2022 KOBE JAPAN
ICoMST

68th International Congress
of Meat Science and Technology

ICoMST2022, Kobe, Japan

Theme > Meat for the Future

Date > August 22nd – 25th, 2022

Program Book




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68th International Congress of Meat Science and Technology

ICoMST2022 Kobe, Japan

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Greetings!

Welcome to the 68th International Congress of Meat Science and Technology

On behalf of the Scientific and the Organizing Committee, it is our great pleasure to welcome you to the 68th International Congress of Meat Science and Technology (ICoMST) 2022 in Kobe, Japan.

The 68th International Congress of Meat Science and Technology is scheduled to be held on August 22nd-25th, 2022 by online whose key station is the Kobe international convention facility here in Japan.

Lately, the meat industry in Japan has undergone a number of important changes resulting in highly significant improvements. These changes were occasioned by factors such as reduction in birthrate, globalization and recent developments in computer science and IT. It was considered that, on this occasion, the purpose of ICoMST could be well served by adopting as the theme for this congress, "Meat for the Future". It is thus with the utmost pleasure that invitations to this congress have been extended to each and every one of you who are so importantly engaged in meat science and technology worldwide.

The outbreak of the present COVID-19 pandemic has unavoidably placed time limitations on this congress. Thus we had to change from conventional face to face into an on-line congress, as in the following ICoMST2022 website: https://icomst2022.com/

I speak for the whole of my country in extending to you a most cordial welcome to the 68th ICoMST, 2022. This congress will feature many outstanding speakers, panelists, consultation opinion exchange meetings as well as poster sessions and virtual exhibition.

I am looking forward to seeing you from Japan.

坂田亮一

Ryoichi Sakata

Organizing Committee Chair of the ICoMST2022

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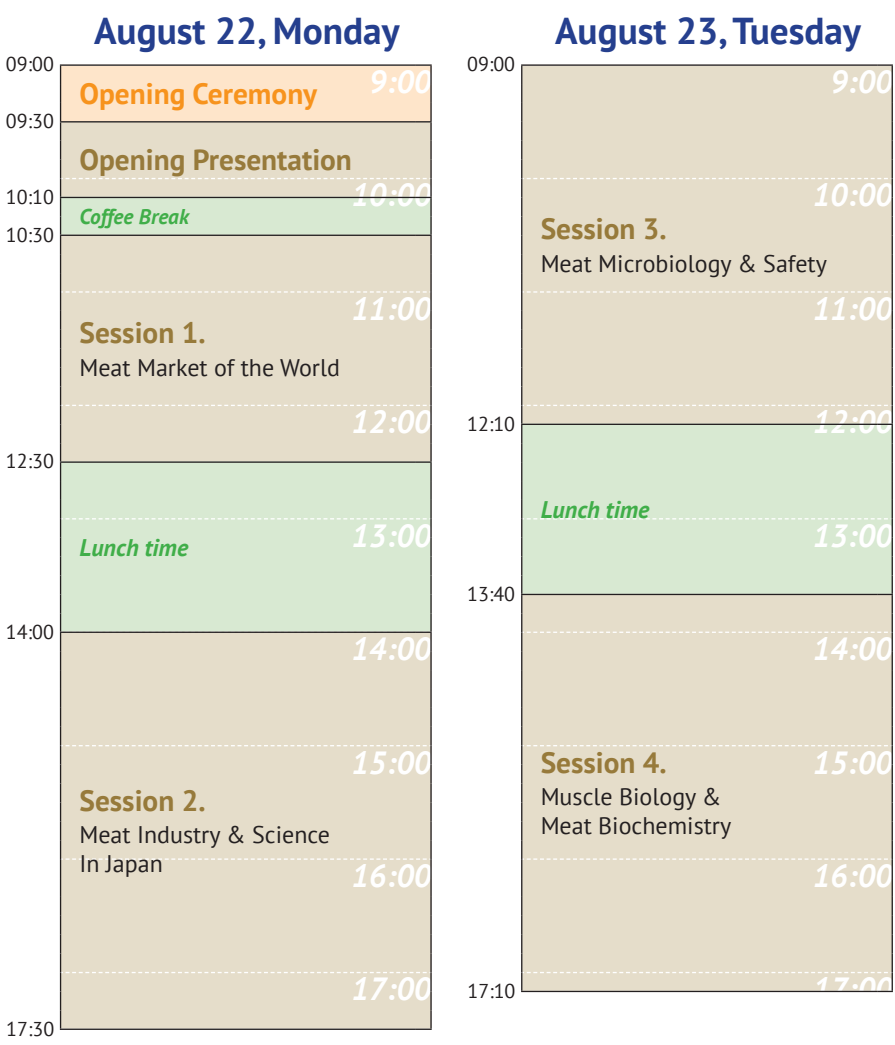
Conference Overview



-All of times are based on Japan Central Standard Time (GMT + 09:00).
-E-Poster session opens over the entire period of ICoMST2022.
It opens 9:00 of August 22 and close 18:00 of August 25.

August 24, Wednesday

09:00 – 10:00 **Virtual Excursion**
(Course No. 1, 2, 3)

10:30 – 11:30 **Online Presentation of Exhibition**

No special programs are provided 11:30-17:00. Visit E-Poster session and Virtual Exhibition.

17:00 – 18:00 **Virtual Excursion**
(Course No. 4, 5)

August 25, Thursday

09:00 – 12:00 **Session 5.**
Meat Products & Technology

12:00 – 13:20 *Lunch time*

13:20 – 16:00 **Session 6.**
Meat Productions & Quality of Meat

16:00 – 18:00 **Session 7.**
Topics of Meat Science & Technology

18:10 – 18:40 **Closing Ceremony**

-Virtual Exhibition opens over the entire period of ICoMST2022.
It opens 9:00 of August 22 and close 17:00 of August 31.

Invited Presentations

Opening Session

Monday, August 22, 2022

OS-1 (09:30~10:10)

Stephen B. Smith

Department of Animal Science, Texas A&M University, USA

"Meat Production in Asia and the World"

The demand for beef as a protein source is increasing worldwide, although in most countries beef accounts for less than half of total meat consumption. Beef provides a highly desirable eating experience in developed countries and, increasingly, in developing countries. The sustainability of beef production has different meanings in the various geographical regions of the world. Natural resources including land mass and uses, rainfall and access to livestock feed, and the robustness of the economy are major determinants of the perception of beef sustainability. This session will discuss important aspects beef production in countries in Asia as well as countries producing highly marbled beef for export and/or for domestic consumption. Notable differences exist within Asia and in other countries in the production and marketing of beef. These reflect differences in natural resource availability and climate, population size, traditional culture, and degree of economic development, including industrial and technological developments. The contributions to the 68th International Congress of Meat Science and Technology will serve as a valuable resource for the livestock industries, researchers, and students with an interest in enhancing the prospects for sustainable, efficient beef production that satisfies the growing size and complexity of consumer demands and markets for beef.

Session 1. Meat Market of the World

Monday, August 22, 2022

S1-1 (10:30~11:10)

Paul Greenwood

New South Wales Department of Primary Industries, Australia

"The Evolving Beef Industry in the Pacific Rim"

The Pacific Rim includes countries with widely diverse beef industries. They include

primarily subsistence-based beef production in developing south-east Asian countries that may also import beef, carabeef from buffalo, or live cattle for slaughter or breeding. They also include countries that consume high eating quality beef from limited domestic production and substantial volumes of imported beef. The latter include Japan and South Korea and, increasingly, China which is now the world's largest importer of beef. Australia, USA, New Zealand, Canada and Mexico are large-scale Pacific Rim beef exporters, supplying primarily to Asia and the USA. Countries outside the Pacific rim, notably Brazil, Argentina, Uruguay, and India are also important exporters of beef or carabeef to Pacific Rim countries. Global consumption and prices for beef continue to grow, largely underpinned by increasing standards of living and demand for beef in developing Asian countries including China. Beef is perceived as a premium meat, however, beef consumption as a proportion of all meat consumed is expected to decline, and to face increasing competition from non-meat protein sources. Consumer preferences for beef are driven by numerous factors among Pacific Rim countries, including food safety, freshness, Halal status, naturalness, and value of product. The more advanced Pacific Rim beef industries have evolved a high degree of flexibility in their production and marketing systems that increases resilience in the dealing with variable climatic conditions and limiting resources and in shifts and uncertainties in target markets. They are also evolving to use more objective data and improved linkages across the supply chain to enable improvements in efficiency of resource use and environmental and cattle welfare outcomes, compliance with market specifications, and hence provenance and financial returns.

S1-2 (11:10~11:50)

Keith E. Belk

College of Agricultural Sciences, Colorado State University, USA

"Diversity in Global Production Systems Allows Beef to Hit Consumer Targets in a Range of Markets"

In 2021, the global meat market was valued at US$1.33 trillion; growth is expected to continue at an annual rate of >3% over the next 5 years. Beef is a very important meat product in trade, representing more than than 20% of total meat market share. Beef production systems differ by country of origin, availability of resources, genetic adaptability to the environment, culture, and tradition. Diversity in production results in variation among characteristics of concern to consumers, including animal wellbeing, environmental footprint, flavor, tenderness, etc. These diverse characteristics tied to beef allows production systems from differing countries to specifically target consumer preferences in different markets. This presentation focuses on variability in beef production systems and potential markets to target for those products across North America, South America, Europe, Australia, and New Zealand. From grain-finished cattle in North America to grass-fed in South America and Oceania, or to no-antibiotic or growth

promotant use in Europe, beef systems have evolved to provide products that can satisfy consumers' needs around the globe. Understanding the interaction between beef production systems and markets will increase opportunities for producers by allowing them to target the characteristics preferred by consumers in those markets.

