2016 APCBEES KYOTO CONFERENCE ABSTRACT

December 25-27, 2016

Kyoto, Japan

Hotel Co-op Inn Kyoto

(ホテルコープイン京都)

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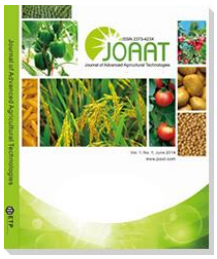
2016 APCBEES Kyoto Conference Introductions

Welcome to CBEES 2016 conference in Kyoto, Japan. The objective of the Kyoto 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 Food and Agricultural Sciences, Environment Science and Biotechnology, Environment Pollution and Prevention and Chemical Engineering and Applications.

2016 4th International Conference on Food and Agricultural Sciences (ICFAS 2016)



❄ **Paper publishing and index:** ICFAS 2016 papers will be published in **Journal of Advanced Agricultural Technologies (JOAAT, ISSN:2301-3737)**, which will be included in Ulrich's Periodicals Directory, Google Scholar, Engineering & Technology Digital Library, Wourldcat and sent to be reviewed by Ei Compendex and ISI Proceedings or **International Journal of Food Engineering (IJFE, ISSN: 2301-3664)**, which will be included in the Engineering & Technology Digital Library, and indexed by WorldCat, Google Scholar, DOAJ, Doi system.

❄ **Conference website and email:** http://www.icfas.org/; icfas@cbees.net.

2016 6th International Conference on Environment Science and Biotechnology (ICESB 2016)

❄ **Paper publishing and index:** ICESB 2016 papers will be published in **Journal of Environmental Science and Development (IJESD, ISSN:2010-0264)** and all the papers published in IJESD will be included by Chemical Abstracts Services (CAS), CABI, DOAJ, Ulrich Periodicals Directory, Engineering & Technology Digital Library, Electronic Journals Library, Crossref, ProQuest.

❄ **Conference website and email:** http://www.icesb.org/; icesb@cbees.org

2016 4th International Conference on Environment Pollution and Prevention (ICEPP 2016)

- **Paper publishing and index:** ICEPP 2016 papers will be published in Journal of Environmental Science and Development (IJESD, ISSN:2010-0264) and all the papers published in IJESD will be included by Chemical Abstracts Services (CAS), CABI, DOAJ, Ulrich Periodicals Directory, Engineering & Technology Digital Library, Electronic Journals Library, Crossref, ProQuest

- **Conference website and email:** http://www.icepp.org/; icepp@cbees.net

2016 3rd Journal Conference on Chemical Engineering and Applications (JCCEA 2016 3rd)

- **Paper publishing and index:** JCCEA 2016 papers will be published International Journal of Chemical Engineering and Applications (IJCEA ISSN: 2010-0321 available at: http://www.ijcea.org/list-6-1.html), and distributed at the conference.

- **Conference website and email:** http://www.ijcea.org/jccea/3rd/; jccea03@iacsitp.com

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 **40** Minutes including Presentation and Question &Answer
Plenary Speech: about **20** Minutes including Presentation and Question &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

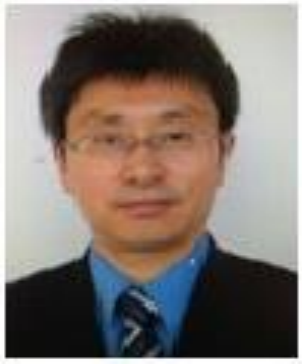
One Best Oral Presentation will be selected from presentation session, and the Certificate for Best Oral Presentation will be awarded at the end of each session on December 25 and December 26, 2016.

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 Profitable System for Phytoremediation of Contaminated Soils with Resourceful Plants"

Kokyo Oh

Abstract: Contamination of agricultural soils with heavy metals has been a worldwide concern over the last decades, especially in Asian countries, where urbanization and industrialization are rapidly forwarding. It is important to find suitable technologies to remediate the contaminated agricultural soils without destroying soil productivity and influencing the economic income of famers. One of the choices is phytoremediation, an emerging low cost and ecofriendly technology with the use of plants to remove heavy metals from the environment or to render them harmless. So far, the heavy metal hyperaccumulating plants have been widely studied and involved in phytoremediation of contaminated soils. However, as the heavy metal hyperaccumulating plants usually had extremely high heavy metal contents after harvested, which need incineration treatment to the harvested biomass. In this way, the conventional phytoremediation needs cost year by year, and the owners of the contaminated sites have no income during the remediation period. Therefore, the practical application of phytoremediation has been greatly limited.

