

# 2019 5th International Conference on Biotechnology and Agriculture Engineering (ICBAE 2019)

March 26-29, 2019

Tokyo, Japan

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# Conference Venue

## **HOTEL SUNROUTE PLAZA SHINJUKU**

Address: 2-3-1 Yoyogi, Shibuya-ku, 151-0053 Tokyo - Japan



Hotel Sunroute Plaza Shinjuku is a chic hotel located in the busy Shinjuku business district of Tokyo, Japan. Newly renovated in 2007 with sleek lines and modern accents, this Tokyo Shinjuku hotel's guestrooms are both contemporary and inviting for business and leisure travelers. Spacious and considerate, Hotel Sunroute offers guests competitive prices with special discounts and deals and the choice of a variety of guestrooms to meet each party's specifications.



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# Tokyo Conference Introductions

Welcome to 2019 HKCBEEES Tokyo conference. This conference is organized by HKCBEEES. The objective of the Tokyo conference is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in Biotechnology and Agriculture Engineering.

**2019 5th International Conference on Biotechnology and Agriculture Engineering (ICBAE 2019)**

Papers will be published in the following Journals:



**Journal of Advanced Agricultural Technologies (JOAAT, ISSN:2301-3737)**, which will be indexed by Ulrich's Periodicals Directory, Google Scholar, Engineering & Technology Digital Library, Crossref and Electronic Journals Digital Library..

or



**International Journal of Pharma Medicine and Biological Sciences(IJPMBBS, ISSN: 2278-5221)**,which will be indexed by Engineering & Technology Digital Library, and indexed by Embase; ProQuest; International Committee of Medical Journal Editors(ICMJE); Health sciences library(NYU); HINARI Access to Research in Health Programme; etc.

Conference website and email: <http://www.icbae.org/>; [icbae@cbees.net](mailto:icbae@cbees.net)

# Presentation Instructions

## Instructions for Oral Presentations

### **Devices Provided by the Conference Organizer:**

Laptop Computer (MS Windows Operating System with MS PowerPoint and Adobe Acrobat Reader)

Digital Projectors and Screen

Laser Sticks

### **Materials Provided by the Presenters:**

PowerPoint or PDF Files (Files should be copied to the Conference laptop at the beginning of each Session.)

### **Duration of each Presentation (Tentatively):**

Regular Oral Presentation: about 12 Minutes of Presentation and 3 Minutes of Question and Answer

Keynote Speech: about 35 Minutes of Presentation and 5 Minutes of Question and Answer

## Instructions for Poster Presentation

### **Materials Provided by the Conference Organizer:**

The place to put poster

### **Materials Provided by the Presenters:**

Home-made Posters

Maximum poster size is A1

Load Capacity: Holds up to 0.5 kg

## Best Presentation Award

One Best Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session on March 27-28,2019.

## Dress code

Please wear formal clothes or national representative of clothing.



# Keynote Speaker Introductions

## Keynote Speaker I



Prof. Kokyo Oh

Center for Environmental Science in Saitama, Japan

Kokyo Oh is a senior researcher in Center for Environmental Science in Saitama, Japan. He graduated with his MSci degree and Ph.D. degree (soil science) in Chinese Academy of Sciences, and was honored as a STA research fellow by Japan government from 1997 to 1999. The research areas include soil science, environmental conservation, environmental chemistry, and atmospheric environment. His current research is mainly on soil remediation, environmental agronomy, atmospheric PM2.5 and water environment conservation. He has published more than 90 publications.

Topic: “Development of Environmental-friendly Rural Area and Agriculture in Japan”

*Abstract*—Japan is a country with high population density, high rainfall, and high rate of mountainous and hilly lands. These conditions are disadvantageous to the development in rural area, agricultural production and environment protection. However, Japan has developed its clean and convenient rural area and sustainable agricultural way. The rural area in Japan is no difference with comparison of the urban areas in environment quality, convenience, and economic income, and the agriculture is at high level in quality, productivity, safety, reliability and environmental conservation. This presentation introduce and discuss how Japan develop its rural area and its agriculture. These experience, technology and information are possibly a reference for development of sustainable rural area and agriculture for other countries.

## Keynote Speaker II



Prof. Shigeru Kato  
Seikei University, Japan

Prof. Shigeru Kato was born in Tokushima, Japan, 1947. His experiences are as following:

March 1970, B.S. (Agricultural Chemistry), Faculty of Agriculture, Tokyo University of Agriculture

April 1971, Graduate School (Agricultural Chemistry course), Tokyo University of Agriculture (until March 1976)

March 1976, Ph.D. (Agricultural Chemistry), Tokyo University of Agriculture

April 1976, Visiting Fellow, NIEHS (National Institute of Environmental Health Sciences), NIH (National Institute of Health), US Government (until June 1979), North Carolina, USA

July 1979, Research Associate, NRI (NODAI Research Institute), Tokyo University of Agriculture (until March 1982)

April 1982, Lecturer, NRI (NODAI Research Institute), Tokyo University of Agriculture (until March 1990)

April 1990, Associate Professor, NRI (NODAI Research Institute), Tokyo University of Agriculture (until March 1995)

April 1995, Professor, NRI (NODAI Research Institute), Tokyo University of Agriculture (until April 1997)

May 1997, Visiting Scientist, RCAST (Research Center for Advanced Science and Technology), The University of Tokyo (until April 1998)

July 1998, Invited Researcher, NEDO (New Energy and Industry Technology Development Organization), Ministry of Economy, Trade and Industry (until March 2001)

April 2003, Invited lecturer and Research associate, Department of Applied Chemistry, Faculty of Engineering, Seikei University (until March 2007)

April 2007, Professor (Special Invited Research Professor), Department of Materials and Life Science, Faculty of Science and Technology, Seikei University

Topic: “Global warming mitigation through planting mangrove in southern Thailand and our planet”

*Abstract*— Our planet is warming and Carbon dioxide is the cause for main global warming gas. The climate actions communicated in these INDCs (INDCs: intended nationally determined contributions) largely determine whether the world achieves the long-term goals of the Paris Agreement to hold the increase in global average temperature to well below 2°C, to pursue efforts to limit the increase to 1.5°C, and to achieve net zero emissions in the second half of this century.

Many carbon sequestration techniques from atmosphere and industrial sites are developing in developed countries. But these techniques need lots of energy for carbon sequestration/fixation and much carbon dioxide are ejecting to atmosphere in the back with using huge fossil energy.

On the other hand, tree can sequester carbon dioxide through photosynthesis from atmosphere. Especially, carbon fixation performance of tropical trees is very higher than trees of the Temperate and Boreal forests.

Mangrove forests of the world distribute only 14 million ha in the tropical and subtropical regions. Mangroves are very important for local people and earth environment.

But, mangrove forests were targeted to develop to aquaculture, agriculture, urban development and industrial area, especially in Southeast Asia countries. From 2000 to 2012, mangrove forests of Asia countries lost around 270,000 ha. The forest area in Thailand has significantly reduced by the concession for unethical timber trading and land conversion to aquaculture area and agriculture area such as shrimp pond and palm oil plantation. Mangrove forest decreased to 167,000 ha in middle of 1990.

Our project started to rehabilitate abandoned shrimp ponds and degraded mangrove at Nakhon Si Thammarat in Thailand since 1997. Over 9 million mangrove seeds were planted in the area over 1,400 ha. Rehabilitated mangrove area is accumulating carbon into both above and below ground biomasses and soil. Present time, Thailand mangrove forest restores to around 250,000 ha.



**Coffee Break & Group Photo Taking**

**10:25~10:40**

## Invited Speaker I



Jie Sun

Xi'an Jiaotong-Liverpool University (XJTLU)

Sun Jie is an associate professor in Xi'an Jiaotong-Liverpool University. She got her PhD degree in Mechanical Engineering from National University of Singapore in 2005. She received both her bachelor and master degree from Dalian University of Technology. She worked at National University of Singapore between 2005-2014. Her research interest covers a broad spectrum of 3D printing related technologies such as customized 3D food printing, biomimetic scaffold fabrication, bio-inspired composite coating, and printhead development for biofabrication..

Topic: “Extrusion-based Multiple Material Mixer Design in Food Printing”

*Abstract—* Food products can be designed and fabricated to meet individual needs through controlling the amount of printing material and nutrition content. Food printing technology with multiple-material is proposed to produce such customized food products. Applying multiple-material is quite common in food design. Both single and multiple extrusion-based printhead are utilized to deliver food materials in printing process. The objectives of this study are to analyze the printing platforms, materials (i.e., natively printable materials, nonprintable traditional food materials, and alternative ingredients), and develop a multi-material mixing printhead for dynamic mixing of material composition. In this study, the mixing mechanisms and design consideration are reported. Two extrusion-based mixing printhead designs are discussed and an improvement design version is proposed.