S1-3 (11:50~12:30)

Abdulatef M. Ahhmed

Life Science Department, School of Basic Sciences, The Libyan Academy for Graduate Studies, Libya

"Perspectives on the Trends, Challenges and Benefits of Halal Meat"

Halal meat (HM) is becoming increasingly popular among non-Muslims, especially in Europe and some major Asian countries, due to the desire to eat healthy meat. The demand for Halal meat is increasing significantly in Europe, North Africa, and the Middle-East, because of the explosion in the Muslim population. The credit for opening young investing trends of Halal meat is not only due to the resident Muslims in foreign countries but also due to the multinational companies that continuously work to develop the overall operating system utilizing Halal dietary rules (Sharia). Recently, because of the quality-and ethical-conscious, consumers are increasingly seeking Halal meat that meet the criteria of Sharia law (Halal and Taieb regulations), traceability practices and a high standard of animal welfare, which the producers and suppliers are said to ensure. The Halal food and beverage market size is growing by 6.1-7%, which topped the list of spending in the Islamic sector with $1.6 trillion in 2018, and is expected to reach 1.9 trillion by 2030. Halal meat production is an emerging opportunity with various new challenges for producers and consumers worldwide, especially in non-Muslim countries. In the Halal production system there are some factors limiting the development of the Halal meat sector from the perspective of regulations acceptance, certification and accreditation, processing (slaughtering methods), distributing, and retailing partners. The meat consumed by Muslims acts as 15% of the global consumption and the market size of Halal meat (51.15 Million Tonnes) is predicted to be approximately around $ 278.767 Billion in 2022. As a matter, Halal meat participate by 17% of the total global Halal food market size (1.6 Trillion) and that is quite important guide offering promising business opportunities. Internationally, the investing opportunity in the Halal meat industry is quite valuable. However, it must be taken into account that this business requires good supply chain management and operations that are highly efficient at a low cost, without compromising the Halal status and integrity of the products.

S2-1 (14:00~14:40)

Masahiko Suneya

Japan Ham & Sausage Processing Cooperative Association, Japan

"Developing Japanese Wagyu Beef in the World Beef Market"

Japan Livestock Products Export Promotion Council (J-LEC) has been conducting export promotion actively since it was established in 2014. In 2019, the Government of Japan set the export target for beef at 25.0 billion yen. Thanks to the great cooperation of our partners in the livestock industry, our beef exports for 2019 reached 29.7 billion yen, exceeding the government target. Genuine Japanese Wagyu beef is characterized by rich marbling which produces a tender, fine-textured product with an enticing aroma and oleic acid-rich fat. As we promote Wagyu beef outside Japan, understanding of the superior qualities of genuine Japanese Wagyu beef has been growing among food connoisseurs around the world. Japan's beef export strategy is now taking the next step. The Japanese government has renewed the export strategy for agricultural products, including beef. The 2025 target for beef exports is 160 billion yen, increasing to 360billion yen in 2030. The current session of the Diet is planning to amend the Act on Facilitating the Export of Agricultural, Forestry and Fishery Products and Food. The amendment would tie government support to the individual export promotion organization requirements specified under the law. I would like to make my presentation on J-LEC's updated approach to meeting the new requirements.

S2-2 (14:40~15:20)

Masanori Matsuishi

School of Food Science and Technology, Nippon Veterinary and Life Science University, Japan

"Science and Technology of Meat and Meat Products in Japan -Pursuit of Their Palatability under the Influence of Washoku, Traditional Japanese Cuisine"

In 2012, Washoku (traditional Japanese cuisine) was registered as a World Intangible Heritage Site. Its characteristics are the variety and freshness of the ingredients, the respect for the inherent flavor, and the well-balanced and healthy diet. However, the western food culture centered on meat eating was brought in and fused with the original Washoku culture to construct recent Japanese food culture. In the midst of such changes, the meat science and technology of Japan has developed. The products

produced by meat industry have adapted to people's preference, resulting in increase of those consumption and improving nutritional status of the Japanese. Thus, the palatability composed of taste, aroma and texture, is one of the major targets of meat science and technology in Japan. Research on meat tastes, almost umami which is an important factor of Washoku, revealed the mechanism of improvement of taste during aging and cooking of meat and demonstrated the possibility to control meat taste by animal diet. Research on meat odors found Wagyu beef aroma, preferable odors of meat products and relaxing effect of cooked meat odors. Studies on meat textures were led to clarifying the mechanism of heating gel formation and tenderness of Wagyu beef, and contributed to understanding postmortem tenderization of meat and tenderness induced by cooking and high pressure.

S2-3 (16:00~16:30)

Wataru Mizunoya

School of Veterinary Medicine, Azabu University, Japan

"The Relationship between Muscle Fiber Types and Taste Substances Contained in Meat"

Free amino acids are important components of taste substances and flavor-precursors in meat. To clarify the relationship between muscle fiber type (slow- and fast-twitch fibers) and free amino acid level, we measured the concentrations of various free amino acids and dipeptides contained in meat pieces derived from different twenty-one muscle tissues in cattle. The muscle fiber type composition showed a large variation depending on the type of muscle tissue. We also found that there was a strong positive correlation between slow-twitch fiber composition and total free amino acid concentrations. Moreover, we also found a similar positive correlation between fiber type composition and umami taste intensity by using a taste sensor. These results suggest that high levels of slow-twitch fiber in beef could induce strong umami taste and richness induced by possibly high level of free amino acids.

S2-4 (16:30~17:00)

Jun-ichi Wakamatsu

Research Faculty of Agriculture, Hokkaido University, Japan

"Zinc Protoporphyrin IX Formation Mechanism in Nitrite/nitrate-free Dry-cured Ham"

A large amount of zinc protoporphyrin IX (ZnPP) is found in nitrite/nitrate-free dry-cured ham products, such as Parma ham, and it contributes to the favorable bright red

color. ZnPP is a metalloporphyrin in which zinc is coordinated instead of the iron in heme. The color of ZnPP gives a preferable bright red color and it is markedly more stable than heme. Therefore, the use of ZnPP is expected to improve the color of meat products without the addition of nitrite or nitrate. Thus, it is important to understand the mechanisms by which ZnPP is formed in nitrite/nitrate-free dry-cured ham, as they have not been completely elucidated. In this lecture, I will introduce some of our group's findings; for example, why ZnPP is not formed in cured meat products, where and how ZnPP is found in Parma ham, and which endogenous and exogenous factors contribute to the formation of ZnPP in ham.

S2-5 (17:00~17:30)

Keisuke Sasaki

NARO Institute of Livestock and Grassland Science, Japan

"Evaluations of Sensory and Consumer Perceptions of Meat: Recent Progress in Japan"

Measurements of sensory and consumer perceptions are important for monitoring, maintaining, and improving the eating quality of meat. A sensory evaluation is the primary and the most important procedure for measuring sensory traits and eating preferences that cannot be determined by instrumental measurements alone. Novel procedures for sensory evaluation have been proposed in recent years, as is also the case for instrumental analyses. These novel sensory testing procedures have contributed to the progress in sensory evaluations of meat and meat products. For example, check-all-that-apply (CATA) questions, one of the 'rapid' procedures for sensory techniques, have been for the screening of sensory items and for non-target analyses of sensory characteristics of meat. The multidimensional sensory method known as temporal dominance of sensations (TDS), which collects the sequence of the 'dominant' sensations during tasting, also provides novel findings regarding sensory traits of meat. These recent sensory techniques will increase our understanding of sensory traits and consumer perceptions that have not been clarified with the use of traditional descriptive sensory-testing protocols.

S3-1 (09:00~09:40)

Yukio Morita

School of Veterinary Medicine, Azabu University, Japan

"Historical Background of Eating Meat Culture and Meat Hygiene in Japan"

While the Edo period (1603-1868), Japan was a strict Buddhism and Shintoism country. In addition, Japan was isolated country in the world. There was no culture of eating meat in Japan. Only few people eat wild boar and deer meat as a medicine, because the wild animals are God in forest. In 1859, foreign settlement was established in Yokohama. The foreigner wanted to eat beef, so many Wagyu beef cattle shipped from Kobe to Yokohama. It is the start of eating meat culture. When Wagyu beef from 3 slaughterhouses start to export to the United State in 1990, I think that meat hygiene started. Because Japan cannot export meat to foreign country, and nobody including veterinary meat inspectors know world-class meat hygiene. In 1996, STEC outbreak in humans has occurred in Japan, the meat hygiene system was evaluated. Now, 15, 12, and 10 slaughterhouses export Wagyu beef to the United State, EU countries, and Australia, respectively. Japanese had a habit of eating raw liver from cattle and pig as well as see food "Sashimi". But now, eating the raw liver is forbidden. According to the domestic guideline of meat industries, expiry period of beef packed vacuum and kept 4°C is 26 days. But the period in slaughterhouse exporting beef shows over 100 days. In this session, I talk about meat culture in Japan and meat hygiene based on microorganisms.

S3-2 (09:40~10:20)

Djuro Josić

Waren Alpert Medical School, Brown University, USA

"The Use of Foodomics in Food Safety"

Food safety plays a crucial role in both food-producing and food-processing industry that now face new challenges, mostly due to globalization of food chain. Gradually increasing risk of environmental chemical and microbial contamination and increasing resistance of foodborne pathogens, changes in climate and human errors in food handling remain a pending barrier for the efficient global food safety management. Consequently, a need for development, validation, and implementation of rapid, sen-

sitive, and accurate fast high-throughput foodomics methods that are based on genomic, transcriptomic, proteomic, metabolomics and lipidomics techniques. For their development investigations of sample structure and composition, biological activity of food contaminants and their interference with the host is necessary. Presented new foodomic techniques are suitable to address a number of novel requirements posed by the food production sector, especially regarding drastically reduced time for analysis and validation. The shortest and most reliable methods are mass-spectrometry based, but their combination with other most chromatography- and electrophoresis-based analyses is frequently necessary, especially during sampling and sample preparation processes. Further work in direction of miniaturized units with integrated sampling, sample preparation and final analysis including fast data interpretation that has resulted in fulminant development of sensors as miniaturized and fast in situ devices that will be presented.