In order to promote the practical application of soil phytoremediation, in this study we suggested a profitable strategy for both utilization and remediation of contaminated soils with use of resourceful plants such as biofuel plants and ornamental plants. In this strategy, the owners of contaminated sites possibly obtain income through selling the biofuel plants to biofuel factories and the flowers to the market, thus the practical application of phytoremediation can be effectively promoted. To test the feasibility of the suggested strategy, two case studies were carried out in the heavy metal contaminated fields with biofuel plants and ornamental plants, respectively. The results showed that both biofuel plants and ornamental plants from experimental fields could not only accumulated considerable levels of heavy metals but generated economic benefits to the owners of soil contaminated sites through providing biofuels and marketing flowers, respectively. (*This work was supported by JSPS KAKENHI Grant Number JP16H05633 and 23405049).

Keynote Speaker II

Prof. Chiharu Ishii

Hosei University, Japan

Chiharu Ishii received his PhD in Mechanical Engineering from Sophia University, Japan in 1997. From 2002 to 2009, he was an Assistant Professor with Kogakuin University. Currently, he is a Professor at the Department of Mechanical Engineering, Hosei University, Japan. His research interests are in medical robotics, assistive technology and robust control. He is a member of JSME, SICE, RSJ, IEEJ and IEEE.

Topic: “Applications of Robot Technology to Devices for Assistive Technology”

Chiharu Ishii

Abstract: Japan is facing a serious problem for super-aged society which no country in the world has experienced. With this progress, demand for nursing care of elderly people is increasing. One of the solutions to solve this problem is an application of the Robot Technology (RT). In this talk, some assistive devices developed in my laboratory with application of RT are mentioned.

The lightweight power assist suit to reduce care giver’s burden in transfer work, leg-type powered exoskeleton for rehabilitation of standing up motion for hemiplegic patients, control system of the electric wheelchair based on user's biosignals, such as EMG, EOG and EEG, and sensory feedback device for myoelectric prosthetic hand, are introduced.

Plenary Speaker I

Assoc. Prof. Teppei Nunoura

The University of Tokyo, Japan

Teppei Nunoura was born in Hakodate, Japan, in 1975. He received his Ph.D. degree in Department of Urban Engineering, The University of Tokyo, Japan, in 2003. After his graduation he worked as apost-doctoral fellow in Department of Mechanical Engineering, HiroshimaUniversity and as a research assistant in Hawaii Natural Energy Institute,University of Hawaii at Manoa. He is currently an associate professor at Environmental Science Center, The University of Tokyo. He also belongs to Department of Environment Systems, Graduate School of Frontier Sciences in thesame university. His research interest includes hazardous wastewater treatmentand waste-to-energy conversion. Especially, he is working on physicochemicaltreatment of refractory wastes using supercritical water technique.

Topic: “Management of Chemically Hazardous Laboratory Wastes in the University of Tokyo”

Teppei Nunoura

Abstract: Laboratory wastes generated in universities and research institutes contain highly diverse chemical substances and their compositions change temporally depending on the progress of research activities, which makes their management and treatment difficult. Considering the various hazards of chemical compounds contained in those wastes, strict management of laboratory wastes as well as that of chemical reagents is one of the most important responsibilities of universities and research institutes. In the University of Tokyo, more than 200 cubic meters of waste liquids and around 10 tonnes of waste solids are annually generated, and Environmental Science Center is in charge of their management. The Center regularly collects chemically hazardous wastes from laboratories and carries out necessary procedures for the entrustment of their treatment to the external waste disposal operators. For the purpose of proper waste management as well as safe operation and environmental conservation, the Center has established three systems, i.e., the license system, the segregation rules, and the inspection system. Based on these systems, the Center has been fulfilling the duty of chemically hazardous laboratory waste management successfully. In this speech, I am going to describe these three systems for the hazardous waste management in detail. In addition, I will introduce our new challenge in developing a treatment method for highly refractory waste materials.

Plenary Speaker II

Assoc. Prof. Chi-wai KAN

Institute of Textiles and Clothing, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong

Dr. Kan graduated from Hong Kong Polytechnic with a BSc in Textile Chemistry. He gained his PhD degree from the Hong Kong Polytechnic University. He had worked in private and public sectors in the area of textile evaluation and safety and health management for more than five years before joining the Institute. His main duties in the Institute are in the area of teaching colouration and finishing. Dr. Kan's research interests are also in the area of colouration and finishing.

Dr. Kan holds the professional qualification of Chartered Colourist, Chartered Textile Technologist and Chartered Safety and Health Practitioner; also Fellowship of the Society of Dyers and Colourists and Textile Institute, U.K. In addition, Dr. Kan is a member of Royal Society of Chemistry, Institution of Occupational Safety and Health and Hong Kong Institution of Textile and Apparel.

