Verification of spoilage organisms in oyster (*Ostrea rivularis Gould*) under refrigeration and its shelf-life prediction based on growth kinetics models

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Ostrea rivularis Gould is one oyster specie widely distributed in China and Japan, but it is easily prone to spoilage due to microbial reproduction. The microorganisms that play key roles in spoilage are called as specific spoilage organisms (SSOs), when the SSOs in oyster mainly include *Pseudomonas*, *Acinetobacter*, *Shewanella*, etc. The abundance of SSOs have a close correlation with the quality of oyster, hence, the colony numbers of SSOs can be used as a reference to evaluate the freshness of oyster. In this study, the species and colony changes of SSOs in oyster under refrigerated storage (0, 4 and 10℃) were analyzed, when the freshness indices were measured to determine the actual shelf-life of oyster. Then the colony changes of total viable count (TVC) and SSOs were taken to build growth kinetics models, which can simulate the growth status of these microbial indices and predict the shelf-life of oyster based on colony numbers and storage temperature. Our results suggested that the representative SSOs in spoiled oyster were *Pseudomonas* and *Acinetobacter*, when the shelf-life of oyster was about 168 h in 10℃, 240 h in 4℃, and 432 h in 0℃. Subsequently, different growth kinetics models were utilized to fit the changes of above microbial indices, when the Gompertz Model (first-order model) and Belehradek Model (second-order model) showed better fitting effects. Furthermore, the shelf-life prediction model to oyster based on Gompertz-Belehradek Model was built and displayed satisfied predictive ability, when the absolute errors between actual shelf-life and predicted shelf-life were maintained among 0.11%-16.89%. Our study revealed that, under specific storage temperature, the prediction model could provide accurate and quick prediction to the shelf-life of refrigerated oyster according to the colony numbers of TVC, *Pseudomonas* and *Acinetobacter*.

Keywords: *Ostrea rivularis Gould*, Specific spoilage organisms, Shelf-life, Growth kinetics model

The identification of key non-volatile taste components and flavor characteristic of abdomen muscle in *Eriocheir sinensis* under various thermal processing methods

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The identification of key non-volatile taste components and flavor characteristic in abdominal muscle of Chinese mitten crab (*Eriocheir sinensis*) was evaluated based on different thermal processing methods: boiling at rising temperature (BO-R), boiling at constant temperature (BO-C), steaming with boiling water (ST), baking with salt (BK), and raw samples (Raw) as control. The free amino acids, 5'-flavored nucleotides, inorganic ions, organic acids and betaines were determined, identifying the key non-volatile taste components, which were integrated with sensory evaluation and electronic tongue to evaluate the overall taste characteristic of abdominal muscle. The contents of glutamic acid (Glu) and sweet amino acids in BK and ST group were significantly higher than these in BO-C group, and the contents of arginine (Arg), 5'-IMP and the equivalent umami concentration (EUC) were markedly higher in BK group (4.49 MSG/100g) than other groups. The contents of Na^+, Ca^{2+}, Cl^- and tartaric acid in BK group were significantly higher than these in other groups. The content of malic acid in ST and BK groups was significantly higher than in BO-C and BO-R groups. The BO-R group had a considerably higher lactic acid content than other groups. Compared to other groups, the content of PO43- in BO-C group was markedly higher. Furthermore, Glu, 5'-AMP, glycine (Gly), alanine (Ala), Pro (proline), lysine (Lys), histidine (His), Arg, K^+, Cl^-, PO_4^{3-}, lactic acid, succinic acid and betaine exhibited taste activity values (TAV) higher than 1, indicating that they potentially play a significant role as non-volatile taste contributors in abdominal muscle of *E.sinensis*. Some reference for the most suitable thermal processing method for the *E.sinensis* could be provided.

Keywords: *E.sinensis*, abdominal muscle, non-volatile taste, thermal processing, Umami

Development of Biodegradable Soft Lures Using Polysaccharides: A Sustainable Alternative to PVC

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Background and Objectives
As environmental concerns grow, the search for sustainable alternatives to conventional materials has intensified. Polysaccharides, natural compounds extensively used in the food industry for their thickening, stabilizing, and gelling properties, are emerging as promising candidates for eco-friendly applications. This study explores the potential of konjac glucomannan (KG) and carrageenan (CA), both well-established in food products, as biodegradable materials for soft fishing lures. The goal is to develop a sustainable, customizable alternative to polyvinyl chloride (PVC), a material traditionally used in soft lures but known for its environmental harm.

Materials and Methods
KG and CA powders were combined in a 1:2 ratio, dissolved in different volume of distilled water at 95°C to form a sol, and then cast into metal molds to create gel lures at various concentrations. The resulting lures were evaluated for their physical properties, including stress relaxation, breaking strength, puncture resistance, and flexibility, to identify the optimal concentration for practical use. These biodegradable lures were also subjected to real-world fishing scenarios and compared with conventional PVC-based lures to assess their performance.

Results and Discussion
The gel lures demonstrated excellent shape flexibility, enabling diverse design possibilities that cater to various fishing needs. Lures with a 5–7 wt% concentration of KG/CA sol exhibited the most favorable physical properties, balancing strength and flexibility. In practical fishing scenarios, these lures proved effective, successfully attracting and catching multiple fish species. This indicates their potential as a viable, sustainable alternative to PVC lures. Ongoing research will focus on improving the preservation of these biodegradable lures and studying their degradation in different aquatic environments, ensuring their long-term viability and environmental compatibility.

Keywords: Polysaccharides, Soft lures, Biodegradable materials, Sustainability, Reuse

Plastein reaction enhances the emulsifying and rheological properties of silver carp hydrolysates in oil-in-water emulsions

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The plastein reaction was ubiquitously acknowledged for its capacity to enhance the functional properties of protein hydrolysates. Despite this, the specific impact of the plastein reaction on emulsification, a critical functional aspect of protein hydrolysates, remains incompletely understood. In this study, the plastein reaction in silver carp protein hydrolysate (SCPH) was explored. A detailed comparison between the primary product (PP) and the blended product (SCPH–P) in terms of their oil-water interfacial adsorption kinetics and the shear strain of oil-in-water emulsions was reported. The interfacial adsorption kinetics suggested that the higher molecular weight imparted a slow rate of diffusion, penetration, and reorganization to the PP compared to SCPH-P. Furthermore, the elevated surface hydrophobicity also resulted in higher surface activity (i.e., high interfacial pressure) for PP. Simultaneously, nonlinear rheological analysis revealed that PP possessed enhanced resistance to shear strain due to its strong affinity for the oil-water interface of emulsion. These improvements manifested in PP-stabilized emulsions with reduced mean particle size (71.6 μm–9.5 μm), diminished instability index (nearly 3-fold prolongation of stabilization time), and increased electrostatic repulsion (zeta potential values increased from 6-15 mV to 21–27 mV), which underscored a substantial enhancement in the emulsification of SCPH through the plastein reaction. Notably, the emulsifying and rheological properties of PP at a 1% (w/w) concentration were nearly equivalent to those of soybean protein isolate at 0.5% (w/w), highlighting the plastein reaction's innovative potential in utilizing SCPH as a promising emulsifier.

Keywords: Dynamic interfacial pressure, Adsorption behavior, Interface microstructure, Shear strain, Lissajous-Bowditch curves, Physical stability.