S3-3 (11:00~11:40)

Michael W. Pfaffl

TUM School of Life Science, Technical University of Munich, Germany

"New Food Safety Surveillance Concepts in Meat Producing Animals: the Successful Use of '-omic' Technologies"

The worldwide misuse of anabolic growth promoters is an ubiquitous problem in animal husbandry and meat production. In the EU the ban of such illegal drugs and growth promoters is well controlled. Nevertheless, there are worldwide application regimens that are difficult to detect. The indirect identification of endogenous molecular biomarkers, which are based on the physiological response after the illicit treatment, has come into focus of modern detection methods. This measurement of the pharmacological reaction of the illegal applied hormone cocktail or the newly designed drug in the living animal or in selected tissues after slaughtering will help. The holistic analysis of the 'transcriptome' has been shown to be a promising approach to discover the misuse of anabolic or growth promoting drugs in food producing animals. Characteristic 'transcriptomic biomarker signatures' were identified at the mRNA and microRNA level by high throughput 'omics' technologies (RNA-Sequencing) or quantification by RT-qPCR. With the successful use of advanced bioinformatical tools and multivariate algorithms, such as hierarchical clustering analysis (HCA), principal components analysis (PCA), or partial least squares discriminant analysis (PLS-DA), a valid 'biomarker signature' could be identified. Our results from farm animal production and food safety studies demonstrate that the transcriptome analysis has high potential as a new screening and detection method, to discriminate between illegal treated and untreated healthy animals. Furthermore, this 'omics' and bioinformatical approach can help to increase the overall animal health and animal welfare, to reach the 'One Health' goal.

S4-1 (13:40~14:20)

Steffen Maak

Leibniz Institute for Farm Animal Biology, Germany

"Molecular and Cellular Background of Intramuscular Fat Deposition"

Modulating intramuscular fat (IMF) in farm animals is still an important research topic. Besides the major effects of IMF on tenderness and palatability of meat, topics like resource efficiency are considered additionally. Although, basic molecular mechanisms of adipogenesis are known for decades, only the availability of genome data in farm animals provided a wealth of additional candidate genes for IMF deposition. Only few candidates, which could be verified at least in part in different breeds, were used in breeding for higher IMF. Data at cellular level showing amount and localization of candidate proteins are even more rarely. Candidate gene analyses were subsequently complemented and partly replaced by genome-wide studies including hitherto neglected RNA species. These studies revealed complex networks of genes, which are involved in or related to IMF deposition. Recent approaches aimed at identification of so-called adipokines and myokines, which are crucial components of the cross talk between the different cell types in skeletal muscle tissue. While not directly usable in breeding, the results of these studies contributed to a better understanding of biological processes underlying intramuscular adipogenesis and lipid deposition in farm animals.

S4-2 (14:20~15:00)

Xing Chen

School of Food Science and Technology, Jiangnan University, China

"Colloidal Engineering to Tailor Myoprotein Functionality for Muscle Food Innovation"

There is still space for improvement in the field of future meat products which pursue healthy, functional, nutritious and sustainable processing. The underlying reasons can be attributed to insufficient understanding and exploration of the functional properties of muscle protein. Therefore, it is of urgent to actively explore the novel functional properties of muscle protein in order to broaden its application scope, realize its efficient use and consequently promote the rapid development of the industry. In recent years, with the rapid integration and development of material science, soft matter

physics, nanotechnology, colloid and interface science in the food context, multi-length scale exploration, assembly and functional re-design of food structures are becoming an effective way for the green innovations of future food. It is also a green, safe, efficient and potentially feasible strategy for improving and expanding the functional properties of muscle protein. This article reviews the research progress of functionalized structural and colloidal design in the expansion of muscle protein functionality, the advances of promoting the processability of muscle protein in beverage or soft foods are highlighted. Meanwhile, their contributions in the application of muscle protein on 3D printing, morphing food, and the construction of delivery system and functional materials are prospected. This review aims to provide a reference for the promotion of future meat processing technology and the industrialization.

S4-3 (15:40~16:10)

Shinobu Fujimura

Faculty of Agriculture, Niigata University, Japan

"Regulation of Taste-active Components of Meat by Dietary Amino Acids in Chicken"

Meat quality is an important quality attribute for consumers. For example, breeding technique, dietary antioxidants and colors were mainly used for improving the meat quality in the world. However, there are few reports about improving the taste active components of meat by diet. Previously, we suggested that main taste-component, free glutamate (Glu), content of meat was regulated by dietary crude protein levels. In this study, we investigated the effect of dietary amino acids on the Glu contents and sensory scores of meats. As a result, free Glu content in meat was significantly increased by High Lysine (Lys) diet. In addition, for the investigation of the mechanism of Glu regulation, metabolome analysis in muscle were conducted. In the feeding of a high Lys diet, the Lys degradation pathway contributed to the increase in the free Glu concentration of muscle. While, the feeding of a low Lys diet also increased the free Glu in muscle. Sensory evaluation of meat soups from different Lys diets showed that they had different meat tastes. Dietary BCAAs also affected the free Glu contents of meat. These results suggest that some dietary amino acids are regulating factor of free Glu content in meat and improves meat taste.

S4-4 (16:10~16:40)

Susumu Muroya

NARO Institute of Livestock and Grassland Science, Japan

"Farm Animal Muscle Metabolism Approached with Omics Technologies"

Farm animal skeletal muscle formed through development, growth, and maturation processes, is converted to edible meat during postmortem rigor mortis and aging. The live and postmortem muscle metabolism is the phenotypic determinant of muscle characteristics and meat quality traits such as flavor and color. In addition, muscle metabolites and the biosynthetic network are further modulated by alteration of animal feeding and environment through nutritional/physiological adaptation, which could alter meat quality traits. The past few years, metabolomics has exerted the efficient and comprehensive performance to elucidate effects of animal growth, feeding, and postmortem aging on the muscle and meat metabolome profile, sometimes in integrative approaches combined with genomics, transcriptomics, and/or proteomics information. These approaches are beneficial for better understanding of muscle metabolism and for exploration of the biomarker to monitor meat production processes and to evaluate the products. This presentation will overview current metabolomics studies focusing on research of live and postmortem metabolism of farm animal muscle that is associated with meat quality and production.

Session 5. Meat Products and Technology

Thursday, August 25, 2022

S5-1 (09:00~09:40)

Andy King

United States Department of Agriculture, USA

"The Biological Basis for Animal Variation in Lean Color Stability"

Lean color is the primary factor considered by consumers while making purchase decisions. Failure to meet consumer expectations regarding lean color results in discounting and discarding of products, which are costly to the meat industry. Case-ready distribution of muscle foods requires greater lean color stability, and cuts from some animals do not meet specifications for color-life. Heritability and breed difference estimates indicated that genetic influences are significant contributors to animal variation in lean color stability, which was comparable to the contribution of muscles within a

carcass. These effects have been reported to be mediated through variation in initial capacity of oxygen consumption and reducing ability, combined with variation in the ability of the muscle to maintain reducing ability. Proteomic and metabolomic investigations into the color chemistry have implicated antemortem and postmortem metabolism in mechanisms influencing color stability. From these studies, animals favoring glycolytic metabolism tended to produce muscles with more stable lean color, while animals favoring oxidative metabolism tended to produce muscles with labile lean color. Moreover, evidence indicating the importance of mitochondrial abundance and function has increased. This presentation will discuss these factors and strategies to reduce the incidence of carcasses producing cuts with insufficient lean color stability.

S5-2 (09:40~10:20)

*Since the original presentation by Dr. Vincenza Ferraro (INRAE, France) was cancelled, Dr. Keizo Arihara is scheduled to give the alternative presentation.

Keizo Arihara

Kitasato University, Japan

"Strategies for Utilizing Animal By-products: Promising Approaches with Fermentation, Proteolysis and the Maillard Reaction"

Animal by-products can be defined as entire bodies or parts of animals, products of animal origin, or other products obtained from animals, which are not intended for direct human consumption. As the representative such products, skins, bones, meat trimmings, blood, fatty tissues, horns, feet, hoofs, and internal organs are listed. They are produced in large quantities in slaughterhouses and during the processing of meats. Most parts of animal by-products are discarded as waste or used for low-value products. Since meat trimmings, collagen, blood, are rich in proteins, they are seemed to be promising sources for functional foods and high value-added ingredients. We have been approaching to the utilization of animal by-products with fermentation, protein hydrolysis and the Maillard reaction. Fermentation and protease treatments generates various bioactive peptides from proteins in animal by-products. Although protein-derived bioactive peptides are attractive ingredients, their properties can be improved by the Maillard reaction. Our efforts for developing promising strategies for utilizing animal by-products would open new avenues in the meat industry.

S6-1 (13:20~14:00)

Takafumi Gotoh

Faculty of Agriculture, Kagoshima University, Japan

"Potential of Grass-fed Wagyu and Application of Epigenetics in Beef Production"

A new and innovative strategy for animal production with animal welfare and sustainability for the next generation need to overcome many current environmental challenges, including worldwide abnormal weather, global warming, and pollution. The innovative feeding strategy should consider not only higher-efficiency production, but also advanced biological concepts and multi-functional agricultural techniques, into environmentally friendly systems. Our team focus on the application based on a unique phenomenon referred to as fetal and neonatal programming, which is based on the concept of developmental origins of health and disease (DOHaD) related to epigenetics. Marbled beef with increased intramuscular fat (IMF) is considered valuable in Wagyu (Japanese Black cattle) raised in Japan and requires feeding a large amount of cereal grain to cause its deposition. However, our challenge is to produce grass-fed Wagyu beef, which is produced on pastures and minimizes environmental impacts, however with moderate marbling. We introduce our studies which have shown that alterations in fetal and early postnatal nutrition and endocrine status may result in developmental adaptations that permanently change the structure, physiology and metabolism of affected grazing Wagyu during adult life. Fetal and neonatal programming through nutritional manipulations in Wagyu may help the ruminant, as an effective grass–protein converter, bring out its quality beef production potential.