# Brief Schedule for Conference

<b>Day 1</b>	<b>March 26, 2019 (Tuesday) 10:00~17:00</b> <b>Venue: HOTEL SUNROUTE PLAZA SHINJUKU</b> (Add: 2-3-1 Yoyogi, Shibuya-ku, 151-0053 Tokyo - Japan) Participants Onsite Registration & Conference Materials Collection	
	<b>March 27, 2019 (Wednesday) 9:00~18:35</b> Arrival Registration, Keynote Speech, Conference Presentation	
	<b>Morning Conference</b> <b>Venue: Conference Room-Fuyo (Mai)</b>	
	<b>Opening Remarks 9:00~9:05</b> Prof. Kokyo Oh Center for Environmental Science in Saitama, Japan	
	<b>Keynote Speech I 9:05~9:45</b> <b>Topic: ‘Development of Environmental-friendly Rural Area and Agriculture in Japan’</b> (Prof. Kokyo Oh, Center for Environmental Science in Saitama, Japan)	
	<b>Keynote Speech II 9:45~10:25</b> <b>Topic: ‘Global warming mitigation through planting mangrove in southern Thailand and our planet’</b> (Prof. Shigeru Kato, Walailak University, Thailand)	
	<b>Coffee Break &amp; Group Photo Taking 10:25~10:40</b>	
	<b>Invited speaker I 10:40~11:05</b> <b>Topic: ‘Extrusion-based Multiple Material Mixer Design in Food Printing’</b> (Prof. Jie Sun, Xi'an Jiaotong-Liverpool University, China)	
	<b>Session 1: 11:05-12:20</b> 5 presentations <b>Topic: Agricultural Machinery and Agricultural Informatics</b> <b>Session Chair: Prof. Jie Sun</b>	
	<b>Lunch 12:20~13:20</b>	
	<b>Afternoon Conference</b> <b>Venue: Conference Room-Fuyo (Mai)</b>	
	<b>Venue: Conference Room</b>	
<b>Venue: Conference Room</b>		
<b>Session 2: 13:20~15:20</b> 8 presentations <b>Topic: Microbiology and Biochemistry</b> Session Chair: Prof. Shigeru Kato		
<b>Coffee Break 15:20~15:35</b>		

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	<p><b>Session 3: 15:35~16:50</b> 5 presentations <b>Topic: Food Chemistry and Analysis</b> Session Chair: Prof. Kokyo Oh</p>
	<p><b>Session 4: 16:50~18:20</b> 6 presentations <b>Topic: Food Processing and Packaging</b> Session Chair: Prof.Kokyo Oh</p>
	<p><b>Dinner 18:20</b> <b>Venue: HOTEL SUNROUTE PLAZA SHINJUKU</b></p>
<b>Day 3</b>	<p><b>March 28, 2019 (Thursday) 9:30~12:05</b> Conference Presentation</p>
	<p><b>Morning Conference</b> <b>Venue: Conference Room-Fuyo (Mai)</b></p>
	<p><b>Session 5: 9:30~10:30</b> 4 presentations <b>Topic: Agricultural Environment and Resources</b> Session Chair: Prof.Charles Kinoshita</p>
	<p><b>Coffee Break 10:30~10:50</b></p>
	<p><b>Session 6: 10:50~12:05</b> 5 presentations <b>Topic: Botany and Plant Biotechnology</b> Session Chair: Prof. Shamsul Haque Prodhan</p>
	<p><b>Poster Session: 9:30~12:05</b> <b>Venue: Conference Room-Fuyo (Mai)</b></p>
	<p><b>Lunch(12:05)</b></p>
	<p><b>March 29, 2019 (Friday) 9:00~17:00</b> <b>One Day Visit</b></p>
<b>Day 4</b>	

**Tips:** Please arrive at the conference to upload or copy PPT into the laptop room 10 minutes before the session begins.

**Note:** (1) The registration can also be done at any time during the conference.

(2) The organizer doesn't provide accommodation, and we suggest you make an early reservation.

(3) One Best Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session.



# Session 1

**Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.**

**Morning ,March 27,2019(Wednesday)**

**Time: 11:10-12:25**

**Venue: Hotel Conference Room**

**5 presentations-Topic: “Agricultural Machinery and Agricultural Informatics”**

**Session Chair: Prof . Jie Sun**

M5009 presentation 1 (11:05~11:20)

Accuracy Analyses for Detecting Small Creatures using an OpenCV-based System with AI for Caffe’s Deep Learning Framework

**Shinji KAWAKURA**

Laboratory for Future Interdisciplinary Research in Science and Technology, Tokyo Institute of Technology, Kanagawa, Japan

*Abstract*—Agricultural workers want to detect, eliminate, and avoid touching small creatures such as frogs and insects in advance of and during their agricultural work. On the other side, recent researches have suggested diverse countermeasures such as developing robot arm-based machines for harvesting vegetables and pulling up weeds using camera systems; past methods have included monitoring and identifying the positive and negative targets. However, there are not sufficient previous systems for sensing and analyzing the aforementioned small creatures in farmlands. The purpose of this original research is proving the utility of our visual data analysis system based on huge image datasets using Caffe Framework for deep learning using ImageNet 2012, which connects to our program using OpenCV libraries and other outside files. In short, this study selects and executes static visual analyses using AI-based computing by tools concerning deep learning using several hidden layers after obtaining and accumulating field pictures and video data concerning small creatures such as frogs and insects in outdoor farmlands. Additionally, the author calculates the ratio between the sizes of outline of leaves on which small creatures existed as well as that of the targeted small creatures as one original standard for giving a unity to the pictures selected to some extent. Our results confirm the utility of the detection methodologies. In future, these results could contribute to the development of automatic agricultural harvesting robot-systems and to improving the daily work effectiveness of actual manual workers. Furthermore, an automatic system for eliminating small creatures could support the recruitment of agricultural workers.

# Session 1

**Morning ,March 27,2019(Wednesday)**

**Time: 11:10-12:25**

**Venue: Hotel Conference Room**

**5 presentations-Topic: “Agricultural Machinery and Agricultural Informatics”**

**Session Chair: Prof . Jie Sun**

M5016 Presentation 2 (11:20~11:35)

Effect of Rainfall and Urban Expansion on Runoff in the Agricultural Area

Thanutch Sukwimolseree, **Preeyaphorn Kosa**

School of Civil Engineering, Suranaree University of Technology, Nakhon Ratchasima, Thailand

*Abstract*—In Thailand, agricultural area is very important for a main occupation of Thai people. However, the agricultural areas changed to be the urban areas. Then, the objective of this study is to study the effect of variation rainfall and urban expansion on runoff. A study area is an agricultural area in the Mun river basin. To achieve purpose, there are two parts of this study. They consists of (1) the calculation of daily runoff based on land use 2008 and (2) the daily runoff determination based on the variation of rainfall and urban development. The results present that the runoff increases from the case of urban explanation 5 km to 15 km. A big change of runoff reveals from the case of land use 2008 to the case of urban explanation 5 km. Moreover, mean monthly runoff base on rainfall more than 100 mm/month is higher than mean monthly runoff base on rainfall less than 100 mm/month. The high runoff occurs during May to October. There is the lowest mean runoff in the urban area 1.00-25.00% but there is the highest mean runoff in the urban area 50.01-75.00%. The difference of runoff in the urban area 1.00-25.00% and in the urban area 50.01-75.00% is range 0.35 – 47.12 mm. or 13.97 mm. by averaging. The average runoff has a direct variation with the rainfall and urban area. It means that increased urban area can indicate a variation of runoff. In addition, rainfall is directly affect to runoff.

# Session 1

**Morning ,March 27,2019(Wednesday)**

**Time: 11:10-12:25**

**Venue: Hotel Conference Room**

**5 presentations-Topic: “Agricultural Machinery and Agricultural Informatics”**

**Session Chair: Prof . Jie Sun**

M5020 Presentation 3 (11:35~11:50)

Development of AI-based System for Classification of Objects in Farms using Deep Learning by Chainer and a Template-Matching based Detection Method

**Shinji KAWAKURA**

Laboratory for Future Interdisciplinary Research in Science and Technology, Tokyo Institute of Technology, Kanagawa, Japan

*Abstract*—It has generally been difficult for agri-system developers to identify diverse objects automatically and accurately before the harvesting without touching something dangerous (e.g., poisonous creatures, toxic substances). Such objects could include harvestings for sale, stems, leaves, artificial stiff frames, unnecessary weeds, agri-tools, and creatures, especially in Japanese traditional small-medium sized, insufficiently trimmed (messed) farmlands. Scientists, agri-managers, and workers have been trying to solve these problems. On the other side, researchers have been advancing robot systems, mainly based on automatic machines for harvesting and pulling up weeds utilizing visual-data analysis systems. These studies have captured a significant amount of visual data, identified objects with short time delay. However, previous products have not yet met these requirements. We have considered the achievements of recent technologies to develop and test new systems. The purpose of this research is proving the utility of this visual-data analysis system by classifying and outputting datasets from an AI-based image system that obtained field pictures in outdoor farmlands. We then apply Chainer for deep learning, and focus on computing methodologies relating to template-matching and deep learning to classify the captured objects. The presented sets of results confirm the utility of the methodologies to some extent..

# Session 1

**Morning ,March 27,2019(Wednesday)**

**Time: 11:10-12:25**

**Venue: Hotel Conference Room**

**5 presentations-Topic: “Agricultural Machinery and Agricultural Informatics”**

**Session Chair: Prof . Jie Sun**

M5004-A Presentation 4 (11:50~12:05)

DEVELOPMENT OF MANUALLY-OPERATED WEAVING MACHINE FOR COCONUT MAT WITH CARBONIZED CHICKEN MANURE FOR SOILLESS PRODUCTION FOR BERMUDA GRASS (*Cynodon dactylon* L.)

Nikki Marie Recide Adrias , Ana Arminia Salamat Valino, **Engr. Wilfredo G. Tuso**

Institute of Agricultural and Biosystems Engineering, Laguna State Polytechnic University, Siniloan, Laguna, Philippines

*Abstract*—This study was conducted to design, fabricate and test a manually-operated weaving machine using different diameters of the heddle. The sizes of coconut rope are 4, 6, and 8 mm. The coconut mat was made from coconut coir rope bond with a mixture of carbonized chicken manure and water in the ratio of 1:1.2 by weight to volume. The working parameter of the manually-operated weaving machine with highest actual capacity was heddle for 8 mm coconut rope. The actual capacity is 17 mat per day with an efficiency of 56.73%. D8 also obtained the largest number of stolon, it initiated 47 new stolons. In stolon elongation, D6 recorded the largest stolon length of 47 mm. The widest area covered by Bermuda grass observed in D6, the percentage of coverage is 85.4%. The breakeven point is 157 mat-yr-1, the payback period is 1.67 years (313.96 working days) and ROI is 60%. Thus, the operation will be feasible based on the breakeven point (BEP), Payback period (PP), and rate of return (ROR).

