-CO_2), keeping pressure, temperature and particle size being the independent variables and CO_2 flow rate was kept constant with 0.1 m^3/h during the interaction. The process optimization was advocated using a central composite design (CCD) in linguistic response surface methodology (RSM) and compared with Interval Type 2 Fuzzy Logic System (IT2FLS) under the following parametric conditions: pressure (15, 20 and 25 MPa), temperatures (40, 50 and 60^oC) and average seed particle size (0.7×10^{-3} m, 0.85×10^{-3} m and 1×10^{-3} m). The highest yield of *Nigella sativa* seed oil from SCFE-CO_2 process was 33.2% (w/w) at 25MPa, 50^oC and 0.7×10^{-3} m average particle size. Although, the highest thymoquinone content was found to be 4.06% (w/w) with extraction condition at 15 MPa, 40^oC and 0.7×10^{-3} m, characterized by GC-MS/MS and GC-FID respectively. SEM analysis and FTIR have also been performed to characterize the defatted seed and extracted seed oil.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
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Board No.	97
Author Name	GEORGIA FRAKOLAKI, Magda Krokida
Organisation	NATIONAL TECHNICAL UNIVERSITY OF ATHENS
Country	Greece
Title	Encapsulation of omega-3 fatty acids in biopolymer matrices through electrospinning or spray-drying
Abstract Text	Regular consumption of adequate quantities of omega-3 polyunsaturated fatty acids (Ω3 PUFAs) have been reported to provide a multitude of health benefits, including inhibition of inflammation, cardiovascular diseases, arthritis, diabetes and ulcerative colitis. Due to their limited consumption, supplementation of food products with Ω3 PUFAs has become of high interest. However, their protection against autoxidation and degradation during food processing and storage is a major concern. Thus, encapsulation of Ω3 PUFAs has been examined in the current study for the improvement of their stability and their delivery into food products without impacting the taste of the final product. For this purpose, two different encapsulation technologies were applied for the preparation of Ω3 PUFAs capsules and the encapsulation process was optimized based on the encapsulation efficiency and the oxidative stability of the produced capsules. Specifically, the encapsulation of Ω3 PUFAs in maltodextrin and/or modified starch through spray drying as well as in pullulan and whey protein through electrospinning was investigated. GC-MS was employed for the determination of the encapsulation efficiency, whereas oxidative stability was determined through detection of peroxide value (PV), anisidine value (p-anisidine) and thiobarbituric acid (TBA).
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Board No.	98
Author Name	Arianna Ortali
Organisation	University of Lincoln
Country	United Kingdom
Title	Soaking water properties and pea (Pisum sativum) evaluation
Abstract Text	Marrowfat peas are a large seed size pea mainly cultivated in United Kingdom for the production of canned peas which involves the hydration of the seeds by soaking for an extended period of time prior to further processing. Soaking is an important step during legumes production however the property of water used is seldom monitored. This study evaluated the effect of varying soaking water temperature (15 vs. 20 â °C) and hardness (soft vs. hard) on hydration kinetics of Marrowfat peas (*Pisum sativum)*. The effect of the pea variety used (Sakura, Kabuki or Maro) has been also considered. Parameters monitored were water hardness, electrical conductivity, turbidity, pH and Brix (%) of the soaking water after 16 hrs. Maximum shear force (texture) of peas. Results have shown that the pea variety had a strong impact on and correlation with the properties assessed, compared to water temperature and harness. Kabuki presented lower turbidity of the soaking water and higher hardness of soaked peas than Sakura and Maro. Furthermore, turbidity was positively correlated with soak ratio. Results have shown that turbidity, a parameter related with leaching of protein and starch during soaking, blanching or cooking, could be a good parameter to monitor during pea soaking in order to have a product with selected properties. I
Categories	Food Chemistry & Ingredients,Food Processing and Engineering

Board No.	99
Author Name	Zhao-Liang Weng, Yu Wen Ting
Organisation	Institute of Food Science and Technology, National Taiwan University
Country	Taiwan
Title	Optimized Emulsifying Ability and Allergenicity of Limited Enzymatic Hydrolyzed Casein by Non-thermal Pretreatment
Abstract Text	Allergic disease is one of the common chronic diseases worldwide, causing people to avoid their own allergens when making dietary choices. However, the allergenicity of food additives is often overlooked, leaving consumers to ingest allergens unknowingly. Casein is widely used as emulsifier in food due to its good emulsifying property. Nevertheless, its commercial value is restricted by allergenicity. To improve the application of casein, different protein modification techniques to mitigate food allergy have been used. For instance, enzymatic hydrolysis is a common method to modify secondary structures and epitopes of protein. However, extensive hydrolysis reduces the functionality of casein. Therefore, the combination of non-thermal pretreatment and limited hydrolysis is the way to enhance functionality of casein while potentially having a dual effect on allergenicity reducing. In this study, high pressure homogenization and ultrasonic treatment will be applied to assist enzymatic hydrolysis of casein, and its allergenicity, physiochemical properties, emulsification property will be analyzed. In addition, these caseins will be produced into O/W emulsion with soybean oil, and human intestinal absorption of the allergen in emulsion is simulated by CACO-2 cell permeability assay. In the future, the hypoallergenic casein is expected to apply as emulsifier on variable emulsion products.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering

Board No.	100
Author Name	Ioannis Mourtzinos
Organisation	Aristotle Univeristy of Thessaloniki
Country	Greece
Title	Green extraction solvents of tomato carotenoids and encapsulation of extracts in alginate beads
Abstract Text	Tomatoes constitute a rich source of carotenoids (i.e. lycopene and β-carotene) that apart from their coloring properties, they also exhibit various bioactive actions. Till lately, the extraction of these carotenoids was carried out using conventional organic solvents, however, recently, the interest of the scientific community has focused on the use of green solvents. In this view, the use of hydrophobic deep eutectic solvents (HDESs) as well as edible oils could be a promising alternative considering the lipophilic nature of carotenoids. Even though such solvents have been used for the extraction of carotenoids from different plant materials (e.g. carrot wastes, pomegranate wastes, spirulina, pumpkin etc.), limited are the data regarding their use for tomato carotenoids. In the present study, a combination of such green solvents and ultrasounds was employed for the recovery of these precious compounds. Extraction parameters, such as duration and solid:solvent ratio (w/v), were optimized using Response Surface Methodology. The obtained extracts were then encapsulated in alginate beads which were characterized with a variety of analytical techniques, i.e. Fourier-Transform Infrared spectroscopy, Raman spectroscopy, confocal laser scanning microscopy and chromatometer. Our approach is expected to be of use for food, pharmaceutical and other applications.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
Other Authors	Name: Anastasia Kyriakoudi Organisation: Aristotle Univeristy of Thessaloniki City: Thessaloniki Country: Greece

Board No.	101
Author Name	Amy Hui-Mei Lin, Rakesh Raghunathan
Organisation	Singapore Institute of Food and Biotechnology Institute, Agency for Science, Research and Technology (A*STAR), Singapore 117609, Singapore
Country	Singapore
Title	Modification of pea starch digestibility through complexation with gallic acid via high-pressure homogenization
Abstract Text	Legume starches, such as pea starch, are often discarded as side streams of plant-sourced protein production. Native pea starch is slowly digestible which is a desirable attribute from a healthy perspective. However, thermal processing for the manufacturing of foods significantly increases its digestibility rate. We hypothesized that the high-pressure homogenization of pea starch in the presence of gallic acid would promote the complexation of these molecules and have a positive effect on the rate of starch digestibility. The disruption of the compact starch structure was evidenced by a decrease of gelatinization temperature, enthalpy change, and relative crystallinity. A high level of the complex index and a typical V-type complex X-ray diffractometry pattern were observed when 10% of gallic acid was applied. Data also indicated a significant decrease in the susceptibility to α-amylase and an increase in resistant starch. In addition, starch functionality was improved with a reduction of the retrogradation rate. When comparing our results to what has been reported for rice and maize starch, pea starch requires a substantially less gallic acid to achieve high level of complexation and a significant delay of starch digestion.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
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Board No.	102
Author Name	Wen-Chang Chang
Organisation	National Chiayi University
Country	Taiwan
Title	Effect of high pressure and enzyme treatments on physicochemical properties of pumpkin starch
Abstract Text	Pumpkin is a kind of food with high content of resistant starch. In this study, commercially available pumpkin powder (*Cucurbita moachate*) was reacted with different concentrations of pullulanase enzymes in different times, and incubated at a high pressure of 600 MPa at room temperature to evaluating the digestion and physical and chemical properties of pumpkin powder. The contents of resistant starch, amylose, slowly digesting starch and the structural changes and physical property analysis in pumpkin powder treated with different enzyme concentrations and high pressure was determined. The results showed that the contents of resistant starch, amylose, solubility and the oil absorption increment in the enzyme concentration of 200 NPUN/g after 8 hours treated. The X-ray diffraction analysis has the highest crystallinity in the 12-400 group and the strong diffraction peak appears at 17â˚˜ from which it can be known that pumpkin powder is a B-type crystalline form. Finally, the pumpkin powder not only has the significantly improved ability of resistant starch and slowly digesting starch, but also has fine solubility and oil absorption treated with 200 NPUN/g pullulanase for 8 hours and 600 MPa pressure for 10 minutes.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
Other Authors	Name: Chia-Hsuan Lin Organisation: National Chiayi University City: Chiayi City Country: Taiwan

Board No.	103
Author Name	Jenshinn Lin
Organisation	National Pingtung University of Science and Technology
Country	Taiwan
Title	Study on the development of puffed rice snack by Tatary buckwheat
Abstract Text	Tartary buckwheat (TB, *Fagopyrum tataricum*) is rich in amino acids, lipids, dietary fiber, minerals, and polyphenols, particularly flavonoid rutin. Rutin reported in the literature has physiological effects against oxidative stress and inflammation. Collet extrusion is a high-temperature short time (HTST) process. Its high shear could inactivate the endoenzyme of TB, and puff TB as well. Therefore, in the study, mixtures of different ratios of brown rice to TB were firstly extruded at a screw speed of 350 rpm for puffed snacks with high bioactive properties. The rutin, total phenolic, total flavonoid, were found to be 14.40 mg RE/g d.m., 1380.54 μg GAE/g d.m., and 4067.67 μg RE/g d.m., respectively, when the ratio of brown rice to TB was 55 to 45. Secondly, different screw speeds (320, 350, and 380 rpm) were used to extrude the mixture of brown rice and TB at a ratio of 55 to 45. According to the results, the higher screw speed did not favor the higher physical and bioactive properties of the extrudate. In the first and second stages of collet extrusion, the levels of quercetin in puffed rice snacks were found around 0.26 – 0.39 mg QC/g d.m., which were lower than expected due to the inactivation of rutin degrading enzyme in collet extrusion.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
Other Authors	Name: Chong-Wei Hong Organisation: National Pingtung University of Science and Technology City: Pingtung County Country: Taiwan

Board No.	104
Author Name	Xuan Dong
Organisation	The University of Auckland
Country	New Zealand
Title	Hemp protein isolate: The influence of thermal and non-thermal drying techniques on its physicochemical and functional properties
Abstract Text	Hemp protein isolate (HPI) is an alternative protein with good potential to be applied in food systems for nutritional value and promote environmental sustainability. However, the research on the impact of thermal and non-thermal drying techniques on HPI is still very little. This study investigated the effect of the drying, including freeze and spray drying, on the physicochemical and functionalities of HPI. The powder properties such as colour, density, moisture content, and water activity of the spray and freeze-dried HPI powders were measured. Protein subunit composition and the secondary structure of undried HPI and HPI powders were examined using gel electrophoresis and circular dichroism. The impact of the drying process and drying techniques on the thermal properties, including denaturation temperature and denaturation enthalpy, were examined using differential scanning calorimetry. Protein functionalities including solubility, water/oil holding capacities, foaming properties and emulsifying properties were also investigated. The results from this study have provided scientific insight for HPI powder production and application in the food industry in light of the use of plant-based protein for environmental sustainability.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
Other Authors	Name: Siew Young Quek (Corresponding Author) Organisation: The University of Auckland City: Auckland Country: New Zealand

Board No.	105
Author Name	Gabriela Râpeanu
Organisation	Dunarea de Jos University of Galati, Faculty of Food Science and Engineering
Country	Romania
Title	Functionalization of food by strategic combinations of probiotics and bioactives from underutilized by-products into new composites
Abstract Text	The unsustainability of current food systems arises from the industrialization and globalization of agriculture and food processing, the shift of consumption patterns toward more dietary animal protein, the emergence of modern food styles, the growing gap on a global scale between rich and poor, and the paradoxical lack of food security. Simultaneous, highly efficient systems are needed for sustainable utilisation of agri-food by-products, whereby apparently side flows become multifaceted resource opportunities via the multi-feed, multi-platform and multi-product integrated facilities. This concept germinates the thrust for a circular bioeconomy. Our approaches exploit the synergy between dietary fibres, plant secondary metabolites and probiotics, as a strategic combination designed to improve human health and food trade. A new concept of tribiotication is introduced, targeting prebiotics, probiotics and postbiotics, into a combination of approaches from microbiology to food engineering. Therefore, our approaches propose a holistic, multi-actors and industry oriented approach to develop smart strategies such as green extraction, fermentation, hydrolysis, concentration, and encapsulation for the use of selected agri-food by-products as source and resource, thus contributing to the reliable transition from current linear food production, to sustainable, cyclical oriented bioeconomy, designed to respond to consumers demand for a diverse, healthy, safe and attractive diet.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering

Board No.	106
Author Name	Sohyeon Im
Organisation	Seoul National University of Science and Technology
Country	South Korea
Title	Formation of WPI/pectin particles by thermal treatment: Influence of high-pressure treatment
Abstract Text	Biopolymer particles can be fabricated by heating the protein/anionic polysaccharide mixtures above the thermal denaturation temperature of the protein. In this study, the influence of high-pressure pretreatment of WPI/pectin mixtures on the formation and properties of WPI/pectin particle was examined. Biopolymer particles (524.0 and 358.4 nm of particle diameters for WPI/high-methoxy pectin (HMP) and WPI/low-methoxy pectin (LMP) mixtures, respectively) were formed by heating WPI/pectin mixtures (0.5% (w/v) WPI and 0.25% (w/v) pectin) at 85°C for 15 min at pH 4.5. The degree of esterification of pectin played an important role in determining the size of WPI/pectin particles. The high-pressure pretreatment decreased the particle size of WPI/pectin complexes (approximately 315.7 and 189.1 nm for WPI/HMP and WPI/LMP complexes, respectively). The turbidity of WPI/pectin particle solution was also reduced by the high-pressure pretreatment (84.3 to 70.9% for WPI/HMP complexes and 95.5 to 60.7% for WPI/LMP). However, the particle surface charge was not affected by high-pressure pretreatment. These results suggest that that the protein/carbohydrate complexes with the desired particle sizes could be fabricated by controlling the conditions of high-pressure treatment before thermal treatment. Conclusively, these findings suggest that these biopolymer particles may be useful for functional compound delivery vehicles or fat replacers.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
Other Authors	Name: Jihyo Lee Organisation: Seoul National University of Science and Technology City: Seoul Country: South Korea Name: Seung Jun Choi Organisation: Seoul National University of Science and Technology City: Seoul Country: South Korea

Board No.	107
Author Name	Abdul-Rasaq A. Adebowale
Organisation	Federal University of Agriculture (FUNAAB), Abeokuta, Nigeria
Country	Nigeria
Title	CHARACTERIZATION OF THE FUNCTIONAL, PASTING AND MICROSTRUCTURAL PROFILE OF MUNG BEAN STARCH
Abstract Text	There has been an increasing need for food products with low glycemic index, high dietary fibre and resistant starch which previous research works have established with mungbean starch. Functional and microstructural properties of mungbean starch was investigated with a view to providing data that could improve its utilization in different food applications. Mungbean were dehulled, blended and sieved to obtain starch. The starch was dried to a moisture content of 12.3%, grounded, and subjected to functional and microstructural analysis. The starch exhibited a high dispersibility (84.3%), swelling power (9.66g/g), bulk density (0.96g/ml), water absorption capacity (2.25g/g) and oil absorption capacity (3.09g/g). Mungbean starch also exhibited a high peak viscosity which is an important parameter of gel and textural properties of a product thereby enhancing acceptability. The Type-C pattern exhibited by the starch has also been linked with high gelatinization. The shape of mungbean starch varies from irregular to oval to kidney-bean shape. The starch granules also exhibited large variations ranging from 0.7 to 52.2μm and is likely to have a high affinity for water due to presence of large amount of small granules thereby producing a high unit yield when applied to starch based products.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
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Board No.	108
Author Name	Jong-Bang Eun
Organisation	Department of Integrative Food, Bioscience and Biotecechnology, Graduate school of Chonnam National University
Country	South Korea
Title	Thermo-oxidative stability of different multi-element oleogels of carnauba wax, Î²-sitosterol / lecithin and ethyl cellulose
Abstract Text	The oxidation of oleogel was interpreted by measuring the peroxide value (POV), anisidine value (P-AV), total antioxidant value (TOTOX), 2-thiobarbituric acid value (TBA) of different multi-element oleogels (DMEO). Combining cluster analysis (CA), principal component analysis (PCA) and linear discriminant analysis (LDA) of the electronic nose were used. Results showed that the gelation temperature of the oleogels determines its oxidation degree. The oleogel prepared using ethyl cellulose (ECO) showed the highest oxidation value compared to the oleogel prepared using β-sitosterol and lecithin (S/LO) and the oleogel prepared using carnauba wax (CWO). Loading resveratrol (RE) and added surfactants can effectively reduce the oxidation of oleogels. Oleogels were more sensitive to nitrogen oxides and methane substances in the thermal oxidation process than other compounds, such as aromatic components, aldehydes and ketones. Therefore, TBA is not suitable for evaluating oxidation degree of oleogels, while POV and P-AV would be used to measure the degree of oxidation of oleogel. CA, PCA, LDA qualitative discrimination of DMEO oxidation classification accuracy rate was as high as more than 90%. Therefore, electronic nose technology might be an innovative tool for rapid detection of oleogels oxidation.
Categories	Food Chemistry & Ingredients,Food Safety & Regulatory Science
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Board No.	109
Author Name	Gita Addelia Nevara
Organisation	Universiti Putra Malaysia (Malaysia); Universitas Mohammad Natsir Bukittinggi (Indonesia)
Country	Malaysia
Title	Characterization of dietary fibre from kenaf seed by-products
Abstract Text	One way to promote food sustainability is to use underutilized agricultural by-products. Kenaf seeds are the major residue from kenaf plantations. This study evaluates the macronutrients and dietary fiber (DF) of kenaf seeds and their secondary by-products to valorize the seeds and support the zero-waste concept. The macronutrients of kenaf seeds are comparable to those of other commercial oilseeds such as soybeans, almonds, and hemp seeds. Furthermore, secondary by-products, i.e., kenaf seed meals and dregs, could be reused as DF sources. It found that kenaf seed by-products had 20.63 – 35.08% of DF content, which was comparable to soybean by-products (6.75 – 55.48%). Furthermore, the fractionation of DF from kenaf seed dregs showed that DF comprised of 1.86%, 1.01%, 6.33%, and 66.33% (db) of acid-soluble pectin, calcium-bound pectin, alkali-soluble hemicellulose, and cellulose, respectively. It can be concluded that kenaf seed and its by-products are the potential DF sources. *Keywords: dietary fibre; food sustainability; fractionation; kenaf; oilseeds*
Categories	Food Chemistry & Ingredients,Future of Food Manufacturing
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Board No.	110
Author Name	Hong Sung Hoon
Organisation	Chungbuk national university
Country	South Korea
Title	Recombinase RecT Improves Stress Tolerance Effect against Electroporation and Cas9 Mediated DNA Double-Strand Break
Abstract Text	RecT is single-strand annealing protein (SSAP) and acts as recombinase by promoting the annealing of complementary DNA strand in bacteria. In addition, RecT is considered as chaperone protein which has stress-tolerance factor that plays important role in repairing system. The aim of this study was evaluating the stress tolerance effects of RecT against electroporation and Cas9 mediated DNA double-strand break. For this, RecT from *Lactiplantibacillus plantarum* WCFS1 was cloned and expressed in *Escherichia coli* BL21 (DE3) using pET-21a (+) vector. After purification, recombinant RecT protein was electroporated to *Leuconostoc citreum* EFEL 2700 with Cas9-ribonucleoprotein (RNP) which induced DNA double-strand break. As results of Cas9-RNP transformation, the survival rates of *Leu. citreum* significantly decreased 51% on MRS agar and 47% on PES agar after Cas9-RNP transformation. Meanwhile, when electroporated with RecT, the survival rate significantly increased as 68% to 166% on MRS agar and 27% to 170% on PES agar. This result indicates that RecT protein has a protective effect against electroporation stress and Cas9 mediated DNA double-strand break. Further research on protective effect and recombinase activity of RecT are needed.
Categories	Food Chemistry & Ingredients,Future of Food Manufacturing
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Board No.	111
Author Name	Deirdre Mikkelsen
Organisation	The University of Queensland
Country	Australia
Title	Enzymatic arabinose depletion of wheat arabinoxylan regulates in vitro fermentation profiles and potential microbial degraders
Abstract Text	Arabinoxylan (AX) is a major dietary fibre in wheat/rye cereals containing a xylan backbone with one or two single arabinose units attached to some backbone xylose units. *In vitro* fermentation with porcine faecal inoculum was used to investigate the fermentability of AX samples, enzymatically modified by bacterial α-L-arabinofuranosidases, depleting mono- or di-substituted arabinose residues, or both, from the xylose backbone. Gas kinetics, short-chain fatty acid and ammonium production, substrate disappearance and microbiota alterations due to AX breakdown were characterised, to identify how arabinose removal impacted these fermentation outcomes. Results showed that AX-structural variations led to differences in gas kinetics and end products. Lower arabinose:xylose ratios contributed to slower substrate disappearance and low microbial diversity with higher evenness. Genera regarded as potential AX degraders differed between the enzymatically modified AX samples. Interestingly, higher *Prevotella* relative abundance was associated with higher arabinose:xylose ratios and faster substrate fermentability, whilst higher relative abundances of Lachnospiraceae XPB1014 group, Lachnospiraceae MK4A136 group and Lachnospiraceae UCG009 were linked to slower fermentable AX. Overall, this study reveals how microbiota in a model for the complex gut environment respond to molecularly defined dietary changes, leading to possibilities of regulating desirable fermentation profiles by selecting/modifying AX fine structures.
Categories	Food Chemistry & Ingredients,Nutrition & Health
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Board No.	112
Author Name	Masaru Ochiai
Organisation	Kitasato University
Country	Japan
Title	Study on the nutritional and physiological functional characteristics of migratory locust, a representative edible insect
Abstract Text	Edible insects are increasingly recommended as novel sustainable food resources, but their nutritional and functional properties have not been fully progressed. We investigated the nutritional and functional properties of migratory locust (Locusta migratoria), a representative edible insect. In protein digestion experiments using SDS-PAGE analyses, the migratory locust powder represented the resistance to pepsin, but not to trypsin or chymotrypsin digestion. And in rat experiments, feeding migratory locust powder (10%) for 5 weeks presented the favorable growth and improvement effect on hepatic lipid metabolism in Wistar rats. Dietary migratory locust suppressed plasma LDL-lipid levels and plasma arteriosclerosis-related factors by upregulating liver LDL-receptor expression and suppressing PCSK9 activity. In particular, small-dense LDL-lipid levels were notably suppressed. Liver de novo lipogenic enzyme activity was also downregulated by the dietary migrant locust. These findings can be comparable to the effects of statin, a dyslipidemia improving agent. Migratory locust powder contained rich in n-3 fatty acids, phospholipids, polyphenols, and indigestible fiber chitin as well as proteins, which can multiply contribute to the improvement effect of lipid-metabolism. In conclusion, the migratory locust which has been recognized as a novel food material by EFSA on 2021 is expected as valuable and sustainable food resources with functionality.
Categories	Food Chemistry & Ingredients,Nutrition & Health
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Board No.	113
Author Name	Eunyoung Oh
Organisation	Department of Human Ecology, Graduate School, Korea University, Seoul, Korea
Country	South Korea
Title	The enhanced functional properties of tofu developed from Tenebrio molitor larvae
Abstract Text	This study aimed to evaluate the functionalities of tofu from the mealworm (Tenebrio molitor) larvae (M), edible insects. Mealworm larvae protein isolate (MPI) was extracted from M, and its hydrolysate (MPH) was prepared with flavourzyme and alcalase under optimized conditions. The tofu was prepared by partially substituting soybean with M (SM), MPI (SMPI), and MPH (SMPH) at a 1:1 ratio, and their properties were compared with those of control tofu (S). The amino acid profile confirmed that mealworm larvae-derived tofu has a higher amount of essential amino acids, branched-chain amino acids, and total amino acids than S. SMPH (94.10%) had significantly ($p<0.05$) higher in vitro ileal digestibility than S (58.35%), SM (64.64%), and SMPI (73.38%). As for anti-oxidative properties, SMPH had the lowest IC50 value for both ABTS and DPPH assays (1.56 and 0.11μg/mL, respectively), and the highest phenolic content (22.66mg GAE/g). Moreover, SM, SMPI, and SMPH had significantly higher anti-inflammatory effects against lipopolysaccharide-induced cytokines including tumor necrosis factor (TNF)-α, interleukin (IL)-1β, and IL-6 than S ($p<0.05$). Consequently, tofu developed from mealworm larvae can be potentially used as an alternative to traditional tofu; SMPH, particularly, has the most significant functional potential among all tofus.
Categories	Food Chemistry & Ingredients,Nutrition & Health
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Board No.	114
Author Name	Geonhee Kim
Organisation	Gaesinbiotech
Country	South Korea
Title	Prebiotic Effects of Dextran from Leuconostoc mesenteroides on the Human Gut Microbial Ecosystem
Abstract Text	The aim of this study was to investigate the prebiotic activities of dextran (LM742) produced by *Leuconostoc mesenteroides* in the aspect of the human gut microbial ecosystem focusing on microbiome and metabolome changes in *in vitro* colonic fermentation. LM742 dextran had a medium-chain structure with the molecular weight of 1394.87 kDa (DP = 7759.22) and α-1,6 and α-1,3 linkages with a 26.11 : 1 ratio. The LM742 dextran was resistant to digestive enzymes in the human gastrointestinal conditions. The individual cultivation of 30 intestinal bacteria with LM742 dextran showed the growth of *Bacteroides* spp., whereas *in vitro* human fecal fermentation with LM742 exhibited the symbiotic growth of *Bacteroides* spp. and beneficial bacteria such as *Bifidobacterium* spp. Further co-cultivation of *Bacteroides xylanisolvens* and several probiotics indicated that *B. xylanisolvens* provides a cross-feeding of dextran to probiotics. In fecal fermentation, LM742 dextran resulted in increased concentrations of short-chain fatty acids, valerate and pantothenate, but it rarely affected the conversion of betaine to triethylamine. Lastly, LM742 dextran inhibited the adhesion of pathogenic *E. coli* to human epithelial cells. Taken together, these results demonstrate the prebiotic potential of LM742 dextran as a health-beneficial polysaccharide in the human intestine.
Categories	Food Chemistry & Ingredients,Nutrition & Health
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Board No.	115
Author Name	Rena Nobuoka
Organisation	Ehime University
Country	Japan
Title	Anti-inflammatory effect of black pepper ethanol extract on adipocytes
Abstract Text	Black pepper is one of the most widely used spices in the world. Piperine, one of major pungent components in black pepper, has been reported to have various health functions. However, there are few reports about the effect of black pepper on chronic inflammation of adipose tissue. Therefore, in this study, we focused on the anti-inflammatory effect of black pepper ethanol extract (BPE) on the mouse pre-adipocyte cell line 3T3-L1 cells and the mouse macrophage cell line RAW264.7 cells. BPE was applied to 3T3-L1 pre-adipocytes to examine its effects on differentiation adipocytes and on mature adipocytes. BPE suppressed chemokine production and its gene expression in 3T3-L1 adipocytes during differentiation and in matured 3T3-L1 adipocytes without cytotoxicity. In addition, the effect of BPE on chronic inflammation of 3T3-L1 adipocytes and RAW264.7 cells under non-contact co-culture condition was examined. As a result, BPE significantly suppressed inflammatory cytokine production by 3T3-L1 adipocytes under non-contact co-culture condition with macrophages compared with single culture of macrophages and adipocytes. These findings suggest that BPE may inhibit chronic inflammation induced by the interaction between macrophages and adipocytes.
Categories	Food Chemistry & Ingredients,Nutrition & Health
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Board No.	116
Author Name	Ricardo Villalobos-Carvajal
Organisation	Universidad del Bío-Bío
Country	Chile
Title	Multilayer double emulsion to protect Lactobacillus reuteri: stability during thermal treatment, in vitro gastrointestinal digestion and storage
Abstract Text	*Lactobacillus reuteri* is a probiotic that can be used as a food supplement and it represents an interesting alternative to prevent inflammatory diseases. However, its viability can be affected by food processing, storage, and gastrointestinal conditions. In this study, *L. reuteri* was microencapsulated by double emulsion coated with calcium alginate. The effect of a heat treatment (70 °C, 30 min) and *in vitro* digestion and storage conditions (14 days, 4 °C) on the viability of microencapsulated *L. reuteri* was evaluated. The interfacial structure formed during the microencapsulation process significantly improved the stability of *L. reuteri* under stress conditions, especially when the outer alginate layer was subjected to ionic gelation. After microencapsulation process, probiotic viable count was 9 log CFU/mL while after thermal treatment was maintained above 8 log CFU/mL. The microcapsules provided high viability during the *in vitro* digestion (6 log CFU/g), and achieving high viability on day 14 of storage at 4 °C (7 log CFU/mL). The proposed encapsulation technology represents an interesting alternative to improve *L. reuteri* viability during processing, storage, and digestion and it could be used to develop functional foods.
Categories	Food Chemistry & Ingredients,Nutrition & Health
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Board No.	117
Author Name	Sean Jun Leong Ou
Organisation	National University of Singapore
Country	Singapore
Title	Interactions of black rice anthocyanin and food matrices, and their combined effects on starch digestibility.
Abstract Text	Food matrix effects play a critical role in the delivery of bioactives through functional foods. The relationship between food matrices and bioactive delivery through functional foods are significant to clarify its accessibility, bioavailability, and eventual bioactivity in the human body. However, there is still limited clarity in the significance of food matrices for bioactive delivery as a food-based strategy against metabolic disorders. In this work, we demonstrate in a simulated starch digestion model, the *in-vitro* effects of food matrices on the accessibility of anthocyanins and starch digestibility of bread fortified with black rice extract (BRAE). Our preliminary results show that BRAE fortification had significantly reduced the rate and extent of bread digestion, but differences between the digestion of fortified bread (FO) and the codigestion of white bread with black rice extract (CO) were non-significant. Interaction studies indicate that, relative to CO, lesser anthocyanins were released from FO during digestion, suggesting a hindrance to anthocyanin accessibility. Altogether, our results suggest that while interactions between anthocyanin and bread matrices interfere with bioactive release, the overall reduction in starch digestibility may be contributed by both food matrix effects and a hindered bioactive accessibility.
Categories	Food Chemistry & Ingredients,Nutrition & Health
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Board No.	118
Author Name	Mayu Yoshii
Organisation	Ehime University
Country	Japan
Title	Anti-degranulation activity of black vinegar produced by traditional fermentation methods
Abstract Text	In recent years, foods effective on alleviating allergic symptoms such as hay fever have been attracting attention. In this study, we focused on the anti-allergic activity of Black vinegar (BV) produced by traditional fermentation methods in Fukuyama Town, Kagoshima Prefecture in Japan. The anti-allergic effect of black vinegar was evaluated as the degranulation-suppressive effect on rat basophilic cell line, RBL-2H3 cells. We evaluated two types of black vinegars matured for different periods, 6 and 14 months, respectively. Both BVs suppressed degranulation of RBL-2H3 cells, however 14-month-matured BV more strongly suppressed degranulation than 6-month-matured one. In addition, the anti-degranulation activity of BV was enhanced after dialysis with MWCO 14 kDa membrane. These results suggested that maturation period is very important for the anti-degranulation activity, and the amount of the active substance whose molecular weight is higher than 14 kDa is increased during maturation. To reveal the mode of action of BV, the effect of BV on microtubule formation promoted by antigen stimulation was evaluated. As a result, BV significantly suppressed microtubule formation in RBL-2H3 cells.
Categories	Food Chemistry & Ingredients,Nutrition & Health
Other Authors	Name: Momoko Ishida Organisation: Ehime University City: Matsuyama-shi Country: Japan Name: Akira Fujii Organisation: Sakamoto Kurozum Inc. City: Fukuyama-shi Country: Japan Name: Rintaro Hayasegawa Organisation: Sakamoto Kurozum Inc. City: Fukuyama-shi Country: Japan Name: Kosuke Nishi Organisation: Ehime University City: Matsuyama-shi Country: Japan Name: Takuya Sugahara Organisation: Ehime University City: Matsuyama-shi Country: Japan

Board No.	119
Author Name	Melindee Hastie
Organisation	The university of Melbourne
Country	Australia
Title	Consumer and chemical characterisation of the flavour profile of wet and dry aged mutton.
Abstract Text	Dry ageing is a novel process application for sheepmeat that may add value to mutton products through both flavour and tenderness improvement. However, it is not known if consumers can differentiate the flavour profile of wet aged (the mainstream commercial ageing process for meat) and dry aged mutton. Therefore, a flavour lexicon was developed for mutton, and consumers assessed the flavour of wet and dry aged mutton patties against this lexicon using the check all that apply methodology. Results show that consumers most often associated caramel and roasted flavours with dry aged patties, and sheepy and metallic flavours with wet aged patties. Volatile analysis supported the consumer characterisation with higher levels of Maillard reaction products, including pyrazines which are associated with roasted and cooked flavours, found in the dry aged patty volatile profile. In contrast, higher 1-octen-3-one levels, which is associated with metallic flavours, was found in the wet aged patty volatile profile. These results validate that the lexicon developed in this study is suitable for the characterisation of mutton flavour and can be used to support future consumer investigations into the flavour components driving liking for mutton, and dry aged mutton product development.
Categories	Food Chemistry & Ingredients,Sensory & Consumer Science