S6-2 (14:00~14:40)

Keigo Kuchida

Obihiro University of Agriculture and Veterinary Medicine, Japan

"New Evaluation System for Beef Quality"

Marbling, meat color, fat color, and rib eye area are grading traits that are evaluated in many countries. In order to determine these traits in countries that do not have a grading system, it is desirable to establish a mechanical evaluation system. We have developed an inexpensive camera system using a mobile phone. Moreover, we are currently working on the development of a new system. It is an objective meat quality evaluation method using image analysis realized using the MIJ cloud system. The target values are obtained from a mirror-type carcass camera that can acquire ultra-high-resolution images of the rib eye. Image analysis values from the newly developed "MIJ mobile with BEAK" were compared with the target values using high marbled meat (Japanese Black). While the mirror-type imaging system draws the rib eye contour lines manually, the new camera system draws automatically. The results from the "MIJ mobile with BEAK" were very similar to the target values, with correlation coefficients of 0.98 for the marbling percentage and 0.95 for the coarseness index. The percentage of the difference between the grader BMS and the BMS from image analysis within ±1 was 91.7%. This study showed the possibility of automating the grading process for Japanese Wagyu cattle in Japan.

S6-3 (14:40~15:20)

Maria Font-i-Furnols

IRTA Institute of Agrifood Research and Technology, Spain

"Understanding the Future Meat Consumers"

Meat production and consumption continues to grow globally, but in recent decades, issues such as animal welfare and ethical issues, climate change and sustainability, population growth and food security, and increased awareness of the relationship between meat consumption and health have become increasingly important. All these aspects are real barriers that can have a significant impact on meat consumption and its future. The meat sector is aware of these threats and needs to define and reorient its production strategy to adapt it to the new market demands. This work focuses on the detailed analysis of aspects related to animal welfare, sustainability, meat alternatives such as cultured meat, the social and anthropological vision of meat consumption and how they are affecting and will affect the perception and consumption of meat in the

coming years. Each of these aspects is approached from a multidisciplinary perspective, including the social, environmental and economic dimensions.

Session 7. Topics of Meat Science & Technology Thursday, August 25, 2022

S7-1 (16:00~16:40)

Koo Bok Chin

Chonnam National University, South Korea

"Improvement of Functional Properties of Meat Products Using Plant Resources"

Functional properties, such as water holding capacity, emulsification and gelation, are highly associated with the quality of the final meat products. The raw meats and ingredients used for the manufacture of meat products might significantly affect these functional properties. Many vegetable resources, including proteins, fats and carbohydrates, have been used for the manufacture of various meat products to improve their functional properties. They contribute to improve the water binding capacity and protein functionality, resulting in improved rheological properties of the meat products. Thus, the mechanisms how the muscle proteins interacted with other vegetable resources with various conditions should be understood to manufacture meat products with better functionality. Therefore, this article briefly reviews the interaction between muscle proteins and either vegetable proteins or other nutrients using various chemical and physical measurements and suggests the optimum condition for the functional improvement of meat products. The combination of functional ingredients from various vegetable resources and effective processing technology might expect to produce the meat products with better quality and reduced ingredients, resulting in a reduced formulation cost.

S7-2 (16:40~17:20)

Shinji Takai

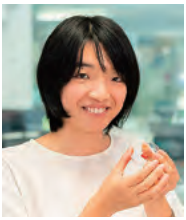
School of Veterinary Medicine, Kitasato University, Japan

"Guidelines on the Hygienic Management of Wild Meat in Japan"

The populations of wild ungulates, especially sika deer (Cervus nippon) and wild boar (Sus scrofa), have been abnormally increasing their density and distribution across Jap-

anese archipelago in the last 20 years. The traditional food culture of wild game meat has been inherited in some limited regions in Japan, but in recent years, the usage of caught wild animals for food has been increasing, and game meat has become popular in local restaurants and retail meat shops in many places in Japan. However, fundamental knowledge of game meat hygiene and health risks have not been fully established among hunters, meat processors, restaurant operators and consumers, and occasionally food poisonings through game meat have been occurred. Unlike domesticated livestock, there is no requirement that wild animals be inspected for disease when being butchered for food, and the meat thus derived carries high risks in terms of food hygiene. Accordingly, the Guidelines on the Hygienic Management of Wild Meat were created on 2014 to ensure the safety of wild meat in Japan. Current situation of wild animals and game meat in Japan will described in this paper.

S7-3 (17:20~18:00)



Mai Furuhashi

University of Tokyo, Japan

"Formation of Contractile 3D Bovine Muscle Tissue for Construction of Millimeter-thick Cultured Steak"

The global consumption of meat is increasing with population growth, leading to concerns regarding "protein crisis". As the conventional stock-raising industry has been problematic in terms of sustainability due to the ethical problems and its adverse effects on the environment, more sustainable technologies for meat production are required to bridge the demand-supply gap and thwart the protein crisis. Cultured meat constructed via tissue culture of animal cells is one of the candidates as sustainable alternative meat, as it can be generated using small amounts of cells obtained without killing the livestock, as well as lower land use and water footprint. For the construction of cultured steak meat with a realistic texture, large muscle tissue with densely accumulated and unidirectionally aligned matured myotubes is required. In this study, we develop a culture method for constructing 3D cultured bovine muscle tissue composed of unidirectionally aligned myotubes sufficiently mature to show contractility. We also develop a method for fabricating millimeter-thick bovine muscle tissues containing highly aligned myotubes using bovine myoblast-laden hydrogel modules with striped structures. Our method paves the way for further development of larger portions of realistic cultured meat that can supplement animal sources.

Program

All of dates and times are shown based on Japan Central Standard Time (GMT +09:00).

Monday, August 22, 2022

Opening Session 09:00-10:10

09:00-09:30 **Ceremony**

09:30-10:10 **Opening Presentation (OS-1)**
Stephen B. Smith
Texas A&M University, USA
"Meat Production in Asia and the World"

Session 1. Meat Market of the World 10:30-12:30

10:30-11:10 **Keynote Presentation 1 (S1-1)**
Paul Greenwood
New South Wales Department of Primary, Australia
"The Evolving Beef Industry in the Pacific Rim"

11:10-11:50 **Keynote Presentation 2 (S1-2)**
Sara V. Gonzalez, Mahesh Narayanan Nair, Keith E. Belk
College of Agricultural Sciences, Colorado State University, USA
"Diversity in Global Production Systems Allows Beef to Hit Consumer Targets in a Range of Markets"

11:50-12:30 **Keynote Presentation 3 (S1-3)**
Abdulatef M. Ahhmed
The Libyan Academy for Graduate Studies, Libya
"Perspectives on the Trends, Challenges and Benefits of Halal Meat"

Session 2. Meat Industry & Science in Japan 14:00-17:30

14:00-14:40 **Keynote Presentation 1 (S2-1)**
Masahiko Suneya
Japan Ham & Sausage Processing Cooperative Association, Japan
"Developing Japanese Wagyu Beef in the World Beef Market"

14:40-15:20 **Keynote Presentation 2 (S2-2)**
Masanori Matsuishi
Nippon Veterinary and Life Science University, Japan
"Science and Technology of Meat and Meat Products in Japan -Pursuit of Their Palatability under the Influence of Washoku, Traditional Japanese Cuisine"

15:20-16:00 **Poster Viewing**

Presentation by Japanese Up-and-coming Researchers

16:00-16:30 **Invited Lecture 1 (S2-3)**
Wataru Mizunoya
Azabu University, Japan
"The Relationship between Muscle Fiber Types and Taste Substances Contained in Meat"

16:30-17:00 **Invited Lecture 2 (S2-4)**
Jun-ichi Wakamatsu
Hokkaido University, Japan
"Zinc Protoporphyrin IX Formation Mechanism in Nitrite/nitrate-free Dry-cured Ham"

17:00-17:30 **Invited Lecture 3 (S2-5)**
Keisuke Sasaki
NARO Institute of Livestock and Grassland Science, Japan
"Evaluations of Sensory and Consumer Perceptions of Meat: Recent Progress in Japan"

Tuesday, August 23, 2022

Session 3. Meat Microbiology & Safety 09:00-12:10

09:00-09:40 **Keynote Presentation 1 (S3-1)**
Yukio Morita
Azabu University, Japan
"Historical Background of Eating Meat Culture and Meat Hygiene in Japan"

09:40-10:20 **Keynote Presentation 2 (S3-2)**
Marija Begić*, Martina Šrajer Gajdošik and Djuro Josić*****
*University of Rijeka, Croatia
**J. J. Strossmayer University, Croatia
***Brown University, USA
"The Use of Foodomics in Food Safety"

10:20-11:00 **Poster Viewing**

11:00-11:40 **Keynote Presentation 3 (S3-3)**
Michael W. Pfaffl
Technical University of Munich, Germany
"New Food Safety Surveillance Concepts in Meat Producing Animals: the Successful Use of 'omic' Technologies"

11:40-11:55 **Oral Presentation 1 (S3-O1)**
Mayu Hattori
Nagoya Bunri University, Japan
"Study on the Immunostimulatory Effect of Fermented Meat Products with Psychrotrophic Lactic Acid Bacteria"

11:55-12:10 **Oral Presentation 2 (S3-O2)**
Atusko Kikuchi
Starzen Co. Ltd., Japan
"Bacterial Sanitation Status of Pork Processed by the Automated Pork Thigh Deboning Machine"

Session 4. Muscle Biology & Meat Biochemistry 13:40-17:10

13:40-14:20 **Keynote Presentation 1 (S4-1)**
Steffen Maak and Elke Albrecht
Leibniz Institute for Farm Animal Biology, Germany
"Molecular and Cellular Background of Intramuscular Fat Deposition"