Effects of plasma-activated water combined with ultrasonic treatment of corn starch on structural, thermal, physicochemical, functional, and pasting properties

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In this study, corn starch was used as the raw material, and modified starch was prepared using a method combining plasma-activated water and ultrasound treatment (PUL). This method was compared with treatments using plasma-activated water (PAW) and ultrasound (UL) alone. The structure, thermal, physicochemical, pasting, and functional properties of the native and treated starches were evaluated. The results indicated that PAW and UL treatments did not alter the shape of the starch granules but caused some surface damage. The PUL treatment increased the starch gelatinization temperature and enthalpy (from 11.22 J/g to 13.13 J/g), as well as its relative crystallinity (increased by 0.51 %), gel hardness (increased by 16.19 %) compared to untreated starch, without inducing a crystalline transition. The PUL treatment resulted in a whitening of the samples. The dual treatment enhanced the thermal stability of the starch paste, which can be attributed to the synergistic effect between PAW and ultrasound (PAW can modify the starch structure at a molecular level, while ultrasound can further disrupt the granule weak crystalline structures, leading to improved thermal properties). Furthermore, FTIR results suggested significant changes in the functional groups related to the water-binding capacity of starch, and the order of the double-helical structure was disrupted. The findings of this study suggest that PUL treatment is a promising new green modification technique for improving the starch structure and enhancing starch properties. However, further research is needed to tailor the approach based on the specific properties of the raw material.

Keywords: Ultrasound, Plasma-activated water, Corn starch, Structural properties, Functional properties

The Influence of COVID-19 on Fish Consumption Behavior: A Comparative Study Between Japan and China

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[Background and Objectives]

This study aims to compare fish consumption awareness between Japan and China, focusing on changes in consumption intentions due to the COVID-19 pandemic and consumer preferences for different forms of fish (fresh, frozen, sashimi-grade, etc.). Since the pandemic, consumer concern for safety has increased, leading to a rise in frozen seafood consumption. Therefore, it is essential to identify which forms of fish are preferred by consumers in both countries. Additionally, with the recent resumption of Chinese imports of Japanese seafood, the expansion of seafood trade between the two countries is anticipated. This study seeks to analyze the impact of consumer preferences and cooking habits on the market and to propose marketing strategies and product development based on these insights.

[Materials and Methods]

This survey was conducted through the online survey platforms “SurveyMonkey” and “Wenjuanxing” in both Japanese and Chinese. The survey took place in January 2021 and included 263 respondents residing in Japan and 897 respondents residing in China. The survey consisted of 31 questions, covering a wide range of topics, including social attributes such as gender and age, as well as attitudes towards fish consumption. The questions addressed fish purchasing methods, consumption frequency, and changes in eating behavior due to the pandemic.

[Results and Discussion]

The results revealed that in Japan, there was a higher preference for seafood compared to meat, with salmon, tuna, and scallops being particularly popular. In contrast, in China, 56.33% of respondents preferred saltwater fish, while 38.67% favored freshwater fish, with squid, crab, and scallops being among the most favored. Additionally, 58.85% of Japanese respondents used refrigerated thawing methods, indicating a high awareness of quality preservation, whereas 71.44% of Chinese respondents primarily used room-temperature thawing, emphasizing convenience. Flowing water thawing, commonly used in both countries, was widely supported for its speed and convenience. In terms of online purchasing, frozen sashimi-grade products were preferred in Japan, while unprocessed frozen products were more popular in China. Furthermore, both countries saw a significant decline in dining out and an increase in home cooking due to the pandemic, with fish consumption at home notably expanding in Japan. Based on these findings, it is suggested that marketing strategies in Japan should emphasize quality and hygiene management, while in China, products that cater to convenient cooking methods will be most effective.

Keywords: Fish Consumption, Seafood Trade, Market Strategy, Consumer Preferences

Based on SPME-GC-MS and HS-GC-IMS, the aroma characteristics of key volatile compounds in Red Sour Soup during the fermentation of three tomatoes were analyzed

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The effect of tomato types (horseshoe tomato, hairy chorizo, and pink tomato) on the physicochemical properties and flavor profiles of the fermentation process of red sour soup was investigated. We found that total sugars and total acids showed a decreasing trend and antioxidant activity increased significantly after fermentation. And Glu (umami taste) and Ala (sweet taste) were considered as the main flavor substances based on TAV. The GC-MS results showed that the content of esters, acids and ketones increased, which promoted the production of aroma. In addition, OAV combined with VIP values screened up to 20 key volatile compounds after HT fermentation, which resulted in higher sensory scores compared to SF and PT, among which five amino acids were significantly associated with four volatile compounds, such as 1,8-cinnoline and His, among others. In addition, GC-IMS showed that the flavors among the three tomatoes were more reflected in alcohols and esters.

Keywords: Tomato, Red sour soup, Spontaneous fermentation, Volatile organic compounds, Flavor amino acids, Correlation

Modulating allergenicity of prawn tropomyosin (*penaeus chinensis*) via pulsed electric field-induced conformational changes

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The effect of electric field intensities (EFIs, 5-20 kV/cm) and treatment times (0.5-2 h) on allergenicity and spatial conformation of prawn tropomyosin was evaluated. The results demonstrated that the IgG and IgE binding capacity of tropomyosin maximally increased by 24.34% and 29.16% respectively, followed by a subsequent decrease after 20 kV/cm treatment for 1 hour. Interestingly, 5-10 kV/cm treatments significantly decreased the α-helix content ($P < 0.05$) and fluorescence intensity, while 20 kV/cm treatment promoted extensive spiralization, resulting in a tightly packed structure. The increased flexibility further exposed the hydrolysis sites and strengthened the gastrointestinal digestibility of tropomyosin. Additionally, molecular dynamic simulation indicated that extended EFIs increased structural flexibility and depolymerized the tropomyosin dimers through destroying intermolecular hydrogen bonds (formed within arginine and glutamate), which allowed tropomyosin to be easily recognized by IgG/IgE. Whereas, decrease of solvent-accessibility surface area (SASA), hydrophobic surface area induced conformation folded and caused epitopes masked.

Keywords: Penaeus chinensis; Tropomyosin; Pulsed electric field; Allergenicity; Molecular dynamic simulation

Influence of starch on freeze-thaw stability of Hypophthalmichthys molitrix surimi gel observed via ice crystal distribution and gel properties

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Starch has been recognized as a vital ingredient in surimi products due to its ability to absorb water, which reduces the deterioration of gels and water loss during freezing and thawing. However, it is essential to ascertain the role of starch in the formation of ice crystals and the texture of surimi gels. The impact of freeze-thaw cycles on the morphology and distribution of ice crystals, as well as the textural characteristics of gelatinized and ungelatinized starch-surimi gels was investigated. The results of light microscopy revealed that the presence of starch, irrespective of whether it was gelatinized, resulted in a reduction in the size of ice crystals within the surimi gel network during the freeze-thaw process. In addition, starch in surimi gels was subjected to freeze-thaw cycles, resulting in the emergence of two distinct states of bound water. The higher relative content of immobile water indicated that the gelatinized starch had improved water holding properties. Furthermore, the incorporation of gelatinized starch into surimi enhanced its freeze-thaw stability and retarded the loss of gel strength, hardness, and whiteness. The addition of starch had a synergistic impact, enhancing the gel properties of the gel by affecting the formation of ice crystals and water absorption.

