

Intestinal Microbiota and Obesity

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Intestinal microbiota is a complex community of microorganisms that inhabited in the intestine. In recent years, analytical method for intestinal microbiota has been advanced by using the next-generation sequencer and research of intestinal microbiota and host health is of particular concern. This paper summarized recent studies of intestinal microbiota and obesity.

Some studies mentioned that the Firmicutes/Bacteroidetes ratio was increased with obesity. Increase of Actinobacteria and decrease of Verrucomicrobia were also reported. Short chain fatty acids produced by intestinal microorganisms were considered the factor of obesity to act as 1) an energy source, 2) control of fat accumulation through the fatty acid receptor GPR43. Other reports mentioned that Lipopolysaccharide (LPS) from intestinal gram negative bacteria is another factor of obesity to promote the chronic inflammation. Probiotics studies for improving obesity were also performed. For example, it was reported that fermented milk containing *Lactobacillus gasseri* SBT2055 decreased visceral and subcutaneous fat by human trial.

Only 10 years have passed since next-generation sequencer has been used for the analysis of intestinal microbiota. It is expected that new knowledge about intestinal microbiota and health is found and applied to the prevention or improvement of the illness in the near future.

Global Detection Methods and Reference Materials Symposium Report

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<Summary>

It has been 20 years since genetically modified (GM) crops first became commercially available (1996). A variety of GM crops are now being cultivated in 28 countries including the United States and Canada. Thirty-nine countries began to import GM crops following their authorization. However, when viewed from a regulatory standpoint, there are some problems, such as different authorization standards and different detection methods employed by various countries. Different detection methods may provide different results. In addition, a new type of GM crop has been developed, which includes endogenous promoters and terminators. Screening methods using the virus-derived 35S promoter will no longer work, therefore new methodologies and techniques will be needed to detect wide varieties of GM crops which will be commercialized in the near future. Therefore, there is a great need for international harmonization in GM crop detection. To this end, Global Detection Methods and Reference Materials Symposium was held on Oct. 15 and 16, 2015, in Minneapolis, Minnesota USA. Invited speakers from Japan, Korea, China, Brazil, Indonesia, EU, Canada, and USA provided status reports to the participants. All participants were able to discuss and share information.

Report on the Debriefing Session on the Researches and Activities in the ILSI Japan-Endowed Chair of Functional Food Genomics

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<Summary>

The ILSI Japan-Endowed Chair of Functional Food Science and Nutrigenomics was established at the University of Tokyo on December, 2003. The third-term of this chair started on December, 2013. This chair has conducted a lot of collaborate researches with many companies to contribute to both academic and industrial researches on food functions by publishing their scientific evidences using the nutrigenomics methodology. Their outcomes have been presented in the papers, the conference presentations and the commercialization of several products.

Here, I would like to introduce the debriefing session on the researches and activities in this chair, which was held on Dec. 1, 2015.

Report of the 37th Session of the Codex Committee on Nutrition and Foods for Special Dietary Uses

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<Summary>

The 37th Session of the Codex Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU) was held in Bad Soden am Taunus, Germany from 23 to 27 November 2015. The Committee was attended by 306 delegates representing 66 Member Countries, one Member Organization (EU) and 36 International Organizations (NGOs).

The Committee agreed the following matters for CAC39 adoption and for their information:

- To advance to Step 5/8 the Proposed Draft Additional or Revised Nutrient Reference Values for Labelling Purposes in the Codex Guidelines on Nutrition Labelling (CAC/GL 2-1985): NRV-R for Copper, Iron (dietary description and footnote), Magnesium, Phosphorus, Vitamin E and Vitamin A (dietary equivalents and conversion factors),
- Amendments to the Annex to CAC/GL 2-1985,
- Amendments to Section 10, Methods of Analysis in the Standard for Infant Formula and Formulas for Special Medical Purposes Intended for Infants (CODEX STAN 72-1981),
- To submit a proposal for a new work on Guideline for Ready-to-Use Therapeutic Foods (RUTF),
- To remove the ML for lead in the section on contaminants of CODEX STAN 72-1981 and aligned the section with a reference to the General Standard for Contaminants and Toxins I Food and Feed (CODEX STAN 193-1995),
- To make available the recorded details of all NRVs-R as an information document,
- To return the draft NRV-R for Vitamin D, and the dietary equivalents and conversion factor for Vitamin E to Step 3,
- To continue work on the revision of the Standard for Follow-up Formula (CODEX STAN 156-1987), retaining the definitions in section 2.1.2 and 2.2 and the essential composition and optional ingredients at Step 4, while returning the remainder of the text to Step 2/3,
- To return the Proposed Draft Definition for Biofortification to Step 2/3,
- To return the proposed draft NRV-NCD for EPA and DHA long chain omega-3 fatty acids to Step 2/3,
- To differ discussion on claims for “Free ” of Trans Fatty Acids to the next session.