Board No.	120
Author Name	Ardiansyah
Organisation	Department of Food Technology, Universitas Bakrie
Country	Indonesia
Title	The volatile compounds and sensory properties of Indonesian pigmented rice bran
Abstract Text	Rice bran is a by-product of the rice milling that contains large amount of functional bioactive compounds. However, the utilization of rice bran is limited and demands for an effort to ferment rice bran. The objective of this study was to identify the volatile compounds and aroma profile of fermented and non-fermented rice brans (FRB and NFRB) from several local varieties of pigmented rice. Four types of rice bran (Inpari 24, Saodah, Cempo Ireng, and Jeliteng) were fermented using Rhizopus oligosporus for 72 hours at room temperature. Both samples were analyzed by using headspace solid phase microextraction-GC/MS for volatile compounds identification and qualitative descriptive analysis (QDA) for sensory profile determination. The result showed that a total 114 of volatile compounds were identified in both FRB and NFRB. The aroma attributes of FRB were sweet, caramel, vanilla, grass, milky, fatty, nutty, smokey, rancid, acid, cereal, pungent, earthy and fermented. The NFRB has the same with FRB except fermented aroma. Furthermore, based on Pearson's correlation test showed several positive correlations between volatile compounds and aroma profile. In conclusion, FRB increases the volatile compound and improve aroma of rice bran. These studies may provide information to develop FRB as a functional ingredient.
Categories	Food Chemistry & Ingredients,Sensory & Consumer Science
Other Authors	Name: Amalia Mar'atun Nadhifah Organisation: Department of Food Science and Technology, Faculty of Agricultural Technology, Universitas Gadjah Mada City: Yogyakarta Country: Indonesia Name: Dwi Larasatie Nur Fibri Organisation: Department of Food Science and Technology, Faculty of Agricultural Technology, Universitas Gadjah Mada City: Yogyakarta Country: Indonesia Name: Wahyudi David Organisation: Department of Food Technology, Universitas Bakrie City: Jakarta Country: Indonesia Name: Dody Dwi Handoko Organisation: Indonesian Center for Rice Research, Indonesian Agency for Agricultural Research and Development, Ministry of Agriculture City: Subang Country: Indonesia Name: Slamet Budijanto Organisation: Department of Food Science and Technology, Faculty of Agricultural Engineering and Technology, IPB University City: Bogor Country: Indonesia Name: Hitoshi Shirakawa Organisation: Laboratory of Nutrition, Graduate School of Agricultural Science, Tohoku University City: Sendai Country: Japan

Board No.	121
Author Name	Koh Hui Si Audrey
Organisation	National University of Singapore
Country	Singapore
Title	FUCOIDAN AS A FUNCTIONAL INGREDIENT: INSTRUMENTAL AND SENSORY EVALUATION OF FUCOIDAN-FORTIFIED BAKED BREAD
Abstract Text	Reformulation of bread by fortifying bread with functional ingredient often alters the organoleptic properties of bread. In this study, baked bread samples were fortified with fucoidan at 0.0%, 1.5%, 2.0%, 2.5% and 3.0%, and the impact of fucoidan fortification on the sensory properties of baked bread were evaluated through the use of a trained panel and instrumental analysis. Results from instrumental analysis suggest the production of a larger, softer, less chewy and more porous baked bread with darker, yellower and redder crumb when fortified with fucoidan. Results from the trained panel evaluation revealed that the fucoidan fortified bread samples were perceived to be saltier, more umami and chewier than control bread. Overall, fucoidan fortification did not alter the panel's acceptability and liking towards baked bread.
Categories	Food Chemistry & Ingredients,Sensory & Consumer Science

Board No.	122
Author Name	Meta Mahendradatta
Organisation	Food Science and Technology Study Program, Department of Agricultural Technology, Faculty of Agriculture, Hasanuddin University
Country	Indonesia
Title	Development of Analog Rice Using Pumpkin Flour and Purple Yam Flour as Source of Bioactive Compound
Abstract Text	Analog rice was defined as a processed product in form of rice grains but made from non-paddy raw material. The research aimed to develop the analog rice formula with the addition of pumpkin flour and purple yam flour to the main raw materials of modified cassava flour and mung beans flour. Totally six formulations were made from each pumpkin and purple yam flour. The formulation was analyzed for its physical characteristic (moisture content, water absorption capacity, bulk density, and swelling power). Based on the sensory test of six formulations of cooked analog rice, two formulations were selected, i.e. 30% purple yam and 30% pumpkin analog rice. Measurement parameters were the chemical characteristic. In addition, anthocyanin was measured for the purple yam analog rice, while β-carotene for the pumpkin analog rice. The result of chemical analysis showed that protein content of raw and cooked analog rice was 8.18-11.34%, carbohydrates 73.43-11.34%, fiber 1.27-2.27%, fat 1.52-3.03%, amylose 7.28-10.50%, amylopectin 63.55-67.14%. β-carotene content in pumpkin flour, pumpkin analog rice raw and cooked was 437.98 ppm, 330.87 ppm, 219.87 ppm, respectively. Anthocyanin content in purple yam flour, purple yam analog rice raw and cooked was 25.84 CyE/g, 12.31 CyE/g, 4.93 CyE/g, respectively.
Categories	Food Chemistry & Ingredients,Traditional & Future Food
Other Authors	Name: Zulfiyani Putri Sada Organisation: Graduated from Food Science and Technology Master Program, Department of Agricultural Technology, Faculty of Agriculture, Hasanuddin University City: Makassar Country: Indonesia Name: Rindam Latief Organisation: Food Science and Technology Study Program, Department of Agricultural Technology, Faculty of Agriculture, Hasanuddin University City: Makassar Country: Indonesia Name: Jumriah Langkong Organisation: Food Science and Technology Study Program, Department of Agricultural Technology, Faculty of Agriculture, Hasanuddin University City: Makassar Country: Indonesia Name: Abu Bakar Tawali Organisation: Food Science and Technology Study Program, Department of Agricultural Technology, Faculty of Agriculture, Hasanuddin University City: Makassar Country: Indonesia

Board No.	123
Author Name	Nikita Sanwal
Organisation	Food Customization Research lab, Centre for Rural Development and Technology, Indian Institute of Technology Delhi
Country	India
Title	Valorisation and Flavour Enhancement of Sea buckthorn (Hippophae sp.) Leaves through Novel Kombucha Tea Processing
Abstract Text	The nutrient-dense Seabuckthorn (Hippophae sp.) leaves contain high variety of phytochemicals with strong antioxidant and antibacterial characteristics, making an attractive raw-material for kombucha fermentation. The kombucha drink is primarily prepared from black tea (1–2%), sucrose (5–10%) and pellicle called SCOBY (2.5–5.0%) and incubated at 25–37 °C for 7–14 days. A kombucha consortium of bacteria and yeast was employed to develop a unique functional beverage by fermenting seabuckthorn leaves for 14 days at 25 °C. Kombucha's physicochemical, antioxidant, nutraceutical, and flavor components were investigated and compared to seabuckthorn leaf infusion. Analytical techniques such as HPLC, ICP-MS, GC-MS, and spectrophotometric approaches utilized for characterization. Tea kombucha exhibited higher amounts of total phenols (40.83 mg GAE/g), flavonoid (70.02 mg CE/g), and improved DPPH scavenging ability (IC50 value- 0.048 µg/mL). Also, enhanced content of ascorbic acid (10.33 to 164.73 mg/100 mL), acetic acid (50.36 to 181.54 mg/100 mL) and citric acid (684.14 to 1602.52 mg/100 mL) with high titratable acidity, and lower pH value was observed. Consequently, the sourness of high organic acid content influenced sensory preference. Hence, Seabuckthorn leaves offer a lot of potential as a raw material for fermenting non-alcoholic functional beverages for its flavour enhancement and valorization.
Categories	Food Chemistry & Ingredients,Traditional & Future Food
Other Authors	Name: Achala Gupta Organisation: Food Customization Research lab, Centre for Rural Development and Technology, Indian Institute of Technology Delhi City: New Delhi Country: India Name: Jatindra K Sahu Organisation: Food Customization Research lab, Centre for Rural Development and Technology, Indian Institute of Technology Delhi City: New Delhi Country: India

Board No.	124
Author Name	Joseph Oneh Abu
Organisation	University of Agriculture Makurdi, Nigeria
Country	Nigeria
Title	Effect of short-term germination on the chemical composition, antinutritional and antioxidant properties of pigeon pea flour
Abstract Text	Food insecurity exists in developing nations especially in Africa due in part to lack of modern processing equipment and machinery. Consequently, there is a growing interest in the use of low-cost and adoptable food processing methods in the development of high quality leguminous food ingredients with health benefits for the teeming population of Africa. There is paucity of information on the impact of short-term germination on the chemical composition, anti-nutritional and antioxidant properties of pigeon pea. Pigeon pea seeds were sorted, cleaned, sterilized with 0.07% (w/v) hypochlorite solution in order to sanitize the grains, washed with distilled water for three times to neutral pH and soaked in distilled water for 6h. The hydrated seeds were germinated for 24, 48 and 72h under dark condition at room temperature. Germinated seeds were oven dried at 40C until 10% moisture content was achieved, and milled into flour. Raw flour served as control. Flour samples were analysed using standard methods. Germination significantly (p 0.05) increased protein, total dietary fiber, minerals, resistant starch, protein digestibility and antioxidant activities with low residual antinutrients compared to raw flour. Short-term germination is an affordable means for the development of functional Pigeon pea flours.
Categories	Food Chemistry & Ingredients,Traditional & Future Food
Other Authors	Name: Chiemela Enyinnaya CHINMA Organisation: Federal University of Technology City: Minna Country: Nigeria Name: Glory Fadekemi AGUNLOYE Organisation: Federal University of Technology City: Minna Country: Nigeria Name: Dorcas JOSEPH Organisation: Federal University of Technology City: Minna Country: Nigeria Name: Shakirah Omotoke AZEEZ Organisation: Federal University of Technology City: Minna Country: Nigeria

Board No.	125
Author Name	Zijian Liang
Organisation	School of Agriculture and Food, Faculty of Veterinary and Agricultural Sciences, University of Melbourne
Country	Australia
Title	Changes in polyphenol profile of green tea-flavoured wine processed by pulsed electric fields
Abstract Text	Flavoured wine is fortified with additional flavourings such as fruits and herbs, which has attracted increasing interests in the past decade. Tea is the second most consumed beverage around the world, which is characterized by multiple health benefits such as antioxidant, hypolipidemic and anti-carcinogenic effects, due to its rich polyphenols. Pulsed electric fields (PEF) is a non-thermal processing technology that uses instantaneous pulses of high voltage for a short time (microseconds to milliseconds). The application of PEF contributes to a quick diffusion of extractable molecules like phenolics from plant cells. So far, the study on innovative flavoured wine has remained stagnant, and the use of flavour additives is under strict regulations for commercial wine production in most countries. The aim of this research is to use the PEF technique to develop flavoured wine with green tea as flavouring material, and investigate its impact on wine phenolic composition. This study will provide practical applications of green tea and PEF to develop tea-flavoured wines with a greater diversity and abundance of phenolic compounds, and potentially enhanced health benefits, thereby opening new markets particularly Asia which is a large market for both wine and tea.
Categories	Food Chemistry & Ingredients,Traditional & Future Food
Other Authors	Name: Zhongxiang Fang Organisation: School of Agriculture and Food, Faculty of Veterinary and Agricultural Sciences, University of Melbourne City: Melbourne Country: Australia Name: Pangzhen Zhang Organisation: School of Agriculture and Food, Faculty of Veterinary and Agricultural Sciences, University of Melbourne City: Melbourne Country: Australia Name: Xin-An Zeng Organisation: School of Food Science and Engineering, South China University of Technology City: Guangzhou Country: China

Board No.	126
Author Name	Chih Yao Hou
Organisation	National Kaohsiung University of Science and Technology
Country	Taiwan
Title	Effect of anti-fat accumulation and anti-obesity of resveratrol butyrate esters in 3T3-L1 cells and animal models
Abstract Text	Resveratrol butyrate esters (RBE) synthesis by resveratrol and butyric acid with Steglich methods in our previous research and its biological activity have been demonstrated such as antioxidant ability and reduction HepG2 cell anti-fat accumulation. In this study, we further explore the unction of RBE in the 3T3-L1 cell and animal experiments to determine the Validation of the lipolytic ability of RBE and its potential therapeutic. The results of 3T3-L1 adipocytes showed that using 2,5,10 μM RBE can effectively reduce the total number of cells, with 10 μM registering the most significant reduction, reaching 28% and 32 % at 48 h and 72 h, respectively. In terms of physiological activity, RBE (2, 5, and 10 μM) significantly reduced intracellular TG content on days 4, 6, 8, and 10 ($p<0.05$), and upon treatment with 10 μM RBE were 0.53 mg, 0.54 mg, and 0.63 mg, respectively. In terms of the physiological activity of animal experiments, similar results were also obtained in the separate compounds ED2 (3,4′-di-O-butanoylresveratrol) and ED4 (3-O-butanoylresveratrol) That purification from the RBE complex), this result indicates that RBE has a potential therapeutic effect in obesity treatment in the future.
Categories	Food Chemistry & Ingredients,Traditional & Future Food
Other Authors	Name: Cai-Sian Liu Organisation: National Kaohsiung University of Science and Technology City: Kaohsiung City Country: Taiwan Name: Rou-Yun Liu Organisation: National Kaohsiung University of Science and Technology City: Kaohsiung City Country: Taiwan Name: Shu-Ling Hsieh Organisation: National Kaohsiung University of Science and Technology City: Kaohsiung City Country: Taiwan Name: Ming-Kuei Shih Organisation: National Kaohsiung University of Hospitality and Tourism City: Kaohsiung City Country: Taiwan Name: Yu-Wei Chen Organisation: Chang Gung University City: Kaohsiung City Country: Taiwan

Board No.	127
Author Name	Qurrata Ayuni
Organisation	Kasetsart University
Country	Thailand
Title	"Soto" Indonesian Traditional Soup Legacy: Richness of Natural Flavor and Bioactive Properties of Artisanal Cuisine
Abstract Text	***Soto*-**based Indonesian cuisine wealth is diverse and unique in flavor followed by the localization of ***Soto***'s recipe and region. ***Soto*** was found in 22 regions in Indonesia among 75 types of ***Soto***-based cuisine. The ingredients-based herbs and spices create a variety of flavors and effects on bioactive properties. Seasonings of ***Soto*** are broad natural ingredients-derived bioactive compounds and contain bioactive properties. The most popular seasonings of ***Soto*** are turmeric, lemongrass, candlenut, bay leaf, galangal, and ginger, influencing characteristics of savory flavor and fragrant aroma. The authenticity of ***Soto*** has a variety of foods depending on the ingredients and seasoning-based region. "*Soto Makassar*'' based on Sulawesi contains galangal and ginger, with the flavor of warmth and pungent sensation derived from 1,8 cineole, gingerol, and shogaol which are anti-inflammatory and antioxidant. Meanwhile, "*Soto Bandung*" based on Java contains lemongrass with a freshness flavor derived from citral and geraniol and its bioactive properties are antibacterial, antifungal, and antioxidant. The perception of Indonesian people consume Soto with the aim of anti-stress, antioxidants, and immunity due to herbs and spices formulation. The spread of ***Soto*** in the Indonesian archipelago based on the richness of flavor and bioactive properties based on natural ingredients are the overview of the topic. **Keywords: "Soto" Indonesian cuisine, herbs and spices, natural seasonings, natural flavor, bioactive properties.**
Categories	Food Chemistry & Ingredients,Traditional & Future Food

Board No.	128
Author Name	Vusi Mshayisa
Organisation	Cape Peninsula University of Technology
Country	South Africa
Title	Structural properties of native and conjugated black soldier fly(Hermetia illucens) larvae protein via Maillard reaction and classification by SIMCA
Abstract Text	Black soldier fly(Hermetia illucens) has received considerable interest as an alternative protein source. Aqueous solutions of black soldier fly larvae (BSFL) protein and glucose (2:1 w.w?1, pH 9) were heated at 50, 70 and 90 ?C, for 2–10 h at 2 h intervals, respectively. The zeta-potential (ζ) of BSFL-Glu conjugates heat-treated at 70 ?C ranged from -10.25 to -25.25 mV while the native BSFL protein ranged from -12.84 to -16.70 mV. The ζ-potential analysis revealed that the glycation reaction modified the surface charge density of the BSFL protein as a function of reaction time and temperature. In addition, an increase in thermal stability of the BSFL-Glu conjugates was observed by means of Thermo-gravimetric analysis (TGA) and differential scanning calorimetry (DSC). Fourier transform infrared spectroscopy (FT-IR) analysis indicated that the most apparent structural changes in the BSFL protein were in the amide I and amide II region. Well-separated clusters permitting differentiation between native BSFL and BSFL-Glu conjugates were observed by using principal component analysis (PCA) on FT-IR spectra. At 50, 70 and 90 ?C the first two principal components (PC1 and PC2) showed an accumulated total variance of 91, 96 and 95%, respectively. A classification efficiency of 91% was obtained when using soft independent modelling of class analogy (SIMCA). Infrared spectroscopy combined with SIMCA is a powerful tool to monitor the formation of edible insect protein–sugar conjugates by Maillard reaction. As a result, combining FT-IR spectroscopy with multivariate techniques (PCA and SIMCA) exhibited a strong potential to differentiate between native and gly- cated
Categories	Food Chemistry & Ingredients,Traditional & Future Food
Other Authors	Name: Jessy Van Wyk Organisation: Cape Peninsula University of Technology City: Cape Town Country: South Africa Name: Bongiswe Zozo Organisation: Cape Peninsula University of Technology City: Cape Town Country: South Africa Name: Silvio D. Rodríguez Organisation: Instituto de Biodiversidad y Biología Experimental y Aplicada (IBBEA), CONICET –Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, City: Buenos Aires, Country: Argentina

Board No.	129
Author Name	Venkatesh T
Organisation	CSIR NIIST & AcSIR
Country	India
Title	ENERGY ANALYSIS & TECHNOLOGICAL INTERVENTIONS FOR TRADITIONAL NON-CENTRIFUGAL SUGARS â€" AN ATTEMPT FOR REJUVENATION OF TRADITIONAL SWEETENERS & HEALTHY CARBS PROMOTION
Abstract Text	Increasing demand for traditional sweeteners like non-centrifugal sugars (NCS) is hampered by its production techniques like uncontrolled addition of chemicals, elevated operating temperatures resulting in antioxidant losses and energy extensive concentration operations. As process improvement, various organic clarifying agents and natural available in-organic clarificants were studied and clarification potential is estimated in terms of turbidity reduction, scum removal, viscosity and pH. Among these, lime at a concentration of 0.05 % yielded better removal of impurities. Traditional NCS units have energy efficiency as low as 10-13 %. To improve efficiency, controlled steam jacketed concentration and thermic oil-fired concentrations are explored at 25 L pilot scale plant. Efficiency of both the methods are calculated in terms of equivalent steam consumption, process time and temperature. Maximum temperature for the operation is fixed from the Antoine equation: log10 P = A - (B/T); Results yielded a processing time of 2.5±0.20 hours and 2.2±0.22 hours, equivalent steam consumption of 405±14 MJ and 422±16 MJ, and efficiency at 76±1.8 % and 73±1.4 % for steam controlled & thermic oil-controlled concentration respectively. Improvements in pan design and insulation materials will further enhance efficiency, thereby promotes the traditional sweeteners.
Categories	Food Chemistry & Ingredients,Traditional & Future Food
Other Authors	Name: RESHMA M V Organisation: CSIR NIIST & AcSIR City: Thiruvananthapuram Country: India Name: ANJINEYULU KOTHAKOTA Organisation: CSIR NIIST & AcSIR City: Thiruvananthapuram Country: India

Board No.	130
Author Name	Edwin Hlangwani
Organisation	University of Johannesburg
Country	South Africa
Title	The Nutritional Profile of Optimally Processed Umqombothi (South Africaâ€™s Indigenous Beer)
Abstract Text	Sorghum beers, often known as ‘African opaque beers,’ are popular in many African countries. Umqombothi, a South African version of the beer, plays a crucial dietary role in the lives of many low-income consumers. The beer was produced under optimal conditions obtained using an AI-hybrid approach and compared to the customary beer brew (CB) and mixed raw ingredients (RI). The proximate compositions of the resultant beer were then evaluated. The optimized beer brew (OPB) was higher in energy (165 kcal), crude protein (8.6%), and ash content (1.0%). The CB had the highest concentration of magnesium (1170.5 mg/kg), potassium (2993.8 mg/kg), and phosphorus (2100.7 mg/kg). Glutamic acid was the highest detected amino acid, with concentrations of 1.5 g/100 g, 1.5 g/100 g, and 1.6 g/100 g in the RI, CB, and OPB, respectively. The OPB contained a higher concentration of the two forms of vitamin B3, nicotinamide (0.2 µg/g) and nicotinic acid (0.7 µg/g) in comparison to the CB. The concentration of mannitol, was 0.4 mg/g, 0.2 mg/g, and 2.0 mg/g in the RI, CB, and OPB respectively. In comparison to the CB, the OPB had a desirable nutritional profile.
Categories	Food Chemistry & Ingredients,Traditional & Future Food
Other Authors	Name: Janet Adeyinka Adebiyi Organisation: University of Johannesburg City: Johannesburg Country: South Africa Name: Oluwafemi Ayodeji Adebo Organisation: University of Johannesburg City: Johannesburg Country: South Africa

Board No.	131
Author Name	L.A.D.S. De Silva
Organisation	Sabaragamuwa University of Sri Lanka
Country	Sri Lanka
Title	Experimental evaluation of physicochemical characteristics of chili: Sri Lankan variety MI2 (Capsicum annuum L.)
Abstract Text	MI2 (Capsicum annuum L.) is one of the locally developed chili varieties in Sri Lanka, which is rich in nutrients and phytochemicals. Therefore, the study aimed to evaluate the physicochemical and antioxidant properties of MI2 variety. Both fresh and dry chili samples were evaluated for antioxidant properties using 1,1-diphenyl-2-picrylhydrazyl assay and the total phenolic content by the Folin-Ciocalteu reagent method. The ascorbic acid content was determined using the 2, 6 -dichlorophenol indophenol titration method and the capsaicin content was measured by the High-Performance Liquid Chromatography. The radical scavenging activity of fresh and dry chili were IC 50 - 1361.64 µg/ml and IC 50 - 1142.07 µg/ml, respectively. The total phenolic contents of dried and fresh chili were 416.12 GAE µg/g and 33.25 GAE µg/g. The ascorbic acid contents of fresh and dried chili were recorded 150.51 and 85.53 mg AA/100g. Capsaicin content for the fresh and dried chili varied as 476.7± 38.0 ppm and 1251.0±97.1 ppm, respectively.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
Other Authors	Name: D.M.S.P. Bandara Organisation: National Institute of Post-Harvest Management, Sri Lanka City: Anuradhapura Country: Sri Lanka Name: Thilini Kananke Organisation: Sabaragamuwa University of Sri Lanka City: Ratnapura Country: Sri Lanka

Board No.	132
Author Name	Felicia Peh
Organisation	Singapore Institute of Technology (SIT) - Massey University
Country	Singapore
Title	Functional Properties of Native Starch Blends in Asian Steamed Foods
Abstract Text	Native rice starch is the main ingredient in many Asian steamed foods, which are in essence starch gels. Tapioca, corn and wheat starches are commonly added in smaller amounts for improved functionality. This study characterised the functional properties of native starches in single and mixed starch systems (Rice-Tapioca (R-T), Rice-Corn (R-C) and Rice-Wheat (R-W) starch blends at 1:1 ratio). The functional properties of these steamed gels were studied at Day 0, Day 7 and after freeze-thaw with re-steaming (FT). At Day 0, R-C and R-W gels displayed reduced hardness compared to the average values (reductive effect) while R-T showed an averaging effect. At Day 7 of chilled storage, R-T gel showed no significant increase in hardness due to the low degree of retrogradation (based on Differential Colourimetry Scanning data). Despite FT, all mixed starch gels maintained their hardness, which was not achieved by rice starch alone. Modifications in gel textural properties of blends are attributed to a reduction in retrogradation among other complex mechanisms including by granule polydispersity, pasting properties, degree of granule swelling, and amylose leaching. A precise selection of starch blends is an effective strategy for manufacturers to achieve improved functionality in Asian steamed foods.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Kelvin Goh Organisation: Massey University City: Singapore Country: Singapore Name: Matthew Zhao Organisation: Massey University City: Singapore Country: Singapore

Day 3 - 2 November 2022

Board No.	1
Author Name	Tong Thi Anh Ngoc
Organisation	Can Tho University
Country	Vietnam
Title	Occurrence, antimicrobial resistance, and genetic diversity of Listeria monocytogenes at fish-processing plants in Vietnam
Abstract Text	In this study, the occurrence, serogroups, virulence genes, antibiotic susceptibility profiles, and diversity were estimated for *Listeria monocytogenes* isolated from *Pangasius* fish in two processing facilities in Vietnam. *L. monocytogenes* was most frequently detected in wash water samples at 20.8 % (15 out of 72), and in Pangasius fish it was 16.6 % (15 out of 90 fish samples). Serotypes 1/2b were dominant, and internalin genes (inlA, inlC, and inlJ) were found in all the *L. monocytogenes* isolates. Most of the isolates were resistant to cefoxitin, oxacillin, and fosfomycin. Genotyping of *L. monocytogenes* by random amplified polymorphic DNA analysis revealed three clusters of the isolates specific to the facilities to some extent. This study suggests a high risk of *L. monocytogenes* contamination from wash water to fish. Hence, maintaining the quality of water and designing sanitation procedures to reduce *L. monocytogenes* contamination are required to ensure food safety at *Pangasius* fish processing plants.
Categories	Agri and Aqua-Technology

Board No.	2
Author Name	Yusa NAKAMURA
Organisation	Tokyo University of Marine Science and Technology
Country	Japan
Title	Deep-sea aging of greater amberjack (Seriola dumerili) at depths of 4,000 and 6,000 m for sustainable utilization of marine resources
Abstract Text	Long-term-aged fish prepared by refrigeration for more than a week has received substantial attention because of its superior taste and extended shelf life. However, high refrigeration costs and food hygiene concerns have prevented the commercialization of fish aging. Deep sea can potentially suppress microbial growth and provide a suitable environment for fish aging owing to its high pressure and low temperature. Thus, the effects of deep-sea aging on the microbial growth and quality of greater amberjack meat were investigated at depths of 4,000 and 6,000 m. The fish sample was vacuum-packed and then aged. The aging temperature and duration were approximately 1.5 °C and 4 months, respectively. These results were compared with those obtained from a laboratory-aged sample. Deep-sea aging well-inhibited microbial growth in fish meat, particularly at a depth of 6,000 m. Proteolysis was effectively promoted in the deep-sea-aged fish samples. Free amino-acid content, which affects fish taste, was considerably higher in the deep-sea-aged samples than that in the laboratory-aged sample. Therefore, deep-sea aging allows both long-term fish storage and the processing of superior quality fish by inhibiting microbial growth, while promoting proteolysis. This novel technology can contribute to the sustainable utilization of marine resources.
Categories	Agri and Aqua-Technology
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Board No.	3
Author Name	Luis Pinto De Andrade, Pedro Dinis Gaspar
Organisation	University of Beira Interior
Country	Portugal
Title	Delay of fruits ripening by gases inhibition/activation - A review of techniques, methods, and devices
Abstract Text	*Cherry and peach are fruits widely perishable during ripening at air temperature. While the peach is a climacteric fruit, the cherry is non-climacteric, where the factor that varies is the respiration rate. The purpose of this paper is to review devices and/or methods to extend the shelf life of peaches and/or cherries by ripening delay through gases inhibition or activation.* *The most important factors for the ripening process are the conservation atmosphere and the percentage or concentration of oxygen and carbon dioxide. Taking into account that peaches and cherries have their own profiles, the changes in the type of material of the packaging box, the storage conditions, and respiration rate are notorious and thus, it is important to use sensors for monitoring the levels of oxygen and carbon dioxide.* *Technical specifications such as usability, cost, communication capability, accuracy, and data storage size, as well as their advantages and disadvantages, are discussed. With these devices/sensors or even with innovative and efficient and effective methodologies, it is possible to develop intelligent and active packaging that delays the fast ripening of these fruits, allowing to extend the shelf-life and providing the consumer with high safety and quality fruits.*
Categories	Agri and Aqua-Technology
Other Authors	Name: Eduarda Gonçalves Organisation: University of Beira Interior City: Covilhã Country: Portugal

Board No.	4
Author Name	Huijin Heo
Organisation	Chungbuk National University
Country	South Korea
Title	Phytochemical contents of various wheat (Triticum aestivum L.) cultivars grown in Korea
Abstract Text	Whole wheat consumption has been associated with the reduced risk of chronic diseases such as cardiovascular diseases and cancer. These beneficial effects have been attributed to phytochemicals in whole wheats, including carotenoids, tocopherols, tocotrienols, and phytosterols. The objective of this study was to determine phytochemical profiles of 41 different whole wheat cultivars. HPLC was employed to analyze carotenoids and vitamin E profiles. Phytosterols were quantified by GC. Lutein was a major carotenoid in whole wheat cultivars ranged from 40.21 to 132.02 μg/100 g. β-Sitosterol was the predominant phytosterol found in the samples. The concentrations for α-, β-tocopherol and α-, β-tocotrienol were in the range of 0.28-0.80, 0.04-0.45, 0.18-0.44, and 0.62-1.83 mg/100 g, respectively. In correlation analysis, the carotenoid and vitamin E contents showed positive correlations. The principal component analysis indicated that the first two components represented 66.53% of total variability. In clustering analysis, the 41 wheat cultivars were classified into three clusters. Cluster A showed the highest phytosterol contents. Cluster B contained 21 cultivars and had the highest carotenoid contents compared to other clusters. This study provides basic information to plant breeders and biotechnologists who are planning to breed genotypes with high content of phytochemicals.
Categories	Agri and Aqua-Technology
Other Authors	Name: Minjun Kim Organisation: Chungbuk National University City: Cheongju Country: South Korea Name: Kyeong-Hoon Kim Organisation: Rural Development Administration City: Wanju-Gun Country: South Korea Name: Jong-Wook Chung Organisation: Chungbuk National University City: Cheongju Country: South Korea Name: Junsoo Lee Organisation: Chungbuk National University City: Cheongju Country: South Korea

Board No.	5
Author Name	Roshini Devi Mohan
Organisation	Singapore Food Agency
Country	Singapore
Title	Identification and Antibiotic-Susceptibility Profiling of Aeromonas species in seafood products along the food chain in Singapore
Abstract Text	*Aeromonas* species are facultative anaerobic bacteria that are widely distributed in aquatic and terrestrial environments. They are also increasingly recognized as human pathogens accountable for causing gastroenteritis as well as extra-intestinal infections. Recent studies have shown that this emerging foodborne pathogen has been detected in meat, fresh vegetables, drinking water as well as fish and shellfish in seafood related outbreaks. The extensive use of antibiotics in aquaculture sector which aids in prevention and treatment of bacterial diseases, have resulted in an increase in antimicrobial resistance (AMR) that needs to be monitored. As part of Singapore's National Strategic Action Plan (NSAP) towards AMR with One Health's approach, the AMR surveillance program aims to study the trends of prevalence of *Aeromonas* species in seafood products along the food chain (from imported food, retail food and local fish farms). This study has isolated a total of 115 *Aeromonas* spp. bacteria from 710 seafood products since the year 2021 of which, 71% (n=81/115) were *Aeromonas hydrophilia/caviae* and 24% (n=28/115) were *Aeromonas sobria*. 26% (n=30/115) of the *Aeromonas* species isolated were from Ready-To- Eat (RTE) oysters. Antimicrobial profiles and genome analysis of the isolated *Aeromonas* will provide a better understanding of AMR implications in aquatic environments and fish health. Overall, our findings highlighted the occurrences of *Aeromonas* species in seafood products, particularly RTE types, which potentially harbours a threat towards food safety for public health consumption. (230 words)
Categories	Agri and Aqua-Technology
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Board No.	6
Author Name	Liu Zifei
Organisation	NUS
Country	Singapore
Title	Effects of carvacrol combined with chitosan coating on fresh-cut jackfruit
Abstract Text	Essential oils (EOs) are often used to address spoilage problems triggered by tissue damage in fresh-cut fruits during storage. However, the loss in bioactivity from their volatility limits the application of EOs. To improve the functional properties of EOs, fresh-cut jackfruit with four different coating treatments (uncoated; chitosan-coated; carvacrol-coated; chitosan-carvacrol-coated) were subject to microbiological and physicochemical characterisation during storage and further metabolic studies using NMR. Chitosan-carvacrol coating showed the most effective in controlling juice leakage (8.83g), moisture loss (7.47%) and less discolouration after 13 days. Also, the growth of total aerobic bacteria, and yeast and mould was retarded effectively by chitosan-carvacrol coating treatment (1.02 and 0.97 log CFU/g reduction at day 7, respectively), which extended the shelf life approximately two days. Forty-four metabolites were identified, among which most saccharides and undesirable metabolites such as histidine, dimethylamine, and choline ($P < 0.05$) underwent depletion significantly but amino acids showed increased. The metabolic pathway of glycine, serine and threonine ($P< 0.05$) had the most significant relationship with the storage of jackfruit. Chitosan-carvacrol coating shows the potential to extend the shelf life of fresh-cut fruits. Effectively by blocking and altering the amino acid-related metabolic pathways to inhibit microbial growth.
Categories	Agri and Aqua-Technology