Keywords: surimi gel; starch gelatinization; freeze-thaw; ice crystal; texture

Determination of residual nitrite and nitrate in high-salt meat products by transient isotachophoresis-capillary zone electrophoresis

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A very simple and sensitive capillary zone electrophoresis (CZE) method was established to determinate low amount of nitrite and nitrate for high-salt meat products samples. The nitrite and nitrate in samples could be online preconcentrated with leading-type sample self-stacking, which was based on transient isotachophoresis. In the test, native chloride served as leading ion, and high concentration of acetate as terminating ion. Background electrolyte with a high concentration of sodium chloride, was used to reduce the matrix interferences and minimization of electrodispersion for CZE separation. The separation conditions providing excellent resolution and high detection sensitivity for nitrite and nitrate have been optimized and validated. The optimum separation buffer consisted of 0.1 M sodium chloride and 30 mM β-alanine (adjusted to pH 3.6 with diluted hydrochloride). Sample injection was followed by additional 2 M sodium acetate for 30 s at the same pressure to produce more advanced stacking effects. The limit of detection (LOD) was 9 and 5 μg/L for nitrite and nitrate (correspond to 0.18 mg/kg nitrite and 0.1 mg/kg nitrate in meat products) at a signal-to noise ratio of 3, respectively. This method was successfully used to detect 8 types of meat products sold in the market, and the reliability and accuracy of the method were confirmed by comparing the results with the reference method, which indicates the method is suitable for high sensitivity analysis of residual nitrite and nitrate in high-salt meat products.

Keywords: Nitrite, Nitrate, High-salt meat products, Transient isotachophoresis, Capillary zone electrophoresis

Effect of sodium alginate on surimi gels of tilapia (*Oreochromis mossambicus*) containing potassium chloride-based salt substitutes: gel characteristics and sensory evaluation

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The study aimed to investigate the effect of sodium alginate (SA) on surimi from tilapia (*Oreochromis mossambicus*) containing 50 % KCl. The results showed that the addition of SA significantly increased the whiteness and water-holding capacity (WHC) of surimi. Low-field nuclear magnetic resonance (LF-NMR) analysis indicated that there was a shift from more free water to bound water. The addition of SA led to a decrease in the gel strength and hardness of the surimi, while increasing its cohesiveness and chewiness. Moreover, the rheological behavior revealed that the viscoelasticity of the gels decreased with increasing amounts of SA. In addition, SA masked the bitter taste of KCl, retained the salty taste, and adsorbed fishy substances in the surimi. Specifically, the addition of 0.8 % SA effectively improved both the gel characteristics and sensory evaluation of surimi containing KCl. This study provides a new method for reducing sodium salt usage in the processing of surimi products.

Keywords: *Oreochromis mossambicus*; Surimi gel; Salt substitute; Sodium alginate

Improvement of solubility of astaxanthin using deep eutectic solvent-based microemulsions

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Carotenoids exhibit superior antioxidant activity due to the presence of double bonds, hydroxyl groups, ketone groups, and other functional groups within their molecular structures. However, the polyunsaturated chains render carotenoids highly unstable. In this study, deep eutectic solvents (DES) composed of DL-menthol as a hydrogen-bond acceptor (HBA) and various organic acids (acetic acid, propionic acid, valeric acid, and octanoic acid) as hydrogen bond donors (HBD) was developed to form novel microemulsions (MEs) in combination with Tween 80 and water. By investigating the phase behavior characteristics of the DES-based ME system, a stable DES-based ME system with a strong ability to form MEs was selected to enhance the solubility of astaxanthin. The results demonstrated that the DES-based ME with larger single-phase areas (> 20%) can maintain a single-phase ME across varying temperature and pH environments. Furthermore, the four DES-based MEs exhibited ultra-small particle sizes (7.27-8.49 nm) and temperature stability, with droplets uniformly dispersed and free from aggregation. In comparison to ethanol, methanol, and acetone, all the DES-based MEs studied significantly improved the solubility of astaxanthin. These findings indicate that DES-based MEs with low viscosity (<0.2 Pa · s) and mildly acidic pH (4-5) are promising solvents for natural astaxanthin in food processing and storage, pharmaceutical formulation, and biomaterials processing.

Keywords: deep eutectic solvents, microemulsion, phase behavior, physicochemical property, astaxanthin

In vitro gastrointestinal digestion of thermally reversible and irreversible fish gelatin induced by microbial transglutaminase

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Thermally reversible and irreversible fish gelatins induced by different microbial transglutaminase (MTGase) contents (0.00–0.21%, w/v) were prepared and evaluated in cross-linking degree, gelation-melting transition temperature and gel strength. Moreover, modified fish gelatin was digested by in vitro digestion model, and produced collagen peptides were analyzed by molecular weight distribution, Tricine SDS-PAGE and HPLC MS/MS. With MTGase concentration increasing, cross-linking degree increased from 0.00% to 77.67%. Meanwhile, gelation and melting temperatures gradually increased, and then a thermal irreversible gel appeared when MTGase concentration reached to 0.15%. Regardless of thermally reversible or irreversible state induced by MTGase, fish gelatin could be hydrolyzed in vitro gastrointestinal digestion. The results of free amino content analysis showed that the greater cross-linking degree of gelatin, the more obvious delayed effect of digestion, especially when the gelatin was in a thermally irreversible state. However, the digestibility of gelatin increased with the increase of MTGase concentration. When the gelatin changed to a thermally irreversible state, the improvement in digestibility was very significant. More interestingly, after digestion, the types of collagen peptides increased first and then decreased with the increase of MTGase. When MTGase concentration was 0.06%, the types of collagen peptides were the largest, reaching 708. In addition, MTGase cross-linking with appropriate concentrations increased the type of hydroxyproline-containing peptides. The results showed that MTGase was beneficial to delay the digestion of fish gelatin and release a variety of collagen peptides, which would be significant to improve the quality of fish gelatin-contained collagen products and promote their application.

Keywords: Fish gelatin, MTGase, Collagen peptide analysis, *In vitro* gastrointestinal digestion.

Study on the gel properties of emulsion gels as influenced by emulsion sizes and oil types

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This study aimed to investigated the effect of glycoslyated reaction between whey protein isolate (WPI) with κ-carrageenan (KG) and high methoxyl pectin (HMP) via Maillard reaction under wet-heated condition. Grafting degree and solubility were compared over a range of heating time and simulated system (KG, HMP, mixture of KG and HMP). To characterize Maillard product, SDS-PAGE, ζ-potential, particle size, browning index (BI) and thermal properties are evaluated before and after heat-setting.
The glycoslyated reaction and the structure changes of Maillard product WPI-KG (G_KG), WPI-HMP(G_HMP), and WPI-KG, HMP(G_KGHMP) conjugates were confirmed by infrared spectroscopy (FT-IR). The result of FT-IR showed that the structure of the modified protein had a very obvious change, including the decrease in β-fold and β-turn and the increase in α-helix at a certain degree. G_HMP significantly enhanced the browning index (BI) of the Maillard reaction system by 0.01 to 134.51 in the thermal and storage processes, respectively, which were methylation degree of pectin–dependent. Analysis of the molecular weight with SDS-PAGE revealed increasing molecular weight upon higher heating temperature at 90℃. These findings revealed that indicating that WPI and HMP can be heat-set into complexes with enhanced colloidal stability in beverage applications.