# Session 1

**Morning ,March 27,2019(Wednesday)**

**Time: 11:10-12:25**

**Venue: Hotel Conference Room**

**5 presentations-Topic: “Agricultural Machinery and Agricultural Informatics”**

**Session Chair: Prof . Jie Sun**

M3003 Presentation 5 (12:05~12:20)

**PERFORMANCE OF SORGHUM POLISHING MACHINE TYPE OF THREE LEVEL OF POLISHER CYLINDERS**

**Ana Nurhasanah**, Amran Sulaeman, Andi Nur Alam Syah, Athoillah Azadi  
Indonesian Center for Agricultural Engineering Research and Development, Indonesia

*Abstract*—Performance of the sorghum polishing machine was performed to determine the performance of the sorghum polishing machine as a whole. The need of polishing the sorghum seed is to reduce the tannin content which is mainly found in the outer skin of the pericarp layers. The high tannin content can reduce the protein digestibility and cause a constipation. Development of a sorghum polishing machine, type of three level of polisher cylinders, was carried out to improve the previous design of polisher. Previously, farmers re-fed the sorghum seeds into the polisher up to three times. This study develop a machine working in a single feed polishing mechanism. Previously in 2012 and 2016, the Indonesian Center for Agricultural Engineering Research and Development, Serpong developed an abrasive type of sorghum polishing machine with a repetitive feeding (up to 4 times), so the working capacity was low varied between 50-100 kg / hour. This study aims to modify the polisher machine in order to improve the working capacity. The activities consisted of (i) Development a sorghum seed polisher using a main component of abrasive stone; (ii) Development a three level of polishing mechanism with a single feeding system; (iii) Modification of the screens rotation mechanism working in an opposite direction of the rotation of the abrasive stones. The good quality of the polished seed is shown by the appearance of a full shape and bright color. The performance tests shows that the output capacities were 100-150 kg / hour with tannin content of 0.095 % and 3-5% of broken seeds and whiteness of 45.77% with the appearance of whole grain shape and bright color.



**Lunch**

**12:20~13:20**

## Session 2

**Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.**

**Morning, March 27,2019(Wednesday)**

**Time: 13:20~15:20**

**Venue: Hotel Conference Room**

**8 presentations-Topic: “Microbiology and Biochemistry”**

**Session Chair: Prof. Shigeru Kato**

M5022 Presentation 1 (13:20~13:35)

Characterization and succinic acid production of anaerobic bacteria Clostridium SP17-B1

**Siriluk Teeradakorn**, Sukanya Phuengjayaem, Somboon Tanasupawat

The Institute of Biotechnology and Genetic Engineering, Chulalongkorn University, Bangkok 10330, Thailand

*Abstract*—Clostridium SP17-B1 isolated from dog saliva was Gram-positive rod-shaped, facultative anaerobe bacteria. It grew in 4% (w/v) NaCl, at a pH range of 5.0–8.0 (optimally at pH 7) and at 30–40 °C (optimally at 37 °C). Major cellular fatty acids were C16:0, C17:0 cyclo, C16:1 w9c, and C18:1 w9c of 36.33, 9.67, 13.85 and 10.74% of total component, respectively. The DNA G+C content of the type strain was 40.84 mol%. Based on the result of 16S rRNA gene sequence analysis. It was closely related to Clostridium amygdalinum BR-10T (97.84%), Clostridium saccharolyticum WM1T (97.76%) and Clostridium celleracrescens DSM 5628T (97.69%). There were few researches studied on the production of succinic acid by the genus of Clostridium. Clostridium SP17-B1 was able to produce succinic acid 25.07 g/L from 40 g/L of glucose as a substrate. The application of lignocellulose as a carbon source for succinic production from this strain is under studied.

## Session 2

**Morning, March 27,2019(Wednesday)**

**Time: 13:20~15:20**

**Venue: Hotel Conference Room**

**8 presentations-Topic: “Microbiology and Biochemistry”**

**Session Chair: Prof. Shigeru Kato**

M3001-A Presentation 2 (13:35~13:50)

FUNCTIONAL STUDIES OF PYRUVATE CARBOXYLASE REGULATION BY CYCLIC DI-AMP IN *LACTOCOCCUS LACTIS*

**Thu Ngoc Minh Vu**, Huong Thi Pham, Raquel Lo, Nidhi Bansal and Mark S. Turner  
School of Agriculture and Food Sciences, The University of Queensland, Brisbane, Queensland, Australia

*Abstract*—Lactococci are broadly used as starters in dairy fermented products, and their rapid growth is crucial to produce an appropriate rate of lactic acid for optimum fermentation and for the inhibition of undesirable microorganisms. Pyruvate carboxylase activity is required to provide adequate aspartate for rapid growth of cells. The broadly conserved second messenger nucleotide cyclic di-3',5'-adenosine monophosphate (c-di-AMP) has been shown to bind to and allosterically regulate the activity of pyruvate carboxylase (PC) in *Listeria monocytogenes*. The c-di-AMP binding pocket residues are also conserved within PC of the economically important cheese fermentation bacterium *Lactococcus lactis*. In this work we were interested to determine the role of PC and c-di-AMP inhibition of PC in the physiology of *L. lactis*. A markerless PC deleted mutant of *L. lactis* MG1363 background (wt) and c-di-AMP insensitive PC variant overexpression mutants in a high c-di-AMP  $\Delta$ gdpP strain (OS2) were generated and characterised. The PC deleted mutant exhibited similar growth compared to that of wt in rich media with abundant amino acids, but did not grow in chemically defined media (CDM) in the absence of aspartate or asparagine. Complementation with the wt PC gene into the PC deleted mutant restored growth in CDM. In milk, the PC deleted mutant had a significantly slower acidification rate than that of the complemented strain. Supplementation of aspartate or asparagine to milk completely restored rates of acidification and stationary-phase cell numbers of the PC deleted mutant. In the high c-di-AMP mutant strain OS2, the aspartate level was 65% lower than wt. Overexpression of c-di-AMP insensitive Y715T PC variant restored high aspartate levels comparable to that in the wt. In conclusion PC is essential for aspartate biosynthesis in *L. lactis* and is required for efficient acidification of milk, a key property of starter cultures. C-di-AMP negatively regulates the aspartate pool in *L. lactis*, and expression of a c-di-AMP insensitive LIPC can restore normal levels of aspartate.

## Session 2

**Morning, March 27,2019(Wednesday)**

**Time: 13:20~15:20**

**Venue: Hotel Conference Room**

**8 presentations-Topic: “Microbiology and Biochemistry”**

**Session Chair: Prof. Shigeru Kato**

M2001 Presentation 3 (13:50~14:05)

Study on Immune Colloidal Silver Rapid Detection of Melamine

**Wen-Chien Huang**, Kuo-Hui Wu, Yin-Chiung Chang

School of Defense Science, Chung Cheng Institute of Technology, National Defense University, Taoyuan 335, Taiwan

*Abstract*—An immunochromatography test strip (ICTS) for the rapid detection of melamine using colloidal silver (Ag-TSC) as the signal material was developed. The method of preparation of the antibody-colloidal silver conjugate was based on the ionic interactions binding antibodies with colloidal silver. Morphological study by SEM and TEM showed that the average size of the uniform spherical immune colloidal silver particles (Ag-TSC-mAb) was 20~30 nm. The spectroscopic properties of Ag-TSC showed the typical surface plasmon resonance band at 387 nm in the UV-visible spectrum. FTIR analyses indicated that citrate anions and anti-MEL monoclonal antibodies were adsorbed on the Ag-TSC through carboxylate groups. The mAb conjugated with the colloidal silver, and was applied to the conjugate pad of the ICTS. The visual detection limit for the ICTS was 0.5 ppm, which was below the detection limit that is legislated by the European Union (EU) and the Food and Drug Administration (FDA). No cross-reactions with homologues cyanuric acid, ammeline or ammelide were found, and this test required only 15 min to obtain a result.



## Session 2

**Morning, March 27,2019(Wednesday)**

**Time: 13:20~15:20**

**Venue: Hotel Conference Room**

**8 presentations-Topic: “Microbiology and Biochemistry”**

**Session Chair: Prof. Shigeru Kato**

M3002-A Presentation 4 (14:05~14:20)

Unravelling the regulation of c-di-AMP in osmotic stress in bacteria

**Huong Thi Pham**, Nidhi Bansal and Mark S Turner

School of Agriculture and Food Sciences, University of Queensland, Brisbane, Queensland, Australia

*Abstract*—*Lactococcus lactis*, the most common starter culture used in dairy fermentation, is subjected to many stressors during industrial processes. To better control these stressors, the mechanisms to cope with each one have attracted scientists in the last decade. Under osmotic conditions, cells tend to uptake or release compatible solutes to balance the cellular turgor pressure. Many researchers have figured out how this process is regulated at the genetic level. We recently discovered the regulation of osmotic stress in *Lactococcus lactis* via the signalling molecule c-di-AMP (cyclic-adenosine monophosphate). c-di-AMP has been shown to regulate a range of cellular processes, most via binding to protein targets, with most identified thus far being linked to osmoregulation functions. It also plays an important role in cell wall homeostasis,  $\beta$ -lactam antibiotic resistance, biofilm formation, acid stress resistance, cell size and mammalian cell immune responses in other gram positive bacteria (*Bacillus subtilis*, *Staphylococcus aureus* and *Listeria monocytogenes*). Here we show that *Lactococcus lactis* GdpP phosphodiesterase mutant with a high c-di-AMP level is able to grow under hyperosmotic conditions after acquiring mutations which increase potassium [K<sup>+</sup>] uptake. Surprisingly these mutations led to significantly elevated c-di-AMP levels. Constitutive potassium uptake was found to trigger c-di-AMP accumulation, likely in response to increased turgor pressure. In agreement with this, c-di-AMP levels in resting and energised *Lactococcus*, *Lactobacillus*, and *Listeria* were found to be rapidly responsive to external osmolarity changes. Taken together, these data show c-di-AMP can regulate the osmotic stress by controlling osmolyte transporters which provides potential useful information for optimizing food fermentation processes.