Topic: “Dyeing Cotton with Reactive Dyes Using Solvent-assisted Dyeing System”

Chi-wai Kan

Abstract: In this study, the dyeability of cotton fabrics with reactive dye, in non-aqueous solvent medium of heptane and octane was examined using reverse-micellar approach comprising of poly(ethylene glycol)-based surfactant. Experimental results revealed that reactive dye was satisfactorily encapsulated in the reverse micelle under the optimised process parameters as measured by the colour yield. The dyeability of cotton fibre with reactive dye from the reverse micellar solution was significantly improved even in the absence of electrolytes. Optimisation of dyeing and fixation process could be achieved in a one-bath reverse-micelle solution. Experimental results revealed that dyeability in the solvent-assisted dyeing process is better than that in conventional water-based dyeing without incorporation of electrolytes. The scanning electron microscopic (SEM) images showed no obvious surface damage from heptane or octane but some microfibrils were noticed.

Acknowledgement

This is a research project funded by Innovation and Technology Fund (ITF) with title “A Novel Cotton Dyeing Process Using Surfactant as Reactive Dye Carrier” (ITS/051/15). Author would like to thank the financial support by ITF.

Brief Schedule for Conference

<table>
<tr><td rowspan="6">Day 1</td><td colspan="2">December 25, 2016 (Sunday)
Arrival Registration (9:00-17:15)</td></tr>
<tr><td>Opening Remarks & Keynote Speech I
Venue: 204 Conference Room
13:00~13:50</td><td>Plenary Speech I
Venue: 204 Conference Room
13:50~14:10</td></tr>
<tr><td colspan="2">Coffee Break & Photo Taking 14:10~14:45</td></tr>
<tr><td>Session-1: 14:45~17:15
Venue: 204 Conference Room
10 presentations-Topic: Environmental Science and Engineering</td><td>Session-2: 14:45~17:15
Venue: 205 Conference Room
10 presentations-Topic: Environmental Science and Engineering</td></tr>
<tr><td colspan="2">Poster Session</td></tr>
<tr><td colspan="2">Time: 13:00~17:15
Venue: 204 Conference Room
7 presentations-Topic: Environmental Science and Engineering</td></tr>
<tr><td rowspan="7">Day 2</td><td colspan="2">December 26, 2016 (Monday)
Arrival Registration (9:00~17:35)</td></tr>
<tr><td colspan="2">Morning Conference</td></tr>
<tr><td>Opening Remarks & Keynote Speech II
Venue: 201 Conference Room
9:00~9:50</td><td>Plenary Speech II
Venue: 201 Conference Room
9:50~10:10</td></tr>
<tr><td colspan="2">Coffee Break & Photo Taking 10:10~10:40</td></tr>
<tr><td colspan="2">Session-3: 10:40~12:10
Venue: 201 Conference Room
6 presentations-Topic: Environmental Science and Engineering</td></tr>
<tr><td colspan="2">Lunch： 12:10~13:00
Venue: Hotel Restaurant</td></tr>
<tr><td colspan="2">Afternoon Conference</td></tr>
</table>

<table>
<tr><td></td><td>Session-4: 13:00~15:00
Venue: 203 Conference Room
8 presentations-Topic: Environmental Science and Engineering</td><td>Session-5: 13:00~14:45
Venue: 204 Conference Room
7 presentations-Topic: Food Science and Engineering</td></tr>
<tr><td></td><td colspan="2">Session-6: 13:00~15:00
Venue: 205 Conference Room
8 presentations-Topic: Agricultural Science and Engineering</td></tr>
<tr><td></td><td colspan="2">Coffee Break 15:00~15:20</td></tr>
<tr><td></td><td>Session-7: 15:20~17:35
Venue: 203 Conference Room
9 presentations-Topic: Environmental Science and Engineering</td><td>Session-8: 15:20~17:20
Venue: 204 Conference Room
8 presentations-Topic: Food Science and Engineering</td></tr>
<tr><td></td><td colspan="2">Session-9: 15:20~17:05
Venue: 205 Conference Room
7 presentations-Topic: Chemical Engineering Technology and Bioengineering</td></tr>
<tr><td></td><td colspan="2">Poster Session</td></tr>
<tr><td></td><td>Time: 13:00~17:20
Venue: 204 Conference Room
3 presentations-Topic: Food Science and Engineering</td><td>Time: 13:00~17:05
Venue: 205 Conference Room
3 presentations-Topic: Agricultural Science and Engineering</td></tr>
<tr><td></td><td colspan="2">Dinner:18:00
Venue: Hotel Restaurant</td></tr>
<tr><td>Day 3</td><td colspan="2">One Day Tour</td></tr>
</table>

Tips: Please arrive at conference room 10 minutes before the session beginning to upload PPT into the conference laptop.