Board No.	7
Author Name	SONG Shuang
Organisation	National University of Singapore
Country	Singapore
Title	Sowing seeds for the future: The application of genome-wide association in genomics-assisted breeding of kale for indoor farming
Abstract Text	The majority of commercial vegetable seeds are selected based on their performance in the traditional open-air farm setting. Nonetheless, with the increasing popularity of indoor farming, there is a need to develop seeds selected for indoor conditions. In this study, 15 cultivars of *Brassica oleracea* var *acephala*, or kale, were both genotyped and phenotyped to identify genetic markers controlling yield-related traits. After identifying single nucleotide polymorphisms (SNPs), samples were sub-grouped based on population structure via principal components analysis. Group differences were characterized using fixation index calculations, with selective sweeps converging towards purifying selection on survival-related genes. Within each group, SNPs were linked to yield-related phenotypes using genome-wide association. Strong candidate SNPs beyond the significance threshold of 10^{-6} were selected, and 13 related genes identified via linkage disequilibrium between inter-gene SNPs and the candidate SNPs. These genes potentially regulate development pathways that influence yield-related traits. Genomic selection was then performed with 20,000 SNPs associated with the traits for each group to predict phenotypes. Results showed that model performance improved with more phenotype-associated SNPs, validating the association of the markers to the phenotypes. The results of this study can be used to improve plant yield in indoor settings through genomics-assisted breeding.
Categories	Agri and Aqua-Technology
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Board No.	8
Author Name	Chengchu Liu
Organisation	University of Maryland Sea Grant Extension Program
Country	USA
Title	OFF-FLAVOR COMPOUNDS IN FINFISH GROWN IN RECIRCULATING AQUCULTURE SYSTEM
Abstract Text	The contribution of world aquaculture to global seafood production and human consumption has been steadily growing, which accounts for 46% of the total seafood production and 52% for human consumption. Although there have been different aquaculture systems for seafood production, recirculating aquaculture systems (RAS) have gained prominence. One major advantage of RAS is the ability to reduce the need for fresh, clean water while still maintaining a healthy environment for fish. However, fish grown in RAS has the tendency to bioaccumulate earthy and musty off-flavors. This presentation will provide an overview on off-flavors compounds in RAS-produced fish and their mitigation strategies. Various compounds are responsible for undesirable (musty, muddy, and earthy) flavor and taste in RAS-produced fish. Among them, two compounds geosmin (GSM) and 2-methylisoborneol (MIB) are greatest concern. Different perspectives of GSM and MIB will be discussed, including (1) the origins of GSM and MIB, (2) effects of water quality and RAS operations on GSM and MIB, and (3) product quality improvement through various strategies to remove GSM and MIB in RAS-produced fish.
Categories	Agri and Aqua-Technology

Board No.	9
Author Name	Chengchu Liu
Organisation	Seafood Technology Specialist
Country	USA
Title	CAPACITY BUILDING FOR FUTURE SMART SUSTAINABLE SHELLFISH AQUACULTURE MANAGEMENT
Abstract Text	Seafood, including fish and shellfish, provides an ideal package of nutrients and is an important part of a healthy diet. The United States (U.S.) is the sixth largest seafood producer in the world. However, U.S. aquaculture sector is relatively small, accounting for less than 10% of the total production. Globally, aquaculture accounts for 46% of the total seafood production, with of that used 52% for human consumption. In order to advance U.S. aquaculture, the U.S. Department of Agriculture (USDA) has funded numerous projects on aquaculture research, education and extension. This presentation will introduce an innovative framework to transform shellfish farming with smart technology and management practices for sustainable production. Based on smart sustainable shellfish aquaculture management (S3AM), this innovative precise farming and harvesting framework has been developing and implementing through integrating research, education and extension activities, which are conducted among experts in Aquaculture, Engineering, Computer Science, Biology and Environmental Science. The ultimate goal of this comprehensive approach is to build capacity for advancing shellfish farm technology, enhancing nationwide shellfish farm production, preserving environmental heath, sustaining economic viability of shellfish farm operations, and enhancing quality of life for farmers and society as whole. Current progress of the S3AM framework and future outlook will be discussed.
Categories	Agri and Aqua-Technology
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Board No.	10
Author Name	Nikkie D. Francisco
Organisation	University of the Philippines Diliman
Country	Philippines
Title	Valorization of mature coconut water (MCW) as beverage: a review
Abstract Text	Mature coconut water (MCW) is the liquid endosperm (LE) of coconuts aged 9-11 months. Despite its inherent nutritional and functional properties, MCW is often discarded. In the Philippines, about 2.4B L MCW is annually disposed. There is imminent concern of its disposal due to its adverse environmental impact. Compared to young coconut water (YCW), MCW is less commonly consumed due to its unfavorable taste. Limited attempts to valorize MCW as a beverage include blending with fruits, use of probiotics, and fortification with grape pomace extract to improve its sensory and functional properties. Due to its rich nutrients, CW is prone to deterioration. Numerous studies investigated the effects of different thermal and non-thermal processes on YCW. However, for MCW, studies are limited to filtration, pasteurization and microwave heating. This review shows that MCW is a valuable raw material (RM) for a functional beverage. Characterization of the physico-chemical, microbiological and sensory properties of MCW from different Philippine varieties is recommended to understand it as a RM for beverage development. Additionally, underutilized Philippine fruits and vegetables can be used with MCW to improve beverage quality. Finally, other processing treatments and packaging options for MCW beverages can be explored to establish its shelf stability.
Categories	Agri and Aqua-Technology
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Board No.	11
Author Name	Dorin Boldor
Organisation	Louisiana State University Agricultural Center
Country	USA
Title	Improved drying of wood fibers via microwave methods
Abstract Text	The forestry and timber industries are generating large amounts of wood waste (limbs, bark, chips, and sawdust). This renewable resource is underutilized, with large quantities being left in fields or requiring substantial additional processing for conversion into value-added products. As current trends favor minimizing use of fossil fuels, these waste products can be converted into pellets, but the conversion requires specific starting moisture content (mc) to obtain the desired properties. In this study, we investigated the utilization of microwave technology to reduce the mc of wood-derived fibers (25g size samples, starting at 25% mc) from an industrial wood processing operation. The drying times (to 0% mc) reduced significantly as the power was increased from 120W to 480W, 840W and 1200W (respectively 1100s, 420s, 210s, 190s). More importantly, the drying rates stayed high throughout the drying process. The power utilization efficiency, as measured at the wall, was 20.3% for 120W, 65.8% for 480W, 66.9% for 840W, and 78% for 1200W, indicating that system performance increases with the higher powers. Thus, microwave drying can be utilized for rapid reduction of moisture content not only of waste fibers, but also for other agricultural and food materials.
Categories	Agri and Aqua-Technology
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Board No.	12
Author Name	Yaowen Hai
Organisation	Department of Food Science and Technology, National University of Singapore
Country	Singapore
Title	Nano-emulsified essential oils-based edible coatings inhibit Pseudomonas weihenstephanensis on tilapia fillets (Oreochromis niloticus) via disturbing the metabolic energy and amino acid pathways
Abstract Text	*Pseudomonas* brings postharvest losses and infection concerns, which can be effectively solved by essential oils (EOs). However, the effects can not last a long time because of the high volatility of EOs. To extend the effect, coatings derived from three nano-emulsified EOs (NEOs: clove, cinnamon, white thyme) and three strains of *Pseudomonas weihenstephanensis* (ABa3, ABe3, and BBa3) were investigated. Their bioactive compounds and droplets sizes were measured using GC-MS and Nano Particlesizer. The analysis of the antimicrobial effect was conducted on fillets inoculated with *P. weihenstephanensis*, followed by a metabolic study using NMR. The main compounds in NEOs were eugenol (93.6%), cinnamaldehyde (89.4%), and thymol (73.5%). Among them, coating derived from cinnamon NEO (maintained 180 nm within 10 days) significantly reduced 1.80 log CFU/g of *Pseudomonas* on fillets. A total of 45 metabolites were identified and most of them suffered significant depletions, especially glycolysis intermediates and amino acids. Meanwhile, low levels of putrescine and creatine indicated the disturbance of cells growth. In short, bacteria cells suffered self-destruction and the failure of cellular repair after cinnamon NEO treatment. Interfering the metabolic pathways associated with energy and amino acids could be crucial in controlling the *Pseudomonas* spoilage in other perishable food.
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Board No.	13
Author Name	E.I. KIPRUSHKINA
Organisation	ITMO University
Country	Russia
Title	Influence of the immune modulator as a feed additive for bees on the honey quality and biosafety
Abstract Text	The production of beekeeping products ecologically safe for humans is an important social, medical and biological problem, one of the main urgent and modern tasks in the industry. In the current environmental conditions, there is a threat to the normal life of bees and the possibility of contamination of beekeeping products. A serious problem in the field of beekeeping is the massive death of bee colonies as a result of the use of fertilizers and pesticides in agriculture as plant protection products, exposure to electromagnetic radiation, poor-quality nutrition of bee colonies, emissions from industrial enterprises and road transport, etc. To reduce the negative effect of negative factors for the vital activity of bees, a multifunctional feeding was developed, which increases the survival rate, resistance and immunity of bees based on the use of polysaccharides of higher fungi - β-glucans, which have a pronounced immunomodulatory activity. As a result of the study, it was found that the feed additive for bees based on β - glucans does not negatively affect the quality and safety of honey.
Categories	Agri and Aqua-Technology
Other Authors	Name: M. M. SHAMTSYAN Organisation: Technical University City: St. Petersburg Country: Russia Name: A. A. IVANOVA Organisation: ITMO University City: St. Petersburg Country: Russia

Board No.	14
Author Name	Aubrey Lee and Huei Hong Lee
Organisation	International Food and Water Research Center, Waters Pacific Pte Ltd
Country	Singapore
Title	Free Amino Acids Profile of Protein Enriched Mushroom (Pleurotus ostreatus) Grown on Oil Palm Based Substrate
Abstract Text	The environmental pollution from the palm oil industry is one of the global concerns due to the amount of waste generated. Fungi have effective delignification capability to convert raw biomass into the fruiting body which appeared to be a good protein source. Hence, this study aimed to profile the available amino acids of the edible fungi, Pleurotus ostreatus oyster mushroom grown on a substrate made from oil palm empty fruit bunch (OPEFB) fiber. The harvested mushroom fruiting bodies were analyzed for crude protein content. Screening of amino acids in hot water extracts was conducted using ultra-high-performance liquid chromatography-quadrupole time of flights mass spectrometer (UHPLC-QToF). Three times higher crude protein content ($p < 0.05$) are shown in mushroom fruiting bodies grown on OPEFB-based substrate than in the control substrate. Metabolite profiling of hot water extracts detected 6 essential amino acids and 5 non-essential amino acids. Tyrosine and valine are present at a relatively higher level in hot water extracts of mushrooms grown on an OPEFB-based substrate than in control. This study shows that OPEFB-based substrate used for mushroom cultivation could improve the crude protein and free amino acids content of mushrooms. The innovative use of OPEFB-based substrate as mushroom cultivation substrate introduces the waste to wealth concept in the production of alternative protein sources.
Categories	Agri and Aqua-Technology,Food Chemistry & Ingredients
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Board No.	15
Author Name	Meihan Tao
Organisation	The University of Auckland
Country	New Zealand
Title	Optimized droplet delivery of novel antimicrobial carriers to plant leaf surfaces
Abstract Text	Yeast microcarriers have been demonstrated to be excellent encapsulants that enhance the inactivation efficacy of biocides against foodborne pathogens. This study aims to investigate the potential of using yeast microcarriers as an eco-friendly approach to deliver biocides on leafy plants. A high-speed imaging approach was designed to study the wetting dynamics of yeast droplets on a PDMS-replicated biomimetic leaf surface and optimize the spray composition to minimize spray drift. The results demonstrate a strong impact of velocity (V0) on the maximum spreading of yeast suspension (βmax=Dmax/D0); for every 1 m/s increase of v0, the βmax of the yeast droplet increased 1.01 dimensionless on leaf surface. By modifying the surface tension (from 74.65 ± 0.05 to 60.18 ± 0.28 mN/s) and viscosity (from 1.11 ± 0.43 to 2.11 ± 0.22 mPa*s) with 40% glycerol, βmax of the yeast droplet increased 0.93 dimensionless corresponding to 1 m/s increase of v0. The results suggest that an increase in viscosity of yeast droplets resulted in a decrease in maximum spreading and lower likelihood of splitting on the uneven leaf surface. This research provides a fundamental understanding of microcarrier-surface interactions and will be adaptable to future precision agricultural spray systems.
Categories	Agri and Aqua-Technology,Food Chemistry & Ingredients
Other Authors	Name: Dr. Kang Huang Organisation: The University of Auckland City: Auckland Country: New Zealand

Board No.	16
Author Name	Ricardo Villalobos-Carvajal
Organisation	Universidad del Bío-Bío
Country	Chile
Title	Influence of the nanoemulsion coating application method on the postharvest quality of cherry tomatoes
Abstract Text	The way of applying edible coatings on fresh fruits and vegetables is one of the critical factors associated with the effectiveness of the coatings to prolong their shelf life. In this research, the effect of the application method of a nanoemulsified chitosan-carvacrol coating on water barrier properties and postharvest quality of cherry tomatoes was evaluated. The coating application methods studied were: immersion, spray and electrostatic spray. Surface density of solids (SDS) and resistance to water vapor transfer (RWVT) on day 1 were determined for the coated tomatoes. In turn, weight loss, respiratory activity, firmness, soluble solids, titratable acidity, pH, total carotenoids and colour during 15 days of refrigerated storage were also evaluated. The results showed that the application of coatings using the immersion and electrostatic spraying techniques generated coatings with the highest barrier to water vapor transfer (RWVT) and gases, due to their greater theoretical thickness (DSS). These coatings reduced the weight loss and respiratory activity of the tomatoes, delaying their ripening and maintaining their firmness. In conclusion, the use of the electrostatic spray technique could be advantageous over the immersion technique, since it uses a smaller amount of emulsion and has better control of the application process.
Categories	Agri and Aqua-Technology,Food Packaging & Material Science
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Board No.	17
Author Name	Liling ZHANG
Organisation	Nanyang Technological University
Country	Singapore
Title	Boosting leafy crop growth and harvests: Scalable, tunable biodegradable microgel formulations designed for effective release of nutrients and moisture in soil
Abstract Text	Fuelled by the growing world population, the global food crisis is compounded by issues such as global warming, dwindling availability of arable cropland and non-saline water for agriculture. To mitigate these issues, our team has developed and optimized plant material-based biodegradable microgel formulations capable of 1) delivering nutrient cocktails that supplement leafy crop growth, and 2) maintaining sufficient soil moisture and water percolation for plant drought resilience. The latter also increases the potential survivability of harvests by buying time for crop growers to address an urgent, unforeseen problem (e.g. manpower crunch and logistical hurdles due to pandemic, sudden / unpredictable drought onset due to climate change). In this work, we demonstrate that a single post-seeding application of our microgel formulation to indoor-farmed lettuce crops not only improves plant vigor, leaf development and growth until harvest, but also helps buffer against soil dryout for sustaining crop health. The design and synthesis of the microgels' encapsulation and degradation are versatile and scalable, and allow application by watering manually or via existing irrigation channels without the need for soil churn.
Categories	Agri and Aqua-Technology,Food Processing and Engineering
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Board No.	18
Author Name	Shanshan Liu
Organisation	School of Chemical Sciences, University of Auckland
Country	New Zealand
Title	Bio-inspired Carrier Systems and Improved the UV-stability of Bacteriophage
Abstract Text	Despite significant progress in exploring new biocontrol solutions to reduce bacterial contamination in the agricultural environment, the effectiveness of these living biopesticides such as bacteriophages (phages) remains limited, particularly due to their UV instability. This study aims to evaluate the feasibility of using yeast cell wall particles (YCWPs) as microcarriers to encapsulate phages for improving their stability under UV irradiation. In our study, T7 phages were used as a model phage system. A rapid and non-thermal vacuum infusion method was used to facilitate the encapsulation process. The success of encapsulation was demonstrated by confocal microscopic images. Approximately 8 log PFU of T7 phages were loaded into 0.1 g YCWPs under negative pressure (1.01 kPa for 50 s) in a vacuum sealing unit. The YCWPs effectively enhanced the UV stability of T7 phages, showing less than 1 log PFU/mL reduction in phage viability after 2-hour exposure to UV-A. As a control group, the viability of non-encapsulated phages was reduced by more than 3 log PFU/mL under the same experimental conditions. In summary, this research shows a new and cost-effective strategy to enhance phage stability under UV exposure, which will be adaptable for a field deployable biocontrol approach.
Categories	Agri and Aqua-Technology,Food Processing and Engineering
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Board No.	19
Author Name	ZHANG XING
Organisation	National University of Singapore
Country	Singapore
Title	A Response-Surface-Methodology-Assisted Study of the Enzymatic Hydrolysis of Minced Chicken Carcass
Abstract Text	By-products from meat and poultry processing can be further processed and recycled for other applications. Proteases were utilized to treat minced chicken carcass to make protein hydrolysates that can be employed as nutritional or taste enhancers. Flavorzyme®, Protamex®, PB01, PB02, and PB03 were tested for their ability to hydrolyze chicken carcass. Using RSM and Box-Behnken design, we adjusted the critical hydrolytic parameters in PB02, which had the maximum degree of hydrolysis. The best conditions were found to be 3:100 (w/w) enzyme/substrate, 51.20°C, natural pH, and 1:1 (w/v) substrate/water for a maximum DH of 45.44 percent after 4 hours of hydrolysis. Essential and taste-active amino acids made up 41.74 percent and 92.64 percent of the protein hydrolysate, respectively. Due to the hydrolysate's high concentration of low molecular weight peptides (1000 Da), these may be the precursors of aromatic chemicals when heated. This study's hydrolysate can be used as a flavoring agent or a fermentation medium.
Categories	Agri and Aqua-Technology,Food Processing and Engineering

Board No.	20
Author Name	Sebnem KURHAN
Organisation	Czech University of Life Sciences
Country	Czech Republic
Title	Method to track carbamazepine and its metabolites in rabbit tissues, blood, and excrete at different sample volumes
Abstract Text	The threat of water scarcity led The European Parliament and Council (EU2020/741) to set legislation on the re-use of treated wastewaters in agriculture. However, reclaimed water in feed crops may lead to the carry-over of resistant pharmaceuticals to the farm animals. Carbamazepine (CBZ) is a treatment-resistant pharmaceutical and is accumulated in crops. This study aimed to develop and optimize a sensitive analytical method for CBZ and its metabolites on rabbit tissues, excretes, and serum at different sample weights(1g, 100mg, and 0.1 mL). Solid samples were lyophilized, milled, and weighted, while the liquid samples were directly transferred into the test tubes. Dried samples were wetted, and acetonitrile was used as an extraction solvent. The extraction was carried out with the modified QuEChERS EN15662:2008 method with different salt weights. The extract was de-fatted, cleaned up, and analyzed with LC-QQQ-MS. The extraction method for all compounds (CBZ, CBZ-epoxide, rac-trans-10,11-dihydro-10,11-OH-CBZ, 3-OH-CBZ, acridine, acridone, 10,11-dihydro-10-OH-CBZ) was validated based on SANTE/12682/2019. The limit of quantification varied between 0.5 ng/g and 10 ng/g according to test matrices, sample weight, and sample physical state. The developed method is easy, sensitive, and adaptable to also other matrices.
Categories	Agri and Aqua-Technology,Food Safety & Regulatory Science
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Board No.	21
Author Name	Carelene Lakhan, Sherrilyn Bain
Organisation	The University of the West Indies
Country	Trinidad & Tobago
Title	Evaluation of Food Safety Knowledge, Practices and Risk-Perception among Diabetic Patients in Chronic Disease Clinics in Trinidad and Tobago, West IndiesÂ
Abstract Text	In Trinidad & Tobago, it is estimated that there are over 150,000 people living with diabetes and the numbers keep growing, with 1,000 new cases every year. This study investigated whether diabetics have perceived risks of secondary conditions related to food safety risks and their level of acceptability of diabetic food safety knowledge and practices. A cross-sectional study was conducted among a cohort of 124 patients with diabetes selected on site at four public clinics of St. George Central, Trinidad. The structured questionnaire comprised of demographics, morbidic experience, food safety knowledge and food safety practices. There was a significant association($P<0.05$) between years of diagnosis of diabetes to knowledge of risks perception of secondary conditions. Participants had a 'fairly acceptable level' (50-80%) of food safety knowledge and practices regardless of diabetic type and years of diagnosis. Although Salmonella (56.2%) and E. coli (49.2%) were the most known bacteria, 37% of participants were unaware of any bacteria. Participants in this study had more than just basic knowledge about food safety with a 'fairly' acceptable level of proper food handling practices but lacked risk-perception related to morbidic conditions.
Categories	Food Safety & Regulatory Science
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Board No.	22
Author Name	Yi-Yuh Huang
Organisation	National Taiwan Ocean University
Country	Taiwan
Title	Protective Effects of Vitellaria paradoxa Nut Extract Toward Cytotoxicity and Osteoarthritis by Polystyrene Microplastics in Male Rats
Abstract Text	Microplastics (MPs) are environmental pollutantsthathave been shown toaffect physiological metabolism, neurotoxicity, intestinal flora imbalance, andabnormal hepatic lipid metabolism in rats. Despite this, little is known about the healtheffects of microplastics. Osteoarthritis (OA) is a degenerative disease characterized bychronic inflammation in the joints. *Vitellaria paradoxa* nut extracts (VPE) have beendemonstrated to have anti-inflammatory, anti-oxidant, and anti-osteoarthritis properties.Therefore, this article explores whether VPE can reduce theinflammation caused by Polystyrene MPs.*In vitro,* the results showed that exposure of RAW264.7 to 0.5 μmMPs for 48 hours significantly decreased cell viability and increased oxidative stress.After the non-saponifying fractions are administered from VPE,the toxicity of MPsmay be alleviated.*In vivo*, compared to the control group, the group given VPE cansignificantly decrease the levels of pro-inflammatory cytokines Interleukin-1β, nitricoxide, oxidative stress, matrix metalloproteinase-13, and C-telopeptide fragments oftype II collagen following MPs exposure serum in rats. In conclusion, 0.5 μm MPs canincrease cellular oxidative stress, induce chronic inflammation throughout the body,and worsen the damage caused by OA. While VPE can reduce oxidativestress in cells,inhibit chronic inflammation throughout the body, and mitigate the harm caused byMPs
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Board No.	23
Author Name	Chuan-Liang Hsu
Organisation	Tunghai University
Country	Taiwan
Title	Extending the reactive species of plasma-activated water and enhances its long-term bactericidal properties through pH adjustment
Abstract Text	Fresh plasma-activated water (PAW) has been applied for various treatments including for decontamination of bacteria. However, maintaining the characteristics of PAW for a long time is a challenging effort for it could compromise its beneficial properties. This study had been applied low temperature (-20^{o}C and -80^{o}C) in conserving the reactivity of PAW stored for several days, unfortunately, the attempts failed to find good results. In addition, the lower the storage applied, the faster PAW losses its reactivity. For instance, it only took 4 hours for PAW losses its nitrite and hydrogen peroxide significantly making PAW lose its bactericidal. However, this study proved that pH adjustment is able to preserve the beneficial reactive species contained in PAW longer. Furthermore, via simple proper pH manipulation, the bactericidal properties of PAW can be enhanced and generated whenever PAW is applied. The increasing pH level of PAW to 5 or 7 maintains the NO_2- and H_2O_2 significantly for 10 days of observation. This adjustment mode, in contrast, reduces the ability of PAW in killing bacteria significantly. However, simply by lowering the pH level back to 3.5 can the bactericidal restored and enhanced make it possible to delay the utilization of PAW.
Categories	Food Safety & Regulatory Science

Board No.	24
Author Name	MUTHUBHARATHI BALASUBRMANIAN CHELLAMMAL
Organisation	ALAGAPPA UNIVERSITY
Country	India
Title	Impact of metabolites isolated from food borne pathogen, Cronobacter sakazakii on the chemotaxis behaviour of model organism, Caenorhabditis elegans
Abstract Text	*Cronobacter sakazakii*, an emerging food borne pathogen prevalently detected in contaminated powdered infant formula and is associated with different diseases including meningitis, necrotizing enterocolitis and bacteremia in immune-compromised, neonates/infants. It can cross the blood-brain-barrier and affects CNS. Impact of *C. sakazakii* on host neuronal cells and behaviour is largely unknown. Hence, a detailed molecular data is required to understand its severity. *Caenorhabditis elegans* a unique model for studying chemical communication, as they relay on chemosensation. *C.sakazakii* affected the life-span of *C.elegans* when compared with control and also alters dopamine cells by increasing the dopamine transportation that modify the behaviour. Although, *C.sakazakii* is pathogenic to *C.elegans*, our analysis indicated that *C.elegans* were highly attracted towards *C.sakazakii* when compared to its food source, *E.coli* OP50. To study cue for the attraction, biomolecules (DNA/RNA/Protein/Lipids/Metabolites) of *C.sakazakii* were isolated and used for observing the chemotaxis behaviour of *C.elegans*. The results signified that, *C.elegans* were attracted towards the isolated metabolites (acidic conditions) than the other extraction methods. Combined action of isolated metabolites (acidic conditions) and whole pathogen drastically reduced the survival of *C. elegans*. In addition, preliminary qPCR analysis suggested that the isolated metabolites modify the candidate immune regulatory genes and the proteins. Key words: *Cronobacter sakazakii*, *Caenorhabditis elegans*, dopamine, metabolites and Chemotaxis.
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Board No.	25
Author Name	Maria Leonora dL. Francisco
Organisation	University of the Philippines-Diliman
Country	Philippines
Title	Assessment of skim milk powders available in Philippine market
Abstract Text	The skim milk powder (SMP) market in the Philippines is highly import-driven due to the small but developing dairy industry in the country. In addition, milk and its products are one of the most common adulterated foods, thus, attention must be placed in terms of compliance to international and local regulations. This study assessed the overall quality of SMP in the Philippine online and physical retail markets. Twenty-six SMP samples were purchased and were evaluated based on their compliance with mandatory labeling requirements, proximate composition (moisture, fat and protein), microbial quality, and functional properties. Twenty five out of 26 SMP samples failed to comply with the 11 mandatory labeling requirements. Nineteen samples had moisture content >5%, nine had fat >1.5%, and 25 had protein content <34%. All SMP samples had acceptable microbial load. Many samples performed well in terms of functional properties. Fourteen exhibited good emulsifying properties and heat stability, 15 showed good solubility indexes, and all had fair to excellent flowability. There is a need to update the current local standards for milk and milk products' identity such as protein content, which is critical to ensure the purity and quality of milk powders, and subsequently to protect the consumers.
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Board No.	26
Author Name	Sio Yang Yie
Organisation	National University of Singapore
Country	Singapore
Title	Allergenicity risk assessment of novel insect-based food proteins
Abstract Text	Background: Novel foods derived from insect-based proteins were proposed as a sustainable source of dietary proteins for human consumption, however, the allergenicity of these proteins is not fully elucidated. Objective: To investigate the allergenicity of food proteins derived from insect sources. Methods: We recruited 131 participants from Sunway University, Malaysia (age = 23.8 ± 9.1, 30.4% male). The serological assessment was performed using the immune-dot-blot approach against a panel of insect-derived proteins, including wild-caught crickets (Lebinthus luae), wild type and lab-cultured strain "D" black soldier flies (BSF-WT and BSF-D) that were each fed on different types of feeds. Results: The IgE sensitization levels (IU/ml) of BSF-WT-derived proteins were generally higher than that of BSF-D-derived proteins ($p < 1 \times 10\text{-}5$). BSF-WT fed with soybean meal resulted in the highest allergenicity of their extracted proteins as compared to all the other feed types ($p < 1 \times 10\text{-}5$). BSF- and crickets-derived protein sensitizations ($p < 0.05$) were both positively correlated with seafood sensitizations, suggesting a shared allergenic component. Lastly, the heating of these insect-derived proteins resulted in significant changes in their sensitization profile. Conclusion: Allergenicity assessment is essential to evaluate the safety of insect-derived novel foods for human consumption.
Categories	Food Safety & Regulatory Science