## Session 2

**Morning, March 27,2019(Wednesday)**

**Time: 13:20~15:20**

**Venue: Hotel Conference Room**

**8 presentations-Topic: “Microbiology and Biochemistry”**

**Session Chair: Prof. Shigeru Kato**

M5006-A Presentation 5 (14:20~14:35)

Study on efficient purification of recombinant protein from the silkworm larval haemolymph targeting pharmaceutical grade

**Minkner, Robert** , Park, Enoch Y.

Dept. of Biosci., Grad. Sch. of Sci. and Technol., Shizuoka Univ., 836 Ohya, Suruga-ku, Shizuoka 422-8529, Japan

*Abstract*—The silkworm *Bombyx mori* is a promising bioreactor for the production of recombinant proteins. Widely used *Escherichia coli*-based expression system provides an advantages of the relatively low production cost and easily handling, yet post-translational modifications are limited. On the opposite, the silkworm can produce foreign proteins in high expression level with post-translational modifications. However, the purification of expressed proteins from the haemolymph is challenging, because its contain a high amount of impure proteins. Mostly purifications are done with a tag or with sucrose gradient centrifugations, but there is no systematically approach to purify recombinant proteins from the haemolymph up to date. We have tried to purify mCherry from the haemolymph as a model recombinant protein using only up scalable methods. To reduce the amount of impurities before using chromatography, different kind of pre-treatments were investigated. A centrifugation force with 17800 g, 5 min was chosen, the supernatant then subjected to a 2.5 % PEG precipitation and followed by chromatography steps. After investigation of several chromatography methods, we settled for hydrophobic interaction, size exclusion and heparin affinity chromatography. The final purity leaves much to be desired compared to the Strep-tag affinity purification and the recovery is respectively 1.57 % or 4.09 %.

## Session 2

**Morning, March 27,2019(Wednesday)**

**Time: 13:20~15:20**

**Venue: Hotel Conference Room**

**8 presentations-Topic: “Microbiology and Biochemistry”**

**Session Chair: Prof. Shigeru Kato**

M8001-A Presentation 6 (14:35~14:50)

Pangolin genomes and the evolution of mammalian scales and immunity

**Siew Woh Choo**, Mike Rayko, Tze King Tan, Ranjeev Hari, Aleksey Komissarov, Wei Yee Wee, Yurchenko Andrey, Sergey Kliver, Agostinho Antunes, Richard K. Wilson, Wesley C. Warren, Klaus-Peter Koepfli, Patrick Minx, Ksenia Krashennnikova, Ian C. Paterson, Pavel Dobrynin, Pasha Dobrynin, Frankie Thomas Sitam, Jeffrine Rovie Ryan Japning, Warren Johnson, Aini Mohamed Yusoff, Shu-Jin Luo, Kayal Vizi Karuppanan, Gang Fang, Deyou Zheng, Mark B. Gerstein, Leonard Lipovich, Stephen J. Obrien and Guat Jah Wong.

Xi'an Jiaotong Liverpool University ,China

*Abstract*—Pangolins, unique mammals with scales over most of their body, no teeth, poor vision, and an acute olfactory system, comprise the only placental order (Pholidota) without a whole-genome map. They (as pest controllers) have adapted to a highly specialized diet of ants and termites, and are of significance in the control of forest termite disaster. To investigate pangolin biology and evolution, we developed genome assemblies of the critically endangered Malayan (*Manis javanica*) and Chinese (*M. pentadactyla*) pangolins. Strikingly, we found that interferon epsilon (IFNE), exclusively expressed in epithelial cells and important in skin and mucosal immunity, is pseudogenized in all African and Asian pangolin species that we examined, perhaps impacting resistance to infection. We propose that scale development was an innovation that provided protection against injuries or stress and reduced pangolin vulnerability to infection. Further evidence of specialized adaptations was evident from positively selected genes involving immunity-related pathways, inflammation, energy storage and metabolism, muscular and nervous systems, and scale/hair development. Olfactory receptor gene families are significantly expanded in pangolins, reflecting their well-developed olfaction system. This study provides insights into mammalian adaptation and functional diversification, new research tools and questions, and perhaps a new natural IFNE-deficient animal model for studying mammalian immunity. The new knowledge from this study may also help to improve the conservation of the endangered pangolins in future.

## Session 2

**Morning, March 27,2019(Wednesday)**

**Time: 13:20~15:20**

**Venue: Hotel Conference Room**

**8 presentations-Topic: “Microbiology and Biochemistry”**

**Session Chair: Prof. Shigeru Kato**

M2029 Presentation 7 (14:50~15:05)

Role of  $\beta$ -cryptoxanthin as an antioxidant and its ability to bind with Transferrin

**Anushka Ghosh, Ujani Hazra** and Debjani Dutta

National Institute of Technology, Durgapur, India

*Abstract*—The potential nutraceutical benefits of carotenoids, which are versatile bioactive compounds, have been of great interest recently for its applications as dietary supplements. Carotenoids are red-orange coloured pigments which absorb light in the wavelength region of 400-550 nm. They are produced by plants, bacteria, algae and fungi and are abundantly distributed in the nature. In this study, our focus is on beta-cryptoxanthin ( $\beta$ -CRX), a yellow colored pro-vitamin A xanthophyll which is extracted from a previously isolated bacterium *Kocuria marina* DAGII grown in Brain Heart Infusion and sub-cultured in low cost dairy waste like whey and incubated at 25 °C and 150 rpm for 5 days. The extracted beta-cryptoxanthin showed good radical scavenging activity and played a role in inhibition of lipid oxidation.

Transferrin is a glycoprotein which plays a significant role in the mobilisation of iron in the body. It has two receptors TfR1 and TfR2 amongst which TfR1 binds to the iron-loaded transferrin. In cases of secondary hemochromatosis, HFE protein competes with transferrin to bind to TfR1 which leads to iron built up which is detrimental to the human body. Beta-cryptoxanthin was found to bind to Transferrin with a binding energy of -8.2 Kcal/mol.

# Session 2

**Morning, March 27, 2019 (Wednesday)**

**Time: 13:20~15:20**

**Venue: Hotel Conference Room**

**8 presentations-Topic: “Microbiology and Biochemistry”**

**Session Chair: Prof. Shigeru Kato**

M5035-A Presentation 8 (15:05~15:20)

Hydrothermal liquefaction of wastewater algal biomass: A comparative study using a tubular and Parr batch reactors

**Rowena B. Carpio**, Yuanhui Zhang, Rizalinda L. de Leon

Department of Chemical Engineering, University of the Philippines Los Baños, Laguna 4031, Philippines

*Abstract*—This study demonstrates how the type of reactor influences the conversion of wastewater algal biomass (raw and demineralized) into biocrude oil under hydrothermal liquefaction (HTL). Experiments were conducted using a tubular reactor (40 ml) and Parr reactor (100 ml) under the same following conditions: reaction temperature (300 °C), holding time (60 mins), reactor filling ratio (0.3 g/ml), feedstock solid concentration (25%), and initial reactor headspace pressure (100 psig). Results showed that HTL of raw biomass has higher liquefaction conversion using the Parr reactor (83.12%, dry ash-free, daf) than the tubular reactor (67.30% daf). However, more biocrude oil was generated with the tubular reactor (17.01% daf) versus Parr reactor (14.71% daf). Demineralized biomass showed different performance, higher liquefaction conversion was obtained using the tubular reactor (85.99% daf) versus the Parr reactor (71.26% daf), while comparable amounts of biocrude oils (about 25% daf) were achieved. Analysis showed the biocrude oils are comparable in terms of higher heating value. The atomic ratios of N/C, H/C, and O/C are lower in biocrude oils from Parr reactor than the tubular reactor, indicating the former provided a better denitrogenation and deoxygenation process. GS-MS analysis revealed the oils obtained using the Parr reactor are very much abundant in N&O-heterocyclic compounds compared to using the tubular reactor.



**Coffee Break**

**15:20~15:35**

## Session 3

**Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.**

**Afternoon, March 27, 2019 (Wednesday)**

**Time: 15:35~16:50**

**Venue: Conference Room**

**5 presentations-Topic: “Food Chemistry and Analysis”**

**Session Chair: Prof. Jie Sun**

M2018 Presentation 1 (15:35~15:50)

Encapsulation of gac powder extract and its application in low-nitrite chicken sausage

**Nachayut Chanshotigul** and Bung-Orn Hemung

Faculty of Applied Science and Engineering, Khon Kaen University, Nong Khai Campus, Thailand

*Abstract*—The aril and pulp of gac fruit were vacuum dried at 60 °C prior to extract with ethanol using microwave assisted method. The extract was encapsulated with maltodextrin using spray drying techniques. The inlet temperatures were varied from 140, 160, and 180 °C, while the ratio of extract:maltodextrin solution were varied at 1:5, 1:10, and 1:20. The moisture content, water activity, lycopene content, and radical scavenging ability were monitored to optimize the drying condition at inlet temperature of 160 °C and the ratio was at 1:5. The encapsulated gac powder extract (EGPE) at this condition was used as incorporated in chicken sausage prepared at low-nitrite level (25ppm) prior evaluating the quality. The results showed that EGPE could reduce cooking yield slightly. However, it could improve the redness and yellowness of sausage as well as maintain this characteristic during storage at 4 °C for a week. EGPE could also inhibit microorganisms indicated by a reduction of total plate count. Moreover, the lipid oxidation of sausage, determined by TBARS value, was also retarded when EGPE was applied. These results suggested that EGPE could be functional ingredient in chicken sausage at low nitrite level.

# Session 3

Afternoon, March 27, 2019 (Wednesday)

Time: 15:35~16:50

Venue: Conference Room

5 presentations-Topic: “Food Chemistry and Analysis”

Session Chair: Prof. Jie Sun

M2025 Presentation 2 (15:50~16:05)

PLS Modeling the Starch Contents of Corn Data Measured Through Different NIR Spectrometers

**Tahir Mehmood**

School of Natural Sciences, National University of Sciences and Technology, Islamabad, Pakistan

*Abstract*—A variety of filter wavelength region selection algorithm, including loading weight PLS (PLS-LW), regression coefficient PLS (PLS-RC), variable importance on PLS (PLS-VIP) and selectivity ratio PLS (PLS-SR) and significant multivariate correlation (PLS-SMC) are considered in modeling the starch contents of corn with corn spectral data. Corn samples were measured on three different NIR spectrometers known as M5, Mp5 and Mp6. Hence, the class of filter PLS methods were imposed on each data set obtained from different spectrometers. Filter PLS can select influential wavelength region of spectral data, through leave-one-out (LOO) cross validation procedure. The performance of each fitted PLS on each spectrometer data set was measured with root mean square error for prediction (RMSEP), which reveals the PLS-SR (p-value=0.001) and Mp6 (p-value=0.073) select the wavelength region which best explains the variation in starch corn contents.