Keywords: Whey protein isolate, κ-carrageenan, high methoxyl pectin, Maillard reaction

Attempt to develop a new vitality index for Pacific oysters exposed to air

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In recent years, domestic consumption of marine products has been declining, while demand outside Japan has been increasing. In order to meet export demand, storage methods that can maintain high quality are needed. Although the vitality of oysters is an important factor in maintaining quality in long-term storage, no technology has yet been developed to measure the vitality of oysters in a simple and rapid manner. The speakers reported that the heartbeat movement of oysters is related to their vitality and can be treated as a vitality evaluation index equivalent to biochemical indices. In this study, using cultured Pacific oysters in Yamada Bay, we will evaluate the vitality of these oysters in storage using multiple indices, and attempt to develop a new vitality evaluation index by analyzing the water present in the shell with the soft parts.

Sixty cultured Yamagata Bay oysters were stored in their shells at -1°C with air exposure. Experiments were conducted on days 0, 1, 3, 7, and 13 to measure ATP-related compound content, pH, glycogen content, and TTC test and TF production (n=3). To observe cardiac motion, the hearts were placed in a half-shell condition for 15 minutes at a temperature of 25°C, and then an optical microscope (Leica DMS1000) was used. The results were sorted into the heartbeat patterns reported by Bizen et al. and used as one of the indices to measure vitality.

During storage, ATP decreased in ATP-related compound content over time, with A.E.C. values decreasing from about 50% on the first day to about 30% on day 13. The pH in closed shell muscle and the water present in the shell with the soft parts decreased from an average of 7.00 ± 0.14 and 7.93 ± 0.16 to 6.57 ± 0.16 and 7.14 ± 0.22, respectively. In the TTC test, all individuals showed a red color (+) and a gradual decrease in TF production. In the heartbeat pattern, pattern 1 (active contraction of atria and ventricles alternately) was observed in almost all individuals on day 0, but after day 1, the number of individuals in pattern 1 rapidly decreased, indicating a clear decline in heart rate motion. Observation of heartbeat patterns is a simple and rapid evaluation compared to other biochemical fresh vitality indices. In addition to that, the present results suggest that the presence or absence of heartbeat pattern1 can be a very sensitive vitality indicator in living Pacific oysters. In this study, we believe that analyzing oyster water may be a simple way to evaluate freshness without damaging the soft parts, and we plan to add other measurement items to the study in the future.

Keywords: Oyster, vitality index, A.E.C. value, heartbeat,

Mitochondrial Protein Dissolution: A Marker for Freeze-Thaw Damage in Takifugu rubripes

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This study aimed to investigate how different thawing methods affect the quality of *Takifugu rubripes* fillets. Fresh muscle served as the control group, while rapid thawing and slow thawing were employed as treatment groups. Thawing shrinkage and changes in extractable proteins quantified by TMT-labeled quantitative proteomics were compared. Results indicated that rapidly thawed fillets experienced greater shrinkage compared to slowly thawed ones. Both thawing methods resulted in cell membrane damage and significant disruption of mitochondrial structures compared to fresh fish. Following freeze-thaw cycles, proteins such as ATP synthase, NADH dehydrogenase, and aconitase within mitochondria showed increased solubilization. Comparison of extractable proteins between thawing methods revealed significant upregulation of pyruvate dehydrogenase and cytochrome c in the slow thawing group, whereas myosin and structural proteins like Z-line were significantly upregulated in the rapid thawing group. These differential proteins serve as crucial markers for understanding muscle quality deterioration mechanisms under different thawing conditions.

Keywords: *Takifugu rubripes*, freeze-thaw damage, mitochondria, muscle quality

Taste and aroma characteristics of Antarctic Krill hydrolysate improved by ultrasonic Maillard reaction using HS-GC-IMS and electronic sensory analysis

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Given its abundant resources and favorable nutrition, to realize the application range of Antarctic Krill, the effects of ultrasonic and Maillard reaction on the flavor characteristics of the hydrolysate were investigated. After ultrasonic treatment, the degree of hydrolysis of Antarctic krill protein increased from 13.32% to 20.56% and the degree of grafting increased from 14.46% to 21.85%. The result of Ultra-high-speed AAA showed that 16 kinds of free amino acids were detected in the hydrolysate, and the content of free amino acids in the samples decreased significantly after the Maillard reaction. The results of E-tongue and E-nose demonstrated that after ultrasonic Maillard reaction, the sour taste and bitter taste decreased, and the content of alcohol and carbon oxygen compound increased in samples. Moreover, 38 volatile compounds, including aldehydes, ketones, alcohols, esters, and pyridines, were identified in samples. The findings provide a theoretical basis for the application of Antarctic Krill.

Keywords: Antarctic Krill, taste, flavor, ultrasound, Maillard reaction

Identification of novel angiotensin converting enzyme (ACE) inhibitory peptides from Pacific saury: *In vivo* antihypertensive effect and transport route

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Nature food-derived angiotensin converting enzyme inhibitory peptides (ACEIPs) can be potent and safe therapeutics for many medical illnesses, particularly hypertension. In this study, novel ACEIPs were screened and identified from Pacific saury by bio-activity guided approach through ultrafiltration membrane, Sephadex G-25 and RP-HPLC. The antihypertensive effect of ultrafiltration fraction was confirmed with spontaneous hypertensive rats' (SHRs) model. The peptides sequences of which gave the best activity was identified by Q-Orbitrap-MS/MS and selectively synthesized based on the binding energy of molecular docking. Five peptides VVLASLK, LTLK, LEPWR, ELPPK and LPTEK were synthesized, and the peptide LEPWR (IC50=99.5 μM) showed the best ACE inhibitory ability. Furthermore, LEPWR against ACE in a mixed competitive pattern and formed six hydrogen bonds with ACE. Additionally, the apparent permeability coefficient (Papp) of LEPWR was 3.56 ± 0.14 ×10-6 cm/s and paracellular transport across tight junctions was the main pathway across the Caco-2 monolayer. Therefore, the Pacific saury is a good material to prepare ACEIPs, but antihypertensive mechanism of peptide LEPWR on SHRs needs further investigation.

Keywords: ACE inhibitory peptide; Pacific saury; isolation and purification; molecular docking; Caco-2 cell monolayers

Development and characterization of Japanese soy sauce-like fermented seasoning with various ingredients

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Ten types of ingredients, including pressed barley, sprouted brown rice, red sorghum, amaranth, glutinous millet, upland rice, rice bran, chickpeas, rapeseed pomace, and perilla pomace, were utilized to develop a soy sauce-like seasoning. Free amino acid, aroma compound, and sensory evaluation values were measured in comparison to regular soy sauce (fermented with soybean and wheat). The content of free amino acids was highly correlated with the total nitrogen content, with regular soy sauce showing the highest value. The taste attribute amino acids levels were also high in regular soy sauce, rapeseed pomace, and perilla pomace, which attributed to a rich flavor. Except for sprouted brown rice and pressed barley, the remaining nine seasonings exhibited distinctive or elevated content of aroma compounds. Sensory evaluation separated eleven seasonings into sprouted brown rice, together with upland rice, and the rest. PLSR analysis identified sixteen free amino acids as flavor key contributors and twenty-four key aroma contributors. Among the eleven types of seasoning, regular soy sauce was characterized by a sweet and umami taste, while rapeseed pomace was predominantly bitter. The aroma of regular soy sauce was mainly derived from grains and tea, whereas rapeseed imparted distinctive flavors of broth smell and a fragrant aroma.