14:20-15:00 **Keynote Presentation 2 (S4-2)**
Xing Chen
Jiangnan University, China
"Colloidal Engineering to Tailor Myoprotein Functionality for Muscle Food Innovation"

15:00-15:40 **Poster Viewing**

15:40-16:10 **Invited Lecture 1 (S4-3)**
Shinobu Fujimura
Niigata University, Japan
"Regulation of Taste-active Components of Meat by Dietary Amino Acids in Chicken"

16:10-16:40 **Invited Lecture 2 (S4-4)**
Susumu Muroya
NARO Institute of Livestock and Grassland Science, Japan
"Farm Animal Muscle Metabolism Approached with Omics Technologies"

16:40-16:55 **Oral Presentation 1 (S4-O1)**
Brodie Peace
University of Melbourne, Australia
"Accelerating Myogenic Differentiation with Nitric Oxide Precursors L-arginine and L-citrulline for Cultivated Meat Production"

16:55-17:10 **Oral Presentation 2 (S4-O2)**
Rabiaa Ben Mbarek
Teagasc Food Research Centre, Ireland
"Effect of Rearing Practices and Pre-slaughter Handling on the Longissimus thoracis and the Semitendinosus Muscle Proteomes of Young Bulls"

Wednesday, August 24, 2022

Virtual Excursion and Virtual Exhibition

Thursday, August 25, 2022

Session 5. Meat Products and Technology 09:00-12:00

09:00-09:40 **Keynote Presentation 1 (S5-1)**
Andy King, Steven D. Shackelford and Tommy L. Wheeler
United States Department of Agriculture, USA
"The Biological Basis for Animal Variation in Lean Color Stability"

09:40-10:20 **Keynote Presentation 2 (S5-2)**

Keizo Arihara

Kitasato University, Japan

"Strategies for Utilizing Animal By-products: Promising Approaches with Fermentation, Proteolysis and the Maillard Reaction"

*Since the original presentation by Dr. Vincenza Ferraro (INRAE, France) was cancelled, Dr. Keizo Arihara is scheduled to give the alternative presentation.

10:20-11:00 **Poster Viewing**

11:00-11:15 **Oral Presentation 1 (S5-O1)**

Issei Yokoyama

Nihon University, Japan

"Effect of Grazing on the Odors, Tastes, and Metabolites of Japanese Shorthorn Beef"

11:15-11:30 **Oral Presentation 2 (S5-O2)**

Coline Schiell

ADIV, France

"Investigation of the Physicochemical and Textural Properties of an Iron-rich 3D-printed Hybrid Food"

11:30-11:45 **Oral Presentation 3 (S5-O3)**

Lars Bager Christensen

Danish Meat Research Institute, Denmark

"AI Assisted Cobot Potential for Meat Cutting Procedures"

11:45-12:00 **Oral Presentation 4 (S5-O4)**

Oscar Lopez-Campos

Agriculture and Agri-Food Canada, Canada

"Marbling Relationship between Canadian and Japanese Beef Grading Sites"

Session 6. Meat Production & Quality of Meat 13:20-16:00

13:20-14:00 **Keynote Presentation 1 (S6-1)**
Takafumi Gotoh
Kagoshima University, Japan
"Potential of Grass-fed Wagyu and Application of Epigenetics in Beef Production"

14:00-14:40 **Keynote Presentation 2 (S6-2)**
Keigo Kuchida
Obihiro University of Agriculture and Veterinary Medicine, Japan
"New Evaluation System for Beef Quality"

14:40-15:20 **Keynote Presentation 3 (S6-3)**
Maria Font-i-Furnols
IRTA Institute of Agrifood Research and Technology, Spain
"Understanding the Future Meat Consumers"

15:20-16:00 **Poster Viewing**

Session 7. Topics of Meat Science & Technology 16:00-18:00

16:00-16:40 **Keynote Presentation 1 (S7-1)**
Jiseon Choi and Koo Bok Chin
Chonnam National University, South Korea
"Improvement of Functional Properties of Meat Products Using Plant Resources"

16:40-17:20 **Keynote Presentation 2 (S7-2)**
Shinji Takai
Kitasato University, Japan
"Guidelines on the Hygienic Management of Wild Meat in Japan"

17:20-18:00 **Keynote Presentation 3 (S7-3)**
Mai Furuhashi
University of Tokyo, Japan
"Formation of Contractile 3D Bovine Muscle Tissue for Construction of Millimeter-thick Cultured Steak"

18:10-18:40 **Closing Ceremony**

E-Poster Session

All uploaded e-Posters can be seen during ICoMST2022 (August 22-25). E-Poster session will open from 9:00 (Japan Central Standard Time) of 22nd to 18:00 of 25th. The chat window will be set up on the poster upload screen. Attendees can contact authors via text chat (on-demand discussion). Several excellent e-Posters by young presenters will be awarded by Meat Science journal (Elsevier B.V.).

P01. Muscle biology

P02. Meat biochemistry

P03. Meat processing

P04. Meat quality

P05. Meat production

P06. Consumer science

P07. Meat products

P08. Meat microbiology

P09. Meat safety

P10. Other topics of meat science and technology

P01. Muscle biology

P01-001	**Deciphering organic farming impact on pectoralis major muscle proteome of ross 308 chicken: towards the identification of biomarkers of authenticity** Laura Alessandroni (Italy)
P01-002	**The multi-potent modulator netrin-1 synthesized in satellite cell-derived myoblasts isolated from the fast-twitch muscle may regulate fast-type myotube formation** Takahiro Suzuki (Japan)
P01-003	**Accelerating myogenic differentiation with nitric oxide precursors L-arginine and L-citrulline for cultivated meat production** Brodie Peace (Australia)
P01-004	**EPA activates PPARδ and AMPK pathways in L6 myotubes** Yusuke Komiya (Japan)
P01-005	**Genetic lines influence the texture, collagen and intramuscular fat of pork *Longissimus* and *Semimembranosus*** Xiying Li (Australia)
P01-006	**Effect of rearing practices and pre-slaughter handling on the *Longissimus thoracis* and the *Semitendinosus* muscle proteomes of young bulls** Rabiaa Ben Mbarek (Ireland)
P01-007	**The effects of oleic acid on matured muscle fibers isolated from mice: fiber type-specific analysis** Shugo Iseki (Japan)
P01-008	**Nτ-methylhistidine decreases myofibrillar protein levels by up-regulating ubiquitin ligases in C2C12 myotubes** Miki Ishimaru (Japan)
P01-009	**Netrin-4 synthesized in satellite cell-derived myoblasts regulates myotube formation during myogenic differentiation** Takahiro Maeno (Japan)
P01-010	**Effects of carnosine synthase deficiency on exercise performance and behavior in aged mice** Ai Saiga Egusa (Japan)
P01-011	**Targeted energy metabolomics analysis of postmortem pork in an in vitro model as influenced by protein S-nitrosylation** Wenwei Lu (China)

P01-012	**Effects of muscle atrophy induced by hindlimb suspension and chronic dexamethasone administration on metabolic pathways of skeletal muscle** Yuta Kawamura (Japan)
P01-013	**Effect of sonication on the anti-radical activityt of pork loin protein hydrolyzates after six months of ageing** Paulina Keska (Poland)
P01-014	**Microbiological evaluation of meat preparations available for purchase and consumption** S. Godinho (Portugal)
P01-015	**Calpain isoforms in goose skeletal muscle** Ya-Shiou Chang (Taiwan)
P01-016	**Post-mortem muscle proteome changes in Martina Franca donkey in relation to meat tenderness** Antonella della Malva (Italy)
P01-017	**Extraction and characterization of sheep (*Ovis aries*) skeletal muscle extracellular matrix** Girish Patil Shivanagowda (India)
P01-018	**Effects of early high nutrition related to metabolic imprinting events on comprehensive DNA methylation of longissimus muscle in grass-fed Wagyu** Daichi Nishino (Japan)

P02. Meat biochemistry

P02-001	**Effect of storage of dry-aged beef under vacuum by 1H NMR spectroscopy** Greta Bischof (Germany)
P02-002	**Dietary supplementation of vitamin E influences myoglobin post-translational modifications in beef longissimus lumborum** Yifei Wang (USA)
P02-003	**Effect of high-pressure treatment on collagen fibrillogenesis in presence of decorin** Momoka Masuda (Japan)
P02-004	**Differential alkylation of myoglobin by 4-hydroxy-2-nonenal in high and normal pH beef** Ranjith Ramanathan (USA)

P02-005	**Actomyosin in a low ionic strength solution containing L-histidine could not form heat-induced gel** Toru Hayakawa (Japan)
P02-006	**MicroRNA and circular RNA profiling in the deposited fat tissue of sunite sheep** Xige He (China)
P02-007	**Physicochemical properties of wooden breast-extracted myosin and rheological properties of its heat-induced gel** Tomohito Iwasaki (Japan)
P02-008	**Investigating the effect of ultrasound on glycolysis in early post-mortem bovine muscle** Mary Ann Kent (Ireland)
P02-009	**Mitochondrial characteristics of chicken breast muscle affected by wooden breast** Yasuhiro Hasegawa (Japan)
P02-010	**A simple method for measurement of carnosine, anserine, balenine, histidine, N^{π}-methylhistidine and N^{τ}-methylhistidine in meats by using HPLC** Ayumi Katahuchi (Japan)
P02-011	**Effects of phosphorylation of myosin heavy chain and actin on their acetylation and coregulation on actomyosin dissociation in ovine muscle** Chi Ren (China)
P02-012	**Effect of beta-agonist in the activity of the major proteases involved in beef maturation and its impact on quality** Edith Ponce-Alquicira (Mexico)
P02-013	**The bone-derived components from adult chickens provide a protective action against impaired bone metabolism in mice lacking vitamin D action** Tamao Nishiura (Japan)
P02-014	**Generation of dipeptides in low-salted Spanish dry-cured ham** Alejandro Heres (Spain)
P02-015	**Identification of DPP-IV inhibitory peptides from chicken blood hydrolysates** Gisela Carrera Alvarado (Spain)
P02-016	**Detection of fresh, chilled and frozen-thawed meat by means of metabolite profiling and HADH-assay** Manuela Peukert (Germany)