The Committee requested confirmation from CCMAS on whether the results of the two methods (R5 and G12) are fully comparable for all products covered by CODEX STAN 118-1979 and advice on the accuracy and appropriateness of 5.71 as the nitrogen factor for soy protein isolates used in formula for infants and young children, and submitted the methods for nutrients in infant formula for technical review, typing, endorsement and inclusion in CODEX STAN 234-1999.

The Committee provided information to CCFA on the technological need for the use of Gum Arabic (INS 414) in food category 13.1 and Carrageenan (INS 407) in food category 13.2 and agreed to discontinue the “wish list” of food additives and to consider alignment of the food additives provisions in the different standards under its responsibility with the GSFA.

< Friends in ILSI >

2015 International Symposium for the 20th Anniversary of ILSI Korea on Sustainable Technologies for Minimizing Loss of Food Commodity

Ji Young Lee
Executive Director,
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International Life Sciences Institute (ILSI) fosters global partnership among scientists from industry, academia, and government who work together to deliver science that makes the world a safer, healthier place.

ILSI Korea, non-profit and scientific institute was established in 1995 and has been actively involved in international network to achieve scientific outcomes in the fields of Food Safety, Nutrition and Health, and Biotechnology.

To celebrate the 20th Anniversary of ILSI Korea, organized the Commemorative Symposium in cooperation with Korean Society for Food Engineering and Rural Development Administration (RDA). This International Symposium was held in Jeju Island, Korea from November 11 to November 13, 2015. The main theme of the symposium was ‘Sustainable Technologies for Minimizing Loss of Food Commodity’ and the symposium was composed of 3 sessions including presentations as well as the poster section.

The Symposium attracted more than 230 attendees from global and domestic industry, academia and relevant government agencies. The Symposium Program, Three (3) Thematic Sessions followed with agendas listed below;

Session One (I): Introduction on Sustainable Food Security, Challenges and Solutions from Production Perspective

- Future Direction to Achieve Sustainable Food Security in Korea: Food Industry Perspective (Cherl-Ho Lee, Korean Food Security Research Foundation)
- Policy Direction of Food Industry : Change of Conditions and food Policy for food Industry (Kyung Seok Jeong, Ministry of Agriculture, Food and Rural Affairs)
- Food Security and Global Environmental Change (John Ingram, University of Oxford) - Video Conference
- Various Solutions to Achieve Sustainable Food Security-From the Aspect of Food Production (Harvey Glick, Monsanto Company Regulatory Policy and Scientific Affairs, Asia)

Session Two (II): Advanced Technologies for Distribution and Preservation

- Securing Competitive Advantage in Food Ingredients (Ji Won Jung, CJ Cheiljedang Foods R&D)
- Nanotechnology to Enhance Safety and Security in Food Distribution and Preservation (K. Casey Jeong, University of Florida)
- Supercooling of Perishable Foods for Extended Freshness and Shelf Life in the Cold Chain (Soojin Jun, University of Hawaii)

- Control of Refrigerated Temperature of RTE Foods for Minimizing Food Losses

(Sangwoo Cho, Pulmuone Co.,Ltd.)

Session Three (III): Strategies for Value-added Industrialization of Frozen Foods

- Freezing and Frozen Storage Processes of Foods and Their Environmental Impact
(Volker Gaukel, Karlsruhe Institute of Technology, Germany)
- The Use of Additives to Reduce Recrystallization during Frozen Storage
(Andreas Reiter, Karlsruhe Institute of Technology, Germany)
- Emerging Freezing and Thawing Technologies Focused on Supercooling Phenomena
(Sung Hee Park, Gangneung-Wonju National University)
- New Multi Layered Freezer
(Koga Nobumitsu, MYCOM)
- Development of Quality Control Technologies Based on Ice Crystal Morphology Formed in Frozen Foods
(Yasuyuki Sagara, The University of Tokyo)
- Current Research and Future Development Plan of Korean Domestic Frozen Agriculture Products for Food Ingredients
(Gwi-Jung Han, Rural Development Administration)



At the first session, the speakers presented the current status and issues in the global and domestic food system from food production perspective, as well as various po-

litical and technological solutions for these challenges.