Keywords: soy sauce-like seasoning, free amino acid, aroma compound, sensory evaluation, QDA, PLSR

Effect of H_2O_2-ultrasound degradation on structural and hypoglycemic activity of polysaccharides from *Euryale ferox* Salisb. seeds

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Changes in diet and lifestyle have led to an increase in the incidence of diabetes year by year, which has become a global public health problem. This study aimed to analyze the structural characterization and hypoglycemic activity of *Euryale ferox* Salisb. seed polysaccharides (ESP) and its degradation product (D-ESP). The results showed that H_2O_2-ultrasound degradation treatment resulted in a decrease in molecular weight and a looser structure of ESP, while its primary structure was not changed. Furthermore, D-ESP could improve glucolipid metabolism disorders in type 2 diabetic mice by reducing the levels of blood lipids and inflammation, thereby significantly decreasing insulin resistance, increasing insulin sensitivity and repairing liver damage. This suggested that H_2O_2-ultrasound degradation treatment could enhance the hypoglycemic activity of polysaccharides. This study will provide theoretical support for the development of functional foods and health products from *Euryale ferox* Salisb. polysaccharides for the prevention of diabetes mellitus.

Keywords: *Euryale ferox* Salisb., H_2O_2-ultrasound, Degradation polysaccharides, Hypoglycemic activity

Effects of planting density and cultivar on methane emission from rice paddies

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【Objective】

Paddy field is the major source for methane gases (CH_4) which is one of the most impactive greenhouse gasses increase global temperature. To prevent the global warming and at the same time to feed world population, efficient rice production with minimizing CH_4 emission and maximizing productivity is required. We examined effects of planting density and cultivar on CH_4 emissions and rice yield.

【Materials and Methods】

On 25th May, 2023, four rice cultivars (Hitomebore, Koshihikari, Hokuriku 193, Shoni) were transplanted on paddy field in Iwate University (Morioka, Iwate, Japan, 39◦42N; 141◦8E) with three planting densities (high density: 15 cm × 15 cm, normal density : 30cm × 15 cm, low density: 60 cm × 15cm) at four replicates. Dissolved CH_4 was corrected by soil water sampler (φ3×L100, Daiki Rika Kogyo Co.,Ltd, Saitama, Japan) located at three positions between plants with 10 cm depth at four times. Root length and weight density were measured using core sample once after full heading stage measured by core sampler. Flux of CH_4 was measured by chamber method (W0.6×D0.3×H1.0m) only for cultivar 'Hitomebore' at heading date (3rd August). Yield was determined by all cultivars at maturity stage after 20th September.

【Results】

For cultivar 'Hitomebore', CH_4 flux was affected by planting density; lower planting density can decrease CH_4 emission. The dissolved CH_4 concentration in soils, indicator of the potential amount of CH_4 in soils, was higher for lower planting density. Root length density was lower for lower planting density. Thus, lower rooting zone can prevent to lift the dissolved CH4 produced in soils to atmosphere; less root zone size is beneficial to reduce CH_4 flux. On the other hand, grain yield, ranging from 6 to 8 ton/ha, was highest at normal density, lower for low and high density. The efficiency of rice production per unit emission was the highest at normal density.

Among four cultivars, dissolve CH_4 concentration was the highest for 'Hitomebore', this indicates that 'Hitomebore' is the less CH_4 emitting cultivars.

【Conclusion】

The single-year and single-site field experiment suggested that use of cultivar 'Hitomebore' at normal density is the best balance to reduce emission and to increase productivity, although further studies are required.

Keywords: CH_4, planting density, Crop yield, rice root

Genetic regions associated with cold tolerance at booting stage estimated from anther morphology in rice using two recombinant inbred populations

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【**Objective**】Rice is a crop native to the tropics and is severely damaged by low temperatures. In recent years, breeding rice varieties using genomic regions related to cold tolerance has been actively conducted. Since the damage caused by low temperatures in rice is pollination failure due to insufficient pollen production, we estimated genomic regions related to cold tolerance and their differences by growing environment based on anther length, which is related to pollen number.

【**Materials and methods**】Two populations with different parental cultivars were grown under two nitrogen fertilization conditions.

Experiment 1 : ”Hitomebore,” “Moukotou,” and 216 recombinant inbred lines from a cross between these cultivars (F10, number of DNA markers for genotyping: 3917) were grown in 2022.

Experiment 2 : ”Hitomebore,” “Sasanishiki,” and 188 recombinant inbred lines from a cross between these cultivars (F5, number of DNA markers for genotyping: 149) were grown in 2021.

In both experiments, plants were grown in the field of Iwate University in Morioka, Iwate, Japan (39°42’N, 14°8’E) under no fertilizer (0 gN/m^2) and fertilizer (30 gN/m^2) conditions. Specific spikelets were collected before flowering, and anther length was measured. The relevant genomic region was identified by QTL analysis (R/qtl).

【**Results**】

Experiment 1. QTLs related to anther length were detected on chromosome 1 at 24,736,348 bp (PVE:10.4%) and chromosome 9 at 17,846,334 bp (PVE:10.5%) under the no fertilizer condition. Under the fertilization condition, QTLs were detected on chromosome 6 at 25,199,353bp (PVE:9.9%) and chromosome 7 at 25,013,079 bp (PVE:16.6%). The QTLs on chromosomes 1, 6, and 9 were associated with longer anther length in the “Moukotou” type, while the QTL on chromosome 7 was associated with longer anther length in the “Hitomebore” type.

Experiment 2. QTLs were detected on chromosome 7 at 24,830,619bp (PVE:11.2%), chromosome 8 at 7,393,197bp (PVE:11.9%), and chromosome 11 at 11,491,127bp (PVE:16.0%) under the no fertilizer condition. Under the fertilization condition, it was detected in the same genomic region on chromosome 7 (PVE:14.9%) and chromosome 11 (PVE:13.8%), but not on chromosome 8. The QTLs on chromosomes 7 and 8 were associated with longer anther length in the “Hitomebore” type, while the QTL on chromosome 11 was associated longer anther length in the “Sasanishiki” type.

【**Conclusion**】

We found total 7 QTLs from 4 cultivars. Accumulation of these QTLs may lead to breeding of cultivars with longer anther length and high cold tolerance.

Keywords: Rice, Cold tolerance, Booting Stage, QTL analysis, Anther length

Drivers of intention towards reducing marine plastic pollution - evidence from the US and Indonesia

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Marine plastic pollution presents a severe environmental challenge, threatening both marine ecosystems and human health. While much research has focused on the ecological and economic dimensions of this issue, the psychological and social factors influencing individuals' intentions to reduce plastic waste remain underexplored. This study investigates the drivers of intention to reduce marine plastic pollution in the United States and Indonesia, applying the Theory of Planned Behavior (TPB) model alongside insights from marine experience and risk perception. Interpretable Machine Learning (IML) techniques were used to explain the relative importance of various factors from the survey data. Key findings highlight that attitudes toward specific behaviors, such as using eco-bags and supporting waste sorting, are the strongest predictors of intention to reduce plastic waste. Additionally, marine experience plays a crucial role, with individuals who value ocean education and view the sea as integral to their lives showing higher intentions to reduce plastic use. Risk perception and subjective norms also significantly influence intention. Policymakers can leverage these insights to design more effective campaigns aimed at reducing plastic pollution, complementing broader ecological and economic efforts.