Board No.	27
Author Name	Seinn Lann Aung
Organisation	Kasetsart university
Country	Thailand
Title	Development of encapsulated form of Salmonella phages to increase their stability and efficacy in controlling Salmonella
Abstract Text	**Abstract** Currently, the use of bacteriophages (phages) in food or feed application to control foodborne bacterial pathogens is limited due to their stability and efficacy in various harsh conditions. In this study, the encapsulation technique via freeze-drying was applied to improve phage application. Three phages including vB_SenS_KP001, vB_SenS_KP005, and vB_SenS_WP110 with a broad lytic spectrum covering over 73 *Salmonella* serovars were used for encapsulation. The formulations containing coating materials were optimized by adjusting the ratios of whey protein isolate (WPI), mannitol, and trehalose. The combination of WPI/mannitol/trehalose at a ratio of 1:1:1 represented the optimal formulation with the highest encapsulation efficiency of 94.5%. Fourier transform infrared spectroscopy analysis showed H-bonding in the mixture system and glass transition temperature presented at 72.6 °C. Phage in the encapsulated form showed the phage survivability of 33.9% after 24 h of exposure to pH 2, and 100% after 24 h of exposure to pH 5, 7, 9, and 10. Phage in the non-encapsulated form did not survive at pH 2. In addition, microencapsulated phage showed high effectiveness in decreasing the numbers of *S.* Enteritidis and *S.* Typhimurium by approximately 3 log CFU/ml at 37 °C. Overall, encapsulated phages showed high stability over a wide range of pH and can be potentially used in various applications to control *S.* Enteritidis and *S.* Typhimurium. **Keywords**: Bacteriophage, Microencapsulation, Phage efficacy, Encapsulation efficiency, *Salmonella.*
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Board No.	28
Author Name	Abigail S. Rustia
Organisation	University of the Philippines - Diliman (College of Home Economics)
Country	Philippines
Title	Defining Risk: Hepatitis A Virus in Philippine Shellfish (Oyster and Mussels)
Abstract Text	Hepatitis A Virus (HAV) is considered a primary concern based on the incidence of food-borne diseases, severity, mortality, and transmission. In the Philippines, HAV endemicity is gauged from moderate to high. Despite this, health risks related to local seafood consumption are only raised relevant to the occurrence of red tide or mass fish kill. However, local shellfish as a potential source of HAV should also be considered. This article examines the current trends and data relevant to the presence of HAV along the local shellfish supply chain. Recent research will be considered, from the perspectives of production levels, microbial concentration, consumer demands and behavior, and food safety. It will be shown that despite the susceptibility of local shellfish to HAV contamination, several crucial data gaps such as reliance on bacterial indicators, absence of monitoring records for HAV concentration in local shellfish products, and insufficient studies regarding the effect of local cooking practices for HAV inactivation in shellfish are identified. The synthesis of this article will be able to guide the national food safety risk managers in the identification of data gaps to be addressed to facilitate a full-blown food risk analysis of HAV in Philippine shellfish (oyster and mussel).
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Board No.	29
Author Name	Abiodun Adebayo-Oyetoro
Organisation	Yaba College of Technology
Country	Nigeria
Title	Food Safety Assessment of Roasted Meat (Suya) Spices from Yaba Area of Lagos State, Nigeria
Abstract Text	The crave for street-vended foods has called for attention from food safety perspective. Among these foods is the boneless, thinly sliced, ready-to-eat, barbecued and spicy meat called suya. Possible sources of contamination for this product include: poor handling by vendors, spices, use of contaminated equipment and utensils to mention but few. Low educational status of processors, poor hygienic condition of processing and sale indicate that the product constitutes a safety risk. In addition, meat products which are rich in protein as well as spices in powdery form with high water activity will support the growth and multiplication of microbial hazards The results of this study show that the business is mainly for men whose age is between 24-35 years, out of which 49% are without formal education while 51% only had basic education. Total viable and mould counts for the selected eighteen sample spices ranged between 2.7-8.3X105 cfu/g and 2.7-4.6X105cfu/g respectively. These results are comparable with the findings of other researchers. Preparation and sale of suya in open places encourage microbial contamination which can cause food-borne illness. The production and sale of suya with the spice should be under strict hygienic condition so as to prevent public health concern.
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Board No.	30
Author Name	Phatho Matsheketsheke, Dr Shonisani Eugenia Ramashia
Organisation	University of Venda
Country	South Africa
Title	Microbial quality of ready-to-eat food in Thohoyandou, Limpopo province, South Africa
Abstract Text	Food borne diseases and problems relating to microbiological quality of food is a serious problem around the globe. The aim was to assess the microbial quality of ready-to-eat (RTE) foods sold in retailers around Thohoyandou, Limpopo province, South Africa. Thirty-two RTE foods were purchased from four different retailers and transported to Food Microbiology laboratory. For each sample, 10 g was weighed and mixed with 90 ml of Buffered peptone water and homogenised in a sterile stomacher bag for 2 min. Serial dilutions of (10^{-1} to 10^{-7}) were made for total plate count, coliform count, S*almonella species, Staphylococcus aureus, Bacillus cereus, Escherichia coli*, yeasts and moulds. Biochemical tests such as indole and citrate utilisation test were conducted. The data were analysed using SSPS version 26. Sandwich from Retailer1 had the highest *B. cereus* of 3.9507 $\log_{10}$cfu/g as compared to other retailers. *S. aureus* was not detectable in meat pies and beef stew prepared from Retailer1. Yeasts ranged from 1.4337 to 3.7314 $\log_{10}$cfu/g. Biochemical tests showed positive indole test for *E. coli* and two positive citrates for *Staphylococcus aureus* and *Bacillus cereus.* Contamination of RTE may pose hazard to public health, thus hygiene needs to be maintained to ensure safe food.
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Board No.	31
Author Name	Jonina Marie J. Tengco
Organisation	University of the Philippines Los Baños
Country	Philippines
Title	Subchronic Oral Toxicity Evaluation of Philippine Bignay (Antidesma bunius (L.) Spreng cv. â€˜Kalabawâ€™) Fruits in ICR Mice
Abstract Text	*Bignay* (*Antidesma bunius* (L.) Spreng), a fruit bearing plant indigenous to the Philippines, was found to possess distinct health benefits. Despite this, toxicity studies on its fruits are limited, which are needed to ensure its safety for human consumption. The study evaluated the possible toxic effects induced by oral subchronic administration of *bignay* fruits in male and female ICR mice for 28 days. Aqueous *bignay* fruit extracts were given once a day through oral gavage and the animals were observed daily for abnormal behavior, while body weights, and feed and water intake were also recorded daily. Results showed that the *bignay*-treated mice did not show any significant changes in body weight, feed and water intake, blood chemistry values, and hematology parameters compared to their controls and published values. All mice also had appreciable weight gain (10.89% to 21.69%) with zero morbidity and mortality. Gross and macroscopic evaluation of key organs showed no abnormalities, suggesting that the fruits did not induce any morphological abnormalities. The study concluded that subchronic administration of *bignay* fruit extracts is safe for consumption with an LD_{50} greater than 2000 mg/kg or 162.16 mg/kg BW in human equivalent dose.
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Board No.	32
Author Name	Obadina Adewale Olusegun
Organisation	Federal University of Agriculture
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Title	Fresh produce value chain in Africa: transmission of antimicrobial-resistant bacteria
Abstract Text	Antimicrobial resistance (AMR) is of increasing concern to food safety by significantly affecting the health and livelihoods of people, with direct consequences for national economic development particularly in developing countries. In Africa, there is increasing consumer awareness of the health benefits of fresh produce which is driving consumer demand for these products. Fresh produce typically undergo minimal processing before consumption, and there is increasing concern about their potential role as vehicles for transmitting foodborne pathogenic bacteria and antibiotic resistance. Fresh produce can be contaminated with antimicrobial resistance bacteria at all stages of the value chain and may pose risks of life-threatening foodborne diseases to the final consumer. This review considered the Fresh produce as a vehicle for transmission of pathogenic organisms, One Health perspective of antimicrobial resistance and the fresh produce value chain in Sub-Saharan Africa.
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Board No.	33
Author Name	Cheng-Jou Shen
Organisation	School of Food Safety, Taipei Medical University
Country	Taiwan
Title	Effect of food processing on the thermal-stability of mollusk tropomyosin
Abstract Text	Mollusks is one of major food allergens and needs to be labeled on the food packaging according to the laws and regulations in European Union (EU), Singapore, Korea, Australia, New Zealand and other countries. However, a convenient method for the detection of mollusks is still not available. Immunoassay detects specific protein as analyte and can be performed in user-friendly platform such as lateral-flow assay. The critical factor for the development of immunoassay is a suitable marker protein for the presence of mollusks in food products. Edible mollusks including various species are processed with multiple food processing methods. Tropomyosin has been identified as a major allergenic protein among edible mollusk species. The objective of present study is to investigate the effect of food processing on mollusk tropomyosin. The fresh muscle samples of common edible mollusks were processed by steaming, boiling, baking, frying and autoclaving with different temperatures and lengths of heating time. The processed samples were extracted and analyzed by gel electrophoresis and immunoblotting. The results indicated that the mollusk tropomyosin is thermal-stable to common food processing methods. In conclusion, tropomyosin is a suitable marker protein for the presence of mollusks in food products.
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Board No.	34
Author Name	Max Rubner-Institut
Organisation	Department of Food Technology and Bioprocess Engineering
Country	Germany
Title	Challenges in transferring microplastic analysis to nanoplastics
Abstract Text	The worldwide use of plastics and unsuitable disposal routes have led to environmental pollution from plastic fragments of various sizes and shapes, ultimately also found in food and humans. For analysing microplastics (Ø1-5000 µm), promising methods are established for several media and standardization is in progress. The situation is quite different for nanoplastics (Ø<1 µm). In addition to challenges of microplastic analysis in complex matrices, including procedural sample contamination, enrichment of small plastic quantities, and minimizing matrix effects, the nanospecific properties of the material pose further challenges. For example, the separation of nanoplastics and coarser matrix components by filtration is more difficult because nanoplastic particles do not pass the filter but adsorb at the pore edges. Methods commonly used for microplastic analysis, such as FTIR- and Raman-microspectroscopy, allowing simultaneous particle detection and chemical identification, are not applicable for nanoplastics due to their limited resolution. Mass-based methods such as pyrolysis or TED-GC/MS and quantitative NMR spectroscopy often have relatively low sensitivity; moreover, they do not provide information on particle properties (number, size). Established methods for the analysis of nanomaterials such as light scattering methods, field flow fractionation, and electron microscopy allow particle identification only to a limited extent, if at all. Currently proposed methods, such as MALDI-TOF or specialised spectroscopic applications (e.g. SERS, AFM-IR, are often cost-intensive and still require substantial development for large-scale analysis.
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Board No.	35
Author Name	Harleen Kaur Dhaliwal
Organisation	University of Alberta, Canada
Country	Canada
Title	Efficacy of plasma activated water microbubbles on inactivation of biofilms on polystyrene surfaces
Abstract Text	Recent research has focused on the use of plasma-activated water (PAW) as a promising chemical residue-free non-thermal technology for biofilm dispersal. In comparison with the direct gas-phase plasma discharges in the water, the mass transfer efficiency, and the dissolution of the reactive species from the gas-to-liquid phase can be enhanced through underwater plasma discharges in gas bubbles. Current study evaluated the efficacy of plasma activated water microbubbles (PAMB) in inactivating the mixed culture biofilms of *Salmonella* Typhimurium ATCC13311 and *Aeromonas australiensis* 03-09, formed on polystyrene surfaces at 23°C dynamically for 144 h. The inactivation efficacy of PAMB against *S.* Typhimurium ATCC13311 and *A. australiensis* in the mixed-species biofilm was influenced by the incubation time of the biofilms. For instance, the application of PAMB was effective in reducing *S.* Typhimurium ATCC13311 and *A. australiensis* to a maximum log reductions of 4.28 ± 0.06 log CFU/cm^2 and 4.92 ± 0.34 log CFU/cm^2 in the mixed biofilms grown for 48 h and 72 h respectively. However, the co-cultures offered a synergistic effect and a lower reduction (<3 log CFU/cm^2) in the total population was observed, when treated with the PAMB over varied time intervals. Overall, this study demonstrated the potential of PAMB as a novel technology for efficiently reducing the mixed-species biofilm on polystyrene surfaces.
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Board No.	36
Author Name	Lim Hui Yi
Organisation	Singapore Food Agency
Country	Singapore
Title	Non-targeted Analysis Strategy: Development and Applications
Abstract Text	While globalisation of the food supply chains has allowed for wider variety of foods to meet evolving consumer demands, it has also resulted in an increasing number of unexpected and emerging food safety risks. It is thus imperative to develop strategies that will enable rapid identification of unknown chemical hazards at the earliest opportunity, so that food safety risks may be addressed before they pose a threat to public health. Most targeted methodologies have narrow scopes of detection in specific types of food and are incapable of detecting unknown compounds. On the other hand, non-targeted analysis (NTA) leveraging on ultra-high performance liquid chromatography high-resolution tandem mass spectrometry (UHPLC-HRMS/MS) is a powerful methodology for the detection and identification of unexpected and unknown hazards. While incredibly useful, NTA can be especially challenging for food analysis due to sample diversity and complexity. Data processing is usually the bottleneck of NTA as a single sample can generate millions of data to be analysed, making the entire manual workflow tedious and cumbersome. In response to the increasing needs for food safety assurance and risk assessment, this presentation will report the development of an AI-promoted smart NTA strategy with proven transferability and efficiency to identify potential chemical hazards in food.
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Board No.	37
Author Name	Sri Harminda Hartantyo
Organisation	Singapore Food Agency
Country	Singapore
Title	Antimicrobial resistance characterisation of food-associated Klebsiella pneumoniae
Abstract Text	Due to its ubiquitous nature, Klebsiella pneumoniae has been isolated from several environmental niches, such as hospital environments, food processing lines and different food types. K. pneumoniae can easily acquire resistance to antibiotics due to its known ability to produce enzymes such as Extended Spectrum β-Lactamase and Carbapenemase. K. pneumoniae has also been reported to be a key organism driving the spread of antimicrobial resistance (AMR) genes from environmental microbes to clinical pathogens. With these in mind, we hypothesized that K. pneumoniae could potentially contribute a reservoir of resistance genes that could spread to other pathogens in the microflora of food. To characterize the AMR profiles of food-associated K. pneumoniae, 42 isolates from raw food were tested for phenotypic resistance to clinically-relevant antibiotic classes – Carbapenem (Ertapenem), Polymyxin (Colistin), Cephalosporins (Ceftazidime, Cefepime), Fluoroquinolone (Norfloxacin), Tetracycline, Chloramphenicol and Trimethoprim Sulfamethoxazole. While no Carbapenem-resistance was observed, nearly 30% (12/42) of isolates conferred resistance to at least one type of antibiotic and 15% (6/42) were multidrug-resistant (MDR; resistance to at least 3 antibiotic classes). This result is concerning as it suggests that the range of effective microbials against food-associated K. pneumoniae might be limited. In addition, resistance to Colistin was observed in 2% (1/42) of the isolates. Resistance to Colistin is of clinical importance as it is one of the last-line therapies for infections caused by Carbapenem-resistant Enterobacteriaceae such as E. coli and Klebsiella. Taken together, this study has provided preliminary evidence to suggest that K. pneumoniae can be potentially an important reservoir of antimicrobial resistant genes in the food microbiome. Further studies such as whole genome sequence analysis to correlate foodborne and clinical K. pneumoniae, and to examine potential mechanisms that mediate AMR gene transfer would be required to better understand the epidemiology of food-associated K. pneumoniae in clinical infections and its role in the transmission of antimicrobial resistance among different foodborne pathogens.
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Board No.	38
Author Name	WANG YANWEN
Organisation	Singapore Food Agency
Country	Singapore
Title	Quantification of meat proportions in processed meat products
Abstract Text	Reliable quantification of meat contents at species level is of relevance to many facets of food safety control and food quality assurance. Meat specification and meat contents testing are not only important for cracking down illegal import of falsely declared or mislabelled meat products, but also for curbing illegal meat substitution and adulteration for economic gain. In this study, a quantitative PCR method was developed to determine the proportion of meat fractions of pork, sheep, chicken and beef in processed meat products. Raw and boiled reference materials of known proportions were produced to determine the meat fractions of different processed meat products from the market. Application of this quantitative real-time PCR method will enable quantification of pork, sheep, chicken and beef in meat products and therefore has the potential to be used in regulatory testing and quality control.
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Board No.	39
Author Name	Haiyan LI
Organisation	Singapore Food Agency
Country	Singapore
Title	Micro-/Nanoplastics (MPs/NPs) in Food: Analytical Developments and Challenges
Abstract Text	In recent years, plastic contamination has become a significant environmental burden of growing concern. Microplastics (MPs) and Nanoplastics (NPs) are produced by the degradation of plastics used in our daily lives. Humans can be exposed to MPs/NPs through consumption of food, and their detection has been reported in several food products (i.e., water, beer, salt, honey, seafood and tea bag). As well-established analytical methods are not available, there is a need to develop a set of protocols for identification, characterization and quantification of MPs/NPs in food to support the risk assessment of MPs/NPs. Besides the lack of analytical methods, there is also no legislation for MPs/NPs as contaminants in food. Hence the development of a method was embarked for MPs in salt and water through deployment of a combination of techniques to obtain more comprehensive information of plastics' identity, size and quantity by both number and mass. Method development is also extended for the detection and characterization of NPs in water/food. To understand the exposure of consumers to MPs/NPs, and chemicals adsorbed in various food items, surveillance studies are also conducted to support risk assessment as well as inform risk management measures to reduce human dietary exposure to MPs/NPs.
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Board No.	40
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Organisation	Singapore Food Agency
Country	Singapore
Title	The Simultaneous Detection of Multiple Food Allergens via LC-MS/MS Technique
Abstract Text	Clinical cases of food allergies and food recalls due to the presence of undeclared allergens are on the rise. This necessitates the food industry and regulators to ensure food containing allergenic ingredients are properly labelled regardless whether they are part of the food composition or their presence are due to unintentional cross-contamination. Various analytical tools are available to ensure food products conform to allergen labelling regulations. At present, ELISA techniques are employed as the gold standard for the detection of allergenic proteins through an antigen-antibody interaction. Indirect molecular methods such as PCR are commonly explored as an alternative approach to detect the genetic DNA which codes for the allergenic protein. LC-MS/MS methods are gaining traction due to the advantage of being able to perform multi-allergen detection simultaneously without relying on the conformational epitope, thus allowing for higher sample throughput for food allergen detection. In this poster, we describe the successful development and validation of an LC-MS/MS method for the concurrent detection of egg, milk, peanut, and soy allergens using cereals and a bakery product (cookie) as examples. The method performance fulfilled the criteria documented in the AOAC Standard Method Performance Requirements for detection and quantitation of selected food allergens.
Categories	Food Safety & Regulatory Science
Other Authors	Name: Kadeleine Kong Organisation: Singapore Food Agency City: Singapore Country: Singapore

Board No.	41
Author Name	Ivan Ng
Organisation	Singapore Food Agency
Country	Singapore
Title	A Survey of Inorganic Arsenic in Infant Cereal Products
Abstract Text	Inorganic arsenic, unlike its less toxic organic form, is a confirmed carcinogen and its long-term exposure is associated with various adverse health effects such as developmental effects, diabetes, pulmonary disease, and cardiovascular disease. Amongst cereal products, rice being grown in flooded conditions is especially susceptible to inorganic arsenic contamination as it readily absorbs arsenic from the contaminated soil and water. International food safety regulations for heavy metals have been further refined in recent years for better public health protection, among which inorganic arsenic maximum levels for infant cereals are set by some developed countries with the aim to protect infants as a vulnerable population. A survey was conducted by the National Centre of Food Science of the Singapore Food Agency to assess the levels of arsenic in infant cereals sold in Singapore, particularly the inorganic arsenic levels in rice-based products. The results show that rice-based products expose infants to more arsenic on average than non-rice-based products. While enforcing maximum levels is effective in preventing infant cereal products with unsafe levels of arsenic from entering the market, parents can help further reduce inorganic arsenic exposure to their children by diversifying their diets to avoid overexposure from a single source of foodstuffs.
Categories	Food Safety & Regulatory Science
Other Authors	Name: Ng Wan Ling Organisation: Singapore Food Agency City: Singapore Country: Singapore Name: Melissa Ong Organisation: Singapore Food Agency City: Singapore Country: Singapore Name: Peggy Chew Organisation: Singapore Food Agency City: Singapore Country: Singapore Name: Koh Shoo Peng Organisation: Singapore Food Agency City: Singapore Country: Singapore Name: Wu Yuansheng Organisation: Singapore Food Agency City: Singapore Country: Singapore Name: Joanne Chan Organisation: Singapore Food Agency City: Singapore Country: Singapore

Board No.	42
Author Name	Teo Guat Shing
Organisation	Singapore Food Agency
Country	Singapore
Title	Monitoring illegal antibiotics in honey on Singapore market to safeguard public health
Abstract Text	Bee products, such as honey and royal jelly, are widely consumed as food and medicine and their contamination may pose serious health risk to consumers. Residues of antibiotics in honey may originate from improper beekeeping practices such as illegal use of antibiotics to treat bacterial diseases and parasitic issues. A rapid and sensitive multi-residue test method has been developed for monitoring of illegal antibiotics in honey using liquid chromatography tandem mass spectrometry (HPLC-MS/MS). Major classes of antibiotics such as amphenicols, fluoroquinolones, nitroimidazoles, quinolones, macrolides, and sulfonamides are covered by this multi-residue method with just one equipment acquisition. A modified QuEChERS sample extraction is applied to achieve satisfactory recovery for most of the antibiotic analytes. The limit of detection (LOD) has been validated to be 5µg/kg for fluoroquinolones, macrolides, quinolones and sulfonamides, 0.2 µg/kg for amphenicols and 2 µg/kg for nitroimidazoles. A focus study with 30 honey samples from different countries were conducted using the developed method. The findings of this focus study are used to review and rationalize the regulatory sampling program for import control of honey products in Singapore.
Categories	Food Safety & Regulatory Science

Board No.	43
Author Name	CHIN KEK FOO
Organisation	Singapore Food Agency
Country	Singapore
Title	Sensitive detection of Ethylene-thiourea (ETU) and Propylene-thiourea (PTU) in fruits and vegetables
Abstract Text	Ethylene-thiourea (ETU) and Propylene-thiourea (PTU) are the major metabolites and degradation products of dithiocarbamate fungicides (DTCs) which are widely used in fruit and vegetable cultivation due to their broad spectrum of antifungal activities and low production costs. ETU and PTU can be found on the surface of DTCs-treated crops. The most widely adopted practice for the analysis of DTC residues in food is via their common degradation product carbon disulfide (CS_2). Development of ETU and PTU detection method will supplement this established CS_2 detection method and shed light on the details of the DTC residues detected. In addition, in order to provide scientific data for Singapore's 1st Total Dietary Study (TDS), an initiative which aims to give a holistic food safety assessment from the nation's dietary exposure, NCFS developed and validated a rapid and sensitive method for the detection of ETU and PTU in food by liquid chromatography-tandem mass spectrometry (LC-MS/MS). With a Porous Graphitic Carbon (GPC) HPLC column, we overcame the poor chromatographic retention of ETU and PTU on other types of analytical columns. Through optimization of the key Mass Spectrum (MS) parameters (e.g. collision energy) for the selected mass transitions in multiple reaction monitoring (MRM) mode, desired sensitivity has been achieved for the two analytes. Further sample extract dilution and Solid Phase Extraction (SPE) clean-up have been introduced to address the issues of strong matrix effect (20 times of ion suppression). The recoveries at two spiking levels (0.02 and 1 ppm) for fresh vegetables (kale, spring onion) and processed foods (fried chips) are in the range of 68 – 110 % with relative standard deviation (RSD) < 10%. Satisfactory linearity (R2 = 0.9984) was demonstrated within a calibration range from 0.01 to 1 ppm. The limit of quantification (LOQ) for ETU and PTU are 0.02 ppm and 0.01 ppm, respectively. This method has been applied on both fresh produce and processed food for TDS.
Categories	Food Safety & Regulatory Science

Board No.	44
Author Name	Raymond Shi Rong Sheng
Organisation	Singapore Food Agency
Country	Singapore
Title	Sensitive detection of food processing contaminants-heterocyclic aromatic amines (HAAs) in cooked food
Abstract Text	Heterocyclic aromatic amines (HAAs) are classified as probable carcinogenic /mutagenic substances that are produced mainly from thermal processing of proteinaceous food products. Due to the possible detrimental effects on human health, continuous monitoring of the HAAs in food commonly consumed by Singaporean is necessary. Singapore is known for its wide variety of local delicacies where even the same type of food can be cooked in multiple ways such as boiling, deep frying, roasting or steaming. To review the food safety aspects from both food processing and dietary intake, a reliable and sensitive method has been developed and validated to determine the amount of HAAs in different types of food to establish the baseline for this group of processed contaminants. The results obtained from 8 HAAs in both solid (e.g., cooked beef) and liquid (e.g., bottled water) matrices showed recovery rates ranging from 92.8 % (1-methyl-9H-pyrido[4,3-b]indole, Harman) to 116.5 % (2-Amino-3,4,8-trimethylimidazo[4,5-f]quinoxaline, 4,8-DiMeIQx). The method LOD and LOQ for the least sensitive analyte, 2-Amino-3,8-dimethylimidazo[4,5-f]quinoxaline (8MeIQx) were 0.03ppb and 0.1ppb, respectively. Correlation studies are conducted to determine the impact from cooking methods on the formation of HAAs in cooked food, which become the basis of consumer advisory on home cooking and choice of dinning out to mitigate the risks from HAAs via food consumption.
Categories	Food Safety & Regulatory Science
Other Authors	Name: Ang Wei Min Organisation: Singapore Food Agency City: Singapore Country: Singapore Name: Ignatius Lim Rui Long Organisation: Singapore Food Agency City: Singapore Country: Singapore Name: Wu Yuansheng Organisation: Singapore Food Agency City: Singapore Country: Singapore Name: Shen Ping Organisation: Singapore Food Agency City: Singapore Country: Singapore

Board No.	45
Author Name	Pang Jia Hao
Organisation	Singapore Food Agency
Country	Singapore
Title	Are phytotoxins potential food safety concerns? A market survey of phytotoxins in food from Singapore market.
Abstract Text	Pyrrolizidine alkaloids (PAs) and tropane alkaloids (TAs) are a large group of phytotoxins which are poisonous substances naturally produced by some plants as part of their defensive mechanism against predators, insects, microorganisms, or climate stress (such as drought or extreme humidity). These toxins typically enter the food chain via consumption of contaminated cereals, medicinal herbs, traditional Chinese medicines, or honey. Acute poisoning and allergic reactions due to excessive levels of phytotoxins in food have been reported with symptoms like severe stomach pain, diarrhoea, and even death. Long-term consequences of exposure include adverse effects on the immune and reproductive system, and even cancer. To better understand the potential exposure risk of Singaporean consumers to the two groups of phytotoxins via food consumption, a survey was conducted by NCFS/SFA to analyze PAs and TAs in various foodstuffs collected from local market. Sensitive detection methods were developed for the survey with HPLC-MSMS for a targeted group of 22 PAs and 2 TAs (atropine and scopolamine) with LOQ ranging from 0.3 to 10 ppb. The survey detected low levels of PAs in only 11 samples, covering tea, confectionaries and honey, out of 199 food samples in total. Most of the positive detections were honey samples with the highest level at 170ppb. There is unlikely high exposure risk to PAs from food for local consumers, however, benchmarking our survey results against EFSA's report revealed that our study is still lacking data for herbal infusions and food supplements. As for TAs, our survey has covered the relevant food types that are likely to contain TAs and there was no positive detection in all 206 samples collected in the survey, indicating a low exposure risk to TAs from food for local consumers.
Categories	Food Safety & Regulatory Science

Board No.	46
Author Name	Hyun-Gyun Yuk
Organisation	Korea National University of Transportation
Country	South Korea
Title	Antifungal effect of 405 nm light emitting-diodes in combination with riboflavin against Penicillium italicum and Penicillium digitatum
Abstract Text	The aim of this study was to evaluate the influence of three photosensitizers (chlorogenic acid, chlorophyllin and riboflavin) on the antifungal effect of 405 nm light emitting diode (LED) against *P. italicum* and *P. digitatum*, which are both major postharvest disease pathogens of citrus fruits. The results showed that LED illumination alone reduced both mold spores below the detection limit after 72 h. No reduction of spores was observed when chlorophyllin was added for LED illumination and the antifungal effect of LED illumination with chlorogenic acid was not significantly different with that of LED illumination alone. On the other hand, riboflavin-mediated LED illumination reduced the both spores below the detection limit (6.0-log reduction) within 36 h and 48 h, respectively. Among the different concentrations of riboflavin, 100 μM riboflavin was the most effective on the reductions of *P. italicum,* and *P. digitatum*. The highest amount of reactive oxygen species (ROS) was generated when LED was illuminated with riboflavin compared with LED illumination with or without other photosensitizers, indicating that its antifungal effect might be due to ROS generation. Therefore, this study suggests that riboflavin-mediated 405 nm LED illumination could be applied to control postharvest fungal diseases of citrus fruit.
Categories	Food Safety & Regulatory Science

Board No.	47
Author Name	Hyun-Gyun Yuk
Organisation	Korea National University of Transportation
Country	South Korea
Title	Evaluation of anti-listeria activity of lactic acid bacteria isolated from Korean fermented foods and their application on smoked salmon
Abstract Text	The objective of this study was to evaluate the anti-listeria activities of lactic acid bacteria (LAB) isolated from fermented foods and to assess the effect of fermentate (cells and CFS), cells and cell-free supernatant (CFS) of *Lactococcus lactis* strain to control *L. monocytogenes* on smoked salmon. A total of 142 strains of LAB were screened and, one *L. lactics* (CJNU 3001) strain and two *Enterococcus faecium* (CJNU 2524 and CJNU 2008) strains appeared to have higher anti-listeria activity than other LAB strains. All three LAB strains exhibited anti-listeria activity against 25 *L. monocytogenes* strains. No anti-listeria activity was observed when the CFSs of all three LAB strains were treated with proteinase-K, revealing that their anti-listeria activities might be due to bacteriocins. CJNU 3001 had greater anti-listeria activity in BHI broth than the other two *E. faecium* strains. The initial populations of *L. monocytogenes* on smoked salmon remained unchanged for 15 days at 10°C when the fermentate and CFS of CJNU 3001 was applied, whereas the addition of cells only failed to inhibit their growth. Thus, this study suggests that both CJNU 3001 fermentate and CFS could be used to control the growth of *L. monocytogenes* on smoked salmon.
Categories	Food Safety & Regulatory Science
Other Authors	Name: Na-Yeon Son Organisation: Korea National University of Transportation City: Jeungpyeong-gun Country: South Korea Name: Gi-Seong Moon Organisation: Korea National University of Transportation City: Jeungpyeong-gun Country: South Korea

Board No.	48
Author Name	Ong Jun Xiang
Organisation	National Center for Food Science
Country	Singapore
Title	A Study on the Background Radioactivity Levels in Domestic Food Produce in Singapore
Abstract Text	Natural and anthropogenic radionuclides can be transferred from the environment (air, soil, water, etc.) to plants and animals. These radionuclides are subsequently passed on to human beings through the consumption of food. With Singapore's '30 by 30' national aspiration to produce 30 % of its nutritional needs locally by 2030 through high productivity vegetable and fish farming, the local population would be expected to consume more domestic food products as part of their daily diet. Hence, it would be worthwhile to obtain baseline radioactivity levels in these domestic food produce for evaluation of radiation exposure to the consumers and for formulation of national food radioactivity monitoring program. Moreover, such investigations also provide baseline information to support the detection of any unusual changes in the environmental radioactivity due to nuclear, industrial and other human activities in the vicinity of Singapore. This work represents the first time such a study is being conducted to evaluate the radioactivity levels of ^{238}U, ^{232}Th, ^{228}Ra, ^{226}Ra, ^{40}K and ^{137}Cs in domestically produced fish, vegetables and shellfish in Singapore. The annual effective ingestion doses associated with consumption of each species of domestic food would be assessed and compared against prevailing international food safety limits. In addition, the trends of radionuclide uptakes by individual food species would also be compared with reports available elsewhere.
Categories	Food Safety & Regulatory Science

Board No.	49
Author Name	Alina Lim, Richard Khaw
Organisation	Nanyang Polytechnic
Country	Singapore
Title	Efficacy Studies on UV System on contact surfaces in public
Abstract Text	During the outbreak of infectious diseases, ultraviolet (UV) sterilizer became one of the solutions to disinfect harmful bacteria on hard contact surfaces which are commonly touched or shared, since it has proven to kill up to 99% harmful bacteria. It uses specialized UV wavelength combining both UVA (invisible Light) and violet blue light (visible Light) which is in the effective range to eliminate harmful bacteria. This study aims to test the disinfecting efficacy of the UV light after exposure of 10 seconds, 1 minute, 48 hours and being passed through a UV-installed tray tunnel for 8 - 28 seconds. This should validate cleaning by determining the reduction of microbial load on these contact surfaces, henceforth elimination of these common qualitative indicators. Microorganisms were spiked onto the surfaces of 50 cm^2 (5 x 10 cm) and left to dry. The contact surface was then exposed to UV for the proposed amount of time. A swab on the surface was conducted and tested for Aerobic plate count, *Escherichia coli* count and *Staphylococcus aureus* count. The results illustrated the positive relationship between exposure and bacteria reduction; also presented the possible limitations to such practices.
Categories	Food Safety & Regulatory Science
Other Authors	**Warning**: foreach() argument must be of type array|object, null given in **D:\xampp816\htdocs\paperbrochure\posteroutput.php** on line **98**

Board No.	50
Author Name	Ngaru Millicent N
Organisation	University of Nairobi
Country	Kenya
Title	Food safety standards and trade: Enhancing compliance in the informal sector in Kenya
Abstract Text	Food safety standards and regulations provide key guidelines for food producers to follow therefore reducing incidences and distribution of food-borne illnesses. Different laws on food safety management exist in different countries in an attempt to cater to the different types of foods produced, different cultures, or different food-borne hazards present. However, the existence of different food safety standards controlling the market brings about inconsistencies in the adoption of standards and regulations in different countries. Due to this confusion, there is an increase in the burden of compliance. In Kenya, food safety agencies exist that govern the production of safe food in the market. However, there is an issue of overlapping commissions, fragmented rules, and regulations, pressure to meet global standards, and the active disregard of these food safety guidelines in the informal markets that threaten the adoption of these food safety standards and regulations. This paper, therefore, aims to define the different issues facing the food control systems and determine solutions that could be adopted to produce safe foods within the boundaries of the food safety policy and regulations in Kenya.
Categories	Food Safety & Regulatory Science

Board No.	51
Author Name	Xin Wang
Organisation	Riddet Institute, Massey University
Country	New Zealand
Title	Modelling gastric digestion behavior of oat milk and an oat milkâ€'bovine skim milk blend
Abstract Text	Plant-based milk alternatives have gained increasing popularity among consumers in recent years. It is necessary to understand the behaviour of plant-based milks during gastric digestion, including protein digestibility, structural changes, and macronutrient accessibility. This study was aimed at understanding the gastric digestive behaviours of oat milk and an oat milkâ€'bovine skim milk blend (1:1, v/v), using an in vitro dynamic human gastric simulator. During gastric digestion with pepsin, there were no significant changes in structure and physical stability of oat milk. By contrast, the oat milkâ€'bovine skim milk blend formed coagulated, curd-like particles, which was attributed to the coagulation of casein micelles induced by the action of pepsin. In addition, the oat oil bodies appeared to be incorporated into the curd particles. This difference in gastric digestive behaviour significantly modified the gastric emptying rates. Coagulation of the oat milkâ€'bovine skim milk blend in the stomach slowed down the gastric emptying of macronutrients, resulting in a delay in the release of protein and lipids into the small intestine in comparison to the oat milk. This study provides insight into the way the food structure modification during gastric digestion impacts nutrient delivery.
Categories	Nutrition & Health

Board No.	52
Author Name	Promise Ogbonna
Organisation	National Agency for Food & Drug Administration and Control
Country	Nigeria
Title	COMPARING THE MICRONUTRIENT PROFILE OF A HOMEMADE READY TO USE THERAPEUTIC FOOD (RUTF) IN AN EDIBLE PACKAGE WITH IMPORTED RUTF
Abstract Text	Ready –to- use therapeutic foods (RUTF) is one of the recent innovative food products for combating severe acute malnutrition among under five children. Data obtained from the National Nutrition survey of 2015 shows that there was high incidence of malnutrition with at least 37 per cent of children in Nigeria malnourished; 29 per cent underweight and 18 per cent wasting [1]. Micronutrient is one of the essential nutrients that defines RUTF, hence it has become imperative to compare the micronutrient profile of RUTF formulated from blends of Soya Concentrates, Orange Fleshed Sweet Potato (OFSP), ripe Banana flour and packaged in an edible food raw material with the imported RUFT. Local production of RUTF is critical for the sustainable management of Severe Acute Malnutrition and this study has shown that RUTF formulated from locally available ingredients meet the WHO minimum micronutrients requirement for RUTF, and can be useful in the management of SAM without complications. The lower production costs and the use of indigenous food raw materials and edible packaging materials have the potential of reducing the costs of management of acute malnutrition especially in the North east of the country where there is a high burden of severe acute malnutrition. The blanched and treated cabbage leaves processed in different forms and shape served as both secondary and primary packaging materials were natural, environmental friendly, funtional, cost effective and also provided the needed stability and wholesomeness to the product.
Categories	Nutrition & Health

Board No.	53
Author Name	Chieh-Chun Wang
Organisation	National Taiwan Ocean University
Country	Taiwan
Title	The Mixture of Chitosan-Silica Nanoparticle Encapsulate Echinacea extracts and Garcinia Cambogia extracts Alleviate Periodontal Disease through Modulating the Macrophages
Abstract Text	Periodontitis is the most common form of periodontal disease, an oral biofilm-induced chronic inflammatory disease that leads to periodontal destruction and alveolar bone loss. *Echinacea purpurea* (EP) is known for alleviating toothache. EP ethanol extracts contain a high concentration of phenolic acids. Chitosan-silica nanoparticles are used as carriers to control the release of bioactive components of EP extracts into the body. *Garcinia cambogia* extracts are full of hydroxycitric acid, which would change the metabolic state of activated macrophages. In this study, we aimed that chitosan-silica *Echinacea purpurea* nanoparticles (CSEN) mixed with *Garcinia cambogia* extracts to alleviate the gingival tissue destruction of periodontal disease through shifting the metabolic activity of macrophages and reducing the oxidative agents with CSEN. *In vitro* study, shows that the levels of nitric oxide, reactive oxygen species, and inflammatory cytokine produced by LPS-activated macrophages would decrease. In the animal model, we induced Sprague-Dawley rats with LPS injection on the palate between the first and second molar to simulate the invasion of the oral pathogens. The nanoparticles mixtures show it could effectively promote gingival tissue proliferation in periodontitis rats. In conclusion, CSEN mixed with *Garcinia cambogia* extracts has the potential as a periodontitis treatment.
Categories	Nutrition & Health
Other Authors	Name: Chi-Shung Tseng Organisation: National Taiwan Ocean University City: Keelung Country: Taiwan

Board No.	54
Author Name	Ong Teck Ann, Jamie Siah Xiu Qiang
Organisation	Singapore polytechnic
Country	Singapore
Title	Effect of butterfly pea flower extract and hydrocolloids on the in vitro digestion of glutinous rice
Abstract Text	Blue glutinous rice cake or Pulut Tai Tai is a popular traditional Peranakans dessert widely consumed in Southeast Asia. The rice cake is prepared by steaming glutinous rice with coconut milk and butterfly pea flower (BPE), making it a carbohydrate-dense product and not suitable for people with diabetes. Studies have shown that incorporation of BPE during processing can lower the digestibility of various food products, albeit it is still unclear how BPE can affect the digestion of cooked glutinous rice. In addition, studies have also demonstrated that cooking rice in diluted hydrocolloid solutions can influence the digestibility of cooked rice. Hence, in this study, glutinous rice was cooked in diluted hydrocolloid solutions containing various concentrations of BPE, low-methoxyl pectin, and xanthan gum. The preliminary *in vitro* results of cooked glutinous rice showed that glucose released over digestion periods decreased with increasing pectin concentrations. Further discussion on the effect of BPE and hydrocolloids on the *in vitro* digestion, total phenolic content and textural properties of cooked glutinous rice will be presented.
Categories	Nutrition & Health
Other Authors	Name: Jamie XiuQing Siah Organisation: Singapore polytechnic City: Singapore Country: Singapore Name: Oni Yuliarti Organisation: Singapore polytechnic City: Singapore Country: Singapore

Board No.	55
Author Name	Yit Tao Loo
Organisation	School of Agriculture & Food, Faculty of Veterinary and Agricultural Sciences, The University of Melbourne, Australia
Country	Australia
Title	Effects of sugarcane flavones and fiber on short-chain fatty acids production and gut microbiota profile during in vitro pig fecal fermentation
Abstract Text	The gut microbiota plays a significant role in human health and is modulated through the metabolic contributions of different dietary compounds. While dietary fiber is a substrate for bacteria to produce beneficial short-chain fatty acids (SCFAs), polyphenols influence the growth of bacteria that can affect the SCFAs production. This study aimed to investigate the effects of 4 flavones commonly found in sugarcane, luteolin, tricin, diosmin, and diosmetin, and in combination with sugarcane fiber (SCFiber) on SCFAs production and gut microbiota, using an *in vitro* pig fecal fermentation model and samples were collected at 0, 3, 6, 12 and 24h of fermentation. The production of SCFAs was identified and quantified by GC-FID while the bacterial profile is examined by microbial profiling with 16S rRNA sequencing data. The combination of SCFiber with each of the flavones, except tricin, resulted in a significantly higher level of total SCFAs production as compared to the blank and flavones-only treatments. Besides, different treatments also affected the productions of specific SCFAs differently. The gut microbiota profile was significantly modulated by different flavones, with or without adding SCFiber, to different extents in terms of alpha diversity, beta diversity, and relative abundances throughout the 24h fermentation.
Categories	Nutrition & Health
Other Authors	Name: Kate Howell Organisation: School of Agriculture & Food, Faculty of Veterinary and Agricultural Sciences, The University of Melbourne, Australia City: Melbourne Country: Australia Name: Ken Ng Organisation: School of Agriculture & Food, Faculty of Veterinary and Agricultural Sciences, The University of Melbourne, Australia City: Melbourne Country: Australia