# Session 3

**Afternoon, March 27, 2019 (Wednesday)**

**Time: 15:35~16:50**

**Venue: Conference Room**

**5 presentations-Topic: “Food Chemistry and Analysis”**

**Session Chair: Prof. Jie Sun**

M2010 Presentation 3 (16:05~16:20)

Liposomal encapsulation of  $\alpha$ -lipoic acid as a food supplement

**Sayantani Dutta**, Pintu Choudhary, Moses JA and Anandharamakrishnan C  
IIFPT, Thanjavur, Tamil Nadu, India

*Abstract*—  $\alpha$ -Lipoic acid (6, 8-dithiooctanoic acid) has been attributed with many salubrious benefits such as aid in reduction of oxidative stress, reducing hypertension, improving lipid profile and averting risks of diabetes. However, the biomolecule being vulnerable to environmental oxidation is required to be encapsulated. Nanoliposomal encapsulation of  $\alpha$ -lipoic acid was conducted in the present study using solvent evaporation followed by probe sonication with the objective of enhancing the stability of the biomolecule. The encapsulation was accomplished with optimized process parameters that were 3 g lipid phase (soya phosphatidylcholine: Tween 80= 1:1) with 150 mg lipoic acid; with the aim to achieve the recommended dietary supplementation of the biomolecule conveniently through the consumption of the liposome. The encapsulated  $\alpha$ -lipoic acid was assessed for parameters such as encapsulation efficiency, antioxidant activity, zeta potential, and FE-SEM analyses. The data revealed successful entrapment of the biomolecule with 97% of encapsulation efficiency and desired attributes that indicate liposomal entrapment to be a suitable technique for encapsulation of  $\alpha$ -lipoic acid.



## Session 3

Afternoon, March 27, 2019 (Wednesday)

Time: 15:35~16:50

Venue: Conference Room

5 presentations-Topic: “Food Chemistry and Analysis”

Session Chair: Prof. Jie Sun

M2028 Presentation 4 (16:20~16:35)

### EVALUATION OF PHYSIOCHEMICAL PROPERTIES OF SPRAY DRIED BAEI FRUIT POWDER DURING STORAGE

**Siriporn Sornsomboonsuk**, Tiraporn Junyusen, Natthaporn Chatchavanthatri, Pornpimol Moolkaew, and Nadnapang Pamkhuntod,  
Suranaree University of Technology, Nakhon Ratchasima, Thailand

*Abstract*—This study investigates the effects of accelerated storage conditions of spray dried bael fruit powder. The spray dried powder (particle diameter of 51.03  $\mu\text{m}$ ) was sealed in aluminum laminated polyethylene bag and storage for further analysis. Storage parameters included accelerated storage temperatures (35  $^{\circ}\text{C}$  and 45  $^{\circ}\text{C}$ ), and storage times (0, 2, 4, 6, and 8 weeks). The results showed that accelerated storage temperature and extended storage time affected the physicochemical and antioxidant properties of the spray dried powder. Water activity ( $a_w$ ), moisture content, and bulk and tapped density of the spray dried powder were significantly ( $p < 0.05$ ) increased. However, the final  $a_w$  of the spray dried powder did not exceed 0.6 indicating that the powder was shelf-stable. The antioxidant activity of the spray dried powder stored at 35  $^{\circ}\text{C}$  and 45  $^{\circ}\text{C}$  was significantly ( $p < 0.05$ ) reduced after the 2th week of storage. Color was not affected by accelerated storage conditions.

# Session 3

**Afternoon, March 27, 2019 (Wednesday)**

**Time: 15:35~16:50**

**Venue: Conference Room**

**5 presentations-Topic: “Food Chemistry and Analysis”**

**Session Chair: Prof. Jie Sun**

M5015 Presentation 5 (16:35~16:50)

Application of Dielectric Constant for Identification of Dilution in Raw Milk

**Vanessa E. S. Silva**, Daniel D. Costa, Francisco S. M. Sinfrônio, Allan K. Barros

Federal University of Maranhão/ Department of Electrical Engineering, São Luís,  
Maranhão-BRZ

*Abstract*—In the present work the dielectric constant for the identification of water addition in raw milk is studied. To achieve this objective, a parallel plates capacitive cell was used, and a LCR Meter was used to measure the capacitance. The milk samples were obtained on the Upaon-Açu Island, which were diluted with water from the University supply in known proportions. Samples of approximately 120 ml were used. The measurements were performed in the frequency range between 100 Hz and 100 kHz with a voltage of 1 V, with a temperature of approximately 8 °C. The software used for statistical analysis was SPSS version 25.0. From the results it was observed that all the frequencies presented significant differences between the groups, except the frequency of 100 Hz ( $p = 0.06$ ). In the frequency of 1 kHz and 20 kHz the addition of water causes a decay of the dielectric constant almost linear, whereas in the others frequencies the decay occurs smoothly, except in 10 kHz, which presents a different behavior. With the obtained results, it is concluded that the dielectric constant method is feasible since it becomes possible to quickly identify the presence of water in the milk.

## Session 4

**Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.**

**Afternoon, March 27, 2019 (Wednesday)**

**Time: 16:50~18:20**

**Venue: Conference Room**

**6 presentations-Topic: “Food Processing and Packaging”**

**Session Chair: Prof.Kokyo Oh**

M2003-A Presentation 1 (16:50~17:05)

Atomization behaviour of juice-fibre suspensions in two-fluid nozzle

**Siti N. M. Rozalia**, Anthony H. J. Paterson, Jason P. Hindmarsh and Lee M. Huffman  
Massey University, New Zealand

*Abstract*—Atomization of non-Newtonian extensional liquids was carried out using a two-fluid nozzle. Juice-fibre suspension is a shear thinning liquid that exhibits significant extensional resistance when forced through an extensional flow-field. The rheological characterization of the fibre suspensions was performed prior to this study. This article reports the experimental observations of the atomization. The atomization behaviour of the suspensions discharging in the air was photographed using a backlit setup to visualize the atomization pattern of viscoelastic fibre suspensions. The effect of the extensional resistance is to delay the droplet formation by forming filamentary structures that link successive droplets together. Increasing the atomizing air velocity yields better atomization as proved by the droplet size analysis. This study shows that the atomization of liquids with complex properties should not be predicted based on Newtonian atomization mechanisms or correlations.

# Session 4

Afternoon, March 27, 2019 (Wednesday)

Time: 16:50~18:20

Venue: Conference Room

6 presentations-Topic: “Food Processing and Packaging”

Session Chair: Prof.Kokyo Oh

M2011 Presentation 2 (17:05~17:20)

Effect of High Molecular Weight Maltodextrin and Spray Drying Conditions for Encapsulation of Noni Juice

**Preethi Ramakrishnan**, Sayantani Dutta, Jeyan A Moses, and Anandharamakrishnan C  
Indian Institute of Food Processing Technology

*Abstract*—Researches have suggested that noni is a healthy drink due to the presence of wide of range of bioactive components. Various review and research data proved that noni might protect the immune system and improve health benefits. Hence, our study focused on the development of spray dried noni powder, which can be incorporated into the various food system. Fermented noni juice was spray dried using 2% high and low molecular weight maltodextrin with whey protein and as filler material at concentrations of 3 and 5% under different temperature and feed rate. The yield efficiency of spray dried noni was found to be more in addition to high molecular weight maltodextrin due high glass transition temperature along with 7% whey protein at 120 °C with 20% feed rate. The color value of noni powder sprayed under high temperature, and high concentration of whey protein showed higher brightness. The powder flowability falls under a passable and poor range of Carr index and Hausner ratio, due to the high hygroscopic nature and low glass transition temperature of noni fruit juice. The SEM images of noni powder showed the spherical particle for both whey protein and the combination of whey protein with maltodextrin. The encapsulated noni powder showed the presence of total phenolic and antioxidant content due to the contribution of the functional group (bioactive component) present in the noni juice. The present study investigated the suitable conditions for encapsulating the noni powder without the loss of bioactive phenolic compound.

# Session 4

**Afternoon, March 27, 2019 (Wednesday)**

**Time: 16:50~18:20**

**Venue: Conference Room**

**6 presentations-Topic: “Food Processing and Packaging”**

**Session Chair: Prof.Kokyo Oh**

M2017 Presentation 3 (17:20~17:35)

Effects of Replacement of Sucrose by Maltitol on the Physicochemical and Sensorial Properties of Rose Apple Jam

**Natthaporn Chatchavanthatri**, Tiraporn Junyusen, Weerachai Arjharn, Pormpimol Moolkaew, Siriporn Sornsomboonsuk and Nadnapang Pamkhuntod  
Institute of Engineering, Suranaree University of Technology, Thailand

*Abstract*—This study investigates the effects of replacement of sucrose by maltitol on the quality properties of rose apple jams. Three jam formulations were developed, the traditional jam formulation containing sucrose (T1, control), jam formulation prepared by partially (50%, T2) and fully (100%, T3) replacing sucrose with maltitol. The composition, antioxidant, color, texture, and sensory characteristics were determined. The finding revealed that total sugars and energy value of the T3 jam were significantly reduced compared with those of the T1 jam ( $P<0.05$ ). The energy value of T3 jam was decreased by 35% in relative to T1 jam. The water activity ( $a_w$ ) and total soluble solids (TSS) content of jams were in the range of 0.76-0.81, and 67-70 Brix, respectively. Partially (T2) and fully (T3) replacing sucrose with maltitol in jams significantly increased the  $a_w$  ( $P<0.05$ ). The use of maltitol significantly increased the lightness ( $L^*$ ) value and reduced the redness ( $a^*$ ) of the jams ( $P<0.05$ ), but minimally altered jam's yellowness ( $b^*$ ). The antioxidant, texture, and sensorial properties showed slightly variations between the prepared jams. Overall, the experimental findings verify the prospects of maltitol as a sweetener in the jam product

# Session 4

**Afternoon, March 27, 2019 (Wednesday)**

**Time: 16:50~18:20**

**Venue: Conference Room**

**6 presentations-Topic: “Food Processing and Packaging”**

**Session Chair: Prof.Kokyo Oh**

M2019 Presentation 4 (17:35~17:50)

Production of Tofu Using Electrocoagulation Technique for Protein Precipitation

**Yardfon Tanongkankit** , Parin Khongkrapan

Maejo University, Thailand

*Abstract*—This research was aimed to study a process for production of tofu using electrocoagulation. The effects of voltage at 10, 20 and 30 V and processing time at 30, 60, 90, 120, 150 and 180 min on a percent yield of curd, texture and color of tofu were investigated. The comparison between tofu produced by electrocoagulation and commercial tofu in the terms of texture and color was also determined. The results showed that increase in voltage led to higher percent yield of curd. The voltage of 30 V with processing time at 180 min exhibited the highest percent yield of curd (46.24%). Moreover, it was observed that texture and color of tofu produced using electrocoagulation at 30 V for 180 min was not significantly different when compared to that of commercial tofu with the color value presenting in the terms of L\* (lightness), a\* (redness), b\* (yellowness) and the total color difference ( $\Delta E$ ) and also the textural properties showing in the terms of hardness ( $5,113.83 \pm 15.10$  N), springiness ( $0.87 \pm 0.01$  s/s) and gumminess ( $2,697.77 \pm 5.26$  N).