Keywords: Plastic Pollution, Marine Microplastic, Plastic Reduction Intention, Theory of Planned Behavior (TPB), Interpretable Machine Learning (IML)

Biochemical changes in scallop (*Mizuhopecten yessoensis*) adductor muscle due to different dissolved oxygen concentrations in distribution

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The Yesso scallop (*Mizuhopecten yessoensis*) is a highly significant species in global aquaculture, particularly for its economic value. It is extensively farmed in northeastern Japan, especially in regions such as Tohoku and Hokkaido. The Yesso scallop ranked first in Japan's marine products export ratio in 2022, and the main export destination country was China, accounting for more than 50% of the total. There is a high demand for fresh scallops in Japan, and there is a need for higher quality distribution methods. Currently, high-quality scallops are distributed live in seawater but despite their initial vitality, they often die within one to two days after reaching consumers. To address this, this study evaluated the biochemical changes in scallops stored in seawater under varying concentrations of dissolved oxygen.

Sixteen two-year scallops cultured in Hirota Bay, Iwate Prefecture, were used and transported into the laboratory alive, in a recirculating fish tank after harvest. Samples were placed individually with shells in stock bags (Z) and special resin films (S) with a certain amount of seawater. They were divided into two groups: one group filled with oxygen until the dissolved oxygen concentration reached the maximum value and the other group filled with nitrogen until the dissolved oxygen concentration fell below 1.00 mg/L. And they were kept in a refrigerator at 4 ºC for 1 day. Evaluation indexes were pH, glycogen content, ATP-related compounds, and A.E.C. values, as well as appearance and observed responses to stimuli. Statistical treatment with one-way analysis of variance (ANOVA) using SPSS was performed between groups.

The pH was significantly lower in the S-N group (6.72 ± 0.12) than in the other groups ($p < 0.05$). Results for glycogen and ATP-related compounds did not yield significant differences, but A.E.C. values showed that the S-N group (74.94 ± 3.45 %) was significantly lower ($p < 0.05$). From the appearance, some individuals in the O group had extended tentacles and were spitting out seawater, while those in the N group had slightly open shells and were less responsive upon palpation. No significant decrease in vitality was observed. Although this study evaluated only one day after filling with oxygen and nitrogen, we would like to establish a distribution system that can maintain high quality even during long-term distribution in the future, since at the distribution site, the products may reach consumers within 2 to 3 days after filling.

Keywords: Dissolved oxygen, Distribution, Scallop, A.E.C. value, Appearance, Response

“Enhancing Precision in Dairy Co-operatives through Automated Measurement of Dairy Cow Body Measurements Using YOLOv8: A Step Towards Smart Farming”

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In precision animal husbandry, obtaining accurate body size measurements of livestock is crucial for assessing their health and performance. Traditional methods of manually measuring dairy cow are time-consuming, labor-intensive, and prone to subjective errors. To enhance efficiency and precision in dairy co-operatives, this paper introduces an automated method for measuring dairy cow body measurements using YOLOv8. YOLOv8 is a sophisticated object detection algorithm capable of identifying and pinpointing critical parts of the dairy cow body in real-time, even against complex backgrounds. This approach aims to streamline operations and improve data accuracy within dairy co-operatives, contributing to smarter farming practices.

This paper begins with a description of the data collection process, which entailed acquiring a substantial number of frontal and top view images of individual dairy cows from diverse farms and environments. Subsequently, the methods used for data annotation and their application in model training are detailed.

In the model training and optimization section, this article details the hyperparameter settings, loss function selection, and problems encountered during training along with their solutions. After multiple rounds of iterative training, a YOLOv8 model was finally obtained, which could accurately measure the body dimensions of cows.

Experimental results indicate that the proposed method exhibits high robustness and accuracy under various environmental and lighting conditions. Compared to traditional manual measurement methods, automated measurement techniques are significantly more efficient and precise. Specifically, a measurement accuracy of 95.3% is achieved in

practical applications, greatly enhancing the efficiency and reliability of data acquisition in precision animal husbandry. Additionally, this paper discusses the model's adaptability to different cattle breeds and body types, and suggests directions for future optimization. The findings of this research demonstrate that the automated dairy cow measurement method using YOLOv8 holds considerable potential for application in precision animal husbandry. It offers robust data support for livestock management and decision-making, particularly in dairy cooperatives.

Keywords: YOLOv8, Dairy Cow, Body measurement.

Study on the removal of tetrodotoxin by lactobacillus peptidoglycan

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Pufferfish is popular among consumers because of its delicious taste and rich nutrition. However, tetrodotoxin (TTX) is a potent neurotoxin in pufferfish. Although cultured pufferfish are generally non-toxic, TTX might be present in the ovaries, livers, and other processing byproducts of pufferfish, causing environmental contamination and food safety issues. Therefore, it is important to remove TTX from processing byproducts. We found that three species of LABs (*Enterococcus faecalis, Lactobacillus plantarum N115, Lactobacillus coryniformis I3*) could remove TTX and reduce its toxicity by more than 87.0 % based on the binding between peptidoglycan (PG) and TTX. The adsorption of PG to TTX was found to be consistent with quasi-secondary (R^2 > 0.9972) and Freundlich model (R^2 > 0.9724), indicating the existence of physical and chemical adsorption during binding. In addition, the amino and carboxyl groups of PGs were found to be important action sites for the binding interaction between LAB and TTX, and electrostatic interaction might be one of the ways of binding between PG and TTX. Moreover, the electrostatic interaction of PG was enhanced with the increasing of electronegativity when the hydroxyl group of PG was oxidized to carboxyl group. The potential of PG decreased from -25 mV to -38 mV after modification, and the removal of TTX increased by 10.61%. Hence, hydroxyl-modified PG of *Lactobacillus* could enhance the removal efficiency of TTX.

Keywords: Lactobacillus; Peptidoglycan; Removal of Tetrodotoxin; Adsorption

Text Mining and Ingredient Networks: Understanding Wakame Usage in Japanese and American Cuisine

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This study investigates the consumption trends of wakame seaweed, focusing on dried and salted varieties in the U.S. and Japan. To understand the cultural and culinary differences in the consumption of wakame, we applied text mining techniques to large recipe datasets from Rakuten Recipe in Japan and Yummly in the U.S., comprising over 600,000 recipes in total.

We developed a keyword detection system to automatically identify the type of wakame used (dried or salted) based on the cooking instructions. Keywords like “soak in water” or “rehydrate” indicated dried wakame, while phrases like “rinse salt” or “remove salt” were used to detect salted wakame. This method allowed us to analyze the usage trends across thousands of recipes efficiently.

Following this, we performed a co-occurrence network analysis to examine which ingredients were frequently paired with wakame in both countries. In Japan, the analysis revealed that dried and salted wakame were used almost equally, primarily in traditional dishes like miso soup and salads. Wakame commonly co-occurred with ingredients such as soy sauce, miso, tofu, and green onions, reflecting its integral role in Japanese cuisine.

U.S. recipes overwhelmingly favored dried wakame due to its ease of storage and availability. The co-occurrence network for U.S. recipes showed wakame often paired with ingredients like soy sauce, sesame oil, garlic, and pepper, suggesting that it is primarily used in Asian-inspired dishes or as a health-focused ingredient in salads and soups. Salted wakame was rare, likely due to its shorter shelf life and limited distribution.