Board No.	56
Author Name	Yeon Jae Jo
Organisation	Depatment of Food Science and Biotechnology, Chungbuk National University
Country	South Korea
Title	Antioxidant and Skin Whitening Activities of Sub- and Super Critical Water Treated Rutin
Abstract Text	This study was conducted to evaluate the antioxidant and skin whitening activity of sub- and supercritical water treated rutin(SWR). The treatment temperature and pressure were 200°C and 15 bar, 300°C and 100 bar, and 400°C and 250 bar, respectively. ABTS and DPPH radical scavenging activities and reducing power were the highest value of 1193.72 mg AAE/g, 728.73 mg AAE/g, and 0.65 in 300°C and 100 bar, respectively. Tyrosinase inhibitory activity of SWR were 21.72-60.05% at concentration of 1 mg/mL. Melanin synthesis inhibitory activity was higher 14.91% at 10 μg/mL of ethyl acetate solvent fraction than that of α-MSH alone treatment group. As a result of the protein expression rate of MITF, tyrosinase, TRP-1, and TRP-2 through Western blot, the ethyl acetate solvent fraction showed higher 85.95, 28, 6.95, and 46.56% inhibitory activity at a concentration of 10 μg/mL, respectively, than that of α-MSH treatment group. These results suggest that sub- and supercritical water treatment technology can be used to develop functional food and cosmetic materials. And also SWR can be used as whitening cosmetics materials.
Categories	Nutrition & Health
Other Authors	Name: Tae Whan Shin Organisation: Depatment of Food Science and Biotechnology, Chungbuk National University City: Cheongju Country: South Korea Name: Dan-Hee Yoo Organisation: Industry-Academic Collaboration Founation, Seowon University, Chungbuk City: Cheongju Country: South Korea Name: In-Chul Lee Organisation: Department of Bio-Cosmetic Science, Seowon University, Chungbuk City: Cheongju Country: South Korea Name: Heon Sang Jeong Organisation: Depatment of Food Science and Biotechnology, Chungbuk National University City: Cheongju Country: South Korea

Board No.	57
Author Name	Lee Yi En Jayne
Organisation	National University of Singapore
Country	Singapore
Title	Mixed animal and plant protein gels made suitable for dysphagia patients via modifications in physical and sensorial properties
Abstract Text	Animal or plant proteins can form strong, elastic gels. However, these gels are often unsuitable for elderly or dysphagia patients, as they present a choking hazard. Hence, this study aims to understand the effects of mixing animal and plant proteins and their effects on gel structure disruption, to modify the physical and sensorial properties of the gels. The study found that mixed gels with 20% surimi protein and 80% soy or pea protein isolate were able to achieve a texture profile suitable for patients with serious swallowing difficulties, with significantly lower hardness and cohesiveness and higher adhesiveness. This was due to the reduction of surimi proteins present that reduced cross linking and surimi-surimi protein interactions to form a strong gel network during heating. As such, the elastic character of the mixed gels was reduced from 12000 to 2000 Pa and they exhibited significantly increased stress and frequency dependence of 0.15 and 0.18 respectively as compared to the control of 0.10 and 0.16 respectively. With quantitative descriptive analysis, it was confirmed that mixed gels exhibited characteristics that improve ease of swallowing, including increased softness and adhesiveness, thus having the potential to be used in future product development for dysphagia patients.
Categories	Nutrition & Health

Board No.	58
Author Name	Kai-Huei, Chuang, Yu-Wen Ting
Organisation	National Taiwan University
Country	Taiwan
Title	Electrospun lutein nanofiber bilayer as mucoadhesive buccal delivery system
Abstract Text	According to newly released surveys, more and more office workers have problems with deteriorated eyesight, leading to more concern about eye health supplements. There are lutein supplements designed for people having difficulty in swallowing such as jelly or effervescent tablets. However, it is demonstrated that about 50% of free lutein will be broken down by gastric acid due to the lack of proper protection. Hence, we will use mucosa delivery system, a technology which can prevent compounds from degradation in stomach as well as first-pass metabolism combine with electrospinning to deal with this problem. Using electrospun nanofibers as carriers can prevent lutein from being decomposed in high temperature during food processing. Our aim is to use electrospinning to make an edible buccal nanofilm covered with hydrocolloid dressing as dietary supplements to help people who suffer from dysphagia. In this study, lutein-loaded polyvinyl alcohol/β-cyclodextrin nanofibers at room temperature will be used. Moreover, sodium carboxymethyl cellulose will also be utilized in solvent casting by plasticizing with glycerol and polyethylene glycol 400 to improve mucosa adhesive properties and retention time of buccal film. The effect of the lutein buccal delivery system and physicochemical analysis will be evaluated further.
Categories	Nutrition & Health

Board No.	59
Author Name	Cindy Bermudez
Organisation	The University of Queensland
Country	Australia
Title	Individual nut consumption affects in vitro nut fermentation
Abstract Text	Nuts provide dietary fibre and healthy fats when consumed as part of healthy and diverse diet. This study investigated how abstaining or consuming nuts would impact on the fermentability of consumed nuts. In a cross-over study fourteen individuals consumed a mixture of tree nuts (almonds, macadamias and pistachios; 30g mixture/daily) for two weeks, or abstained from tree nuts for two weeks. Two *in vitro* fermentation experiments were carried out using individual human faecal inocula that were obtained during the cross-over study. Gas kinetics of nut fermentation were measured for 48 hours. Overall, there were significant differences between the nuts in terms of total gas, (Pistachio>Almond>Macadamia). There were also significant differences between the individual donors, as well as a strong interaction between nuts and donors. The production of short chain fatty acids (carbohydrate fermentation) and ammonia (from protein) was also variable between individuals. The full statistical analysis comparing effect of eating nuts on *in vitro* fermentability of nuts will be presented. This work will demonstrate how nut consumption might lead to changes in microbial activity in the large intestine, in response to regular intake of nuts. This analysis will contribute to understanding the health benefits of nut consumption.
Categories	Nutrition & Health
Other Authors	Name: Barbara Williams Organisation: The University of Queensland City: Brisbane Country: Australia Name: Bernadine M. Flanagan Organisation: The University of Queensland City: Brisbane Country: Australia Name: Michael J. Gidley Organisation: The University of Queensland City: Brisbane Country: Australia Name: Deirdre Mikkelsen Organisation: The University of Queensland City: Brisbane Country: Australia

Board No.	60
Author Name	Mapitsi S. Thantsha
Organisation	University of Pretoria
Country	Singapore
Title	The impact of multi-stress adaptation and subsequent long-term freezing on morphological and functional properties of Lactiplantibacillus plantarum B411
Abstract Text	Preadaptation of probiotics to sub-lethal levels of multiple stress factors boosts their survival and stability. However, little is known about how long-term cold storage affects the properties of such preadapted probiotics. This study examined the impact of long-term freezing on structural and functional properties of multi-stress (acid, bile and temperature) adapted *Lactiplantibacillus plantarum* B411. Cell morphology was investigated using scanning electron microscopy, and then their selected functional (bile salt hydrolase activity, surface hydrophobicity, auto-aggregative and antimicrobial) properties were evaluated. Furthermore, the survival of *L. plantarum* B411 cells in yoghurt and juices during storage and under simulated gastrointestinal (GIT) conditions was evaluated. Long-term freezing negatively affected the morphology, auto-aggregation ability, BSH and antimicrobial activities of *L. plantarum* B411. The viability of freshly adapted and old-adapted *L. plantarum* B411 cells in foods was similar. Under simulated GIT conditions viability of the stress adapted cells from the freezer diminished more than that of freshly adapted cells. Prolonged freezing compromised some functional properties of stress adapted cells and their stability under simulated GIT conditions. Caution should thus be taken to ensure that a method that will preserve stress adapted cells without them losing beneficial properties nor reverting to their pre-adaptation status is chosen.
Categories	Nutrition & Health

Board No.	61
Author Name	Nguyen Nhat Minh Phuong
Organisation	Can Tho University
Country	Vietnam
Title	In vitro studies of rambutan (Nephelium lappaceum L.) peel phenolics as inhibitors of digestive and angiotensin converting enzymes
Abstract Text	The peel of rambutan fruits (*Nephelium lappaceum* L.) has been well known to be used in traditional therapy of various human diseases. Thus, the objective of this study was to quantify phenolic compounds of rambutan peel (RP) extracts and evaluate their inhibitory potential on the activity of α-amylase, α-glycosidase, lipase, trypsin, pepsin, and angiotensin converting enzyme (ACE). The main findings indicated that methanolic and aqueous RP extracts with geraniin, corilagin, quercetin, rutin, and ellagic acid as main phenolic compounds had a strong inhibitory activity towards α-amylase, α-glucosidase, trypsin, and ACE with the IC_{50} values of 100-600 mg GAE/L. Only methanolic RP extract (1000 mg GAE/L) had a positive effect on pepsin (50% inhibition). Methanolic and aqueous RP extracts showed a weak inhibitory effect against lipase activity even at a concentration of 1000 mg GAE/L (< 14%). Rutin and ellagic acid exhibited an inhibitory activity on α-glucosidase and ACE; while α-glucosidase, lipase, trypsin, and ACE were inhibited by quercetin in a dose-dependent manner. Therefore, phenolic extracts from RP maybe have some potential as nutraceutical in the management of hypertension, type-2 diabetes, and obesity.
Categories	Nutrition & Health
Other Authors	Name: Thien Trung Le Organisation: Nong Lam University City: Ho Chi Minh Country: Vietnam Name: Thijs Veracx Organisation: Gent University City: Gent Country: Belgium Name: John Van Camp Organisation: Gent University City: Gent Country: Belgium Name: Guy Smagghe Organisation: Gent University City: Gent Country: Belgium Name: Katleen Raes Organisation: Gent University City: Gent Country: Belgium

Board No.	62
Author Name	OSUNDAHUNSI, Oluwatooyin Faramade
Organisation	Federal University of Technology, Akure, Nigeria.
Country	Nigeria
Title	Characterisation of Bioactive Compounds and Nutraceutical Activities of Justicia secunda (Vahl.) Leaf Extract
Abstract Text	This study evaluates the polyphenolic compounds and nutraceutical activities of the Justicia seunda leaf which have been use in decorcation for anaeamic patient in Africa folklore especially Nigeria. Preliminary phytochemical screening of mixed solvent extract and antioxidant activities were based on standard methods. Methanolic extracts of J. seunda leaf was evaluated through qualitative and quantitative HPLC, while LC-MS profiling method was used for a comprehensive study of polyphenolic compounds. The preliminary phytochemical showed that the mixed solvent extract contains flavonoids, saponins, tannin, anthraquiniones, phlobatannins, terpenoids, alkaloids, phenols, cardiglycoside and steroids. It also contains 17.85 % , 0.00094 g and 3.722 ug/mlAAE for phytate, oxalate and total antioxidant values respectively. The mixed solvent extract produced a dose dependent increase in antioxidant activities of 2,2-diphenyl-2- picryl hydrazyl (DPPH), ferric reducing antioxidant power (FRAP), metal chelating and lipid peroxidation. Result showed that the most abundant bioactive phenolic compound is 3,4- dihydroxybenzioc acid. More abundant are; p-hydroxybenzoic acid, salicylic acid, quercitrin, quercetin and luteolin. Others are caffeic acid. chlorogenic acid, epicatechin, ellagiac acid, rutin, naringenin kaempherol. This study shows that *J. secunda* possesses vitals bioactive compounds which could be responsible for its activities and also elucidate scientific reasons for application in traditional medicine.
Categories	Nutrition & Health
Other Authors	Name: OYEWALE, Mary Bose Remi Organisation: Adekunle Ajasin University, Akungba-Akoko, Ondo State City: Akungba-Akoko Country: Nigeria Name: AWOLU, Olugbenga Olufemi Organisation: Federal University of Technology, Akure, Nigeria. City: Akure Country: Nigeria

Board No.	63
Author Name	OYEWALE, Mary Bose Remi
Organisation	Adekunle Ajasin University, Akungba-Akoko, Ondo State.
Country	Nigeria
Title	Molecular Docking Analysis of the Bioactive Compounds and Erythropoietic Effect of Justicia seunda (Vahl.) Leaf Extract.
Abstract Text	Anaemia, defined as a reduction in the haemoglobin concentration of blood, which consequently reduces the oxygen-carrying capacity of red blood cells such that patients are unable to meet the body's physiological needs. Justicia secunda is a therapeutic plant used in Nigerian folklore for the management. Exploration into its mechanism of action, thirty-three compounds characterised by HPLC and LCMS were docked into the active sites of Hypoxia Inducible Factor (HIF) or Prolyl Hydrolase, Activin Receptor IIB and Hepicidin using Glide from Schrodinger suite. Effect of mixed solvent extract of J. secunda leaf on blood parameters in male albino rats was investigated using standard methods. Results showed Luteolin, Epigallocatechin, Diadzein, Genistein, Kaempherol, Myricetin, Narigenin, Quercitrin and Gallic acid. Of note is that p-hydroxybenzoic acid had the most stable ligand-protein molecular interaction with Activin Receptor IIB and HIF Prolyl Hydrolase. After administration of the extract for 28 days, the LD50 was found to be above 5,000 mg/kg bwt. Value were 35.5%, 643x10,000rbc/mm3 and 10% for Packed Cell Volume, Red Blood Cell and Haemoglobin respectively. Significantly ($p < 0.05$) increase was observed in groups administrated 10 and 1000 mg/kg bwt. In conclusion, there exist blood-boosting potentials in Justicia secunda leaf extract.
Categories	Nutrition & Health
Other Authors	Name: OSUNDAHUNSI, Oluwatooyin Faramade Organisation: Federal University of Technology, Akure, Nigeria. City: Akure Country: Nigeria Name: AWOLU, Olugbenga Olufemi Organisation: Federal University of Technology, Akure, Nigeria. City: Akure Country: Nigeria

Board No.	64
Author Name	Xiaoyu Bao
Organisation	Department of Agricultural, Food and Nutritional Science, University of Alberta
Country	Canada
Title	Egg white protein ovotransferrin-derived IRW (Ile-Arg-Trp) inhibits LPS-induced barrier integrity damage and inflammation in Caco-2 cells
Abstract Text	IRW derived from egg ovotransferrin was initially identified to be an inhibitor of angiotensin converting enzyme. Later, IRW has been unravelled with various bioactivities, including anti-inflammatory activity and the ability to suppress colitis development. Nevertheless, its role in protecting intestinal barrier integrity hasn’t been reported. This study aims to investigate the effect of IRW on inhibiting intestinal barrier dysfunction and inflammation in lipopolysaccharide (LPS)-treated Caco-2 cells. IRW pretreatment could mitigate LPS-induced reduction of transepithelial electronic resistance values and increase of paracellular permeation in differentiated Caco-2 cell monolayers. Meanwhile, IRW restored the expression level and cell surface distribution of the tight junction protein occludin. Furthermore, IRW could significantly inhibit LPS-induced activation of nuclear factor-κB (NF-KB) and (MAPK) signalling pathways. In conclusion, our study demonstrated the ability of IRW to prevent LPS-induced intestinal barrier damage and prohibit inflammatory responses.
Categories	Nutrition & Health
Other Authors	Name: Jianping Wu Organisation: University of Alberta City: Edmonton Country: Canada

Board No.	65
Author Name	Zihan Wang
Organisation	University of Alberta
Country	Canada
Title	Food-derived peptides IKW (Ile-Lys-Trp) and RIY (Arg-Ile-Tyr) are the novel activators of Angiotensin converting enzyme 2 (ACE2)
Abstract Text	The Renin-angiotensin system is critical in blood pressure regulation. Central to this system, the enzyme ACE generates angiotensin II (Ang II), a potent vasoconstrictor with detrimental effects on the cardiovascular system, while its homologue ACE2 consumes Ang II to form angiotensin (1-7), a vasodilatory peptide with beneficial effects. Given the structural similarities and their interconnected roles in blood pressure regulation, the objective was to investigate if ACE-inhibitory (ACEi) peptides can act as ACE2 activators. Five ACEi peptides were initially selected from a database of 20 potent ACEi tripeptides through molecular docking as the potential ACE2 activators, confirmed in cells, and then fed orally to spontaneously hypertensive rats for in vivo validation. Blood pressure was significantly decreased in IKW, IQY and RIY-treated groups compared to the control; heart rate was not affected by peptides. IKW and RIY upregulated significantly ACE2 and Ang (1-7) levels; RIY, but not IKW, decreased Ang II level. Interestingly, although IQY did not affect ACE2 and Ang II, its circulating Ang (1-7) level was increased, which might contribute to its blood pressure reduction. Therefore, our study demonstrated that not all ACEi peptides are ACE2 activators, and the structural requirements of ACE2-activating peptides differ from ACEi peptides.
Categories	Nutrition & Health
Other Authors	Name: Hongbing Fan Organisation: University of Alberta City: Edmonton Country: Canada Name: Jianping Wu Organisation: University of Alberta City: Edmonton Country: Canada

Board No.	66
Author Name	Janusz Kapusniak
Organisation	Jan Dlugosz University in Czestochowa
Country	Poland
Title	Evaluation of the effect of soluble dextrin fiber from potato starch on the growth of the main bacteria living in the human colon
Abstract Text	Dietary fiber, including resistant starch and resistant dextrins, are not hydrolyzed and absorbed in the upper part of the gastrointestinal tract, and so they reach the colon in unaltered form, where they provide nutrients for beneficial bacteria. They constitute a promising means of modulating the intestinal microbiota and may possess prebiotic properties. Also soluble dextrin fibre (SDexF) from potato starch, has been proposed as a source of dietary fiber. The objective of the present study was to determine total dietary fiber (TDF) content of SDexF by AOAC 2011.25 method and to assess the prebiotic properties of SDexF. The behavior of this type of dietary fiber in conditions simulating the human gastrointestinal tract was also studied. A three-segment in vitro model was used to determine its digestive resistance. Studies have shown that SDexF contained approximately 35% of TDF, and therefore intestinal bacteria were able to grow by using SDexF as a source of carbon. Growth rate of beneficial strains was significantly higher on media with SDexF than on glucose. Survivability of the gut bacteria was much higher on media with SDexF. Prebiotic index (PI) values were positive and increased with cultivation time, indicating dominance of probiotic strains.
Categories	Nutrition & Health
Other Authors	Name: Renata Barczynska Organisation: Jan Dlugosz University in Czestochowa City: Czestochowa Country: Poland Name: Karolina Lubas Organisation: Jan Dlugosz University in Czestochowa City: Czestochowa Country: Poland Name: Malwina Wojcik Organisation: Jan Dlugosz University in Czestochowa City: Czestochowa Country: Poland Name: Kamila Kapusniak Organisation: Jan Dlugosz University in Czestochowa City: Czestochowa Country: Poland Name: Arkadiusz Zarski Organisation: Jan Dlugosz University in Czestochowa City: Czestochowa Country: Poland

Board No.	67
Author Name	Małgorzata Darewicz
Organisation	University of Warmia and Mazury in Olsztyn, Faculty of Food Science
Country	Poland
Title	Angiotensin I-converting enzyme inhibitory and antioxidant peptides from in vitro digests of raw and cooked trout meat proteins
Abstract Text	Fish proteins can be a rich source of peptides with biological activity, including angiotensin converting enzyme (ACE) inhibitors and antioxidant peptides. Raw and cooked trout myofibrillar and sarcoplasmic proteins were examined after *in vitro* digestion. Computer tools available in UniProt and BIOPEP-UWM databases (http://www.uwm.edu.pl/biochemia/), Fragment Ion Calculator and SSRCalc applications were used in the studies. Samples were digested according to INFOGEST method. Hydrolysates were analysed for their ACE inhibitory and antioxidant activities and were used in a screening for ACE inhibitory and antioxidant peptides. Amino acid sequences were identified using LC-MS/MS method. Hydrolysates of trout myofibrillar and sarcoplasmic proteins obtained from raw or cooked trout tissue showed ACE inhibitory and antioxidant activity. The difference between raw and high temperature treated samples were observed. The ACE inhibitory and antioxidant fragments selected based on the results of *in silico* studies were identified *via* RP-HPLC-ESI-MS/MS method. It was concluded that trout proteins can be the source of ACE inhibitory and antioxidant peptides. This research was supported by a grant from NSC Poland (no. 2017/01/X/NZ9/00368) and by the Minister of Education and Science under the program entitled "Regional Initiative of Excellence" for the years 2019-2022, Project No. 010/RID/2018/19, amount of funding 12.000.000 PLN.
Categories	Nutrition & Health
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Board No.	68
Author Name	Małgorzata Darewicz
Organisation	University of Warmia and Mazury, Faculty of Food Science
Country	Poland
Title	Enzyme inhibitory and antioxidant peptides released via INFOGEST method from of MCC and SPC proteins
Abstract Text	Milk is a rich source of essential nutrients and also bioactive peptides. Biopeptides from milk proteins, can be generated by gastrointestinal digestion after consumption. Milk protein concentrates: MCC – casein and SPC – serum proteins concentrate were *in vitro* digested and their bioactivity were analyzed. The MCC and SPC were prepared by membrane filtration. The *in vitro* digestion method according to INFOGEST protocol consisted of the following steps: "oral", "stomach" – 1 hour, pH = 3, "duodenal "- 1 hour, pH = 7.0. Hydrolysates were analysed for their enzyme inhibitory (ACE and DPP-IV) and antioxidant activities. The hydrolysates were used in a screening for bioactive peptides by RP-HPLC-ESI-MS/MS method. Hydrolysates of milk protein concentrates showed ACE inhibitory, DPP-IV and antioxidant activity. The difference between MCC and SPC samples were observed. The ACE inhibitory (eg. IPA, IR peptides), DPP-IV inhibitory (eg. IPA, IR, PW peptides) and antioxidant fragments (eg. IR, PW peptides) were identified. Milk protein concentrates are considered as an interesting source of peptides with biological activity, including ACE and DPP-IV inhibitors, as well as antioxidant peptides released after digestion. Project financially supported by The National Centre for Research and Development, Project No. WPC1/DairyFunInn/2019, amount of funding 1.950.000,00 PLN.
Categories	Nutrition & Health
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Board No.	69
Author Name	Ye Jin Kim
Organisation	Hanyang university
Country	South Korea
Title	Rottlerin decline lipid accumulation by inhibiting adipogenesis and de novo lipogenesis via LRP6 degradation and mTOR signaling pathway in 3T3-L1 adipocytes
Abstract Text	Obesity is a global pandemic with over 650 million people obese. Various drugs have been developed owing to the increase in the proportion of obese people. However, they are known to have various side effects. Therefore, research on new bioactive compounds that minimize these side effects is increasing. Rottlerin is a natural polyphenol compound. Rottlerin is known to be effective in anti-cancer, anti-inflammatory, and antioxidants. Since the anti-obesity of rottlerin is unclear, we hypothesized that rottlerin inhibits lipid accumulation of adipocytes by inhibiting *de novo* lipogenesis and adipogenesis via nutrient-sensing pathways. As result, it was confirmed by ORO dye phenotype measurement that rottlerin reduced lipid accumulation in a dose-dependent manner. C/EBPα and PPARγ were significantly decreased by rottlerin in mRNA expression and protein levels ($p<0.05$). Also, mRNA expression and protein levels of SREBP1, FAS, and SCD1 were notably diminished by rottlerin ($p<0.001$). Rottlerin, also known as a PKCδ inhibitor, inhibited total PKCδ ($p<0.01$). Moreover, rottlerin regulates phosphorylation of mTOR, AKT, S6K, and S6 via LRP6 degradation ($p<0.05$). Taken together, rottlerin regulates *de novo* lipogenesis and adipogenesis through LRP6 and mTOR signaling pathways, and is a potential nutraceutical compound that supports the treatment of obesity and non-alcoholic fatty liver disease.
Categories	Nutrition & Health
Other Authors	Name: Gwang-woong Go Organisation: Hanyang university City: Seoul Country: South Korea

Board No.	70
Author Name	Sainan Zhao
Organisation	School of Chemical and Biomedical Engineering, Nanyang Technological University
Country	Singapore
Title	Effect of undigested plant proteins on human gut microbiota responses: an in vitro study simulating a wheat-based diet
Abstract Text	Plant proteins, as a sustainable food source, have been investigated to apply into commercial products and substitute animal ingredients. Despite efforts in matching nutritional values of plant proteins to their animal counterparts, limited information is available on undigested plant proteins as a nitrogen source of human gut microbiota. To clarify the impacts of undigested plant proteins, six plant protein concentrates (pea, chickpea, mung bean, soybean, lentil, and brown rice) were chosen and subjected to an in vitro digestion model utilizing milk protein concentrate as comparison. The resulting protein residuals were collected and supplemented to the fermentation medium that contained wheat arabinoxylan as the carbon source. The microbiota fermentations were conducted at *in vitro* condition for 24 h, and 16s rRNA amplicon sequencing was performed to illustrate the community changes. Results indicated that protein supplementations weakened the bifidogenic effect of arabinoxylan. All plant proteins elevated the ratios of propionate to butyrate that corresponded to the increased ratios of Bacteroidetes to Firmicutes. Moreover, plant protein treatments increased the populations of *Lachnoclostridium*, *Phascolarctobacterium*, and *Megasphaera*, but reduced the populations of *Eubacterium rectale* and *Fusicatenibacter*. Our findings provide insights on employing plant proteins for food product formation and their health implications.
Categories	Nutrition & Health
Other Authors	Name: Yang Zhong Organisation: School of Chemical and Biomedical Engineering, Nanyang Technological University City: Singapore Country: Singapore Name: Juan Du Organisation: Division of Food Technology, Singapore Institute of Technology City: Singapore Country: Singapore Name: Ming-Hsu Chen Organisation: Institute of Food Science and Technology, National Taiwan University & School of Chemical and Biomedical Engineering, Nanyang Technological University City: Taipei Country: Taiwan

Board No.	71
Author Name	Eulália Domingos Uaila
Organisation	Eduardo Mondlane University
Country	Mozambique
Title	Total polyphenols content in four native fruits collected in Mozambique
Abstract Text	Many native fruits are a good source of polyphenols which are bioactive compounds with many therapeutic effects whose consumption can reduce non-communicable diseases prevalence, however, there is a lack of data on native Mozambican fruits, leading to their underutilization. The objective of this study was to evaluate Total Polyphenol Content (TPC) in four native fruits collected in different locations and years. The TPC was determined by Folin-Ciocalteu method, after its extraction in 70% acetone, in the peel, pulp and mixture of them in *Syzigium cordatum* and *Garcinia livingstonei*, and in the pulp of *Adansonia digitata* and *Dialium schlechteri*. All fruits were collected mature, frozen, and freeze-dried before analysis (except *Adansonia* which has low moisture content <15%). The results for the edible part of the fruits (mixture of pulp and peel for *Syzygium* and pulp for the others) were 75.7±3.9, 73.4±1.9, 72.8±1 and 76.8±1.5 mg/g dwt for *Syzygium*, *Garcinia*, *Adansonia*, and *Diallium*, respectively. ANOVA revealed that there are significant differences in the TPC of the edible parts (P=0.019). For *Garcinia* polyphenols are more concentrated in the peel. Overall, this study revealed that the four native fruits are quite rich in polyphenols (concentrations >70 mg/g).
Categories	Nutrition & Health
Other Authors	Name: Claudia Lazarte Organisation: Lund University City: Lund Country: Sweden Name: Maida Khan Organisation: Eduardo Mondlane University City: Maputo Country: Mozambique Name: Isabel Guiamba Organisation: Eduardo Mondlane University City: Maputo Country: Mozambique Name: Yvonne Granfeldt Organisation: Lund University City: Lund Country: Sweden

Board No.	72
Author Name	Jakub Michał Kurek, Joanna Mikołajczyk-Stecyna, Zbigniew Krejpcio
Organisation	Poznan University of Life Sciences
Country	Poland
Title	Steviol glycosides from Stevia rebaudiana Bertoni normalise lipid metabolism by modulating selected gene expression in diabetic rats
Abstract Text	A number of studies revealed that *Stevia rebaudiana* Bertoni plant and its functional compounds: steviol glycosides (SGs), apart from sweet taste, have various health promoting properties, i.e. anti-inflammatory, lipid and glucose regulatory potential. The aim of this study was to examine the anti-diabetic potential of pure steviol glucosides (SG): stevioside and rebaudioside A in a diabetic model of rat. The experiment was carried out on 70 Wistar rats. Sixty animals were made type 2 diabetic (by high fat diet feeding + STZ injection) and divided into test groups receiving supplementary SGs (stevioside or rebaudioside A, at doses of 500 and 2500 mg/kg diet) for 8 weeks, while the controls were fed high-fat diet with/or without metformin. After termination of experiment blood and tissue samples were table for analyses. It was found that supplementary SGs normalized blood hyperlipidemia indices (triacylglycerols, LDL-C, T-C). PCR analyses of mRNA isolated from tissue samples revealed that these effects correlated with significant differences in the expression of lipid and glucose metabolism related genes (Pparγ, Glut-4) in tissues (liver, muscle, adipose) The experiment showed that steviol glycosides can attenuate disturbed lipid metabolism by affecting expression of Pparγ, Glut-4 genes responsible for carbohydrate and lipid metabolism in diabetes. The Presented Work Is An Integral Part Of The Research Project (National Science Center, Poland NCN 2017/27/B/NZ9/00677).
Categories	Nutrition & Health

Board No.	73
Author Name	Jakub Michał Kurek
Organisation	Poznań University of Life Sciences
Country	Poland
Title	Stevia-derived compounds improve glucose uptake and alleviate insulin resistance in the 3T3-L1 adipocytes
Abstract Text	The search for better methods of preventing and treating metabolic diseases is a priority for medical and nutrition sciences. *Stevia rebaudiana* Bertoni, a plant famous mainly for its sweetening potential, is currently widely used in food industry. Recently, several health-promoting properties of stevia and its glycosides, especially antidiabetic activity, have been found. However, the mechanisms of their action have not been fully elucidated to date. This study aimed to evaluate the effect of stevia-derived compounds (steviol, stevioside and rebaudioside A) on glucose uptake and glucose metabolism-related gene expression (RESTN and GLUT-4) in the 3T3-L1 adipocytes. The compounds were tested for their ability to affect carbohydrate and lipid metabolism in normal and insulin-resistant mature adipocytes. It was found that stevioside and steviol at low concentrations significantly increase GLUT-4 transcript levels, enhance glucose uptake and mitigate insulin resistance in hypertrophic insulin-resistant adipocytes. *In vitro* studies provide evidence for the antidiabetic potential of compounds isolated from stevia, especially steviol, which was most potent in alleviating insulin-resistant states. The Presented Work Is An Integral Part Of The Research Project (National Science Center, Poland NCN 2017/27/B/NZ9/00677).
Categories	Nutrition & Health
Other Authors	Name: Joanna Zielińska-Wasielica Organisation: Poznań University of Life Sciences City: Poznań Country: Poland Name: Katarzyna Kowalska Organisation: Poznań University of Life Sciences City: Poznań Country: Poland Name: Zbigniew Krejpcio Organisation: Poznań University of Life Sciences City: Poznań Country: Poland Name: Anna Olejnik Organisation: Poznań University of Life Sciences City: Poznań Country: Poland

Board No.	74
Author Name	Li-Yin Pang
Organisation	University of Nottingham Malaysia
Country	Malaysia
Title	Ophiocordyceps sinensis improves healthspan in Caenorhabditis elegans
Abstract Text	*Ophiocordyceps sinensis* is a highly valuable medicinal mushroom used for various illnesses in Asia. It is also commonly used as a tonic to improve general wellbeing and longevity. Although scientific evidence on its anti-ageing effects remains ambiguos, several studies have shown that *O. sinensis* improves energy metabolism and mitochondrial function in addition to its potent antioxidant activities. In the present study, the healthspan benefits of *O. sinensis* were evaluated in the wild-type *Caenorhabditis elegans*. Our results showed that the *O. sinensis* cold water extract (CWE) dose-dependently increased the maximum lifespan of *C. elegans* by 20.43% (p<0.001), 36.56% (p<0.0001) and 38.71% (p<0.0001) at the concentrations of 5, 10 and 20 mg/mL, respectively. In addition, the feeding rate of *C. elegans* fed with 10 and 20 mg/mL of CWE was significantly improved after 72 hours (p<0.001). Previous studies have suggested a decline of feeding rate correlates with ageing. Our findings supports the notion that improving the feeding rate of *C. elegans* extends the lifespan of these worms. Further studies are needed to elucidate the mechanisms of action of *O. sinensis* in promoting healthspan in order to substantiate its potential as nutraceuticals and functional food to improve wellbeing.
Categories	Nutrition & Health
Other Authors	Name: Shin-Yee Fung Organisation: University of Malaya City: Kuala Lumpur Country: Malaysia Name: Chon-Seng Tan Organisation: LiGNO Biotech Sdn. Bhd. City: Selangor Country: Malaysia Name: Szu-Ting Ng Organisation: LiGNO Biotech Sdn. Bhd. City: Selangor Country: Malaysia Name: Kuan-Hon Lim Organisation: University of Nottingham Malaysia City: Selangor Country: Malaysia Name: Sue-Mian Then Organisation: University of Nottingham Malaysia City: Selangor Country: Malaysia Name: Richard Roberts Organisation: University of Nottingham City: Nottingham Country: United Kingdom Name: Kang-Nee Ting Organisation: University of Nottingham Malaysia City: Selangor Country: Malaysia