P02-017	**Effect of pre-rigor temperature on Ca^{2+} concentration and translocation of calpain-1 from sarcoplasm to myofibrils in pork longissimus muscle** Jian Lyu (Finland)
P02-018	**Effect of ultrasound-assisted tumbling on the structure and rheological properties of myofibrillar proteins** Ruyu Zhang (China)
P02-019	**Insight into ultrasound-induced modifications of the proteome and flavor-related proteins of unsmoked bacon by applying label-free technology** Jian Zhang (China)
P02-020	**The effect of farmyard stress on meat quality: a model enabling the search for predictive biomarkers of meat pH** Hannah Yun Young Lee (New Zealand)
P02-021	**Regulation of muscle carnosine and anserine levels by dietary methionine** Kanta Sato (Japan)
P02-022	**UPLC-MS/MS-based metabolomics reveals spoilage metabolic dynamics in modified atmosphere/air-packaged chilled and super-chilled fresh pork loins** Anthony Pius Bassey (China)
P02-023	**Effects of feed withdrawal times on antemortem muscle protein degradation levels and postmortem muscle free amino acid concentrations in broiler chickens** Sachi Katsumata (Japan)

P03. Meat processing

P03-001	**Longevity and anti-fatigue effects of venison extract treated with high pressure** Kana Kogiso (Japan)
P03-002	**Japanese Shorthorn steer meat tenderization using sarunashi (*Actinidia arguta*) juices extracted at different ripening stages** Takayuki Muramoto (Japan)
P03-003	**Optimization of high pressure processing conditions of beef gels with different salt additions using the response surface methodology** Gamze Okur (Japan)

P03-004	**Effects of high hydrostatic pressure with reducing sodium chloride on physicochemical properties of pork gels** Tong Wei Wang (Japan)
P03-005	**Food frying process with and without wrapping using different lipid sources** Peter Bitencourt Faria (Brazil)
P03-006	**The interaction between myosin and aldehydes during heating process by molecular docking simulation and multi-spectroscopy techniques** Xiangru Wei (China)
P03-007	**Effect of sodium nitrite doses on nitrosation, nitrosylation and peroxidation during the shelf-life of refrigerated pork liver pâtés** Aurelie Promeyrat (France)
P03-008	**Quality characteristics of meat sauce prepared from pig kidney** Yasuhiro Funatsu (Japan)
P03-009	**Automated pork belly firmness evaluation as affected by temperature and multiple bends** Xinyi Wei (Canada)
P03-010	**Effect of boiling time on aroma components of Wagyu beef** Yutaro Kobayashi (Japan)
P03-011	**Kinetics of activation and deactivation of cathepsin B and L during sous vide cooking of beef pectoralis profundus** Noorul Faridatul Akmal (New Zealand)
P03-012	**Drying behavior of a Japanese dry-cured meat model in the different drying conditions** Keiichi Kato (Japan)
P03-013	**Optimization of chicken breast cooking through a kinetic study on quality indices modifications** Giulia Romano (Italy)
P03-014	**Application of volcanic ash drying to game meat** Kaoru Kamizono (Japan)
P03-015	**Opportunities and challenges for an automated, cell-based slaughtering-and-deboning of a pig carcass: time for a paradigm shift in meat processing** Tomas Bolumar (Germany)
P03-016	**Combination effect of papaya extract and sous-vide cooking on texture modified chicken meat for elderly care food** Hsin Yun Hsu (Taiwan)

P03-017	**Partial replacement of animal fat in pork burgers with vegetable oil premix: physicochemical characterization and fatty acid profile** Peter Bitencourt Faria (Brazil)
P03-018	**Quality of blended hamburger with rosemary as a substitute for synthetic antioxidant: physicochemical characterization** Peter Bitencourt Faria (Brazil)
P03-019	**Effect of wet ageing on the composition of non-esterified fatty acids in Japanese Wagyu beef** Hiroki Tanaka (Japan)

P04. Meat quality

P04-001	**Dry and tough meat in Belgian Blue cattle caused by a genetic defect in the ATP2A1 gene** Toon Rombouts (Belgium)
P04-002	**The effects of dietary supplementation with natural feed additives and lysine on meat quality and sensory attributes of broiler chickens** Chisato Iida (Japan)
P04-003	**The effect of internal end-point temperature (cooking doneness) on the mineral composition of grilled lamb** Benjamin W.B. Holman (Australia)
P04-004	**Exploiting NMR-based untargeted metabolomics approach to unravel the administration of antibiotics in pig liver** Maria Pia Fabrile (Italy)
P04-005	**Effect of the dietary inclusion of *Camelina sativa cake* or oil for broiler quails on the breast meat sensory traits** Marco Cullere (Italy)
P04-006	**Effect of slaughter age and sexual maturity on meat quality of chickens raised in a free-range system** Peter Bitencourt Faria (Brazil)
P04-007	**Sensory characteristics of beef from cattle finished with cottonseed in feedlot** Peter Bitencourt Faria (Brazil)
P04-008	**Effect of high pressure processing on selected quality properties of marinated pork chops** Marta Chmiel (Poland)

P04-009	**Comparison of the quality of chicken breast meat between fast- and slow-growing chicks during the neonatal period** Yuki Iwai (Japan)
P04-010	**Comparison of meat quality characteristics among native black pigs in Taiwan, Iberian and commercial pig** Ti-Chun Chang (Taiwan)
P04-011	**Metabolomic approach for determination of compounds and pathways related to beef quality** Mariane Beline (Brazil)
P04-012	**Bellies iodine value evaluated non-destructively with NitFom(TM)** Maria Font i Furnols (Spain)
P04-013	**Fibre-type composition influences the formation of odour-active volatiles in beef** Zhenzhao Li (Australia)
P04-014	**Effect of dietary supplementation of dried bonito by-product on carnosine and anserine in broiler chicken muscle** Sharula (Japan)
P04-015	**Comparing the water holding capacity of pork *Biceps femoris*, *Longissimus lumborum* and *Triceps brachi*i using different methods** Huiling Huang (Australia)
P04-016	**Dry vs vacuum aging in Italian autochthonous adult sheep meat: oxidative, colorimetric and volatobolomic profile** Aristide Maggiolino (Italy)
P04-017	**Development of a French marbling grid for the visual evaluation of beef meat quality** Christophe Denoyelle (France)
P04-018	**Prediction of pork belly quality during refrigerated storage using hyperspectral imaging** Michela Albano (Spain)
P04-019	**Influence of muscle type on boer goat meat quality** Archana Abhijith (Australia)
P04-020	**Five Mediterranean autochthonous sheep breeds: study on lamb carcass classification and meat nutritional quality** Antonella della Malva (Italy)
P04-021	**Impact of UV together with dry-aging on meat quality of beef loins (*M.longissimus thoracis et lumborum*) from pasture-based production systems** Sara Alvarez (Ireland)

P04-022	**Moisture content, water activity, and water populations across different locations within beef (*M.longuissimus thoracis et lumborum*) sections during dry-aging** Sara Alvarez (Ireland)
P04-023	**Machine-vision requires fewer technical replicates for colour measurement of seafood than Minolta colorimeter** Kieren Michael Watkins (Australia)
P04-024	**The use of visible near infrared spectroscopy and nuclear magnetic resonance spectroscopy to predict sensory evaluation of beef** Seiki Sasaki (Japan)
P04-025	**Comparison of umami intensity in broiler edible meat and offal during aging** Taiji Tomemura (Japan)
P04-026	**Inclusion of olive pomace in the finishing diet of pigs. Effect on nutritional quality of meat** Jose M. Lorenzo (Spain)
P04-027	**Oxidative stability of meat from Pura Raza Gallega horse breed in two package systems during refrigerated storage** Jose M. Lorenzo (Spain)
P04-028	**Effect of slaughter age in intramuscular fat content and fatty acid profile of grazing Cabra Galega lambs** Jose M. Lorenzo (Spain)
P04-029	**Influence of Celta pig diet on fatty acid profile and cholesterol content of pâté** Jose M. Lorenzo (Spain)
P04-030	**Effect of traditional feeding in Celta pigs on fatty acid profile and cholesterol content of "chorizo criollo" sausage** Jose M. Lorenzo (Spain)
P04-031	**A Comprehensive method for simultaneous quantification of six boar taint compounds in meat products** Manuela Peukert (Germany)
P04-032	**Physicochemical and sensory properties of Hokkaido sika deer (Cervus nippon yesoensis) and brown bear (Ursus arctos) meat** Chika Tsubaki (Japan)
P04-033	**Nix Pro 2, a novel technology for instrumental colour analysis on Canadian veal** Oscar Lopez-Campos (Canada)