# Session 4

**Afternoon, March 27, 2019 (Wednesday)**

**Time: 16:50~18:20**

**Venue: Conference Room**

**6 presentations-Topic: “Food Processing and Packaging”**

**Session Chair: Prof.Kokyo Oh**

M2005 Presentation 5 (17:50~18:05)

The effects of wrapping paper coated with banana flour on physical properties of banana fruit  
**Natcharee Jirukkakul**, Nachayut Chanshotikul,  
Department of Agro-Industry, Faculty of Applied Science and Engineering, Nong Khai  
Campus, Khon Kaen University,Thailand

*Abstract*—A research was conducted to find out the amounts of the extracts produce by the three different indigenous varieties of groundnut (*Arachis hypogea* species) grown in Sokoto State. The varieties were Kamfala (creeping type), Yarmadani (erect type) and Bahausa (Bunch type). Each variety was planted and laid at randomized complete block design (RCBD) with four replications in the 70x70 meters field. The plot size was 4x4 meters. At the end of the season, 8.12 kilogram of raw groundnut was harvested randomly from each field. The same quantity of raw groundnuts were used as samples. All the three different samples of 8.12kg from each variety was replicated three times to obtain an average result of each. The same quantity of each sample was replicated three times and processed by drying, shelling, cleaning, roasting and skinning. The processed samples became 4.5kg for each variety, which has been further kneaded and squeezed for oil. The residues after the extraction of oil were fried to form a groundnut cake. The data obtained were analyzed statistically using analysis of variance according to Gomez (1984) procedure for randomized complete block design. All the three varieties produced the same mean values of the shell quantity of 1.6kg. Kamfala variety produced the highest mean values of 2.80kg groundnut oil and 3.0kg of groundnut cake. Yarmadani produced 1.80kg of groundnut oil and 2.50kg of groundnut cake. Bahausa variety produced the lowest with 1.50kg of groundnut oil and 2.30kg of groundnut cake. However, it has been recommended that the Sokoto State Government should provide loan and improved machines in order to increase production of groundnut oil and cake by the small scale industry. Moreover, the cultivation of indigenous variety especially Kamfala variety, should be encouraged to supply more groundnut oil for the consumers who mostly prefer the groundnut oil for daily consumption use.

# Session 4

**Afternoon, March 27, 2019 (Wednesday)**

**Time: 16:50~18:20**

**Venue: Conference Room**

**6 presentations-Topic: “Food Processing and Packaging”**

**Session Chair: Prof.Kokyo Oh**

M2023-A Presentation 6 (18:05~18:20)

A TRANSIENT SCALING LAW BASED ON DYNAMIC BREAKUP POTENTIAL FOR THE PREDICTION OF DROPLET SIZES FOR OIL-IN-WATER EMULSION SYSTEMS ASSISTED BY ULTRASOUND CAVITATION

SANGEETAPRIVYA P. SIVA, KIEN-WOH KOW, CHUNG-HUNG CHAN, SIAH YING TANG, **YONG KUEN HO**

Monash University Malaysia

*Abstract*—The dynamics of droplet breakup during emulsification is a complicated process due to the interplay between multiple physico-chemical and hydrodynamic factors, especially in an energy-intensive ultrasound-assisted emulsification process. In this work, by mapping the physical processing parameters of ultrasound emulsification into a reduced domain that is governed by the power density and the initial average droplet diameter, a dimensionless parameter that resembles the dynamic breakup potential ( $\eta$ ) was established via dimensional analysis. In addition to shedding important insights into the emulsification process,  $\eta$  further facilitates the establishment of a transient scaling relationship that is a function of the characteristic value ( $a$ ) of the emulsion system. Experimental case study on a cellulose nanocrystals (CNC)-based olein-in-water emulsion system prepared via ultrasound cavitation confirmed the validity of the scaling relationship and sub-universal self-similarity was observed. Using the proposed model, good predictions of the transient of droplet size evolution were attained where the value of  $\eta$ , i.e. the proportionality constant, can be conveniently computed using data from a single time point. Application on other emulsion systems further suggested that the value of  $a$  possibly indicates the relative minimum size limit of a particular fluids-emulsifier system. Our approach is general, which encourages widespread adoption for emulsification related studies.



# Session 5

**Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.**

**Morning, March 28, 2019 (Thursday)**

**Time: 9:30~10:30**

**Venue: Conference Room**

**4 presentations-Topic: “Agricultural Environment and Resources”**

**Session Chair: Prof.Kokyo Oh**

M5002 Presentation 1 (9:30~9:45)

Alternation of the vegetation type for reducing of potential contaminated overland sediment from the upstream area of the Mae Tao Basin Thailand.

**Komsoon Somprasong**

Department of Mining and petroleum Engineering

Faculty of Engineering, Chiang Mai University

Chiang Mai, Thailand

*Abstract*—The Mae Tao basin, reported as the largest zinc deposition area of Thailand, has been considered to be a remote cadmium (Cd) - contaminated area since 2002. According to the reports from both government and private sectors, the agricultural area in the upstream of the basin were discovered to be one of potential cadmium sources. In this study, the integrated spatial technology between remote sensing, digital mapping, GIS, and RUSLE were applied to conduct the simulation of vegetation’s alternation to reduce the potential erosion of the area in the upstream of the basin. According to the study’s results the complex vegetation shows better capability in reducing the potential erosion. Additionally, overlapped cropping with straw mulch cover is the practice that contains the highest erosion reduction efficiency at 92.05% while vetiver, supported by many researches can reduce 62.07% of the erosion at the earlier state..

# Session 5

**Morning, March 28, 2019 (Thursday)**

**Time: 9:30~10:30**

**Venue: Conference Room**

**4 presentations-Topic: “Agricultural Environment and Resources”**

**Session Chair: Prof.Kokyo Oh**

M5029 Presentation 2 (9:45~10:00)

Heavy Metals Bioavailability under Aerobic and Anaerobic Condition in Soil and Bubut Rice Plant Cultivated at Crocker Range, Borneo (Malaysia)

**Diana Demiyah Mohd Hamdan**, Nurain Nabihah Roslan, Sahibin Abd Rahim

Faculty of Science and Natural Resources, Universiti Malaysia Sabah, Kota Kinabalu, Malaysia

*Abstract*—Bioaccumulation of heavy metals in rice that can pose health risk is a grave concern as more than half of world populations are rice consumers. Bioaccumulation of heavy metals in rice grain depends on the heavy metal bioavailability in the medium that provide nutrient sources to plant. Throughout paddy life-cycle from seed germination to development of mature seeds, paddy plants cultivated in flooded field are exposed to alternating anaerobic condition and aerobic condition. The aim of this study is to assess whether these two different paddy field conditions influence heavy metal bioavailability in soil and heavy metal accumulation in Bubut paddy plants cultivated at highland of West Coast Sabah, Malaysia. Heavy metal uptake characteristic of Bubut paddy in different part (root, straw and grain) were also determined for baseline data that can be used for selective breeding or phytomining. Bubut paddy plants were uprooted together with soil that were collected randomly at 3 months old age (reducing (anaerobic) condition) and harvest season (oxidizing (aerobic) condition) for heavy metal analysis by inductively coupled plasma optical emission spectrometry (ICP-OES). Higher bioavailability of heavy metal at oxidizing condition in soil and Bubut paddy plant were observed compared to reducing condition. Bubut paddy was found to be a potential candidate for Cr, Ni and Zn phytoextraction. Heavy metal concentration in Bubut rice grain is below the maximum permissible limit of Malaysia Food Regulation 1985 (MFR 1985). A comprehensive water irrigation management plan is required to strategically develop at West Coast Sabah to reduce bioavailability of toxic heavy metal and reduce heavy metal toxicity risk in rice consumption.

# Session 5

**Morning, March 28, 2019 (Thursday)**

**Time: 9:30~10:30**

**Venue: Conference Room**

**4 presentations-Topic: “Agricultural Environment and Resources”**

**Session Chair: Prof.Kokyo Oh**

M5011 Presentation 3 (10:00~10:15)

Effect of Modified Leonardite on Growth and Fruit Yield of Cucumber (*Cucumis sativus* L.)

**Junya Singkham**, Parichart Ditthakit

School of Agriculture and Cooperatives, Sukhothai Thammathirat Open University, Thailand

*Abstract*—Leonardite is readily available and high in organic matter. It has potentially positive effect on plant growth and yield. The experiment evaluated the effect of modified leonardite on cucumber (*Cucumis sativus* L.). Four treatments including untreated control, modified leonardite at the rate of 15.62 t ha<sup>-1</sup>, modified leonardite at the rate of 31.25 t ha<sup>-1</sup> and modified leonardite at the rate of 46.87 t ha<sup>-1</sup> were arranged in a randomized completely block design with four replications. Data were recorded for soil properties after application of modified leonardite, plant height, number of leaves and yield at 10, 20, 30 and 40 days after planting. Modified leonardite applied soils led to increase in organic matter and potassium contents in the soil. Cucumber treated with modified leonardite increased plant height. The application with high rate of modified leonardite had the highest number of leaves at 20 and 30 days after planting. Number of fruits and fresh weight of fruits showed significant response to the high rate of modified leonardite compared with other treatments. Therefore, the application of modified leonardite had positive effect on plant growth and improved production of cucumber plants.