The results highlight significant cultural differences in wakame usage. In Japan, both dried and salted varieties are valued for their versatility and flavor, while in the U.S., wakame is primarily seen as a health food or an exotic ingredient. The findings suggest that there is potential for marketing salted wakame as a premium product in the U.S., where consumers are increasingly drawn to high-quality, health-focused food products.

Keywords: Text Mining, Seaweed Consumption Trends, Recipe

Quality assessment of frozen-thawed seabream by NADH dehydrogenase exposure

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Until now, the measurements of biochemical reactions (ATP, pH, etc.) or physical changes (drip loss, texture, color, ice crystal morphology, etc.) have been the most widely used methods to evaluate the quality of frozen-thawed aquatic products. The common problems are either their long processing time or large variation in results. This study aims to introduce and demonstrate a more practical and reliable method to determine the severity of damage caused by freezing and thawing treatments on fish fillets by assessing membrane permeability. The integrity of the cell membrane of sea bream was evaluated by mitochondrial exposure to NADH dehydrogenase.

After the method was established, the experimental results showed that the response of mitochondria isolated from frozen-thawed muscle to high-speed homogenization was generally at a very low level and the exposure of NADH dehydrogenase was more severe compared with that of fresh muscle. In addition, freezing at a lower temperature or at a faster rate resulted in less exposure of NADH dehydrogenase and could be said to have a more intact membrane structure compared with the slow freezing rate treatment. This method provides a faster and more reliable way to assess the extent of membrane damage caused by different freezing and thawing treatments.

Keywords: Freeze-thawing, Mitochondria, Membrane permeabilization, NADH, muscle quality

Effect of pulsed electric fields on inactivation of endogenous enzyme in scallop

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The effect of pulsed electric fields (PEF) was investigated on the endogenous enzyme of scallops for preventing degradation of ATP-related compounds. A crude enzyme solution was prepared by dissolving powder of scallop adductor muscle into 0.5 M NaCl solution. The solution was centrifuged at 4000 ×g and 4 °C, for 5 min and the resulting precipitate was put in a platinum parallel plate electrode. The electrode was placed in a cooled water during the PEF treatment and the temperature of the sample was maintained at 7 ℃. Pulsed voltages with an amplitude of 1 kV and a pulse repetition rate of 200 pps were applied to the electrode. After PEF treatment, ATP (final concentration of 1.9 mM) was added as substrate. After reaction time of 0 ~ 24 hours, the enzyme reaction was quenched by adding perchloric acid solutions. ATP-related compounds were determined using liquid chromatography. Fig. 1 shows the decomposition rate of ATP. In the case of first-order reaction by enzyme, the decomposition rate constant is -5.5×10^{-5} s^{-1} for control and -1.2×10^{-6} s^{-1} for PEF. The result shows that the decomposition rate of ATP in the case of PEF treatment is lower than that of control, indicating that ATP-related compound degrading enzyme is inactivated by PEF treatment.

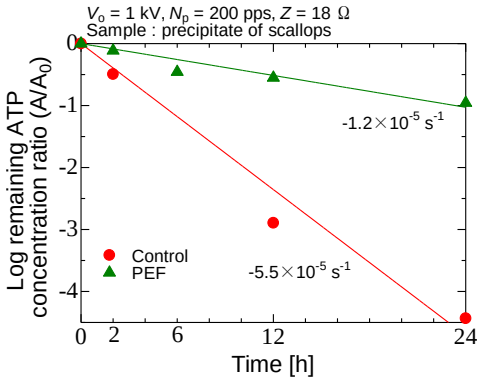

Fig. 1. Decomposition rate of ATP

Keywords: Pulsed electric fields, ATP-related compounds

Monitoring of radioactive cesium in wildlife after the Fukushima Daiichi Nuclear Power Plant accident in 2011

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According to the Fukushima Daiichi Nuclear Power Plant (hereafter, FDNPP) accident that occurred in March 2011 in Fukushima, Japan, large amounts of artificial radioactive materials, were released from the reactors into the environment. Cesium-137, which has a long physical half-life of 30 years, has become one of the major radionuclide contaminants in large areas of eastern Japan. After the accident, restrictions on the shipment and consumption of wild meat have been implemented for some game species due to high levels of radioactive contamination. We summarized the temporal changes and trends in Cesium-137 activity concentrations in wild meat using data from a wild animal monitoring survey conducted by the prefectural governments. Additionally, we summarized the outline of our studies to identify the factors influencing radionuclide fluctuations in wild meat.

Keywords: Radioactive cesium, wild meat, Monitoring, FDNPP, game species, wild boar, Asian black bear, deer, birds

Polysaccharides from fermented coix seed modulates circulating nitrogen and immune function by altering gut microbiota

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Coix lachryma-jobi L. seed is an important food item in Asia with culinary and medicinal values. The effects of non-fermented coix seed (NFC), fermented coix seed with *Lactobacillus plantarum* NCU137 (FC) and polysaccharides from NFC, FC (FCP) on mice circulating nitrogen and immune disorder induced by high relative humidity (RH, 90 ± 2%) exposure were compared. All the treatments reduced circulating nitrogen (BUN and ammonia) might via increasing excretion of fecal nitrogen induced by altering gut microbiota. In comparison, FC and FCP restored erythrocyte morphology by promoting erythrocyte Na+/K+ ATPase activity more effectively, and immune function was modulated by reducing plasma IgM and IFN-γ levels, up-regulating IL-4 and IL-6 levels. Herein, these results indicated that FCP, as the main active ingredient in FC, modulated circulating nitrogen through altering gut microbiota, and restored immune homeostasis by regulating Th1/Th2 cytokines in mice receiving high RH exposure.

Keywords: Coix seed; Polysaccharides; Circulating nitrogen; Gut microbiota; Immune homeostasis

Improvement of solubility of astaxanthin using deep eutectic solvent-based microemulsions

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Carotenoids exhibit superior antioxidant activity due to the presence of double bonds, hydroxyl groups, ketone groups, and other functional groups within their molecular structures. However, the polyunsaturated chains render carotenoids highly unstable. In this study, deep eutectic solvents (DES) composed of DL-menthol as a hydrogen-bond acceptor (HBA) and various organic acids (acetic acid, propionic acid, valeric acid, and octanoic acid) as hydrogen bond donors (HBD) was developed to form novel microemulsions (MEs) in combination with Tween 80 and water. By investigating the phase behavior characteristics of the DES-based ME system, a stable DES-based ME system with a strong ability to form MEs was selected to enhance the solubility of astaxanthin. The results demonstrated that the DES-based ME with larger single-phase areas (> 20%) can maintain a single-phase ME across varying temperature and pH environments. Furthermore, the four DES-based MEs exhibited ultra-small particle sizes (7.27-8.49 nm) and temperature stability, with droplets uniformly dispersed and free from aggregation. In comparison to ethanol, methanol, and acetone, all the DES-based MEs studied significantly improved the solubility of astaxanthin. These findings indicate that DES-based MEs with low viscosity (<0.2 Pa · s) and mildly acidic pH (4-5) are promising solvents for natural astaxanthin in food processing and storage, pharmaceutical formulation, and biomaterials processing.