P04-034	**Impact of a novel amperage-based electrical stimulation system on meat quality and palatability of finished steers** Nuria Prieto (Canada)
P04-035	**Prediction of 24h pH and lamb meat quality parameters in different muscle fibre types using rapid evaporative ionisation mass spectrometry** Hannah Yun Young Lee (New Zealand)
P04-036	**Effect of sodium chloride on myoglobin and lipid oxidation in pork** Tomohiro Uchiyama (Japan)
P04-037	**Effects of novel ultrasound technique on meat quality, sensory attributes, and microstructure of bovine semitendinosus muscle** Seon-Tea Joo (South Korea)
P04-038	**Assessing chicken meat authenticity within divergent farming systems (organic versus antibiotic-free) using SWATH-MS-based proteomic analysis and chemometrics** Laura Alessandroni (Italy)
P04-039	**Metabolism of imidazole dipeptides and taurine of the breast muscle are affected by post-hatch development in meat-type chickens.** Shozo Tomonaga (Japan)
P04-040	**Effect of regulation dietary amino acid level (Lys) on growth performance, blood and muscle metabolism in broilers** Vladislav Rudik (Japan)
P04-041	**Effect of dietary orotic acid and histidine supplementation on meat quality and growth performance of broiler chicken** Kirill Ivanov (Japan)
P04-042	**Effect of impala, mountain reedbuck and springbok on carcass yield and meat quality** Matshepo Nthabeleng Hlohlongoane (South Africa)
P04-043	**Entire male effect on the rate of destructured zones of pork ham** Antoine Vautier (France)
P04-044	**Lipid profile of meat from different free-range chicken strains** Peter Bitencourt Faria (Brazil)
P04-045	**Optimal aging times for beef destined for foodservice** Trent E. Schwartz (USA)
P04-046	**Tenderness of Italian Mediterranean buffalo meat compared to Piemontese beef** Alberto Brugiapaglia (Italy)

P04-047	**Effect of radiofrequency tempering combined with conventional thawing on water-holding status and sensory attributes of chicken breast fillets** Chonlathee Kaewkot (Taiwan)
P04-048	**Bushfire exposure associated with increased beef loin pH at grading** Melindee Hastie (Australia)
P04-049	**Variations in muscle fibre type isoforms and protein denaturation across four pork muscles explain changes in cook loss and tenderness** Michelle N LeMaster (Australia)
P04-050	**Evaluation of rabbit growth performance and meat quality as influenced by genotype** Zikhona Theodora Rani (South Africa)
P04-051	**Influence of chestnuts in the finishing diet of Celta pig breed on the free amino acids** Jose M. Lorenzo (Spain)
P04-052	**Sensorial analyse of *Longissimus thoracis et lumborum* muscle of Celta pig affected by the finishing diet** Jose M. Lorenzo (Spain)
P04-053	**Regulation of meat quality by dietary lysine levels** Arisa Kiryu (Japan)
P04-054	**Effects of pelvic suspension and its duration on Hokkaido sika deer meat quality** Ayumi Yamaura (Japan)
P04-055	**Marbling relationship between Canadian and Japanese beef grading sites** Oscar Lopez-Campos (Canada)
P04-056	**Carcass quality characteristics from swine fed hempseed meal as primary protein source** Rebecca Kirkpatrick Kemp (USA)

P05. Meat production

P05-001	**Prediction of lean meat content in pork carcasses: genetic effect** Gerard Daumas (France)
P05-002	**Muscle composition of carcass and of body weight gain assessed by computed tomography in pigs: genetic effect** Gerard Daumas (France)

P05-003	**Muscle composition of carcass and of body weight gain assessed by computed tomography in pigs: feeding level and sex effect** Gerard Daumas (France)
P05-004	**Effect of vegetable by-product-based feeding on beef carcass quality** Irantzu Goenaga Uceda (Spain)
P05-005	**Effect of genotype and immunocastration on the fatty acid composition in pork backfat** Adrian Hirt (Germany)
P05-006	**The meat quality of lambs grazing perennial wheat with different companion legumes** Benjamin W.B. Holman (Australia)
P05-007	**AI assisted Cobot potential for meat cutting procedures** Lars Bager Christensen (Denmark)
P05-008	**The sensory quality of meat from intact and castrated male lambs** Benjamin W.B. Holman (Australia)
P05-009	**Application of N_2 gas to pig stunning** Kuk-Hwan Seol (South Korea)
P05-010	**Effect of carbon dioxide gas stunning on discoloration and quality trait of chicken breast muscle and small intestine in factory** Kuk-Hwan Seol (South Korea)
P05-011	**Comparative characterization of nutrition, taste substances, aroma compounds in breasts and thighs of Daokou red-cooked chicken** Xiangxiang Sun (China)

P06. Consumer science

P06-001	**Consumer acceptance and shear force values of top sirloin steaks prepared using sous vide and flat-top grill cookery methods** Lauren Taylor Lee (USA)
P06-002	**Analysis of sensory characteristics of chicken broths with different chicken oil content using the check-all-that-apply (CATA) questions** Genya Watanabe (Japan)
P06-003	**Effects of dairy lamb rearing system and slaughter age on consumer liking of meat and its association with lipid composition** Carolina Eva Realini (New Zealand)

P06-004	**Modelling consumer liking of lamb meat based on composition using chemical and rapid evaporative ionisation mass spectrometry methods** Carolina Eva Realini (New Zealand)
P06-005	**Measuring the purchase intention of Irish consumers towards phosphate-reduced processed meat products using extended Theory of Planned Behaviour** Karthikeyan Palanisamy Thangavelu (Ireland)
P06-006	**Expectations and attitude of Australian consumers toward blended-hybrid meat and poultry products** Xinyu Miao (Australia)
P06-007	**The effect of free amino acids supplementation on the taste of beef extract** Shota Ishida (Japan)
P06-008	**Consumer perception and preference for beef mince consumption: predicting premiumisation possibility of beef mince in NZ** Chathurika Samarakoon (New Zealand)

P07. Meat products

P07-001	**Development of drinkable meat and evaluation of its nutritional function** Shinichi Takenoyama (Japan)
P07-002	**Influence of partial replacement of animal fat by microencapsulated oil mixtures on the composition and texture of foal pâté** Aurora Cittadini (Spain)
P07-003	**Use of microencapsulated healthy oil mixtures to enhance the fatty acid profile of foal pâté** Aurora Cittadini (Spain)
P07-004	**Effect of grazing on the odors, tastes, and metabolites of Japanese Shorthorn beef** Issei Yokoyama (Japan)
P07-005	**Nitrite and nitrate levels in meat products labelled as "preservative-free" compared to conventionally cured counterparts** Marzena Zajac (Poland)
P07-006	**Sage (*Salvia officinalis L.*) preparations as natural ingredients improving the qualities and safety of meat balls with mechanically separated meat** Aneta Cegielka (Poland)

P07-007	**A novel Japanese-style prosciutto fermented with dried bonito mold** Michio Muguruma (Japan)
P07-008	**Comparison of the quality of homogenized pork sausages and their plant-based counterparts available on Polish market** Aneta Cegielka (Poland)
P07-009	**Affecting factor of the natural casing toughness and tenderizing method for the Chinese hog casings** Wenjun Liu (Japan)
P07-010	**The use of unconventional methods of physical processing in production of protein meat snacks with increased nutritional and health value** Aneta Cegielka (Poland)
P07-011	**The possibility of using the Baikal skullcap as a natural antioxidant in meat products with a reduced addition of nitrate(III)** Marta Chmiel (Poland)
P07-012	**The preliminary study about taste-active compound-related genes and the on-site real-time PCR assay in Japanese black beef** Tomohiko Komatsu (Japan)
P07-013	**Assessment of the possibility of using pork with a PSE defect in the production of dried sausages** Marta Chmiel (Poland)
P07-014	**Meat products and their vegetable analogues on the Polish market: nutritional value and price** Aneta Cegielka (Poland)
P07-015	**Investigating the effect of high-pressure technology on the quality of phosphate-reduced sausage formulations with ultrasound-treated ingredients as phosphate alternatives** Karthikeyan Palanisamy Thangavelu (Ireland)
P07-016	**Aroma profile of dry fermented sausages as affected by the addition of nitrogen and sulfur precursors** Lei Li (Spain)
P07-017	**Evaluation of colour in rabbit meat prepared with two cooking methods produced and slaughtered in the Ñuble region, Chile** Reinaldo Letelier Contreras (Chile)
P07-018	**Effect of three-component antioxidant blend on oxidative stability and nitrite reduction of cooked sausages** Nikolay Delchev Kolev (Bulgaria)

P07-019	**Reducing salt and monosodium glutamate in frankfurters using a natural flavor enhancer from shiitake by-products** Claudia Ruiz-Capillas (Spain)
P07-020	**Nutritional and sensory properties of frankfurter sausages with cricket flour as a meat replacer** Claudia Ruiz-Capillas (Spain)
P07-021	**Assessment of the nutrient content in selected processed meat products for compliance with the declared nutrient content** Eleni Kasapidou (Greece)
P07-022	**Comparison of the declared and analysed nutritional composition between branded and private-label meat products sold in Greek supermarkets** Eleni Kasapidou (Greece)
P07-023	**Effect of pH, dryness, and fat on the intensity of cold smoke treatment in raw ham (Japanese style 'lachs ham')** Jiro Koizumi (Japan)
P07-024	**Zinc protoporphyrin IX predominantly exists as a complex non-enzymatically bound to apo-hemoglobin in Parma ham** Yang Zhai (Japan)
P07-025	**Effect of wine on the behavior of *Listeria monocytogenes* in a dry-cured sausage made with reduced nitrite** Luis Patarata (Portugal)
P07-026	**Effect of garlic, oregano and thyme essential oils on the *Clostridium sporogenes* behaviour in nitrite-free cured pork sausage** Luis Patarata (Portugal)
P07-027	**Effect of replacing pork fat with healthier oils on lipid profile of dry-fermented foal sausages** Aurora Cittadini (Spain)
P07-028	**Volatile profile of dry-fermented foal sausages formulated with healthy oil emulsion hydrogels** Aurora Cittadini (Spain)
P07-029	**Effects of manufacturing conditions on zinc protoporphyrin IX formation in fermented dry sausage with *Lactococcus lactis* subsp. *cremoris* GB(A)-1** Mihae Yamanouchi (Japan)
P07-030	**The anti-inflammatory effect of Xuanwei ham derived peptides in the dextran sulfate sodium-induced C57BL/6 mice model** Lujuan Xing (China)