# Session 5

**Morning, March 28, 2019 (Thursday)**

**Time: 9:30~10:30**

**Venue: Conference Room**

**4 presentations-Topic: “Agricultural Environment and Resources”**

**Session Chair: Prof.Kokyo Oh**

M5012-A Presentation 4 (10:15~10:30)

An IP Multicast Framework for Routable Sample Value Communication in Transmission Grids  
Proper utilization of tea waste by converting to bioenergy

**Animesh Sarkar**, Sanjida Islam and Ramkrishna Saha

Department of Food Engineering and Tea Technology, Shahjalal University of Science and Technology, Sylhet 3114, Bangladesh

*Abstract*—Tea waste management is a great challenge in the most tea processing country including Bangladesh. Although tea waste is used as a fertilizer, but its economic value is comparatively lower than its existence. This study identified the types and sources of solid wastes generated during tea production mainly through observations, the identified solid wastes at drier, sorting of tea production and after consumption. Solid waste in tea factory was found to be 0.01% of the total tea production. The calorific value was measured for converting the tea waste into bio-energy while higher heating value of tea waste from drier upper side, sorting side, drier side and tea waste created after consumption were determined by ultimate analysis. Fuel properties for the combustion analysis of biomass can be conveniently grouped into physical properties. The carbon content of selected biomass varied from about 47.4% to 53.5%. The hydrogen content of the species varies from 5.8% to 6.7%. Oxygen content ranges from 35.5% to 41.6%, S is <0.1% and N ranges from 0.5-1.6%. The higher heating values (HHVs) of selected samples were correlated with their lignin contents. Tea waste after consumption contained maximum higher heating value...



<b>Coffee Break</b>	<b>10:30~10:50</b>
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## Session 6

**Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.**

**Morning, March 28, 2019 (Thursday)**

**Time: 10:50~12:05**

**Venue: Conference Room**

**5 presentations-Topic: “Botany and Plant Biotechnology”**

**Session Chair: Prof. Shamsul Haque Prodhan**

M5033-A Presentation 1(10:50~11:05)

PsCIPK and PsCBL genes confer partial abiotic stress tolerance in Citrus

Md. Nazmul Hasan, Hammadul Hoque, **Shamsul H. Prodhan**

Department of Genetic Engineering and Biotechnology, Shahjalal University of Science and Technology, Sylhet

*Abstract*—Genetic transformation with abiotic stress tolerant genes in Citrus species is essential for using areas affected by abiotic stresses. Abiotic stress tolerant PsCBL and PsCIPK genes isolated from *Pisum sativum* were transformed into two Citrus species, Citrus reticulata Blanco and Citrus sinensis L. Osbeck through Agrobacterium-mediated transformation method. Mature seed derived calli of two cultivars were infected with Agrobacterium tumefaciens LBA4404 harboring PsCBL and PsCIPK genes. The infected calli were co-cultured in dark condition and later on washed with antibiotic solution and transferred to selection medium. Preliminary resistant calli were recovered and regenerated to plantlets. Maximum regeneration rate was  $61.11 \pm 1.35\%$  and  $55.55 \pm 1.03\%$  respectively. The genetic transformation was confirmed by performing  $\beta$  glucuronidase (GUS) assays and subsequent PCR amplification of the GUS gene. The transformation rates of the two cultivated species were higher than previous reports. Maximum transformation frequencies were found when bacterial OD 600nm was 0.5 and concentration of acetosyringone was 150  $\mu$ M. In-vitro evaluation of drought and salt tolerance of transgenic plantlets were done and transgenic plantlets showed better performance than the wild plants. The present research work demonstrates that transformation of Citrus plants with PsCBL and PsCIPK genes result in improved abiotic stress tolerance.

## Session 6

**Morning, March 28, 2019 (Thursday)**

**Time: 10:50~12:05**

**Venue: Conference Room**

**5 presentations-Topic: “Botany and Plant Biotechnology”**

**Session Chair: Prof. Shamsul Haque Prodhan**

M2027 Presentation 2 (11:05 ~11:20)

Antioxidant activity and components of the ethanol extract of sisal waste  
**Sidan Luo** , Zhaomei Wang, Die Hu and Jian-Yong Wu,  
South China University of Technology

*Abstract*—Agave sisalana can be used as medicinal plant to treat some oxidative stress-caused diseases. This study aimed to fractionate and evaluate the antioxidant components of the ethanol extract from sisal waste. The crude ethanol extract of sisal waste was fractionated into petroleum ether fraction (PEF), ethyl acetate fraction (EAF), n-butanol fraction (BF) and water fraction (WF). Among this different fractions, EAF had the strongest reducing power and radical scavenging capacity with IC<sub>50</sub> of 40 mg/mL against DPPH• and 870 mg/mL against OH•, respectively, comparable to or even lower than that of BHT. EAF also had the highest content of total phenolic (214.6 mgGAE/g) and total flavonoid (179.8 mgRE/g). HPLC-MS analysis revealed the major components of EAF were flavanols and flavanones compounds.

# Session 6

**Morning, March 28, 2019 (Thursday)**

**Time: 10:50~12:05**

**Venue: Conference Room**

**5 presentations-Topic: “Botany and Plant Biotechnology”**

**Session Chair: Prof. Shamsul Haque Prodhan**

M5032 Presentation 3 (11:20~11:35)

Optimization of Explant Surface Sterilization Conditions and Multiple Shoot Induction in Threatened Plant *Phanera sirindhorniae*

Sukanya Sirimat, **Arpakorn Sakulsathaporn**

School of Natural Resource and Environmental Management, Faculty of Applied Science and Engineering,

Khon Kaen University, Nong Khai Campus, Nong Khai 43000

*Abstract*—*Phanera sirindhorniae* is a rare species of ornamental and medicinal plants distributed in the upper Northeastern Thailand. It contains many bioactive compounds including tyrosinase inhibitor, which can be used for blocking melanin synthesis of the melasma process. This species has been listed as a threatened species by the Forest Herbarium Department of National Parks, Wildlife and Plant Conservation of Thailand. In vitro propagation techniques for *P. sirindhorniae* are currently required to help the utilization and conservation of this species. In this study, sterilization steps of the explants were evaluated. The most effective procedure for sterilization with high survival rates is by using the shoot tips treated with 10% NaOCl for 10 min and then 10% NaOCl for 15 min and the nodal explants treated with 10% NaOCl for 10 min and then 5% NaOCl for 15 min. For propagation, shoot multiplication was studied by using shoot tips, nodal explants and cotyledonary nodes incubated on MS media supplemented with BAP at 1, 2, 3 and 4 mg/L for four weeks. The highest shoots were obtained on the MS medium containing 2 mg/L BAP with 4.00, 3.20 and 3.75 shoots per explants from shoot tips, nodal explants and cotyledonary nodes, respectively.

# Session 6

**Morning, March 28, 2019 (Thursday)**

**Time: 10:50~12:05**

**Venue: Conference Room**

**5 presentations-Topic: “Botany and Plant Biotechnology”**

**Session Chair: Prof. Shamsul Haque Prodhan**

M5014 Presentation 4(11:35~11:50)

Current Cacao OMICS and Future Prospects

**Ian Marc G. Cabugsa**, Joval Afalla, Marvin Jose Fernandez, Roger Tan, and Lydia Bajo.  
Mindanao State University – Iligan Institute of Technology, Chemistry Department,  
Philippines

*Abstract*—Theobroma cacao is one of the most highly valued and consumed crop in the world with Europe as the top consumer and Africa as the top producer. There has been a constant increase in cacao consumption and demand in the world and this trend will continue to 2020 as the International Cacao Organization (ICCO) has forecasted. This in turn, caused massive campaign both by the chocolate producers and tropical countries to cultivate cacao along with their existing crops. With the high demand for cacao, the technology in cacao farming must keep with the pace. The traditional farming will not suffice anymore are persistent problems like poor yield, pest and diseases, flood and drought and the heavy metal acquisition of the plant continues to hamper production. To address this issues in cacao production, crop scientists are looking for modern ways to provide answers and one of these answers is the application of OMICs in cacao science. After the complete cacao genome sequence was published, numerous researches in cacao omics have been conducted and this has slowly dissected the molecular mechanisms of cacao in terms of disease resistance, growth and development and its molecular composition. The future of cacao Omics is bright and the chocolate industry will ultimately benefit from this along with the cacao growing countries including the Philippines.



# Session 6

**Morning, March 28, 2019 (Thursday)**

**Time: 10:50~12:05**

**Venue: Conference Room**

**5 presentations-Topic: “Botany and Plant Biotechnology”**

**Session Chair: Prof. Shamsul Haque Prodhan**

M5036-A Presentation 5(11:50~12:05)

EVALUATION OF POD SHATTERING RESISTANCE OF SEVERAL SOYBEAN GENOTYPES USING OVEN-DRY AND SUN-DRYING METHODS

**Ayda Krisnawati**, M. Muchlish Adie

Doctoral Program of Agricultural Science, Faculty of Agriculture, University of Brawijaya, Jl. Veteran, Malang, East Java, Indonesia

*Abstract*—Pod shattering is one of sources of yield losses during soybean cultivation in the tropical area of Indonesia. The aim of the research was to identify the resistance of several soybean genotypes to pod shattering and the performance of its agronomic characters. The field study was conducted in South Lampung using twelve soybean genotypes. The experiment was arranged in a randomized block design with four replicates. Observation of pod shattering using oven-dry and sun-drying methods. The result showed that raises of oven treatment increase the pod shattering. The rate of shattering on oven temperature of 30 °C, 40 °C, 50 °C, and 60 °C were 0, 8.26%, 46.13%, dan 51.06%, respectively. The rate of shattering on 60 °C ranged from 3.62 – 87.23%. On sun-drying method, the rate of shattering after 15 days treatment was ranged from 0 – 67.36%. By using oven-dry method, it has successfully obtained two resistant varieties to pod shattering (Anjasmoro and G511H/Anj-1-3), whereas by using sun-drying method there were three resistant genotypes (Anjasmoro, G511H/Anj-1-3, G511H/Anjasmoro-1-4). The evaluation of shattering resistance using oven-dry method resulted a higher pressure than those of by sun-drying method. Anjasmoro variety and G511H/Anj-1-3 showed consistently resistant to pod shattering by both of methods. G511H/Anj-1-3 produced high yield, have large seed size and early days of maturity. Thus, the G511H/Anj-1-3 was potentially be developed in the tropical regions, especially in Indonesia. The availability of a high yield and resistant to pod shattering genotype will be beneficial to increase soybean productivity..