Board No.	75
Author Name	Takuya Sugaharea
Organisation	Ehime University
Country	Japan
Title	Anti-allergy effect of passion fruit seed ethanol extract and identification of the active substances
Abstract Text	The anti-allergic effect of passion fruit seed ethanol extract was examined. Passion fruit seeds were milled and suspended in 100% ethanol. After stirring for 20 h at 4°C, the suspension was centrifuged and the supernatant was collected as ethanol extract. As a result, the passion fruit seed extract suppressed IgE production by human myeloma U266 cells in a dose-dependent manner without cytotoxicity. Real-time RT-PCR analysis revealed that the suppression of IgE production is induced by down-regulation of the gene expression of IgE. Passion fruit seeds are known to contain resveratrol and its analog, piceatannol, and both compounds suppressed IgE production. In addition, *trans*-scripusin B, a dimer of piceatannol, also suppressed IgE production as much as piceatannol. Moreover, the effects of passion fruit seed extract and these polyphenols were examined *in vivo*. As a result, oral administration of passion fruit seed extract to contact dermatitis model mice, resveratrol and piceatannol alleviated dermatitis symptoms and suppressed IgE production by splenocytes. Another anti-allergic effect, anti-degranulation activity of related compounds was examined by using rat basophilic cell line, RBL-2H3 cells. As a result, *trans*-scripusin B, *trans*-scirpusin A and ε-viniferin had anti-degranulation activity. However, cis-scripusin B did not.
Categories	Nutrition & Health

Board No.	76
Author Name	Minjoo Gu
Organisation	Chungbuk National University
Country	South Korea
Title	Biological activities of the calyx of Diospyros kaki using cell-based assays
Abstract Text	The calyx of *Diospyros kaki* (CDK) attached to the persimmon tree fruit has been widely reported about its antioxidant, anti-inflammatory, and anticancer activities. This study evaluated biological activities of CDK in hepatocytes (HepG2), skin fibroblasts (Hs68), vascular endothelial cells (EA.hy926), and myoblasts (C2C12) with different stimulations. In alcohol-induced HepG2 cells, the methanol extract of CDK improved cell viability compared to 3% ethanol treated group with increased glutathione concentration. In UVB-induced Hs68 cells, the CDK enhanced cell viability compared to the UVB (30 mJ/cm^2) treated group with increased collagen levels. In H_2O_2-induced EA.hy926 cells, the CDK improved cell viability compared to the H_2O_2 treated group with increased nitrogen oxide production. In H_2O_2-induced C2C12 cells, the CDK improved cell viability compared to the H_2O_2 treated group. The production of malondialdehyde was inhibited by the CDK in C2C12 cells. Taken together, CDK can be used as a functional ingredient with antioxidant, hepatoprotective, antihypertensive, and skin protective activities.
Categories	Nutrition & Health
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Board No.	77
Author Name	Sun Young Kong
Organisation	Chungbuk National University
Country	South Korea
Title	Synergistic anti-inflammatory effects of kale juice fermented with Limosillactobacillus reuteri EFEL 6901
Abstract Text	Kale is known to have a variety of beneficial health compounds including flavonoids and other trace compounds. *Limosilacobacillus reuteri* EFEL 6901 (LBRE6901) was reported to have high anti-inflammatory activity as a probiotic in previous study. This study aimed to develop high value-added fermented foods with anti-inflammatory activity by fermentation of kale juice with LBRE6901. For this goal, pasteurized kale juice (KJ) was inoculated with 4% of LBRE6901 and fermented anaerobically at 37°C for 72 h. Flavanol contents were measured by HPLC, and anti-inflammatory activity was measured using lyophilized KJ. As results, after fermentation LBRE6901 cell counts reached over 10^9 CFU/ml, and pH decreased to 4.7 showing its superior growth rate in kale juice. The concentration of kaempferol in kale juice fermented with LBRE6901 was increased to 97.82 μM compared to before fermentation (54.46 μM), and quercetin was also increased to 20.82 uM from 7.87 uM. In addition, KJ fermented with LBRE6901 did not show cytotoxicity within the concentration range of 6.25-25ug/ml, and significantly reduced the nitric oxide production compared to LPS-induced RAW264.7 cells. Moreover, mRNA expression levels of pro-inflammatory cytokines were significantly reduced and IL-10, an anti-inflammatory cytokine, was increased after treatment with LBRE6901-KJ in LPS-induced RAW 264.7 cells. In conclusion, this study demonstrates that LBRE6901 can be used as a potent starter to dramatically increase the anti-inflammatory activity of kale juice after lactic acid fermentation.
Categories	Nutrition & Health
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Board No.	78
Author Name	Soo Hwi Yang
Organisation	Brain Korea 21 Center for Bio-Health Industry, Division of Animal, Horticultural, and Food Sciences, Chungbuk National University
Country	South Korea
Title	In vitro anti-inflammatory activity of soybean germ postbiotics fermented with Lacticaseibacillus B1
Abstract Text	Soybean germ generally has a high isoflavone content, which is a bioactive compound with antioxidant, anti-inflammatory, and anticancer activities. β-Glucosidase produced by lactic acid bacteria hydrolyzes isoflavone glucosides into their respective aglycones which have higher bioavailability. The aim of this study was to develop a functional food material for enhancing immune activity using postbiotics with increased contents of isoflavone aglycones by fermenting soybean germ with *Lacticaseibacillus* B1. For this, screening lactic acid bacteria with high β-glucosidase activity from plant-based fermented foods and analyzing the content of non-glycoside isoflavones, antioxidant and anti-inflammatory activity of soybean germ postbiotics were analyzed. B1 had the highest β-glucosidase activity of 1.4 mU/mL among candidate strains and did not show hemolytic activity and biogenic amine genes. In addition, the number of viable bacteria increased to $2x10^9$ CFU/mL, the pH decreased to 3.56, and the non-glycoside content increased to 67.61 mg/g during fermentation in soybean germ medium. Moreover, soybean germ postbiotics did not show cytotoxicity at all tested concentrations when treated with LPS to Raw 264.7 cells, and statistically reduced the production of nitric oxide at 50 ug/mL. In conclusion, soybean germ postbiotics with improved anti-inflammatory activity were developed by increasing the content of isoflavone aglycones through fermentation with *Lacticaseibacillus* B1, a β-glucosidase-producing strain.
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Board No.	79
Author Name	Yesol Jeon
Organisation	Chungbuk National University
Country	South Korea
Title	Anti-diabetic and anti-hypertensive activities of selected cereal grains and legumes
Abstract Text	Overproduction of free radicals causes oxidative stress, resulting in diabetes and hypertension. Cereal grains and legumes are excellent source of phenolic compounds which have been associated with several physiological and metabolic processes. We investigated that the effect of ethanol extracts from cereal grains (Italian millet, sorghum, proso millet, oat) and legumes (black bean, adzuki bean) on antioxidant, anti-diabetic, and anti-hypertension activities. ABTS and DPPH radical scavenging capacities were 5.0 ~ 408.9 and 1.5 ~ 313.1 mg Trolox equivalent antioxidant capacity/g residue, respectively. Sorghums showed the highest antioxidant activities followed by adzuki beans. α-Glucosidase inhibitory activity was the highest in the sorghum (97.4 ~ 98.7%) followed by proso millet (29.1%). Glucose consumption rate of sorghum extracts at the concentration of 10 μg/mL was comparable to that of 100 μM of metformin. The angiotensin-converting-enzyme inhibitory activity was the highest in the sorghum extracts followed by adzuki bean. In EA.hy926 endothelial cells, protective activity against H_2O_2-induced oxidative stress was the highest in sorghum extracts. A significant correlation between antioxidant, anti-diabetic, and anti-hypertensive activities (r^2=0.538 ~ 0.964) was observed. These results demonstrate that sorghum may prove to be a promising functional food for the prevention of diabetes and hypertension.
Categories	Nutrition & Health
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Board No.	80
Author Name	Mirae Hong
Organisation	Chungbuk National University
Country	South Korea
Title	Protective activity of major triterpenes in Centella asiatica against UVB induced damage in human fibroblasts
Abstract Text	*Centella asiatica* has been utilized as a medicinal herb in Asia and is reported to have diverse pharmacological properties including antimicrobial, antioxidant, and skin-calming activities. The major and purportedly bioactive constituents are pentacyclic triterpenes. Especially, triterpenes have been reported to prevent skin aging. The objective of this study was to compare the protective activities of the four major triterpenes, asiatic acid (AA), asiaticoside (AD), madecassic acid (MA), and madecassoside (MD) against UVB-induced damage in skin fibroblasts. The triterpenes were not cytotoxic to Hs68 cells up to 10 μM. UVB (30 mJ/cm^2) irradiation significantly suppressed the cell viability (65.1%) compared to that of control cells. AA showed the highest protective effect against UVB-irradiation compared to other triterpenes. Triterpenes also significantly reduced UVBâ€ induced production of reactive oxygen species and malondialdehyde in Hs68 cells. Furthermore, the production of glutathione was increased in the triterpenes treated cells. AA increased the production of glutathione more effectively than other triterpenes. Triterpenes significantly inhibited the release of matrix metalloproteinase-1 (MMPâ€ 1) and MMP-3, resulting in reduced collagen degradation. These results indicate that triterpenes protect human skin fibroblasts from UVB-induced photoaging and, therefore, have the potential for use in cosmeceutical preparations.
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Board No.	81
Author Name	Minju An
Organisation	Chungbuk National University
Country	South Korea
Title	Antioxidant and cytoprotective activities of garlic (Allium sativum) sprouts
Abstract Text	Garlic, a member of the onion genus, has been used as a folklore medicine for thousands of years. The sprouting of bulbous plants usually results in the accumulation of diverse secondary metabolites including vitamins, flavonoids, and other phenolic compounds. However, sprouted garlic has received little attention. In this study, we investigated antioxidant capacities *in vitro* and protective effects in fibroblasts, macrophages, hepatocytes, and myoblasts. Non-sprouted garlic and three different parts of garlic sprouts, leaf, clove, and root from garlic sprouts, were compared for their activities. Leaf from garlic sprouts showed the highest total polyphenolic content (TPC, 758.55 mg gallic acid equivalent/100 g) and total flavonoid content (TFC, 167.70 mg catechin equivalent/100 g), followed by root, clove, and non-sprouted garlic. Antioxidant capacities were significantly correlated with TPC and TFC. The clove had the highest protective effect against UVB-induced damage in fibroblasts. The protective effect was the highest in root against LPS-induced inflammation in macrophages. The leaf and clove significantly improved the cell viability against *t*-BHP-induced oxidative stress in hepatocytes. The protective effect was the highest in the leaf against H_2O_2-induced oxidative damage in myoblasts. Taken together, sprouting may be a useful method to improve the antioxidant and cytoprotective activities of garlic.
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Board No.	82
Author Name	Zbigniew Krejpcio
Organisation	Poznań University of Life Sciences
Country	Poland
Title	Effects of supplementary steviol glycosides in combination with L-arginine and chromium(III) on tissular trace mineral contents in mildly diabetic rats
Abstract Text	Steviol glycosides derived from *Stevia rebaudiana* Bertoni have been reported to have anti-inflammatory, lipid and glucose regulatory potential. Diabetes can disturb trace elements (i.e. Fe, Cu, Zn) levels in organs that contribute to aggravation of diabetes complications, while dietary supplements can mitigate these changes. The aim of this 3-factorial experiment was to investigate the effect of supplementary steviol glycosides (stevioside or rebaudioside A) in combination with L-arginine and chromium(III) on tissue mineral contents in mildly diabetic rats (serum glucose > 160 mg/dl). Diabetes was induced in rats by high fat feeding followed by the administration of streptozotocin (3x20 mg/kg b.w.). Afterwards, rats were allocated in 10 test groups fed with: high-fat diet or high-fat diet supplemented with stevioside or rebaudioside A (2.5%), L-arginine (2% or 4%) and Cr(III) propionate complex (10 or 50 mg Cr/kg). It was found that supplementary rebaudioside A elevated hepatic Cu levels, while the combination of stevioside with higher doses of L-arginine and Cr(III), as well as rebaudioside A with lower dose of L-arginine and higher dose of Cr regulated renal Zn levels, whereas higher intake of Cr led to its higher deposition in liver and kidneys of rats. The Presented Work Is An Integral Part Of The Research Project (National Science Center, Poland NCN 2017/27/B/NZ9/00677).
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Board No.	83
Author Name	Jakub Michał Kurek
Organisation	Poznań University of Life Sciences
Country	Poland
Title	Supplementary steviol glycosides in combination with L-arginine and chromium(III) improve selected nutritional indices in mildly diabetic rats
Abstract Text	Steviol glycosides derived from *Stevia rebaudiana* Bertoni have been reported to have anti-inflammatory, lipid and glucose regulatory potential. The mechanisms underlying the lipid and glucose regulatory effects of these compounds have not been elucidated. Our previous *in vitro* study found that stevioside and steviol significantly increase GLUT-4 transcript levels, enhance glucose uptake and mitigate insulin resistance in hypertrophic insulin-resistant adipocytes. The aim of this 3-factorial experiment was to investigate the effect of supplementary steviol glycosides (stevioside or rebaudioside A) in combination with L-arginine and chromium(III) on nutritional indices (body weight gain, feeding efficacy ratio, organ masses, blood glucose and lipid profile in mildly diabetic (serum glucose > 160 mg/dl) rats. Diabetes was induced in rats by high fat feeding followed by the administration of streptozotocin (3x20 mg/kg b.w.). Afterwards, rats were allocated in test groups fed with: high-fat diet or high-fat diet supplemented with stevioside or rebaudioside A (2.5%), L-arginine (2% or 4%) and Cr(III) propionate complex (10 or 50 mg Cr/kg). It was found that supplementary rebaudioside A with higher dose of chromium(III) significantly improved body weight gain and feed efficiency ratio, and lowered serum VLDL-C level in mildly diabetic rats. The Presented Work Is An Integral Part Of The Research Project (National Science Center, Poland NCN 2017/27/B/NZ9/00677).
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Board No.	84
Author Name	Elizabeth H. Arenas
Organisation	University of Santo Tomas
Country	Philippines
Title	Pili (Canarium ovatum, Engl) pomace in beef patties: impact on quality and acceptability
Abstract Text	Processed meats are low in dietary fiber and consequently increased intake of these products is associated with higher risks of cardiovascular diseases and mortality. Pili (*Canarium ovatum*, Engl) pomace is a phenolic-rich fiber byproduct generated from pulp oil extraction. Beef patty formulations containing different levels of pili pomace (0, 5, 6 and 7%) were analyzed for proximate composition, texture profile, cooking, antioxidant and sensory properties. Pili pomace improved the nutritional profile of patties by increasing ash, fat, protein, carbohydrates and total dietary fiber contents. Percent diameter and thickness reduction, cooking loss and shrinkage, decreased with the addition of pili pomace whereas cooking yield increased. Hardness, gumminess, chewiness and cohesiveness values were greater in treated patties while springiness was lower compared to the control. The total phenolic content and antioxidant activity increased with increasing amount of pili pomace used in patties. In all sensory attributes, consumer acceptability ratings were found to be insignificant except for juiciness and flavor wherein slightly lower scores than control were obtained. Overall, results demonstrate the potential of this fruit residue as a functional ingredient to minimize production costs while enhancing the nutritional and technological qualities of comminuted processed meat products.
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Board No.	85
Author Name	Nam Su Oh
Organisation	Korea University
Country	South Korea
Title	Peptides produced by fermentation of Cudrania tricuspidata leaf extract-supplemented milk ameliorated stress-induced brain disorders and anxiety-like behaviors in mice
Abstract Text	The preventive effects of fermented *Cudrania tricuspidate* leaf extract (CT)-supplemented milk with *Lactobacillus gasseri* 505 (505) against stress-related brain disorders and anxiety-like behaviors were additionally investigated in this study. Probiotic strain 505, fermented CT-supplemented milk with 505 (FCT), and peptides derived from fermentation of CT-supplemented milk, which had great antioxidant and antiinflammation activities, were administered to stressed mice, and expressions of mRNA and proteins related to neurodevelopment and neuroinflammation in the brain and intestinal inflammation and barrier function-related genes and proteins in the colon were evaluated. Moreover, behavioral properties were determined. The results showed that stress mechanism into brain-gut axis were regulated by pretreatment of probiotic strain 505 and FCT, and its fermented metabolites, peptide 14 and peptide 21, leading to inhibition of neurodevelopment and neuroinflammation through hypothalamus-pituitary-adrenal (HPA) axis as well as colonal inflammation. Moreover, anxiety-like behaviors were significantly reduced in mice treated with 505, FCT, and both peptides. These results indicated that fermented milk containing CT with probiotic strain 505 has the potential to prevent stress-induced brain disorders and anxiety-like behaviors owing to its regulatory mechanism of HPA axis.
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Board No.	86
Author Name	SOFIA PAPADAKI
Organisation	NATIONAL TECHNICAL UNIVERSITY OF ATHENS
Country	Greece
Title	Development of beverages using functional food ingredients derived from marine invasive alien species in Mediterranean basin
Abstract Text	In the present study, the development of beverages using functional food ingredients derived from the marine alien species *Pterois miles* and *Fistularia commersonii* was examined through incorporation of polyunsaturated fatty acids and collagen derived from the flesh, skin and bones of the selected species in organic juice from osmotically processed Sea buckthorn (Hippophae rhamnoides). The ingredients were in water soluble powder form. Specifically, for the formulation of ω-3 fatty acids powder, spray drying technique was applied using as encapsulating agents whey and pullulan. In case of collagen the aquatic extracts were lyophilized. The developed beverage were packaged into commercial packaging materials and stored in controlled conditions. Quality and nutritional indices were compared with the "conventional" beverage (control). In the "new" beverage products along with the control ones, sensory evaluation tests were carried out during storage by a panel of trained assessors. Visual appearance, color, brightness, texture and taste were assessed. An acceptability test with a nine-point hedonic scale was performed. All tested samples were considered acceptable since their mean value for overall acceptability was equal and/or above five.
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Board No.	87
Author Name	Chin-Kun Wang
Organisation	Chung Shan Medical University
Country	Taiwan
Title	Remission of knee osteoarthritis by the intake of glucosamine and Guilu Erxian Jiao blended drink
Abstract Text	Knee osteoarthritis (KOA) is a chronic disease of cartilage degeneration. Glucosamine and guilu erxian jiao have been proven to reduce joint pain and delay the course of KOA. However, no study is focused on the function of the two combined ingredients. This study was to evaluate the improvement of the combined drinking of glucosamine and guilu erxian jiao on the symptoms of KOA patients. 60 KOA patients were recruited. They were divided into VAS>4 group (moderate and severe pain group) and VAS<4 group (mild pain group). 8 weeks of combined drink (containing glucosamine 1.5g and guilu erxian jiao 3g/bottle) supplementation (one bottle per day before any meal), the additional two weeks was the follow-up period. After 8 weeks of oral intervention, VAS>4 group and the VAS<4 group significantly improved VAS, WOMAC and Lequesne's Index. Lipid peroxidation of the plasma was decreased, the total plasma GSH level and the antioxidant enzymes activities (GSH Px, GSH Rd) were increased. In addition, the concentrations of cartilage degradation markers were suppressed. In summary, continuous drinking the combined drink of glucosamine and guilu erxian jiao significantly improved the physical activities of KOA patients, relieved pain and discomfort, and increased the body's antioxidant capacity.
Categories	Nutrition & Health

Board No.	88
Author Name	Stefan Camps
Organisation	A*STAR
Country	Singapore
Title	Metabolic phenotyping following a low and high GI meal using continuous glucose monitoring and whole body calorimetry
Abstract Text	Metabolic phenotypes or metabotypes are groups of individuals that share similarities in their metabolic response and stratified nutrition can become a helpful tool to improve dietary recommendations that includes a degree of personalization suited to each type. A total of 42 healthy Chinese male subjects followed a 10h low GI or high GI diet in a randomized cross-over design. Respiratory quotient (RQ) and substrate (carbohydrate and fat) oxidation by whole-body indirect calorimetry and blood glucose levels by using a continuous glucose monitoring system were simultaneously assessed. The low GI diet resulted in a lower glucose response and lower glycemic variability. K-means cluster analysis revealed that participants could be grouped in three metabotypes based on their postprandial glucose response, RQ, and change in RQ with a distinct post-prandial metabolic profile. Several metabolic phenotypes can be distinguished irrespective of body composition. Lower carbohydrate oxidation is correlated to higher glycemic response and variability. Furthermore, the capacity to upregulate carbohydrate oxidation when needed i.e. better metabolic flexibility seems to be important for postprandial glycemic control. Improved metabolic phenotype assessments may enable the early-onset diagnosis of metabolic diseases and the development and optimization of nutritional and medical interventions.
Categories	Nutrition & Health

Board No.	89
Author Name	Weili Hu
Organisation	National University of Singapore
Country	Singapore
Title	Effect of intake of xanthophyll-rich food and supplements on visual outcomes: A systematic review and meta-analysis of randomized controlled trials
Abstract Text	Xanthophyll intake is well-known to improve eye health; however, its benefits on visual outcomes have not been systematically studied particularly in populations with eye diseases. The objective of this systematic review and meta-analysis was to investigate the effect of xanthophyll intake on visual outcomes and further subgroup analysis was performed based on eye diseases status. Two researchers independently searched Pubmed, Scopus, Embase, CINAHL, Cochrane, Web of Science and identified relevant randomized controlled trials. Data were extracted by 2 independent researchers from 42 articles which reported visual outcomes including macular pigment optical density (MPOD), visual acuity, photo-stress recovery, contrast sensitivity, and glare sensitivity from which, data from 24 articles were used for meta-analysis. Random-effects models were used to provide a weighted mean difference (WMD) for quantitative synthesis. Xanthophyll intake enhanced MPOD for both healthy individuals (WMD, 0.04; 95%CI, 0.00 – 0.07) and those with eye-diseases (WMD, 0.07; 95%CI, 0.05 – 0.09). A decrease in photo-stress recovery time was also observed (WMD, -2.35; 95%CI, -4.49 – -0.20) with xanthophyll intake while no effect was observed for other visual outcomes. Findings from this study suggest that xanthophyll-rich/supplementation can improve visual functions, particularly MPOD and photo-stress recovery time regardless of eye-disease status.
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Board No.	90
Author Name	HENG Chin Wee
Organisation	National University of Singapore
Country	Singapore
Title	Short-term study on the effects of chrononutrition on postprandial glycemic response using different Asian mixed mealsâ€™ macro-composition
Abstract Text	The circadian system favors different nutrients throughout the day, where glucose metabolism decreases throughout the day. Large variability in glycemic response increases Type 2 diabetes complications. Varying nutrient composition could serve to reduce glycemic variability. However, a research gap exists, particularly in an Asian mixed diet. This study was a single-blinded, 2-week crossover randomized controlled trial. Twenty-six healthy Chinese males (30.9 ± 11.6 years, BMI – 22.2 ± 2.70, mean ± SD) were randomized to consume 3 different Asian mixed meals, High Fat (HF), High Protein (HP), Low Glycemic Index (LGI), and High Glycemic Index (HGI) as a washout meal. Two-hour postprandial glycemic responses (PPGR) were calculated using readings from the continuous glucose monitoring system and evaluated using a linear mixed model (4 x 2 factorial). Statistical differences were observed for both main (p_{meal}: 0.000 and p_{time}: 0.000) and interaction ($p_{interaction}$: 0.008) effect. All meals showed a statistically higher PPGR during dinner except HP (P_{HP}: 0.906). Using HGI as a control, HP was observed to have the lowest PPGR during both meal-timing ($p_{HP,breakfast}$:0.009, $p_{HP,dinner}$: 0.000). Our study revealed the potential of increasing protein content in a meal as a dietary intervention to reduce PPGR and glycemic variability.
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Board No.	91
Author Name	I-Chen Li
Organisation	Grape King Bio
Country	Taiwan
Title	Sanghuangporus sanghuang mycelia promotes development of brown adipocyte-like phenotype in 3T3-L1 adipocytes
Abstract Text	*Sanghuangporus sanghuang*, commonly known as "sanghuang" in China, "meshimakobu" in Japan, and "sangwhang" in Korea, is a popular medicinally valuable mushroom that has been used as an ingredient to alleviate sickness in humans for more than thousands of years. In modern pharmacological studies, *S. sanghuang* was found to possesses antitumor, anti-inflammatory, antiviral, antimicrobial, antioxidant, antidiabetic, hepatoprotective, neuroprotective and immunomodulatory activities. However, the association of adipocyte browning and irisin secretion with *S. sanghuang* mycelia has not yet been explored. Hence, the effect of *S. sanghuang* mycelia on browning of 3T3-L1 pre-adipocytes and irisin secretion was investigated. Results showed that treatment of 3T3-L1 pre-adipocytes with *S. sanghuang* mycelia produced more adipocytes with multilocular lipid droplets, which are typical for brown adipocytes. Moreover, *S. sanghuang* mycelia induced the brown fat-like phenotype by activating gene expressions of brown adipocyte-specific markers, such as peroxisome proliferator-activated receptor gamma (PPAR-γ), peroxisome proliferator-activated receptor gamma coactivator-1 alpha (PGC-1α), and uncoupling protein 1 (UCP1). Furthermore, *S. sanghuang* mycelia upregulated the expression and secretion of FNDC5/irisin in human embryonic kidney cells (HEK293), which is a thermogenic adipomyokine involved in the browning of adipose tissue. Collectively, the current data suggest possible roles for *S. sanghuang* mycelia in browning of white adipocytes, which may be explored as a potentially promising therapeutic agent for the prevention of obesity and other metabolic disorders.
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Board No.	92
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Organisation	Grape King Bio
Country	Taiwan
Title	Hispidin-enriched Sanghuangporus sanghuang mycelia supplementation ameliorate sarcopenia symptom while sustaining muscle endurance in vivo
Abstract Text	Sarcopenia is a chronic skeletal muscle loss disease in the elderly associated with reduced strength and physical function. Risk factors including genetic, nutrients, reduce physical activities and environments can greatly influence the muscle maintenance. In recent severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic outbreak, the skeletal muscle quality for the elderly has been greatly deteriorated due to COVID-19 physical lockdown and lack in nutrients uptakes. As the symptom has enter the coexist stage with the less lethal variant, the risks for the elderly are still high. Therefore, there is an unmet need for muscle reinforcement in the elderly to ensure a better physical performance with improved healthcare. We investigate the fermented hispidin-enriched *Sanghuangporus sanghuang* mycelia (GKSS) as a muscle nutraceutical food supplement in two different models (sarcopenia and endurance) for the first time. In sarcopenia model induced by casting the one hind leg for a week, supplementation of the 250 mg/kg of GKSS for 14 days clearly showed a ~111.2% gastrocnemius muscle recovery compared with the vehicle group (n=7). GKSS supplement also showed improvement in the motor function on a treadmill by ~89.1%. In the prolonged endurance model, supplementation of the 250 mg/kg of GKSS showed improvement both in swimming (~178.7%) and running (~162.4%) activities compared with vehicle before animal undergo exhaustion. Finally, *in vitro* study from the C2C12 myotube showed that the GKSS helps to sustain MYHC protein expression from dexamethasone damage. Taken together, these findings provide the preliminary evidence to studies support that GKSS contained useful phytochemical hispidin which could be considered as a promising functional food agent or nutraceutical for relieving sarcopenia while improving muscle endurance.
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Board No.	93
Author Name	LIM Jun Jie
Organisation	National University of Singapore
Country	Singapore
Title	Association between Increased Dietary Fat Intake, Amount, and Frequency with Increased Presentation, Persistency, and Severity of Atopic Dermatitis in Young Chinese Adults in Singapore and Malaysia
Abstract Text	In recent years, a westernized dietary pattern has been linked to the increased prevalence of atopic dermatitis (AD), a chronic inflammatory skin disease, in Asia. Here, we evaluated the association between food and dietary habits with AD prevalence using our population established for the Singapore/Malaysia Cross-sectional Genetics Epidemiology Study (SMCGES). A total of 11494 participants (1550 AD cases/ 2978 non-atopic controls/6986 atopic controls) completed an investigator-administered questionnaire. We assessed their dietary habits on dietary fats using two novel food indexes - Diet Quality based on Dietary Fat Score (DQDFS) and Quality of Diet based on Total Fat Amount (DQTFA). Based on DQDFS, individuals with a high fat score are significantly associated with increased AD (OR: 1.553; 95% CI: 1.332-1.815; p-value <0.001), increased AD persistency (OR: 1.534; 95% CI: 1.305-1.802; p-value <0.001), and increased AD severity (OR: 1.650; 95% CI: 1.333-2.045; p-value <0.001). Similarly, using DQTFA, diets with a high fat amount increased the odds of AD (OR: 1.394; 95% CI: 1.164-1.669; p-value <0.001), persistent AD (OR: 1.389; 95% CI: 1.152-1.676; p-value <0.001), and severe AD (OR: 1.449; 95% CI: 1.127-1.866; p-value <0.01). Thus, we identified a high overall intake frequency of dietary fats as a risk factor for AD manifestation.
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Board No.	94
Author Name	Hadia Nawaz
Organisation	Hanyang University, Seoul Campus
Country	South Korea
Title	Efficacy of Ginkgo Biloba Extract on Cognitive Function in the Elderly: A Systematic Review and Meta-Analysis
Abstract Text	Evidence regarding benefits of ginkgo biloba extract on age-related cognitive decline has been controversial. This review aimed to evaluate effective time duration of ginkgo intake and dosage that improves cognitive function. Literature was searched through databases including PubMed, EMBASE, Cochrane, Web of Science, and PsycArticles. Two researchers assessed risk of bias and quality of evidence in included literature and conducted a meta-analysis independently. Twenty-two studies met our inclusion criteria. Intervention duration in studies ranged from 6 weeks to 6.1 years. Meta-analysis results were indicated as standardized mean differences (SMD), mean differences (MD), and risk ratios (RRs) scores. Statistically significant superiority of ginkgo on cognitive function was confirmed in three to six months group with 240 mg/d dose subgroup (SMD=-0.21;95%CI -0.39, -0.03;p<0.05) and in more than six months group with 120 mg/d dose subgroup (MD=-2.38;95%CI -3.68, -1.08;p<0.001). Activities of daily living (ADLs) results for ginkgo were statistically significant in more than six months group with 120 mg/d dose subgroup (MD=-0.23;95%CI -0.31, -0.14;p<0.001). Therefore, ginkgo intake for more than three months and more than six months improves cognition and ADLs, respectively in the elderly with cognitive impairment and AD dementia.
Categories	Nutrition & Health

Board No.	95
Author Name	Seungjoo Baik
Organisation	Chungbuk National University
Country	South Korea
Title	Synergy effect between Centella asiatica and Agastache rugosa in protective activity against UVB-irradiated damage in human fibroblasts
Abstract Text	Ultraviolet (UV) radiation from the sun is the most common environmental stressor to damage the skin. Extracts from *Centella asiatica* (CA) have a broad range of beneficial activities through their antioxidant activity. *Agastache rugosa* (AR) has been known as a good source of bioactive compounds that protect human skin fibroblasts against UVB irradiation. The object of this study was to examine whether combination of the CA and AR (CA-AR) exerts synergistic protective effects against UVB-induced damage in human skin fibroblasts. The protective effects against UVB irradiation and cytotoxicity were assessed by MTT assay. CA, AR and CA-AR had not cytotoxic effects (0.625~5.0 ppm). The synergistic interaction between CA and AR were analyzed using the combination index (CI) models. The strongest synergistic effect was observed for CA-AR with the ratio of 3: 7. CA, AR and CA-AR 3:7 treatments increased cell viability 87%, 80% and 98% in UVB irradiated fibroblasts, respectively. Treatment with CA-AR 3:7 have displayed synergistic protective effects with CI values of 0.03~0.41 against UVB-induced photoaging. Our findings demonstrate the potential synergistic effect between CA and AR in UVB-induced skin aging.
Categories	Nutrition & Health
Other Authors	Name: Minha Kim Organisation: Chungbuk National University City: Cheongju Country: South Korea Name: Younghwa Kim Organisation: Kyungsung University City: Busan Country: South Korea Name: Junsoo Lee Organisation: Chungbuk National University City: Cheongju Country: South Korea