Keywords: deep eutectic solvents, microemulsion, phase behavior, physicochemical property, astaxanthin

Comparative Study on the Perception and Processing of Sea Cucumbers between Japanese and Chinese Preferences

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【Background and Objectives】
Sea cucumber (*Stichopus japonicus*) is a species of echinoderm belonging to the class Holothuroidea. It is a valuable marine resource and holds significant cultural and culinary importance in Asian countries, particularly in Japan and China. Recognized as a delicacy, sea cucumbers are also renowned for their rich nutritional profile, with numerous bioactive compounds contributing to their high nutritional value. Japanese fisheries are currently implementing strategies to enhance the domestic consumption of sea cucumbers, focusing on increasing consumer demand and market penetration within the local market. Therefore, this study focuses on the differences in perception and culture between Japan and China regarding sea cucumbers, analyzes the unique active ingredients of Japanese sea cucumbers, and aims to explore ways to utilize sea cucumbers that suit Japanese tastes, thereby contributing to the expansion of domestic demand.
【Methods and Materials】
This study used sea cucumbers from Kuji and sea cucumbers from China.
1. Survey on awareness of sea cucumbers in two regions, Japan and China.
2. Comparative analysis of the results of 1.
3. Creation of the smoked sea cucumber that received the most votes in the survey.
4. Rehydration in two ways, the Japanese method and the Chinese method. (A total of 16 samples of sea cucumbers from Japan and China)
5. Measurement of the moisture content of the samples from 4.
6. Sensory evaluation of the smoked sea cucumber produced.
【Result and Observations】
1 and 2. it was found that Japanese people have never eaten sea cucumbers and do not have a positive impression of them. In China, the opposite results were obtained. In addition, many Chinese people know that sea cucumbers are rich in nutrients.
3. As smoking of raw sea cucumbers was not successful, eight types of smoked products were created using dried sea cucumbers.
4. Japanese sea cucumbers soaked in water the Japanese way was larger, while Chinese sea cucumbers were larger when soaked in water the Chinese way.
5. As with the results in 4, the water content of Japanese sea cucumbers soaked in water the Japanese way was higher, while the water content of Chinese sea cucumbers soaked in water the Chinese way was higher.
6. The reason why Japanese people dislike sea cucumbers is mainly due to two factors: a lack of knowledge due to never having eaten sea cucumbers, and their poor appearance, so it is necessary to develop a product that is easy to handle and does not leave the appearance of a sea cucumber.The results of this research show that the "smell" and "texture" of smoked sea cucumber have a big impact on the overall deliciousness, so we would like to analyze these two components and create a product that suits the Japanese palate.

Keywords: Sea cucumber, Smoked

Comparison of components of Sanriku salmon after thawing

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[Background and Objectives]

Three types of salmon —coho salmon, trout, and cherry salmon have been farming in the Sanriku region, each exhibiting unique characteristics in terms of meat quality. Kamaishi City is promoting the local branding of cherry salmon To increase the consumption both locally and beyond. However, there are concerns among consumers that thawed cherry salmon being perceived as “watery”. The drip released during thawing contains essential umami components; if drip loss is higher, it can negatively affect the taste and texture of the sashimi, ultimately deteriorate its quality. In this study, we will compare the amount of drip loss and other indexes.

[Materials and Methods]

After of landing each of the three types of salmon, they are filleted and rapidly frozen. After 30 days of frozen storage, the samples were thawed in ice water and the drip loss was measured. Each sample was subsequently divided into into blocks of approximately 200 g and subjected to freeze again. After an additional 30 days of frozen storage, the samples were again thawed in ice water and the drip was again calculated. In addition to drip loss, ATP-related compounds and free amino acids (FAAs) were analyzed as other quality evaluation indicators.

[Results and Discussion]

Cherry salmon exhibited the highest drip loss among the three types of salmon, While there was minimal variation in ATP levels, a notable difference in inosine monophosphate (IMP) was observed before and after thawing. The coho salmon had the highest proportion of IMP after thawing. In terms of FAAs, the accumulation of total FAAs was highest in cherry salmon. Additionally, coho salmon contained the highest amount of anserine, which known to be abundant in salmonid species.

Keywords: cherry Salmon, FAAs, ATP, frozen

Impact of temperature control on the quality of live Scallops

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The Yesso scallop (*Mizuhopecten yessoensis*) is a species of significant economic value in global aquaculture. Its adductor muscle, comprising both fast (striated) and slow (catch) muscle fibers, is highly valued for its rich nutritional content. With the rise in health awareness, there is an increasing demand for higher-quality seafood products. However, during the transport of live scallops, certain factors can cause a rapid loss of vitality, which in turn reduces the scallop's economic value. Additionally, there is a lack of research on the optimal temperature conditions for transporting live scallops. Therefore, this study aims to elucidate the effects of different temperatures on the quality of the adductor muscle in live scallops. A total of 20 scallops were divided into two groups: an ice seawater group and a seawater group, both of which were stored in a 2℃ refrigerator for 0 to 4 days. The temperature changes during the entire storage process were monitored using a thermometer. Parameters such as appearance and pH value were analyzed throughout the storage period. The results showed that on day 0, heartbeat activity was observed and pH was above 7. On 2nd day, scallops stored in ice seawater showed no heartbeat, whereas half of the scallops stored in seawater showed a heartbeat. Additionally, pH was also lower for scallops stored in ice seawater compared to those stored in seawater. On 4th day, one of the four individuals still had a beating heart, but the one preserved in ice-sea water had no beating heart and half of the individuals had open mouths.. In addition, one of the individuals also had a cracked scallop and a frizzy texture. However, pH of the scallops kept in ice seawater increased to the same level as that of day 0. These results suggested that the scallops kept in ice seawater died on 2nd day and their pH decreased, but on 4th day, the osmotic pressure generated after death caused the scallops to lose water and crack, which allowed seawater to seep into the cracks and raise pH. In conclusion, this experiment showed that storage with seawater is more suitable for the distribution of live scallops than the use of ice seawater.

Keywords: Scallop, vatality, pH, Seawater, ice, temperature

Visual-Based Quality Assessment of Wakame

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This study explores the potential of using visual features for quality assessment of wakame (*Undaria pinnatifida*), focusing on the correlation between SPAD values (commonly used for chlorophyll measurement in plants) and RGB, Lab*, and HSV color features. We hypothesize that if these visual features correlate well with SPAD values, RGB analysis could serve as a non-destructive, rapid alternative to SPAD testing for assessing chlorophyll content in wakame. To investigate this, we analyzed both frozen and salted wakame samples to examine how different processing methods affect the relationship between visual features and SPAD values. Our models, including linear regression, quadratic regression, and random forests, demonstrated that color features can effectively predict SPAD values in frozen samples, with the best random forest model achieving an R^2 of 0.900 and an RMSE of 0.308. In salted samples, the prediction accuracy was lower, with an R^2 of 0.806 and an RMSE of 0.433, suggesting that salt curing introduces additional complexity. Furthermore, we measured thickness and other biochemical indicators to explore their relationship with color and SPAD values, providing a more comprehensive assessment of wakame quality. Although this study does not include direct measurements of chlorophyll content versus SPAD values, comparisons between different seaweed samples suggest that RGB values could be used for rapid, non-invasive wakame quality assessment. Future research should focus on refining these models and exploring additional factors influencing wakame properties to improve the accuracy and applicability of visual-based quality assessment methods.

Keywords: Wakame, Chlorophyll content, SPAD values, Visual analysis, Machine learning, Color features, Food processing, Non-destructive assessment, Seaweed quality