Dr. Cherl-Ho Lee, Chair of Korean Food Security Research Foundation and Former President of ILSI Korea, presented “Future Direction to Achieve Sustainable Food Security in Korea: Food Industry Perspective” in the first presentation. He pointed out the Korean food security is very much related to the world food situation in the globalized world. Korea imports 3/4 of her grain demand from outside and the food energy self-sufficiency rate is below 50%. The food energy self-sufficiency rate below 50% means that the primary food production industry, agriculture and fisheries, contributes less than a half of national food supply, and the rest are covered by the food manufacturing industry. Dr. Lee also stated that two major hurdles for Korean food industry against fulfilling its food supply function, namely the tariff system unfavorable to food industry and consumers concern on food irradiation and genetically modified organisms (GMO). Food irradiation is considered as the most efficient, clean and economic way of food preservation. Due to the extended labeling regulation on irradiated food in Korea, this technology is almost abandoned by the food industry. Genetic modification is an essential technology to overcome world food shortage in the future, but consumer’s boycott against GM foods makes food importation difficult, and hinders application of this technology in agricultural production.



Dr. Harvey Glick, Head of Regulatory

Policy and Scientific Affairs, Asia, Monsanto Company, delivered his presentation and discussed on ‘Can Modern Breeding and Biotechnology Contribute to Sustainable Food Security?’ Dr. Glick talked about that ASIA is food insecure and efforts to increase agricultural productivity remain of paramount importance to ASIAN policy makers. The yield gains from the Green Revolution of the previous century have plateaued and new, innovative technologies to increase production are required to provide affordable food for an increasing population. Increasing agricultural productivity must be achieved in a sustainable manner – in both developed and developing countries. Deforestation and the inefficient use of fertilizer, pesticides, water, and other inputs will likely compound mounting environmental pressures, including climate change, land degradation, and water pollution, which in turn can endanger human health and jeopardize economic growth. He also urged that the sustainable food security remains a complex and challenging goal for Asia. It will require innovation in technology and innovation in agricultural policy. National and regional policies in Asia have lagged behind the development of these innovative scientific developments and the transfer of this technology has been slow in Asia. This has hampered efforts to address productivity shortfalls and efforts to reduce the environmental footprint of agriculture.



Dr. Casey Jeong, Assistant professor, Emerging Pathogens Institute and Dept. of Animal Science, University of Florida,

presented “Nanotechnology to Enhance Safety and Security in Food Distribution and Preservation” at the Second Session on Advanced Technologies for Distribution and Preservation.

He discussed the importance of food safety and security that could be directly damaged by climate change is likely to worsen agricultural production, food distribution, and preservation, thus serving as a potential threat to human beings in many regions due to food shortages. He also told us the food shortages could be augmented by the increase of human populations resulting in food demanding outstripping production. The adverse effect could lead to increased conflict among populations. To a large extent, nanotechnology can palliate the negative consequences of climate change. He presented the use of nanotechnology that could mitigate plausible consequences caused by climate change to enhance food safety and security.



At the Session III on Strategies for Value-added Industrialization of Frozen Foods, Prof. Yasuyuki Sagara from the University of Tokyo, gave us the lecture about “Development of Quality Control Technologies Based on Ice Crystal Morphology Formed in Frozen Foods.” He discussed the methodologies for searching optimum freezing and storage conditions based on ice crystal morphologies formed in frozen foods.

He delivered that micro-slicer image processing systems were developed to measure the three-dimensional structure and distribution of ice crystals formed in frozen food

materials. The system has functions to reconstruct the 3-D image based on the image data of exposed cross sections obtained by multi-slicing of a frozen sample with the minimum thickness of 1.0 μ m and display the internal structure as well as an arbitrary cross section of the samples choosing observation angles. The artificial neural network modeling was applied to the obtained data on ice crystals, viscoelastic properties and sensory evaluation scores for food samples. Thus the optimum freezing and storage conditions to maintain the quality of frozen foods were demonstrated quantitatively for model solution systems stained by fluorescent indicator, ice cream, raw beef and cooked rice.

The success and value of this symposium

was acknowledged by the attendees in sharing information, strengthening the cooperative relationship in order to improve the understanding of existing data and generate new knowledge, providing update, stimulating each other and fostering future collaboration. And the organizers have made a concerted effort and designed to provide professionals involved in research on minimum loss of food resources with a better understanding of new techniques for the future.

ILSI Korea expects that the attendees met the latest technologies for minimizing food commodity losses and hopefully, they enjoyed the symposium showing the promising techniques applied in food engineering in the near future.