P07-031	**Effect of salt distribution heterogeneity on enhancing perception of saltiness and sensory properties in beef patties** Ruth Marie Hamill (Ireland)
P07-032	**Development of healthy dry-fermented sausages (chorizo) from Cachena beef using emulsion hydrogel and turmeric powder** Jose M. Lorenzo (Spain)
P07-033	**Influence of the addition of turmeric on the color, texture and lipid oxidation of healthy beef sausage** Jose M. Lorenzo (Spain)

P08. Meat microbiology

P08-001	**Effect of sodium bicarbonate on *Staphylococcus aureus* during high hydrostatic pressure treatment and storage under a low temperature condition** Satomi Tsutsuura (Japan)
P08-002	**Probiotic potential of yeasts isolated from Xuanwei ham** Jiaming Cai (China)
P08-003	**Dynamic changes of bacteria and screening of potential spoilage markers of lamb in aerobic and vacuum packaging** Xiangyuan Wen (China)
P08-004	**Bacterial sanitation status of pork processed by the automated pork thigh deboning machine** Atsuko Kikuchi (Japan)

P09. Meat safety

P09-001	**Decreased immunoreactivity of hepatitis E virus antigen following treatment with Sakhalin spruce (*Picea glehnii*) essential oil** Naoyuki Maeda (Japan)
P09-002	**Multilayer furcellaran/chitosan nano/microemulsions with the addition of bioactive peptides and their effect on microbiological quality of cold stored pork loin** Piotr Kulawik (Poland)
P09-003	**Changes in biogenic amines profile of skin-packed beef treated by high pressure processing** Marta Chmiel (Poland)

P09-004	**Microbiological characterization in market centers from the main municipality of sheep meat commercialization of Mexico** Gisela Velazquez-Garduno (Mexico)

P10. Other topics of meat science and technology

P10-001	**Investigation of the physicochemical and textural properties of an iron-rich 3D-printed hybrid food** Coline Schiell (France)
P10-002	**Fatty acids profiles and lipids health indices of plant-based burgers compared to meat burger** Sabah Mabrouki (Italy)
P10-003	**Digestibility of plant-based and meat burgers using an in vitro protocol for swine** Sara Glorio Patrucco (Italy)
P10-004	**Comparative assessment of physical characteristics of plant-based meats and animal meat products in the Japanese market** Kaori Kurabayashi (Japan)
P10-005	**Specific Fluid Content: an instrumental parameter to estimate juiciness in meat and plant-based burgers** Salvatore Barbera (Italy)
P10-006	**Texture profile analysis on raw homogenized meat and plant-based burgers** Sabah Mabrouki (Italy)
P10-007	**Fingerprinting meat and plant-based burgers under smart-NIR rays** Salvatore Barbera (Italy)
P10-008	**An instrumental protocol for measuring water dynamics in meat and plant-based burgers** Sabah Mabrouki (Italy)
P10-009	**Evolution of microbiota in meat and plant-based burgers during vacuum package storage** Salvatore Barbera (Italy)
P10-010	**Effect of *Clostridium butyricum* MIYAIRI 588 supplementation on the intestinal microbiota and meat quality of fattening pigs** Maki Hirata (Japan)
P10-011	**Quality characteristics of beef rib eye roll wet-aged in a microwave aging chamber** Kenichiro Shimada (Japan)

P10-012	**Oxidative stability of meat homogenates treated with spent coffee ground extract obtained by submerged fermentation** Brisa del Mar Torres-Martinez (Mexico)
P10-013	**Effect of feruloylated arabinoxylans on physicochemical properties of York-type ham** Brisa del Mar Torres-Martinez (Mexico)
P10-014	**Screening of food ingredients with proliferative activity for skeletal muscle cells** Makoto Segawa (Japan)
P10-015	**Antihypertensive effect of pork immersed in sake lees through nitric oxide synthesis** Riko Shimizu (Japan)
P10-016	**Effects of niacinamide in an animal model of motivational deficit induced by lipopolysaccharide administration** Yusa Uchino (Japan)
P10-017	**Effects of different meat species and their fractions on postprandial behavioral thermoregulation in mice** Yeying Tan (Japan)
P10-018	**Establishment of a model for examining the improving effects of meat components against brain dysfunction** Akihiro Kawakita (Japan)
P10-019	**Extrusion as a functional measure for increasing the biological value of plant origin rest raw materials to produce meat analogues** Aditya Bali (Lithuania)
P10-020	**Enzyme-digested chicken breast meat affects type IIb fiber diameter on the surface of tibialis anterior muscle in aged mice** Shunsuke Yamamoto (Japan)
P10-021	**Meat production by chicken stem cell engineering** Hiroshi Kagami (Japan)
P10-022	**Application of a novel chick embryo culture system for developmental studies and chicken meat production** Kie Murai (Japan)
P10-023	**Possible chicken meat production by Ex-Ovo embryo culture system and the application for poultry biotechnology** Hinako Shindo (Japan)
P10-024	**A new semantic resource responding to the principles of open science: the meat thesaurus for dialogue between sector actors** Moise Kombolo (France)

P10-025	**Novel anti-inflammatory effects of 3RS, 7R, 11R-phytanic acid** Tomonori Nakanishi (Japan)
P10-026	**Meat and plant-based burgers water dynamics** Sara Glorio Patrucco (Italy)
P10-027	**Niacinamide ameliorates the anxiety-like behavior induced by social defeat stress** Shogo Kiyota (Japan)
P10-028	**Study on the immunostimulatory effect of fermented meat products with psychrotrophic lactic acid bacteria** Mayu Hattori (Japan)
P10-029	**Effects of culture temperature of chicken satellite cell on production yield and taste characteristics for cultured meat** Seon-Tea Joo (South Korea)

Exhibition

Visit the exhibition to get the latest information!

1. Schedule

Virtual Exhibition: August 22, 2022 (Mon) 9:00am to August 31, 2022 (Wed) 5:00pm
Online Presentation: August 24, 2022 (Wed) 10:30am to 11:30am

2. About Exhibition

1) Virtual Exhibition
The contents of each exhibitor can be viewed on the web at any time.

2) Online Presentation
The presentation will be held from 10:30 to 11:30 on August 24th by National Federation of Agricultural Cooperative Associations (ZEN-NOH).

About ZEN-NOH

ZEN-NOH (The National Federation of Agricultural Cooperative Associations) is a member of the JA(Japan Agricultural Cooperatives) Group. As a farmer-owned cooperative, ZEN-NOH connects farmer to consumers around the world.
ZEN-NOH work for creating values in each steps of meat supply chain F2F (farm to fork), such as purchasing grains and processing feeds for farmers, retailing the meat.
In our presentation, we'd like to introduce our meat value chain from three steps. First step is purchasing feed grains (from overseas and domestic market). Second is embryo transfer technology for cattle to empower farmer. Third, from retail point of view, our beef export business.
From feed to meat, we are thinking about the future of meat.

3. Exhibitors

Exhibitor	Virtual Exhibition	Online Presentation
Kobe Beef Marketing & Distribution Promotion Association	○	—
National Federation of Agricultural Cooperative Associations (ZEN-NOH)	○	○
NH Foods Ltd.	○	—
PRIMA MEAT PACKERS, LTD.	○	—
Starzen Co., Ltd.	○	—

Alphabetical order

Virtual Excursion (August 24, Wednesday)

Embark on a journey to experience Japanese traditions, culture, or agricultural heritage beef cattle !

Three types of virtual tours are offered during ICoMST2022.

1) Introducing the Attractions of Tajima Cattle (Kobe beef)
2) Sightseeing in Kyoto's Arashiyama and Sagano district
3) Introduction of Japanese culture - Shakyo (copying sutras) and Tea ceremony Experience

You can choose the start time according to your convenience. All of these are first come, first served. Capacity is 80 people, each course.

The summary of each course is given below the table.

Course number	Title	Tour time (JST)
1	Heritage of Kobe and Tajima, the closed breeding from womb to chopsticks strategy	09:00-10:00
2	Arashiyama & Sagano Virtual Tour	09:00-10:00
3	The Secret Charm of Kyoto Virtual Tour	09:00-10:00
4	Same as Course 2	17:00-18:00
5	Same as Course 3	17:00-18:00

Course1.

Tajima is one of Japan's leading breeds of beef cattle. The breed has been reared with the deep love of agricultural producers and closed breeding techniques. We would like to introduce you that the charm of Tajima cattle, which are certified as an element of Japanese agricultural heritage, and Kobe beef, from a special location you have never been seen before. This is the original tour of ICoMST 2022 by Tajima cattle researcher.

Course 2 and 4.

On this virtual tour, experience sightseeing in the Arashiyama and Sagano areas of Kyoto, one of the popular sightseeing regions of Japan. At Tenryu-ji Temple, which is a registered World Heritage Site, you can view the beautiful Japanese garden while being told about the history of the temple as well as Zen Buddhism. At the Bamboo Grove Path, one of the sites that symbolize Sagano, enjoy the simulated experience of riding on a rickshaw. The tour will also visit popular staple sightseeing spots such as Arashiyama Monkey Park, a shopping arcade lined with souvenir shops, Togetsukyo Bridge as it shows off its seasonal beauty with Mt. Matsuo and Katsura River in the background, and more.

Course 3 and 5.

On this virtual tour, more than half of the destinations comprise areas that are normally not open to the public. At Konkai Komyo-ji Temple, enjoy seeing the sights from different angles, such as from atop the Sanmon Gate, in a formal chamber, in a sacred hall, a garden, and even a light-up display. Then in the comfort of your own home, experience what it's like to copy a sutra used at Konkai Komyo-ji Temple. See how artisans create beautiful Japanese sweets at the long-established confectionery shop Shichijo Kanshundo, and watch a tea ceremony at Shoden Sanso in Uji. Get in touch with Japanese architecture and gardens at Shoden Sanso, built on the remnants of a nobles' villa from 900 years ago.

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