Board No.	96
Author Name	Huirim Park
Organisation	Chungbuk National University
Country	South Korea
Title	Cytoprotection of Andrographis paniculata against oxidative stress in C2C12 cells
Abstract Text	Sarcopenia is a general term to explain the progressive decline of skeletal muscle mass and functional properties with aging. Skeletal muscle is susceptible to oxidative damage due to its high metabolic activity. Reactive oxygen species (ROS) can function as signaling substances or cellular toxicants. Excessive ROS accumulation results in cellular oxidative stress and damages from oxidative stress have been involved in many muscle disorders. *Andrographis paniculata* (AP) is an herbaceous plant used in traditional medicines due to antioxidant and anti-inflammatory activities. The aim of this study was to evaluate the protective effect of AP on H_2O_2-induced oxidative damage in C2C12 cells. AP had no cytotoxic influence on the C2C12 cell at the tested concentration of 1, 5, 10 μg/mL and showed cytoprotective effect against H_2O_2-induced oxidative damage in a dose-dependent manner. AP significantly reduced intracellular ROS level and increased glutathione level in H_2O_2-induced C2C12 cells. Furthermore, AP effectively inhibited lipid peroxidation and decreased the activities of lactate dehydrogenase and creatine kinase. These results demonstrated the protective effect of AP against oxidative stress in C2C12 cells and suggested that AP could be a functional ingredient for the improvement of sarcopenia.
Categories	Nutrition & Health
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Board No.	97
Author Name	Yi-Yuh Huang
Organisation	National Taiwan Ocean University
Country	Taiwan
Title	The Effects of Probiotic on Alleviating Microplastics - Induced Disorder of Intestinal Microbiota and Reproductive System Damaging in Male Rats
Abstract Text	Microplastics are plastic fragments less than 5 mm. Exposure to microplastics may cause oxidative stress and inflammation. However, research on the impact of microplastics on the reproductive system and intestinal flora is still limited. This study investigates the toxic effects of polystyrene microparticles (PS-MPs) on the male reproductive system. PS-MPs were used as the sample on LC540 and Caco-2 cells *in vitro*.The samples significantly decreased the viability of the cells while increasing theconcentrations of superoxide anion and nitric oxide. *In vivo*, after administration of male Sprague-Dawley rats with PS-MPs, no significant difference in body weight was observed, but the liver weight was increased, and testicular weight decreased, indicating that microparticles may cause liver and testicular damage. PS-MP effects on the reproductive system of rats include decreased sperm count and motility, increased abnormal ratio, testicular damage, and lead reproductive endocrine system disorders.Additionally, microplastics altered the intestinal flora, and probiotic supplementation increased the commensal bacteria in rats' guts, ameliorating the adverse effects on the reproductive system. In conclusion, microplastics can alter the composition of the intestinal microbiota and impair the quality of sperm, whereas probiotics indirectly protect male rats' reproductive systems by increasing commensal bacteria in the gut.
Categories	Nutrition & Health,Food Safety & Regulatory Science
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Board No.	98
Author Name	Siew Young QUEK
Organisation	University of Auckland
Country	New Zealand
Title	Phenolics and Bioactivities of Selenium-rich Malus hupehensis
Abstract Text	Selenium is an essential trace element in humans. Plants can accumulate selenium at different levels, depending on the species. *Malus hupehensis (Pamp.) Rehd.* (MH) is a medicinal plant native to China and reported to exhibit bioactivities including antioxidant and anti-inflammatory. This study investigated the selenium-rich MH leaf extracts' phenolics, antioxidant activities, and anticancer properties. From the results, the total phenolic contents were 31.6 and 50.8 mg GAE/g in water and ethanol extracts, respectively. Dihydrochalcone derivatives were identified as the major phenolics. The selenium content was 8.58-10.40 µg/g extracts, and inorganic Se was dominant. The antioxidant activity (measured by DPPH and ABTS assays) was higher in ethanol extract than in water extracts ($p < 0.05$). The MH extracts showed a protective effect against Reactive Oxygen Species generation from H_2O_2 and increased the glutathione content in HEK293 cells. The extract's cytotoxicity, measured by IC50, was 500 µg/ml against A549 lung cancer cell line. The extracts induced the regulation of cellular antioxidant genes, e.g. PLD3, GSTP1, and TRXR1, and apoptosis involving genes CYC and CBR1 in A549 cells. The study indicates that MH is phenolic-rich, has a high selenium level and exhibited antioxidant and anticancer activities.
Categories	Nutrition & Health,Traditional & Future Food
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Board No.	99
Author Name	Joseph Oneh Abu
Organisation	University of Agriculture, Makurdi, Nigeria
Country	Nigeria
Title	Quality of maize ogi enriched with bambaranut and soybean flours and protein isolates
Abstract Text	Protein energy malnutrition remains a major challenge for under-five year (U5) children in many parts of Africa due partly to poor food choices and reliance on low nutrient dense foods. Ogi is a cereal based, thick gruel eaten as a complementary food among U5 children in Nigeria and other parts of Africa. Maize ogi, like all cereal, is low in protein content and quality requiring enrichment with protein-rich leguminous sources. Maize ogi was enriched with bambaranut or soybean flours and protein isolates and evaluated for their protein, amino acid, micronutrient, antinutrient and sensory properties using standard procedures. The results indicate that higher than the 16% protein target for complementary foods could be achieved using both flours and isolates from bambaranut or soybean without unduly compromising the sensory properties. In addition, essential amino acids such as lysine and micronutrients such as potassium where enhanced several folds with the legume flours and isolates. Furthermore, while the antinutrient contents of bambaranut and soybean flour enriched maize ogi were significantly higher than the control maize ogi, the reverse was the case when the protein isolates were used. This suggests that the legume protein isolates would yield safer enriched maize ogi than the corresponding flours.
Categories	Nutrition & Health,Traditional & Future Food
Other Authors	Name: Christiana Ochanya Ameh Organisation: University of Agriculture City: Makurdi Country: Nigeria Name: Comfort M. Bunde-Tsegba Organisation: University of Agriculture City: Makurdi Country: Nigeria

Board No.	100
Author Name	Li-Yin Pang
Organisation	University of Nottingham Malaysia
Country	Malaysia
Title	Use of Ophiocordyceps sinensis for overactive bladder
Abstract Text	Overactive bladder is a condition characterised by urinary frequency, urgency and urge incontinence that adversely affects one's quality of life. The search for alternative therapy is on the rise due to current treatment limitations. We have recently demonstrated the bladder relaxant effect of *Ophiocordyceps sinensis* cold water extract (CWE) *in vitro*, substantiating the traditional use of this medicinal mushroom in relieving frequent urination. In this study, we aimed to investigate the effect of fractionated extracts using the organ bath technique to assist in the process of identification of the bioactive compounds in the CWE. CWE was fractionated by molecular weight (MW) into high (HMW; < 13.7 kDa), medium (MMW; 2.0-12.5 kDa) and low (LMW; 1.8 kDa) fractions. Then, 5 mg/ml of CWE or fractions were added non-cumulatively to the rat bladder tissues pre-contracted with 1 μM of carbachol (muscarinic agonist). The relaxant effect was in the following order: CWE > MMW > LMW > HMW where the tissue relaxation against carbachol-induced tone were 56.91 ± 5.40%, 46.50 ± 3.87%, 32.92 ± 6.08% and 29.58 ± 3.37%, respectively. The findings from this study suggest that the bladder relaxant effect of CWE is superior due to combination effects from these fractions.
Categories	Nutrition & Health,Traditional & Future Food

Board No.	101
Author Name	Shu-Ling Hsieh
Organisation	Department of Seafood Science, National Kaohsiung University of Science and Technology
Country	Taiwan
Title	Anti-obesity effects of lemon peel essential oil in high-calorie diet-induced obese rats
Abstract Text	Lemon peel essential oil (LPO) can be extracted from lemon peel, and contains rich limonene. It has anti-oxidant, anti-inflammatory, and anti-cancer properties. The aim of this study investigated the effects of LPO on anti-obesity in high-calorie diet-induced obese rats. Wistar rats were assigned to five groups: a normal diet (ND); a high-calorie diet (HD); and three groups receiving HD-diet respectively combined with the low dose of LPO (HD+LLPO; 238 mg/kg), medium dose of LPO (HD+MLPO; 714 mg/kg), and high dose of LPO (HD+HLPO; 1190 mg/kg). After the rats were sacrificed, the blood lipid levels, and the lipid metabolism related mRNA levels were examined. The results showed that MLPO, and HLPO reduced the body weight, Lee's index, and serum TG levels. All of the LPO treated groups decreased the body fat mass, serum glucose levels, and the mRNA levels of lipid synthesis (PPARγ, SREBP-1c, ACC). Moreover, all of the LPO treated groups increased the mRNA levels of lipolysis (HSL, ATGL, AMPK). Overall, LPO has anti-obesity property by regulating the lipid metabolism in high-calorie diet-induced obese rats. LPO can be a potential dietary supplement for the prevention of obesity in the future.
Categories	Nutrition & Health,Traditional & Future Food
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Board No.	102
Author Name	Yang Dimeng
Organisation	National University of Singapore
Country	Singapore
Title	Effects of noodles fortified with okra (Abelmoschus esculentus (L.) Moench) seed powder on postprandial glucose, insulin and satiety in healthy human volunteers
Abstract Text	Okra is a commonly consumed vegetable with a rich source of nutrients. Traditionally, it has been used as an alternative treatment for diabetes. Rice noodles are rich in carbohydrates and low in essential nutrients. In this study, freeze-dried okra seed flour (OSF) is used as a functional ingredient to attenuate postprandial blood glucose rise and create lower glycemic index noodles. Twenty healthy individuals consumed control rice noodle (CON), 10% okra seed fortified rice noodle (OKN), 20% OKN and glucose drinks on separate visits. Postprandial glucose and insulin responses were compared, and GI was determined. Satiety, using a visual analogue scale, and gut hormones were analyzed as secondary outcomes. 20% OKN significantly lowered the postprandial glucose and insulin peaks compared to CON. There was also a 20-point reduction of GI value for 20% OKN. While all noodles produced similar gut hormone responses, OKN were more satiating than CON given the same amount of available carbohydrates. Sensory evaluation further revealed that OKN received positive overall liking scores. Overall, the result of this study serves as a reference for future functional studies on okra as a mildly processed bioactive ingredient for glycemic control in carbohydrate-rich habitual diets.
Categories	Nutrition & Health,Traditional & Future Food
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Board No.	103
Author Name	Sungkwon Park
Organisation	Sejong University
Country	South Korea
Title	Spirulina improves anti-oxidant activity with increased levels of protein and minerals in alternative protein.
Abstract Text	Spirulina is a blue green algae, which belongs to photosynthetic bacteria, contains high levels of protein (about 60%), Vitamin B and dietary minerals. To identify the possibility of replacing vegetable protein with spirulina, meat alternatives supplemented with partial replacement of spirulina (1% v/v) was analyzed for nutrition value and chemical properties including anti-oxidant activity. Texture, color, nutrient levels and antioxidant activity were analyzed by texture profile analyzer, colorimeter, AOAC, and DPPH assay, respectively. Results show that supplementation of 1% spirulina did not affect texture profiles or chromaticity. Meat alternatives supplemented with 1% spirulina showed higher levels of Zn, Mg, total protein, as well as antioxidant activity, demonstrating that spirulina can provide micronutrients and health functionality, and may extend self-life of meat alternatives.
Categories	Traditional & Future Food

Board No.	104
Author Name	Oluwatoyin Onipe
Organisation	University of Venda
Country	South Africa
Title	Processing levels of sub-Saharan African plant foods
Abstract Text	With increasing advocacy for plant food consumption, the sub-Saharan Africa (SSA) landscape is home to diverse plant-based food commodities not found elsewhere in the world. In a global context, major classification frameworks separate food processing as either unprocessed/minimally processed or highly/ ultra-processed with other subdivisions within the two groups. The need to leverage the advantages of unprocessed/minimally processed foods over ultra-processed foods (UPF) is a system that requires exploitation in SSA. Industrialisation and formalisation of markets are impacting and marginalising traditional food processing. The level of processing of cereals, grains, fruits, vegetables, roots, and tuber crops in the continent requires intervention from scientific, governmental, and religious bodies. This paper reviews the levels of processing of African foods, the challenges, the cultural impact, and future directions. **Keywords:** exotic fruits, ultra-processing, cereals, tuber, minimal processing
Categories	Traditional & Future Food
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Board No.	105
Author Name	Ramashia Shonisani
Organisation	University of Venda
Country	Afghanistan
Title	Malting of finger millet (Eleusine coracana) grains/ flours and their utilisation in the formulation of gluten-free products.
Abstract Text	Finger millet (*Eleusine coracana*) is also known as *mufhoho, uphoko* (South Africa), *zviyo, rapoko* (Zimbabwe), *ragi* and *mandua* (India). Finger millet is a good source of nutrients, especially calcium, carbohydrates, minerals, and dietary fibre. The calcium content is essential for bone growth, especially for children and ageing people. Some health benefits are also attributed to its polyphenol and dietary fibre contents. Millet is a gluten-free crop, thus making it beneficial in the diets of people who are suffering from gluten intolerance. Therefore, malting causes an increment in hydrolytic enzymes, total sugars, amino acids content, B-group vitamins with a decrease in starch and dry matter, thus it improves the digestive health of consumers. Malting for brewing and child feeding has been traditionally practised in many parts of Africa. Products made from malted cereal grains include porridge, weaning foods, alcoholic and non-alcoholic beverages. Few studies have been conducted on the utilisation of malted FM in food formulations, this might be due to the lack of knowledge on the use of the crop which results in the underutilisation of the crop. Therefore, this study will point out the various benefits and uses of malted FM. **Keywords:** Finger millet, malting, nutrients, gluten-free
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Board No.	106
Author Name	Ardiansyah
Organisation	Universitas Bakrie
Country	Indonesia
Title	The effect of household scale heating on sensory profile and volatile compounds of Kenikir (Cosmos caudatus)
Abstract Text	Kenikir (*Cosmos caudatus*) are one type of vegetable that is commonly consumed in Indonesia both in fresh or cooked. Most of the vegetables are cooked by boiling or steaming before consumed. The cooking processes would bring changes in physico-chemical properties of vegetables. The present study was undertaken to investigate the effect of household scale heating (boiling and steaming at 3 and 5 minutes) on sensory profiles and volatile compounds of Kenikir. The sensory evaluation analyzed by free choice profiling method and volatile compounds were identified by GC-MS after extracted by headspace solid-phase microextraction. The most frequent attributes sensory of fresh and heated of Kenikir were bright and moist for appearance, smooth, tender and juicy for texture, bitter and minty for taste, and floral and grassy for odor. There are 30 volatile compounds identified in Kenikir, such as alcohol (2 compounds), benzene (3 compounds), esters (3 compounds), monoterpenes (10 compounds), and sesquiterpenes (12 compounds). The compounds of (Z)-3-hexenol, α-cadinol, and 3-carene were only detected in fresh Kenikir and β-myrcene and β-elemene were only detected after boiling or steaming. In conclusion, these studies proved that the changes in sensory profiles and volatile compounds because of the household scale heating process. Keywords: Kenikir, sensory profile, volatile compounds
Categories	Traditional & Future Food
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Board No.	107
Author Name	Agnieszka Orkusz
Organisation	Wroclaw University of Economics and Business
Country	Poland
Title	Edible insects as a meat alternative
Abstract Text	Edible insects are a novel food ingredient with great potential that may contribute to ensuring global food security and constitute an interesting food alternative, especially for meat. The study aimed to compare the composition of edible insects (*Acheta domesticus*, *Tenebrio molitor*, *Gryllus bimaculatus*, *Zophobas morio*, *Gonimbrasia belina*, *Bombyx mori*, *Galleria mallonella)* and meat in terms of energy value, protein, fat, fibre, cholesterol, amino acids, fatty acids, minerals and vitamins. The nutritional quality index (INQ) was also used to assess edible insects and meat's nutritional value. Knowledge of nutrients and the amounts in which they occur in various kinds of meat and species of insects can be used, among others, to plan and then prepare meals with the correct content of nutrients. It may foster a change in eating habits and lead to the general improvement in human health. This knowledge can enrich the daily ration of those nutrients whose supply is too low compared to recommended values. The project is financed by the Ministry of Science and Higher Education in Poland under the programme "Regional Initiative of Excellence" 2019 - 2022, project number 015/RID/2018/19 total funding amount 10 721 040,00 PLN.
Categories	Traditional & Future Food
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Board No.	108
Author Name	Seul-Ah Kim
Organisation	Chungbuk National University
Country	South Korea
Title	Development of DNA-Free Genome Editing Technology for Knock-Out Dextransucrase Gene in Leuconostoc citreum Using CRISPR-Cas9 System
Abstract Text	*Leuconostoc citreum* has been used as a starter culture for industrial kimchi in Korea. This bacterium synthesizes exopolysaccharides (dextran) by dextransucrase, which have numerous applications in food and pharmaceutical industries. However, dextran synthesis often causes obstacles in fermented foods such as undesired ropiness of kimchi and in biotechnology such as increased viscosity of medium making it difficult to purify proteins. The aim of this study was knock-out dextransucrase gene in *L. citreum* by employing CRISPR-Cas9 system. For this, preassembled Cas9 and sgRNA targeting dextransucrase gene were transformed into *L. citreum* by electroporation. As result, mutants were obtained on sucrose agar medium which do not produce dextransucrase or dextran. In sequencing analysis, one nucleotide in the mutant DNA was deleted, and it resulted in gene knock-out by a frame shift. When the mutant strain was inoculated as starter in kimchi (dongchimi), the fermentation characteristics such as viable cell counts, pH, and metabolites were not significantly different compared to wild type. Whereas dextran content in dongchimi inoculated with mutant strain was significantly decreased and alternan was produced. This study highlights that DNA-free genome editing tools using preassembled Cas9 and sgRNA can be used to successfully knock-out target gene in *L. citreum*.
Categories	Traditional & Future Food

Board No.	109
Author Name	GAN Heng Hui, Andrea Ng
Organisation	Nanyang Polytechnic
Country	Singapore
Title	A Functional & Sustainable Solution for Ageing Consumers â€" All-in-One Plant-Based Ready-to-Drink
Abstract Text	Singapore is currently facing an increasingly aging population, caused by increased life expectancy coupled with decreasing birth rates. In 2020, it had one of the highest life expectancies in the world. An ageing population comes with a unique set of challenges, from reduced economic growth to increased healthcare and social services costs. Another emerging issue we face is the increasing amount of food waste generated over the past 10 years, it is therefore essential to focus from a food security perspective, to reduce food loss and waste. As we work towards becoming a zero waste nation, we should reduce, reuse and recycle our food to give them a second lease of life. 'Circular economy' approach was adopted to reuse and maximise the production waste, like under-roasted or broken nuts, generated from nut processing manufacturer to create a new, functional nut-based ready-to-drink, shelf-stable beverage suitable for the ageing consumers. Peanuts contain minerals such as calcium, magnesium, potassium, which are inherently loaded with polyphenols. The drink underwent high shear mixing for good dispersion of emulsifiers and stabilisers, then homogenised and retorted. Among the 35 volunteers who tried the lower-in-sugar, calcium-rich nut-based beverage, more than 70% at least liked and would purchase it.
Categories	Traditional & Future Food
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Board No.	110
Author Name	Abdul-Rasaq A. Adebowale
Organisation	Federal University of Agriculture (FUNAAB), Abeokuta, Nigeria
Country	Nigeria
Title	STATUS OF ROOTS AND TUBERS DRYING IN WEST AFRICA
Abstract Text	Root and tuber crops possess variable degrees of inherent shelf life, from yam that remains dormant for 3-4 months to cassava with a shelf life of 3-5 days after harvest. Roots and tubers are traditionally transformed into more durable products by drying, therefore, efficient drying system can reduce postharvest losses. The study aimed at gathering baseline information on existing drying systems in West African countries of Nigeria, Ghana, Sierra-Leone and Benin Republic. Structure pre-tested questionnaires were used to elicit information on socio-demographic characteristics, drying equipment/methods, gender roles, etc. Drying technique adopted by root and tuber processors in the countries showed similarity especially at the village level. In Nigeria, 96.0% of respondents engaged in sun drying while in Republic of Benin was 76.81%. In Ghana and Sierra Leone, 57.2% and 66.0%, respectively practice sun drying. Across the countries, the stages of technological development are not uniform. However, the skill gap is common across board as evidenced by low awareness/practical knowledge of improved drying technology. Conclusively, root and tuber drying in West Africa is still characterized by drudgery, poor and inconsistent product quality. The dominant drying technology in the countries was sun drying with pockets of artificial drying systems.
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Board No.	111
Author Name	Anne Perera
Organisation	Food & Nutrition Consultancy Service
Country	New Zealand
Title	Capacity building and empowerment through volunteering in Tanzania
Abstract Text	Most people are keen to learn new skills and apply new technology to gain personal and economic benefits for themselves, their families and the nation. There are several organisations in Tanzania that are geared to help individuals with entrepreneurial inclinations to start small scale industries to become self sufficient and to contribute to building economically empowered communities. One such entity is the Small Industries Development Organisation (SIDO) of Tanzania, which operates under the Ministry of Trade, Industry and Investment. Some of their best-known activities are the Industrial Estates, Technology Development Centres, Training cum Production Centres, hire purchase schemes for equipment, technology development, technology transfer through exchanges with other countries. At the request of SIDO, the Volunteer Service Abroad (VSA) of New Zealand provided a Food and Nutrition Advisor who initially spent two years engaged in capacity building and full utilisation of the crops and waste reduction through application of appropriate technology. In addition, the volunteer also helped in the revitalisation of the Tanzania Association of Food Scientists and Technologists (TAFST). This presentation will highlight some of the key activities carried out by the VSA(NZ) Volunteer in capacity building and empowerment through Training of Trainers in Tanzania.
Categories	Traditional & Future Food

Board No.	112
Author Name	Joanna Harasym
Organisation	Wrocław University of Economics and Business
Country	Poland
Title	Physiochemical and microbiological characteristics of artisanal cheeses may offer a new solutions for industrial starters
Abstract Text	The local process of making artisanal cheeses draws on the long-standing traditions of the region, which benefits from the fauna, flora and microflora found in that climatic region. The indigenous microflora found in mixed cultures contributes to the specific sensory qualities of each product. This study analyzed three types of Portuguese PDO cheeses - Queijo de Nisa, Queijo Serra da Estrela and Queijo de Castelo Branco by investigating the microbiological characteristics and physicochemical properties. It was possible to differentiate and assign specific mixed cultures to the types of cheese studied. Texture (TPA), colour, water activity, specific volume and some other physicochemical parameters appeared to be well correlated with microbial groups. Such knowledge not only enables the specific characterization of PDO designation protected products but also provides knowledge about the dependence of sensory properties on specific microbial groups. This provides an excellent source for the development of industrial inoculations useful for the production of plant proteins bases products mimicking typical cheeses or sausages. The project is financed by the Ministry of Science and Higher Education in Poland under the programme "Regional Initiative of Excellence" 2019 - 2022 project number 015/RID/2018/19 total funding amount 10 721 040,00 PLN".
Categories	Traditional & Future Food
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Board No.	113
Author Name	Kong Yan
Organisation	National University of Singapore
Country	Singapore
Title	Functional composite microbeads for cell-based meat culture
Abstract Text	Hydrogel microbeads are promising supports for cell-based meat culture but there is a lack of functional microbeads that are food compatible with good cyto-affinity and cyto-proliferation. Herein we report the development of functional microbeads with the desired diameters using electrospray technology. While naked alginate microbeads have poor cyto-affinity, different gelatins derived from animals and gelatin mimics derived from plants, were grafted onto the beads to enhance the cyto-affinity suitable for meat culture. The modified microbeads can maintain round shape of alginate microbeads with mean diameters of 94.81 to 159.5 μm. C2C12 cells were used to identify gelatin mimics from scores of plant proteins and hydrolysates with the best performance in stimulating cells adhesion and proliferation. We found that certain plant proteins as well as animal derived gelatins could achieve 17-fold proliferation of C2C12. With the successful differentiation of C2C12 and proliferation of 3T3-L1 adipocytes and primary porcine myoblasts on plant-based gelatin, cells and microbeads can form clusters and finally become spheroids, illustrating that our plant-based microbeads are promising microcarriers for mammalian cell culture and cell-based meat production. Cell adhesion peptide RGD was identified from the plant proteins, therefore, the plant proteins are possible to replace animal derived ECM materials.
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Board No.	114
Author Name	Carlos Pereira
Organisation	CERNAS-Centro de Estudos dos Recursos Naturais, Ambiente e Sociedade
Country	Portugal
Title	SheepÂ´s butter and buttermilk produced with cream maturated by different microbial cultures
Abstract Text	Four types of sheep's butter were produced. After pasteurization, the cream was divided into 4 portions and: 1) kept under refrigeration (4±2 ºC) for 36 h before churning; 2) inoculated with aromatic culture and kept for 24 h at 20 ºC, than maintained at 4±2 ºC for 12 h before churning; 3) inoculated with a probiotic culture composed of a mixture of *L. casei*, *L. acidophilus* and *L. rhamnosus* in the proportion 1:1:1 and kept for 24 h at 20 ºC, than maintained at 4±2 ºC for 12 h before churning; 4) inoculated with a Kefir culture and kept for 24 h at 20 ºC, than maintained at 4±2 ºC for 12 h before churning. All freeze-dried cultures were previously incubated for 24h at 35 ºC in sterile milk. The obtained buttermilks were also collected and tested for physicochemical and microbiological analysis. The physicochemical analysis performed to the butter and buttermilk samples were: total solids, fat, protein, ash, titratable acidity and color. The butter samples were also submitted to a texture profile analysis and to small strain stress sweep tests using a rheometer. The microbiological analysis performed included total mesophilic aerobic bacteria, lactic acid bacteria (LAB), lactobacilli as well as yeasts and molds. Both butter and buttermilk samples were submitted to sensory analysis by an untrained panel. All butter samples produced with ripened cream presented adequate levels of LAB. Cultured buttermilks also presented levels of LAB higher than log 6 UFC/mL. Butter and buttermilk samples containing probiotics were the most appreciated by consumers.
Categories	Traditional & Future Food
Other Authors	Name: Tânia Silva Organisation: Polytechnic of Coimbra City: Coimbra Country: Portugal Name: Arona Pires Organisation: Polytechnic of Coimbra City: Coimbra Country: Portugal Name: David Gomes Organisation: Polytechnic of Coimbra City: Coimbra Country: Portugal Name: Susana Pereira-Dias Organisation: Polytechnic of Coimbra City: Coimbra Country: Portugal Name: Marta henriques Organisation: CERNAS-Centro de Estudos dos Recursos Naturais, Ambiente e Sociedade City: Coimbra Country: Portugal

Board No.	115
Author Name	Carlos Pereira
Organisation	CERNAS-Centro de Estudos dos Recursos Naturais, Ambiente e Sociedade
Country	Portugal
Title	Integrated actions envisaging the reduction of preservatives and other food additives in traditional portuguese sausages: â€œChouriÃ§o Tradicionalâ€ ; â€œAlheiraâ€ and â€œMorcela da Beiraâ€ .
Abstract Text	In recent years, the consumers' demand for low-salt and nitrite-free cured meat products forced the industry to introduce these products in the market. Several strategies have been studied to obtain low-salt or nitrite-free meat products. However, to control microbial hazards, the current knowledge on food preservation should be applied in salt-reduced or nitrite-free meat products, searching for new technologies and employing them in a synergistic way to control pathogens. Bacteriocin producing protective starters (PS) are an important inhibitory tool to control potential pathogens on low-salt or nitrite-free cured meat products. Vegetable extracts (VE) can also be used to successfully replace nitrite. Essential oils (EO) also play an important role on the inhibition of pathogens. In the present study, an integrated approach combining such tools was used to improve the safety of traditional Portuguese meat sausages: 1) *Chouriço Tradicional*, a dry-cured sausage made from wine-marinated meat; 2) *Alheira*, a naturally fermented and smoked meat sausage and; 3) *Morcela da Beira*, a traditional blood sausage. Conventional products were compared with the modified formulations with regard to their physico-chemical, microbiological and sensory characteristics. It was concluded that the combination of such tools can improve the safety of such products without impairing their physico-chemical and sensory characteristics.
Categories	Traditional & Future Food
Other Authors	Name: Arona Pires Organisation: Polytechnic of Coimbra City: Coimbra Country: Portugal Name: Susana Pereira-Dias Organisation: Polytechnic of Coimbra City: Coimbra Country: Portugal Name: Marta Henriques Organisation: Polytechnic of Coimbra City: Coimbra Country: Portugal Name: Ivo Rodrigues Organisation: Polytechnic of Coimbra City: Coimbra Country: Portugal

Board No.	116
Author Name	Agnieszka Orkusz
Organisation	Wroclaw University of Economics and Business
Country	Poland
Title	Tradition and modernity - dumplings with the addition of edible insects in Polish and Italian cuisine
Abstract Text	The introduction of rich in essential nutrients edible insects into the human diet has recently gained huge attention resulting in a different product with edible insects incorporated. Dumplings are easy to prepare (though time-consuming), cheap and nutritious. Various ways of preparing and serving dumplings make them symbols of different national groups. The variety of dumplings, the dough used, and the stuffing shows that this dish can be easily adapted to taste habits and cultural differences. Polish *pierogi* are one of the most successful products of traditional Slavic cuisine, and the same goes for *cappelletti, tortellini, tortelli, ravioli* in Italy. The simplest dumpling dough in both countries is made of wheat flour, water and salt. The study aimed to assess the nutritional value of dumplings, prepared according to traditional recipes and partially modified by adding powdered edible insects (*Locusta migratoria* and *Tenebrio molitor) using analytical software equipped with* a nutrient content database. Adding powdered edible insects increased protein content and selected vitamins and minerals in dumplings. The project is financed by the Ministry of Science and Higher Education in Poland under the programme "Regional Initiative of Excellence" 2019 - 2022, project number 015/RID/2018/19 total funding amount 10 721 040,00 PLN".
Categories	Traditional & Future Food
Other Authors	Name: Joanna Harasym Organisation: Wroclaw University of Economics and Business City: Wroclaw Country: Poland Name: Massimo Mozzon Organisation: Università Politecnica delle Marche City: Ancona Country: Italy Name: Roberta Foligni Organisation: Università Politecnica delle Marche City: Ancona Country: Italy

Board No.	117
Author Name	CHEN DAI
Organisation	NUS and Probicient (NUS spin-off)
Country	Singapore
Title	Research and development of refrigerated probiotic beer from lab-scale to industrial-scale fermentation
Abstract Text	Probiotic beverages have become one of the trendiest and best-selling health drink products, as more consumers are concerned about their overall health and look for products to boost their immune system during the Covid-19 pandemic. Concurrently, beer is forecast to lead the market recovery of global alcoholic beverages as the most consumed alcoholic beverage. Thus, probiotic beer emerges as a novel product to expand the consumer base of alcoholic and probiotic beverages, as well as the needs of those who are unable to consume dairy-based probiotic beverages due to lactose intolerance or allergies to dairy products. However, many intrinsic antimicrobial hurdles in alcoholic beverages (such as hop iso-α-acids in beer, ethanol, acidity, and lack of nutrients) inhibit the growth and survival of probiotics. Thus, there was no commercial probiotic alcoholic beverage in the market. In our research, different probiotic bacteria and brewing yeasts with different fermentation processes were evaluated, as well as the shelf-life test and sensory evaluation. By using selected probiotic culture and fermentation methods, we have successfully developed probiotic beer from lab-scale production to industrial-scale production, which contains over 1 billion CFU per serving with a shelf life of 12 months under refrigerated storage.
Categories	Traditional & Future Food

Board No.	118
Author Name	Mpho Edward mashau, Dr Shonisani Eugenia Ramashia
Organisation	University of Venda
Country	South Africa
Title	Effect of fermentation on the physicochemical and antioxidant properties of finger millet porridges
Abstract Text	The flours of finger millet (*Eleusine coracana*) from light brown and dark brown varieties were fermented for 96 h and were used to produce porridges. The porridges were evaluated for the physicochemical properties, bioactive compounds and antioxidant activity. Fermentation significantly increased the protein content of porridges and the energy Finger millet (FM) porridges. The crude fibre, fats, ash, moisture and carbohydrates significantly ($p < 0.05$) decreased. Total titratable acid significantly ($p < 0.05$) increased from 1.3 to 2.6 g/100 g (dark brown) and 1.08 to 1.7 g/100 g (light brown). The pH significantly ($p<0.05$) decreased during fermentation. The lightness (L*) and redness (a*) decreased while the yellowness (b*) of both porridges increased during fermentation period. The bioactive compounds of FM porridges significantly ($p < 0.05$) increased with fermentation time, total polyphenolic content increased from 147 to 416.34 mg/100 g (light brown) and 490 to 615 mg/100 g (dark brown) and total flavonoid content increased from 180.31 to 389.7 mg/100 g (light brown) and 230.3 to 410 mg/g (dark brown). However, the total anthocyanin content significantly ($p< 0.05$) decreased during fermentation. The DPPH activity of FM porridgess significantly ($p < 0.05$) increased with fermentation time. Fermentation can be utilised as a cost-effective method to improve the nutritional properties and polyphenolic compounds of FM porridges.
Categories	Traditional & Future Food

Board No.	119
Author Name	RUBEN ALDACO GARCIA
Organisation	CANTABRIA UNIVERSITY
Country	Spain
Title	Superfoods: Environmentally friendly and regionally?
Abstract Text	In response to the urgency of finding solutions to the challenge of the diet-environment-health trilemma, the so-called superfoods have gained prominence in recent years. They commonly stand out for their particular nutritional value, presenting an interesting food option to prevent diseases and fight against food insecurity. This work proposes to go beyond these nutritional characteristics and consider foods as 'super' also taking into account their environmental performance, which there is still a great deal of uncertainty in this area of knowledge. The present study aims to provide a breakthrough by developing the Life Cycle Assessment of several foods: quinoa and spirulina. The methodology, based on the LCA guidelines, includes the definition of a cradle-to-grave approach, the compilation of inventory data, and the evaluation of a wide range of impact categories addressing resources depletion, water and energy consumption, global warming potential and other indicators related to environmental degradation. The environmental impacts of “superfoods” production has been quantified, identifying the weaknesses of the system and proposing opportunities for improvement, enabling the promotion of a more sustainable food sector. The environmental benefits or disadvantages of its local production and consumption patterns has been analyzed, providing a scientific basis for stakeholders’ decision making.
Categories	Traditional & Future Food

Board No.	120
Author Name	Chi Nhan Tran
Organisation	Can Tho university
Country	Vietnam
Title	IMPROVEMENT OF THE QUALITY AND THE STORAGE STABILITY OF FRESH RICE NOODLES â€" VIETNAMESE TRADITIONAL PRODUCT
Abstract Text	*Vietnam's favorite foods are usually the production originally from flour, especially fresh rice noodles. To increase the sensory value and prolong the preservation ability, exceeded or unpermitted food addictives (sulfur dioxide, tinopal, borax, oxalic acid) have been added to fresh rice noodles. To improve the quality of safety fresh rice noodles, 20% of purified wheat flour was added to the mixing stage to improve the quality of fresh rice noodles, leading to the highest force strain value (675g/force) and sensory values. In addition, the use of 0.15 ppm of ozone in cooling water and storing noodles in PA packages in combination with vacuum conditions could preserve noodles for 24 hours, which ensured the food safety and hygiene level and maintained the sensory values of the product.* *Keywords: flour, food additives, fresh rice noodles, ozone, PA packaging*
Categories	Traditional & Future Food,Food Chemistry & Ingredients
Other Authors	Name: Thi Tuyet Nhung Do Organisation: Can Tho university of technology City: Can Tho Country: Vietnam Name: Chi Tam Doan Organisation: Medical prevention center of Long Ho district - Vinh Long province City: Vinh Long province Country: Vietnam