# Poster Session

**Morning, March 28, 2019 (Thursday)**

**Time: 9:30~12:05**

**Venue: Conference Room**

M5021-A Presentation 1

Taiwan green propolis promotes adipocyte differentiation and reduces lipolysis in response to norepinephrine stimulation

**Yu-Hsiang Yu**

Department of Biotechnology and Animal Science, National Ilan University, Yilan City, Taiwan

*Abstract*—The purpose of this experiment was to determine the effects of Taiwan green propolis on adipocyte differentiation and lipolysis of differentiated adipocytes. Confluent mouse mesenchymal stem cells were treated with adipogenic induction medium (insulin + dexamethasone + 3-isobutyl-1-methylxanthine) containing 5  $\mu$ g/ml of Taiwan green propolis for 2 days. After 2 days, the cells were maintained in growth medium containing 5  $\mu$ g/ml of Taiwan green propolis and insulin. Two days later, cells were cultured in growth medium for 4 day with a medium change every 2 day. After 8 day of culture, cells on the plates were stained with Oil-Red O to measure the degree of adipocyte differentiation. For lipolysis analysis, differentiated adipocytes were treated with 5  $\mu$ g/ml of Taiwan green propolis in combination with 1  $\mu$ M norepinephrine for 6 hours. At the end of the experiment, cellular mRNA and culture medium were analyzed. The results showed that Taiwan green propolis significantly enhanced adipocyte differentiation of mesenchymal stem cells after 8-day adipogenic induction, which was accompanied by an increase in intracellular triglyceride content ( $P < 0.05$ ) and adipogenic marker gene expression ( $P < 0.05$ ). Taiwan green propolis was able to alleviate norepinephrine-induced lipolysis in differentiated adipocytes, which was accompanied by a decrease in lipolytic gene expression. The results showed that Taiwan green propolis could regulate lipid metabolism in adipocytes by increasing adipocyte differentiation and reducing lipolysis.

# Poster Session

**Morning, March 28, 2019 (Thursday)**

**Time: 9:30~12:05**

**Venue: Conference Room**

M5026-A Presentation 2

A novel method for PLA degradation by using the enzyme produced from *Actinomadura keratinilytica* strain T16-1 and scale up in a 5-L bioreactor.

**Titiporn Panyachanakul**, Bodeesorn Sorachart, Saisamorn Lumyong, Wanlapa Lorliam, Vichien Kitpreechavanich and Sukhumaporn Krajangsang  
Department of Biology, Faculty of Science, Srinakharinwirot University, Thailand

*Abstract*—Nowadays, plastics are used to produce many kinds of product which make our life easy. Since 1950s, plastic usage has steadily been growing every year because of its properties such as versatile, lightweight, flexible, strong and inexpensive. Meanwhile, plastic pollution becomes a serious problem for the earth because it takes many years for degradation. Moreover, it affects to wildlife, marine life, and human as well that lead to global environment problems. Therefore, biodegradable plastic is interesting to replace the petrochemical plastic. Poly (lactic acid) or PLA is a biodegradable plastic that is derived from agricultural product and can be degraded by various enzyme produced by microorganisms. The aims of this study are to scale up of PLA degradation by crude PLA degrading enzyme produced by *Actinomadura keratinilytica* strain T16-1 in the 5-L stirrer bioreactor and develop the biodegradation process of PLA by using dialysis method. The best condition for PLA degradation in the 5-L bioreactor by using the enzyme produced by the strain T16-1 was controlled pH at 8.0, 50 rpm at 60 °C. The lactic acid titers (mg/L) was 16,651 mg/L and a conversion efficiency was 89% after 72 h. However, during the PLA degradation process we found that lactic acid is a potential inhibitor which can inhibit the PLA degradation. Therefore, the dialysis method was applied to reduce the concentration of lactic acid during the process. The dialysis method achieved PLA degradation by 99.93% weight loss while the PLA degradation without using the dialysis method achieved less than approximately 14.75%. Consequently, the dialysis method was applied for degradation of a commercial PLA material (tray) that shown conversion efficiency about 32%, which is 6-fold higher than that without dialysis. This is the first report demonstrating the scaling up of PLA degradation in the 5-L bioreactor and the evaluation of a potential method for enhancing PLA degradation efficiency.

# Poster Session

**Morning, March 28, 2019 (Thursday)**

**Time: 9:30~12:05**

**Venue: Conference Room**

M5031-A Presentation 3

Cucumber-derived carbon dots in sensing of agricultural pesticides

**Roopkumar Sangubotla** and Jongsung Kim

Gachon University, South Korea.

*Abstract*—Recently carbon dots (CDs) have gained much importance in the sensing of several organic and inorganic substances. By considering the importance of pesticides, it is useful for developing a robust CDs exerted in agriculture. But unfortunately, pesticides such as organophosphates and carbamates exerted potential hazardous effects on human health and other creatures. For instance, sensing of pesticides become an important aspect in agricultural field. However, commercial and other chemical conjugated CDs have potential drawbacks. Regarding this, cucumber-derived CDs have potential importance in the sensing of pesticides. Furthermore, cucumber-derived CDs were demonstrated better results in the photoluminescence (PL) sensing of pesticides.

# Poster Session

**Morning, March 28, 2019 (Thursday)**

**Time: 9:30~12:05**

**Venue: Conference Room**

M5027-A Presentation 4

Screening of Bacterial Antagonist for Biological Control of Asiatic Citrus Canker Disease in Lime

**Natthida Sudyong**, Shinji Tokuyama, Sukhumaporn Krajangsang, Onanong Pringsulaka,,Siriruk Sarawaneeyaruk

Department of Biology, Faculty of Science, Srinakharinwirot University, Thailand

*Abstract*—Asiatic citrus canker is an epidemic disease caused by *Xanthomonas citri* subsp. *citri* (Xcc). It has reduced citrus production and hindered international trade. Accordingly, an effective strategy is required to control and prevent citrus plant from Xcc infection. The aim of this research is to screen efficient bacterial antagonist against Xcc causing current outbreak and to test their plant growth promoting (PGP) characteristics. Firstly, we isolated Xcc pathogen from canker lesion on lime leaves and twigs using the semi-selective medium. All suspected Xcc isolates were confirmed by pathogenicity test and PCR method. Bacterial antagonist was also isolated from lime leaves and twigs. The result of dual culture method indicates that *Bacillus velezensis* strain SWUA08 and *Pseudomonas aeruginosa* strain SWUC02 could inhibit Xcc in vitro. Furthermore, the cell-free supernatant of both isolates also have antibacterial activity. *P. aeruginosa* strain SWUC02 shows the ability to produce siderophore, hydrogen cyanide, ACC deaminase and IAA. In addition, it has the capacity to solubilize phosphorus and fix atmospheric nitrogen as well. For PGP characteristic of *B. velezensis* strain A08, it shows the ability to produce siderophore and IAA and to solubilize phosphorus. Consequently, both of bacterial antagonists can essentially be as biocontrol agents for controlling of Asiatic citrus canker and for promoting plant growth under field condition.



<b>Lunch</b>	<b>12:05</b>
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# One Day Visit

**March 29, 2019. (Friday) 9:10~17:00**

*(Tip: Please arrive at "HOTEL SUNROUTE PLAZA SHINJUKU" at 9:00 a.m. The following places are for references, and the final schedule should be adjusted to the actual notice.)*

## 1. 9:10 Ueno Park

Ueno Park (うえのこうえん) is located in Taito District, Tokyo, Japan, with an area of 530,000 square meters. Ueno Park is the first park in Japan, with a rich history and culture and beautiful scenery. In the gate of Ueno Park, you can see the bronze statue of the great general of the Meiji era, Xixiang Longsheng. In 1650, the Toshogu Shrine, built for Tokugawa Ieyasu, was built with magnificent architecture. There are 95 stone lanterns and 195 bronze lanterns on both sides of the road. The largest lake in the park is a place where countless birds move to the docks. There are big Buddha pagodas, five shrines, folk museums and museums. Whenever the spring is in full bloom, this is the best place to see cherry blossoms.



## 2. 12:00 Lunch

## 3. 14:00 Visit Sensoji Temple



Located in Taito-ku, Tokyo, Sensoji Temple is an existing place for people to play in the "Edo style" of Japan. Sensoji Temple is the oldest temple in Tokyo. According to legend, in the thirty-sixth year of the Emperor of the Ancient Emperor (AD 628), two fishermen were fishing in Miyato River, and a golden statue of 5.5 cm high was picked up. Nearby people raised funds to build a temple to worship the

Buddha statue.

## 4. 16:00 Tokyo Tower

Tokyo Tower (Japanese: Tokyo タワー) is a landmark building in Tokyo. It is located at Shiba Park, Minato-ku, Tokyo, 332.6 meters high. The color of the Tokyo Tower is red and white, because of the air traffic control regulations for identification. In recent years, the public's landscape requirements have increased, and the tower no longer has color restrictions, but the original colors are thus preserved. The lighting is designed by the world famous lighting designer Ishii Shogo, and the lighting time is between sunset and midnight. The color of the light changes with the seasons, white in summer and orange in spring, autumn and winter.











## Feedback Information

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2019 HKCBEEES TOKYO CONFERENCE

<p>Would you please list the top 3 to 5 universities in your city?</p>	
<p>Other Field of Interest</p>	
<p>Any Other Suggestions/Comments</p>	

Thank you for taking time to participate in this conference evaluation. Your comments will enable us to execute future conferences better and tailor them to your needs! More conference information could be found in <http://www.cbees.org/list-15-1.html>