Board No.	121
Author Name	Deepak Choudhury
Organisation	BTI A*STAR
Country	Singapore
Title	Plant-based Edible Scaffolds for Cultured Meat Production
Abstract Text	*Yap Wee Swan[1], Satnam Singh[1], Priyatharshini Murgan[1], Ratima Suntornnond[1],* *Quang Bach Le[1], Hongfei Zhang[2], Zhou Weibiao[2], Deepak Choudhury[1]** *[1]Bioprocessing Technology Institute (BTI), Agency for Science, Technology and Research (A*STAR), Singapore* *[2] Department of Food Science and Technology, National University of Singapore, Singapore* **Correspondence: Deepak_Choudhury@bti.a-star.edu.sg;* Cultured meat production has gained much traction in the past few years [1, 2]. The technique involves isolating muscle cells from animals and expanding them in *in-vitro* settings to develop meat. To produce cultured meat with similar structural complexity as conventional meat, it is imperative for suitable animal-free scaffolds to be generated. Scaffolds should possess appropriate thickness and mechanical properties, and permit suitable cell attachment, proliferation and maturation [3]. We have developed highly macroporous decellularized plant-based scaffolds as edible substrates for structured meat production. Our scaffolds comprise unique anatomical features that help align and orientate cells which is crucial for the differentiation and maturation of muscle cells. We have demonstrated the extent and efficacy of decellularization with DNA quantification and histology staining using Sass's Safranin and Fast Green. SEM and MicroCT were also performed to observe the surface microtopographies and pore sizes of the decellularized scaffolds. In addition, we have evaluated thermal stability with TGA, identified functional moieties with FT-IR and observed the mechanical rigidity. These scaffolds have been shown to support the growth and proliferation of a model muscle cell line – C2C12 cells. More detailed cell maturation and molecular characterizations are ongoing. <u>*References*</u> 1. *Ng, ET et al. (2021) Cultured meat - a patentometric analysis. Critical Reviews in Food Science and Nutrition, 1-11.* 2. *Choudhury, D. et al. (2020) The Business of Cultured Meat. Trends in Biotechnology 38 (6), 573-577.* 3. *Seah, JSH et al. (2021) Scaffolds for manufacturing cultured meat. Critical Reviews in Biotechnology, 1-13.*
Categories	Traditional & Future Food,Future of Food Manufacturing

Board No.	122
Author Name	Yao Olive Li
Organisation	California State Polytechnic University, Pomona
Country	USA
Title	Microbial Safety Assessment on Fresh Orange Pomace and Its Derivative from Drying and Refining as an Innovative Ingredient
Abstract Text	Orange pomace (OP) is a by-product of juicing process, rich in phenolic compounds and dietary fiber. A lab-scale process consisting of multiple unit operations was developed to recover its nutrient values as an innovative ingredient. The objective was to assess the microbiological properties of the raw material (fresh OP) and OP powder. Refined OP power was made through four processing steps: pre-milling for size reduction, drying, grinding and sieving. The TPC (total plate count), yeast/mold count, coliforms, *E. coli*, *Listeria, Salmonella* and *Staphylococcus aureus* were tested before and after each of these steps. The results showed TPC and mold/yeast counts varied batch by batch, depending on the raw material. Pre-drying shredding might be a contamination step to introduce microorganisms but not significant ($p>0.05$). Cleaning and sanitizing of lab utensils were then implemented and standardized. Drying (under $70^{o}C$ for at least 6 hours) played a powerful role in killing most microorganisms, leading to a significant 4-5 log reduction on TPC ($p < 0.05$). All finished samples (OP powder) were free from *Salmonella, Listeria* and *E. coli O157:H7*, while *Staphylococcus aureus* and coliforms were consistently in existence, however, much below the FDA's regulation on dried spices or seasoning powders.
Categories	Traditional & Future Food,Food Safety & Regulatory Science
Other Authors	Name: Huiying Hu Organisation: California State Polytechnic University, Pomona City: Pomona Country: United States Name: Wei-Jen Lin Organisation: California State Polytechnic University, Pomona City: Pomona Country: United States Name: Yan Liu Organisation: California State Polytechnic University, Pomona City: Pomona Country: United States

Board No.	123
Author Name	Neela Badrie
Organisation	The University of the West Indies, St. Augustine
Country	Trinidad & Tobago
Title	Risky Food Choices by Residents in Trinidad and Tobago
Abstract Text	Food choices can vary from one person to another due to reasons such as price, mood, ingredients, safety and even culture. In this study, residents' choice of eating foods that could lead to foodborne illnesses were evaluated. Nearly 0.2% of all individuals in Trinidad and Tobago were interviewed and data were collected by means of a standardized questionnaire covering their consumption habit for risky food dishes. Contingency tables were developed for demographics and categorical variables and p-values of < 0.05 considered statistically significant. Fewer residents (1% - 2%) in our study engaged in the consumption of risky foods such as raw egg dishes, undercooked eggs, raw seafoods and raw meats when compared to 4%, 53% and 86% of residents in Finland, the USA and Australia, respectively. A significant association between sex and consumption of raw seafood was observed in this survey, with more males (n=36) engaging in this practice than females (n=12). To reduce risks associated with these dishes, residents must ensure that foods are fully cooked and kept away from raw meats. This study concluded that residents in Trinidad and Tobago practiced safer food choices when it pertained to consuming risky food dishes compared to other countries.
Categories	Sensory & Consumer Science,Food Safety & Regulatory Science
Other Authors	Name: Neela Badrie Organisation: The University of the West Indies, St. Augustine City: St. Augustine Country: Trinidad & Tobago Name: Adash Ramsubhag Organisation: The University of the West Indies, St. Augustine City: St. Augustine Country: Trinidad & Tobago Name: Lisa Indar Organisation: Caribbean Public Health Agency City: Port of Spain Country: Trinidad & Tobago

Board No.	124
Author Name	Yufeng Zhang
Organisation	Zhejiang Gongshang University
Country	China
Title	Structure-function relationship of saliva alpha-amylase activity in the presence of mucin
Abstract Text	Alpha-amylase in human saliva is known highly active and plays an important role in oral digestion and texture sensation of starch-containing food. This study aims to investigate the effect of mucin with different concentrations (0.5, 1, 2, 3, and 4 mg/mL) on amylase activity. The correlations between salivary amylase activity, total protein and mucin concentrations, amylase activity after mucin addition, enhancement kinetics, fluorescence quenching and QCM-D were also analyzed. The results indicated that: (1) Salivary amylase activity was significantly correlated with total protein concentration (R^2=0.507,p<0.05) and mucin concentration (R^2=0.408,p<0.05). (2) Mucin increased amylase activity and its enhancement was concentration-dependent, with a doubling of amylase activity after the addition of 4mg/mL mucin. (3) Km decreased while Vmax increased in the presence of mucin,mucin combined with amylase as complex. These results suggest that mucin might increase the amylase activity by combining with amylase, increasing the affinity between amylase and starch, and protecting amylase from inactivity. These findings have important implications for explaining the enzymatic hydrolysis mechanism of saliva,thereby developing individualized foods.
Categories	Sensory & Consumer Science,Nutrition & Health
Other Authors	Name: Jianshe Chen Organisation: Zhejiang Gongshang University City: Hangzhou Country: China Name: Yong chen Organisation: Zhejiang Gongshang University City: Hangzhou Country: China

Board No.	125
Author Name	Mapitsi S. Thantsha
Organisation	University of Pretoria
Country	South Africa
Title	The impact of multi-stress adaptation and subsequent long-term freezing on morphological and functional properties of Lactiplantibacillus plantarum B411
Abstract Text	Preadaptation of probiotics to sub-lethal levels of multiple stress factors boosts their survival and stability. However, little is known about how long-term cold storage affects the properties of such preadapted probiotics. This study examined the impact of long-term freezing on structural and functional properties of multi-stress (acid, bile and temperature) adapted *Lactiplantibacillus plantarum* B411. Cell morphology was investigated using scanning electron microscopy, and then their selected functional (bile salt hydrolase activity, surface hydrophobicity, auto-aggregative and antimicrobial) properties were evaluated. Furthermore, the survival of *L. plantarum* B411 cells in yoghurt and juices during storage and under simulated gastrointestinal (GIT) conditions was evaluated. Long-term freezing negatively affected the morphology, auto-aggregation ability, BSH and antimicrobial activities of *L. plantarum* B411. The viability of freshly adapted and old-adapted *L. plantarum* B411 cells in foods was similar. Under simulated GIT conditions viability of the stress adapted cells from the freezer diminished more than that of freshly adapted cells. Prolonged freezing compromised some functional properties of stress adapted cells and their stability under simulated GIT conditions. Caution should thus be taken to ensure that a method that will preserve stress adapted cells without them losing beneficial properties nor reverting to their pre-adaptation status is chosen.
Categories	Nutrition & Health

Board No.	126
Author Name	Chathudina J. Liyanage
Organisation	Department of Food Science and Technology, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka
Country	Sri Lanka
Title	An Internet of Things (IoT)-based real time monitoring and notification system for food safety and traceability applications
Abstract Text	Internet of Things (IoT) is an emerging technology advancement that has many potential applications in the food industry. IoT is envisaged to play a key role in food safety management, tracking and traceability, and logistics. The aim of this study was to develop a simple and portable IoT-enabled system for real-time monitoring of temperature and relative humidity (RH) of a storage environment and control them. The system was fabricated using a Node MCU development board (based on the ESP-12E WiFi Module), a DHT11 humidity and temperature sensor, an LCD display, a serial board module port for LCD, and a USB power adapter (Raspberry Pi). Arduino Pro Mini IDE and PHP were used for coding the system and hosting the website respectively. Data (temperature and RH) were obtained from three storage environments: under ambient conditions, a controlled storage environment (in a desiccator), and cold storage conditions to generate a big data source. A web hosting platform was used to access the real-time data. The system was capable of automatically detecting temperatures from 14.3 ^{0}C to 30.8 ^{0}C, and RH from 19% to 71%. The developed monitoring system can be suggested to detect temperature and RH changes in food through the Internet to ensure food safety throughout the entire food chain from farm to fork.
Categories	Supply Chain Management
Other Authors	Name: M. Arumugam Organisation: Department of Food Science and Technology, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka City: Belihuloya 70140 Country: Sri Lanka Name: Y.M.N.S. Chathuranga Organisation: Department of Food Science and Technology, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka City: Belihuloya 70140 Country: Sri Lanka Name: K.M.S.A.K. Dehideniya Organisation: Department of Food Science and Technology, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka City: Belihuloya 70140 Country: Sri Lanka Name: H.A.D.D.S. Priyadarshana Organisation: Department of Food Science and Technology, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka City: Belihuloya 70140 Country: Sri Lanka Name: D.N.M. Weerasekara Organisation: Department of Computing and Information Systems, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka City: Belihuloya 70140 Country: Sri Lanka Name: M.A. Wickramasinghe Organisation: Department of Food Science and Technology, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka City: Belihuloya 70140 Country: Sri Lanka

Board No.	127
Author Name	Karen Codling
Organisation	Iodine Global Network
Country	
Title	The role of food science and technology in the success of mandatory food fortification as an effective public health strategy
Abstract Text	Food fortification is the addition of micronutrients to foods. It is a long-established, simple food technology that increases the nutritional value of food and is recognized as one of the most cost-effective public nutrition interventions in the world. Fortification is particularly effective when micronutrients deficient in the diet are added to staple foods on a mandatory basis with evidence-based standards. Today 126, 90, 33 and 8 countries mandate the fortification of salt, wheat flour, oil and rice respectively; in the majority of these countries, fortification of these foods for both retail and bulk markets is required. Mandatory fortification is most successful when collaboration between industry and government results in the creation of a supportive environment through even and effective government enforcement of evidence-based food standards, commitment by industry to comply with standards and the use of appropriate fortification technologies and fortificants. This paper will use data from the Global Fortification Data Exchange to present global achievements in food fortification and review the role of food science and technology in successful and effective food fortification for a public health benefit, including advances in fortificants, fortification technologies, quality assurance technologies, regulatory monitoring systems and use of fortified ingredients in food manufacturing.
Categories	Nutrition & Health

Board No.	128
Author Name	Ailbhe McGurrin
Organisation	University College Dublin
Country	Ireland
Title	Screening the antimicrobial activity against E. coli of polysaccharide-rich extracts from the Irish seaweed Alaria esculenta
Abstract Text	Owing to the increasingly severe global problem of antimicrobial resistance, interest has grown towards alternative antimicrobial compounds isolated from natural sources. Among these, macroalgae (seaweeds) have emerged as a potential reservoir of antimicrobial compounds, such as polysaccharides. The aim of this study was to evaluate antimicrobial activity of extracts of the macroalgae *Alaria esculenta* against the foodborne pathogen *E. coli*. *Alaria esculenta* was extracted using either ultrasound (US), microwave (MW), or ultrasound-microwave-assisted (UM) methods. Total phenolic content (TPC) and total soluble sugars (TSS) were determined via Folin-Ciocalteu reagent and phenol-sulfuric acid methods, respectively. Antimicrobial analyses included determining minimum inhibitory concentrations (MIC) and growth curves using *E. coli* (gentamycin as control) following broth microdilution. Antimicrobial activity was observed against *E.coli,* with MIC of 6.25 mg/ml in extracts prepared by US (TSS=32.68 mg glucose equivalents (GE)/100 mg dried extract (DE); TPC=1.27 mg gallic acid equivalents (GAE)/100 g DE), while the worst performing extracts (MIC of 12.5 mg/ml) were achieved by extracts generated by MW (TSS=18.84 mg GE/100 mg DE; TPC=1.5 mg GAE/100 mg DE). This study indicates the potential of macroalgal polysaccharides as alternative antimicrobial agents against *E. coli* to combat pathogen resistance towards conventional antibiotics.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Julie Maguire Organisation: Bantry Marine Research Station Ltd City: Bantry Country: Ireland Name: Rahel Suchintita Das Organisation: University College Dublin City: Dublin Country: Ireland Name: Brijesh K. Tiwari Organisation: TEAGASC Food Research Centre City: Dublin Country: Ireland Name: Marco Garcia-Vaquero Organisation: University College Dublin City: Dublin Country: Ireland

Board No.	129
Author Name	Jihyo Lee, Eunhee Yoo
Organisation	Seoul National University of Science and Technology
Country	South Korea
Title	Formation of whey protein isolate aggregates by thermal treatment: effect of high-pressure treatment
Abstract Text	This study investigated the impact of dynamic high-pressure (DHP) pre- and post-treatment (100 MPa) on the physicochemical and functional properties of whey protein isolate (WPI) aggregates formed by thermal treatment. The size of original WPI aggregates was affected by pH during DHP treatment (183.1 to 176. 4 nm at pH 3 and 165.3 to 184.5 nm at pH 7) but their ζ-potential, surface hydrophobicity (H0) and intrinsic fluorescence intensity (Imax) were not significantly changed. DHP pre- and post-treatment decreased the size of thermally-fabricated WPI aggregates. The conformational parameters (ζ-potential, H0, and Imax) of DHP pre-treated WPI were not affected significantly by thermal treatment. However, DHP post-treatment affected the same parameters, particularly it increased H0, of WPI aggregates formed during thermal treatment because the intense shear, turbulence force, and cavitation during DHP treatment may dissociate WPI aggregated by thermal treatment. DHP treatment slightly increased the emulsifying activity index (EAI) of WPI but the order of DHP treatment had little effect on the degree of the increase in EAI. These results suggest that that the protein aggregates with the specific particle sizes and physicochemical properties could be fabricated by applying DHP treatment before or after thermal treatment.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering
Other Authors	Name: Sohyeon Im Organisation: Seoul National University of Science and Technology City: Seoul Country: South Korea Name: Jihyo Lee Organisation: Seoul National University of Science and Technology City: Seoul Country: South Korea Name: Seung Jun Choi Organisation: Seoul National University of Science and Technology City: Seoul Country: South Korea

Board No.	130
Author Name	Mingeun Jin, Younghwa Kim
Organisation	Kyungsung University
Country	South Korea
Title	Optimizing the polyphenol extraction from mandarin peel using response surface methodology
Abstract Text	In this study, the optimal extraction condition for polyphenol from pre-heated mandarin peels was investigated using response surface methodology (RSM). Box-Behnken design was employed to develop the following three extracting parameters: ethanol concentration (X1: 0-100%), HCl concentration (X2: 0-0.5 M), and temperature (X3: 50-80°C). The optimum extraction conditions of total phenolic content (44.898 mg gallic acid equivalent/g) were obtained at X1=62%, X2=0.2 M, and X3=80°C. The predicted result (44.566 mg gallic acid equivalent/g) matched well with the experimental results obtained using the optimal extraction conditions, which validated the RSM model with a good correlation. On the other hand, acid treatment in mandarin peel increased the contents of flavonoid aglycones, such as hesperetin and naringenin. In addition, a total of 23 phenolic compounds were tentatively identified in acid treated mandarin peel, however, a total of 19 phenolic compounds were found in non-acid treated sample. Therefore, acid hydrolysis can be applied to obtain a maximum of polyphenols and improve bioactivity in mandarin peel.
Categories	Food Chemistry & Ingredients
Other Authors	Name: Mingeun Jin Organisation: Kyungsung University City: Busan Country: South Korea Name: Jiye Pyeon Organisation: Kyungsung University City: Busan Country: South Korea

Board No.	131
Author Name	Rose Otema Baah
Organisation	University of Pretoria
Country	South Africa
Title	NUTRITIONAL AND FUNCTIONAL PROPERTIES OF INFRARED AND MICROWAVE HEAT MOISTURE TREATED SORGHUM MEAL
Abstract Text	Starch is the main component of sorghum meal. The digestibility of a carbohydrate-rich product can be estimated by the glycemic index (GI). Heat moisture treatment (HMT) is one of the physical modification methods to improve the physicochemical properties of starch without destroying its granular structure. The nutritional and functional properties of infrared and microwave heat moisture treated sorghum meal were studied. Three varieties of sorghum meal were treated by HMT using infrared energy (at 1000 W for 15 minutes), microwave energy (at 1000 W for 15 minutes), and combined treatment for 15 minutes. Treated sorghum meal had significantly ($P < 0.05$) lower pasting viscosity as compared to the untreated samples. The was a decrease in the *in vitro* starch digestibility of the treated samples. Heat moisture treatment of starch changes the crystalline nature of the crystallographic pattern of the starch granule, which leads to the conversion of a fraction of amorphous lamella to a crystalline form, increasing the amount of slowly digestible starch and further reducing the glycemic index. These results suggested that HMT by infrared and microwave energy changes the functional and nutritional properties of sorghum meal and has the potential to be used in the development of lower GI food.
Categories	Food Processing and Engineering
Other Authors	Name: Professor Kwaku-Gyebi Duodu Organisation: University of Pretoria City: Pretoria Country: South Africa Name: Professor John Taylor Organisation: University of Pretoria City: Pretoria Country: South Africa Name: Professor Mohammad Naushad Emmambux Organisation: University of Pretoria City: Pretoria Country: South Africa

Board No.	132
Author Name	Dr. Anand Mohan, Mahima Jain
Organisation	University of Georgia
Country	USA
Title	Authentication of Hibiscus sabdariffa L. using Near Infrared Spectroscopy
Abstract Text	Health and convenience continue to grow across the globe. The food industry is continuously seeking to discover and offer consumers natural sources of food ingredients. Edible flowers present a promising source of flavor trends and bioactive compounds. Among edible flowers, hibiscus has been used in folk medicine for health benefits. The application of Near infrared spectroscopy (NIRS) for detection of hibiscus is yet to be investigated and advantages of NIR spectroscopy over chemical methods is the quickness and minimal sample preparation for operations. This study investigated the authentication of *Hibiscus sabdariffa L.* flower using Near Infrared Spectroscopy. In this experiment, we authenticated 75 different varieties of hibiscus sourced from different countries. The calibration models were developed using partial least squares regression (PLSR) with 75 known samples and validated the robustness of the developed model. Principal component analysis is used for calibration and validation. There is notable variation in the antioxidant activity and phenolic content; this could be due to the different sources and growing conditions. The compositional assays revealed that the hibiscus contained moisture content (10.7%), dry matter (9.1%), crude protein (8.5%), ash (6.5%) total fat (1.2%). Colorimetric analyses exhibited *a**-values ranging from 15.5 to 26.2, *L**-values 20.8-33.8, and b*-values from 1.2-5.5. This study aims to prove that near infrared spectroscopy is a viable tool for authentication of hibiscus by their geographical origins and presented a distinguished spectral signature.
Categories	Food Safety & Regulatory Science
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Board No.	133
Author Name	Prof. Dr. Daiva Leskauskaitė, Aditya Bali
Organisation	Kaunas University of Technology
Country	Lithuania
Title	Comparative analysis of yeast extract mixtures for improving the sensory profile of meat analogues
Abstract Text	Surveys show taste and flavour being the two most sought-after qualities in meat analogue products for consumers. Yeast derived products are favourite ingredient for enhancing the sensory properties of meat analogue products. We prepared yeast extract mixtures from spent baker's and brewer's yeast discarded as secondary rest raw material and utilised them to conduct a comparative sensory analysis between samples made from minced chicken matrix and chicken analogue matrix. Samples from both groups without addition of yeast extract mixtures were designated as control. Yeast extract mixtures were prepared in either 10% plum syrup or 10% coconut oil with 10% NaCl, or in water with 20% NaCl. Sensory analysis revealed highest panellist preference for minced chicken matrix samples with spent brewer's yeast extract. Scale based ratings (1-least favourable & 10-most favourable) showed overall consumer acceptability for minced chicken matrix sample with brewer's yeast extract + 20% NaCl in water was highest (8.0/10). The same mixture preference was observed in samples made from chicken analogue matrix (7.5/10). All samples rated higher than control samples in their respective groups. Our results show the potential for repurposing rest raw materials like spent yeast in developing meat analogues to make them attractive for consumers.
Categories	Food Chemistry & Ingredients,Sensory & Consumer Science
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Board No.	134
Author Name	Nicoleta Stănciuc, Gabriela Elena Bahrim and Gabriela Râpeanu
Organisation	Dunărea de Jos University of Galați, Faculty of Food Science and Engineering
Country	Romania
Title	Postbiotication and Paraprobiotication: New paradigms for food grade ingredients and food functionalization
Abstract Text	Metabiotics, defined as selected valuable bioactive components released from the non-viable microbial cells or raw cellular extracts attracted significant attention, due to their long shelf life, safety, and beneficial functional effects. Metabiotics include peptides and proteins, peptidoglycans, β-glycan, β-(1,3)-D-glucans, β-(1,6)-D-glucans, polysaccharides, chitin, lipoteichoic and peichoic acids, short chain fatty acids, enzymes and organic acids. In this context, Biotics+ project (www.biotics.ugal.ro) aims to enable the development of tailored functional foods based on metabiotics, thus contributing to food functionalization. The Biotics+ exploits new emerging concepts, in order to use the non-viable microorganisms or metabolites able to provide physiological health benefits to the consumers. Selected lactic acid bacteria were used for unconventional substrates fermentation (bovine colostrum, gluten free and leguminous flour extracts). The project results are meant to extend the metabiotics application in foods as functional ingredients, providing several advantages during the industrial handling and commercialization, including the possibility of being added to certain foods considered stressful to probiotics survival, thus, contributing to the expansion of the tailored functional foods market. In this context, a new generation of the functional fermented foods are proposed containing metabiotics as ingredients.
Categories	Food Chemistry & Ingredients,Food Processing and Engineering

Board No.	135
Author Name	Dr. Anand Mohan, Robina Rai
Organisation	University of Georgia
Country	USA
Title	Valorization of popcorn fines for the development of low-calorie snack
Abstract Text	Over one-third of the global food production goes to waste as food loss (pre-retail) and food waste (post-retail). This amounts to a total of 1 billion metric tons annually resulting in a major economic and environmental burden. One way of countering food loss is the valorization of by-products that are not suitable for retail. This study aims at the valorization of broken popcorn fines obtained during the production of packaged popcorn. These perfectly edible fines are discarded during the packaging process. In this study, popcorn fines were utilized to develop savory crisps. The developed crisps had hardness and fracturability values of 301 ± 0.42 g and 202 ± 0.11 g, respectively, which were comparable to commercially available chips. The crisps were shelf-stable at room temperature in suitable packaging with water activity and pH of 0.2 ± 0.31 and 5.71 ± 0.45, respectively. Furthermore, upon Tukey's comparison with the commercially available chips, the developed crisps had a lower calorie content and thus can be reintroduced into the food supply chain as a low-calorie snack. This technique can be replicated for similar food industry by-products, reduce food loss, and diversify the current snack market range.
Categories	Food Processing and Engineering
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Board No.	136
Author Name	Yu Wen Ting, Yen-Ting Chen
Organisation	National Taiwan University
Country	Taiwan
Title	Making of butylated hydroxyanisole loaded zein film by electrospinning
Abstract Text	Packaging is an important barrier to prevent food from external contamination and damage. On the other hand, active packing systems are packages containing additives that maintain or extend product quality or shelf-life. The market of active packaging continues to expand in recent decades. Butyrate hydroxyanisole (BHA) is a commonly used food antioxidant and antiseptic due to its low cost and availability. Electrospinning technology is a non-thermal and easy-operated processing that can combine bioactive compounds into fibers for wide applications. Furthermore, electrospinning fibers are more responsive to surrounding atmosphere change and enable the controllable release of encapsulation entities due to its larger specific surface area and higher porosity. The aim of this research is to use this technology to encapsulate BHA into zein fibers to produce an antioxidant and antibacterial packaging film. The morphology of fibers was characterized by scanning electron microscope. The encapsulation efficiency and release rate of fibers was evaluated by UV-Vis. The antioxidant activity and antibacterial activity were analyzed as well.
Categories	Food Packaging & Material Science

Board No.	137
Author Name	Qianzhu Zhao
Organisation	FST, NUS
Country	Singapore
Title	Development of bio-based thermal insulation food packaging
Abstract Text	A fully bio-based thermal insulation functional additives with core-shell structure for food packaging was developed through facile and sustainable solvent exchange method. With broad phase transition points and negligible supercooling effect, fatty acids were used as main phase change materials in core. Moreover, lignin as the second abundant biomass in the world acted as main shell material. As the inevitable interaction between lignin and fatty acids significantly affected the phase transition efficiency, zein was used to shield this interaction by bonding with lignin functional groups, contributing to remarkable increase in encapsulation efficiency and phase transition performance. With zein addition of 10% in shell materials, yield of capsules was increased from 53% to 93%; and the encapsulation efficiency was up to 90% with 54% fatty acids loading ratio in capsule. The capsule size was decreased to 496±50.5nm from 2264±366.3nm which was without zein.
Categories	Food Packaging & Material Science
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Board No.	138
Author Name	zhang molan
Organisation	新加坡国立大学
Country	Singapore
Title	Purification and characterisation of a C-S lyase in seeds of Parkia speciosa Hassk
Abstract Text	Aqueous extracts of *Parkia speciosa* Hassk seeds were analysed by LC/MS and the volatile components were extracted and analysed by GC/QTOF/MS. We found that djenkolic acid, a non-nutritive amino acid, was the main organosulfide precursor fragmented to aroma active volatile sulfides by C-S lyase, which was purified by sequential chromatographic method. The enzyme is made of two protein subunits with a molecular weight of 58 kDa and 45 kDa respectively and, in solution, the enzyme forms agglomerates with an average particle size of 100 nm. The C-S lyase was stable at pH 7.0-11.0 with an optimal pH around 9.0 and was more stable at 25-40 °C with an optimal activity at 50 °C. The C-S lyase converted L-djenkolic acid directly to methanedithiol, which releases hydrogen sulfide and thioformaldehyde. The latter reacts with methanedithiol to give 1,3,5-trithiapentane, which is oxidized to 1,2,4-trithiolane observed in the same reaction conducted under aerobic conditions.
Categories	Food Chemistry & Ingredients

Board No.	139
Author Name	Mark Richards
Organisation	Nanyang Polytechnic
Country	Singapore
Title	Rapid and accurate mud crab quality grading
Abstract Text	Chilli crab, pepper crab, butter crab are popular and iconic Singapore dishes. The main ingredient is mud crab. One of the key problems affecting the seafood restaurant and seafood wholesale business in Singapore is the lack of supply of good meaty mud crabs. Some restaurants resort to using lean crabs but this inevitably leads to customer complaints, damage to the restaurant's reputation and loss of business. This problem is much more pronounced in mud crab compared to other commonly consumed crustacean species such as shrimp and lobster. Current methods adopted by the industry to grade mud crabs (meaty vs lean) are inadequate as they are empirical and based on tacit knowledge and subjective judgement. We have developed a novel "first-of-its-kind" spectroscopy approach to determine the meat grade of mud crabs. The grading strategy is non-invasive, simple, accurate, and portable.
Categories	Agri and Aqua-Technology

Board No.	140
Author Name	Mark Richards
Organisation	Nanyang Polytechnic
Country	Singapore
Title	Overcoming Technical and Cost Hurdles in the Cultured Meat Industry
Abstract Text	Cellular agriculture is the nascent field of the production of Cultured Meat (CM) products without recourse to whole farmed animals. Importantly, cultured meat technologies provide a new food resource and mitigate against unforeseen disruptions in food supply chains. This promising technology is particularly important in land scarce urban communities like Singapore which have limited domestic agricultural output. Cultured meat can potentially provide a safe, secure, affordable, and sustainable meat supply but crucial technical challenges associated with lowering the cost of the technology must be overcome. We have developed a low-cost plant-based fetal calf serum substitute which is suitable for the extended propagation of aquatic species cell lines. This serum replacement is upcycled from a discarded food by-product that is widely available in Singapore. We have also established immortalized cell lines from a variety of unfarmable and high-value aquatic species eg. Unagi which can be differentiated into muscle fibres for cultured meat application.
Categories	Traditional & Future Food

Board No.	141
Author Name	Jeffrey Seng Eng Khuan
Organisation	Nanyang Polytechnic
Country	Singapore
Title	Rapid Development of Autogenous Vaccine for Sustainable Aquaculture.
Abstract Text	Aquaculture is one of the fastest growing business as fish stocks are dwindling due to overfishing and pollution. However, rapid expansion of aquaculture has led to more frequent disease outbreaks killing tonnes of fish. Globally, such outbreaks are estimated to cost the aquaculture industry US$6 billion annually. Most diseases are caused by microbes such as bacteria, virus and fungi and parasites. Traditionally, farmers treat fish diseases using antibiotics but with little success. Furthermore, miss use of antibiotics has led to emergence of antimicrobial resistance in the microbes. To mitigate such occurrences, fish vaccination is the best alternative solution but often, pharmaceutical companies take 3-5years to develop a vaccine which when deployed is often unsuccessful. Often, the affected farmers may exit from the business if a quick solution is not found. Hence, to overcome the shortfalls, I describe the autogenous(customised medicine) way of producing fish vaccines which is rapid and effective. I will illustrate on how I developed an efficacious autogenous bacterial fish vaccine that has increased the farm’s productivity (increased local food production), boost it sustainability in the aquaculture business, and built capabilities in fish vaccine production in Singapore, and enhanced the resilience of Singapore's food supply.
Categories	Agri and Aqua-Technology

Board No.	142
Author Name	Caleb Ong Kian Seng, Ng Cui Fang Grace
Organisation	ASTAR/SIFBI
Country	Singapore
Title	Comparing the gastrointestinal fates of commercial real meat and plant-based products catered to the Asian market
Abstract Text	Increased consumer awareness in health and sustainability issues, accompanied with the improvements in taste and texture because of developments in processing and ingredient formulation, has driven a dramatic increase in consumption of plant- based products. However, the nutritional protein quality of these plant-based products and the implications on the metabolism of the macronutrients are not known. The protein nutritive quality of the plant and meat- based products is dependent on both the biological value and digestibility which is influenced by the amino acid profiles, composition, and structure respectively. Research had been done on plant-based alternatives imitating beef patties (Zhou et al., 2021) but there is still a gap in understanding how the digestibility of other commonly consumed meats in Asia, such as chicken, pork and seafood would compare with their plant-based counterparts. In this study, the internationally used in vitro digestion model (INFOGEST) is used to investigate the differences in the physicochemical properties and gastrointestinal fates of commercial real meat and plant-based products catered to the Asian market. The evolution and decomposition of the macronutrients would be followed throughout the simulated digestion process. The results could be used to design foods with better protein quality and extended to in-vivo studies.
Categories	Food Chemistry & Ingredients,Nutrition & Health
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Board No.	143
Author Name	Xiaohong Sun
Organisation	Dalhousie University
Country	Canada
Title	Identification of peptides from defatted wheat germ proteins with dual functionality: Emulsifying activity and anti-adhesive activity against Helicobacter pylori
Abstract Text	Peptides (n = 267) were identified in wheat germ protein hydrolysates with anti-adhesive potential against *H. pylori*. In addition to biological activities, peptides also exert functional properties on food product formulations. Therefore, the objective of this study was to identify peptides with both emulsifying property and anti-adhesive activity against *H. pylori*. The emulsifying property of the peptides was predicted by calculating the amphiphilic scores and secondary structures *in silico*. Six top-ranking peptides were synthesized for validation of their emulsifying and anti-adhesive activities. Three peptides (HLNLDFQLQEGGR, VNQAIYLLTTGAR, and ESLLNALTEHVK) showed high emulsifying activity by forming smaller oil droplet sizes of 1.396±0.015 μm, 1.163±0.010 μm, and 1.159±0.257 μm, respectively. Compared to Tween 80, only VNQAIYLLTTGAR maintained good emulsifying stability at different pHs, ionic strengths, and heating. Anti-adhesive activity was determined using GES-1 cell line. Anti-adhesive activity of the peptides ranged from 36.3±2.0% (VNQAIYLLTTGAR) to 5.5±7.0% (AINDIRDQLER) at 10 mg/mL, which is attributable to binding of peptides and *H. pylori* adhesins through hydrogen bonding and hydrophobic interactions. In conclusion, VNQAIYLLTTGAR showed both biological and techno-functional properties, thus making it a strong candidate for further development as a dual functional food ingredient.
Categories	Food Chemistry & Ingredients
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Board No.	144
Author Name	Yue-Jia Lee
Organisation	National Taiwan University
Country	Taiwan
Title	Effectiveness of proteolytic treatments on the control of Listeria monocytogenes biofilms
Abstract Text	Biocontrol of pathogenic biofilm has gained further interest as consumers became more conscious of food safety. Biofilms are communities of aggregated microbes enclosed in self-produced extracellular polymeric substances (EPS). As a shield, EPS of biofilms can reduce the efficacy of antimicrobial agents by limiting their diffusion. This study aims to propose an alternative strategy for biofilm removal using food-grade proteases and bacteriocin Nisin. First, we determine the antimicrobial activity of food-grade proteases against *L. monocytogenes* by enumeration after treatment. Through crystal violet staining, we assess the effectiveness of proteases in preventing and reducing *L. monocytogenes* biofilms. Biofilm architecture and bacterial distribution before and after protease treatment are analyzed using scanning electron microscopy and confocal laser scanning microscopy. To provide a comprehensive removal of biofilms without viable dispersed cells left, we evaluate the synergistic effect of protease and Nisin treatment on *L. monocytogenes* elimination and disinfection. Furthermore, the effective concentrations and appropriate time window for administrating this combined treatment will be determined. Upon completing these examinations, we expect to elaborate on an integrated application of food-grade enzymes and antimicrobial agents, aiming at biofilm dispersal and bactericidal activity to reduce contamination by *L. monocytogenes* in food promises.
Categories	Food Safety & Regulatory Science