Detailed Schedule for Conference

December 25, 2016 (Sunday)

9:00~17:15	**Arrival and Registration** **Venue: In the lobby** **(Keynote Speech & Conference Presentations: 13:00~17:15)** **204−205 Conference Room**

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 Oral Presentation will be selected from each oral presentation session, and the Certificate for Best Oral Presentation will be awarded at the end of each session on December 25 and December 26, 2016.

13:00~13:50	 **Opening Remarks & Keynote Speech I** Prof. Kokyo Oh Center for Environmental Science in Saitama, Japan Topic: "Development of Profitable System for Phytoremediation of Contaminated Soils with Resourceful Plants"
13:50~14:10	 **Plenary Speech I** Assoc. Prof. Teppei Nunoura The University of Tokyo, Japan Topic: "Management of Chemically Hazardous Laboratory Wastes in the University of Tokyo"
14:10~14:45	**Coffee Break & Photo Taking** 

Let's move to the Sessions!

Session 1

Tips: The schedule for each presentation is for reference only. In case of missing your presentation, we strongly suggest that you attend the whole session.

Afternoon, December 25, 2016 (Sunday)

Time: 14:45~17:15

Venue: 204 Conference Room

Session 1 10 presentations-Topic: “Environmental Science & Engineering”

Session Chair: Prof. Kokyo Oh

B0003 Presentation 1 (14:45~15:00)

Analyzing Strategic Factors Associated with Issuance of Environmental Liability Insurance Policy in Developing Countries using SWOT and QSPM

Mahnaz Mirza Ebrahim Tehrani

Islamic Azad University-Tehran North Branch, Iran

Abstract—In recent years, environmental pollution is one of the most commonly discussed topic in international scene. Environmental pollution and its associated aspects are not limited to the location of occurrence, but inevitably influence other regions too; as it says: "There is one earth for all". In other hand Environmental pollution is one of the most commonly discussed topics in today's national and international political societies in which increasing efforts are being made. Environmental pollution and its associated aspects are not limited to location of accident but inevitably influence other regions. Emission of carbon dioxide into the atmosphere or transfer of nitrates, and other hazardous chemicals into the rivers, seas and ocean waters can suggest such claim. Due to the lack of associated rules, criteria and regulations for issuance of environmental liability insurance, QSPM (Quantitative Strategic Planning Matrix) technique was applied in this study to introduce strategic factors required for such analysis. There are ten integrated strategies. The essential strategy is using legal tools to assess environmental risks in different industries. Results show that we need raising awareness of environmental accidents outcomes, which is concerned by insurance companies at developing countries.

Afternoon, December 25, 2016 (Sunday)

Time: 14:45~17:15

Venue: 204 Conference Room

Session 1 10 presentations-Topic: “Environmental Science & Engineering”

Session Chair: Prof. Kokyo Oh

B0018 Presentation 2 (15:00~15:15)

Factors Influencing Energy Intensity of Indian Cement Industry

Hena Oak

Jawaharlal Nehru University, India

Abstract—India launched the Perform-Achieve-Trade (PAT) scheme for firms in the eight most energy intensive industries in 2007, Cement industry being one of the industries. The purpose was to induce efficient use of energy through trade in Energy Saving Certificates (ESCerts). The scheme identified the most polluting firms from each of these industries and set individual energy intensity reduction targets. The first PAT cycle runs from 2012-2015 and targets have to be met within this period. This is the first time India has adopted tradable permit scheme for dealing with an environmental problem. It will help India achieve its objective of sustainable development along with economic growth. The objective of this paper is to determine the factors that influence the energy intensity of firms of the Cement Industry and quantify the PAT effect. We use panel data fixed effects model and difference-in-differences estimate. The method of Propensity Score matching is used as a robustness check of the results. The results show that the Cement industry as a whole did not become more energy efficient after the scheme was launched. The firms that were identified have higher energy intensity than the other firms, which suggest that they were correctly identified by the government.

Afternoon, December 25, 2016 (Sunday)

Time: 14:45~17:15

Venue: 204 Conference Room

Session 1 10 presentations-Topic: “Environmental Science & Engineering”

Session Chair: Prof. Kokyo Oh

B3002 Presentation 3 (15:15~15:30)

Sustainable Watersheds: Assessing the Source and Load of Cisadane River Pollution

Adipati Rahmat Gumelar, Abimanyu Takdir Alamsyah, Ida Bagus Hendra Gupta, Darul Syahdanul, and Daniel Mambo Tampi

Universitas Indonesia, Indonesia

Abstract—Cisadane watersheds is a very valuable strategic area for the people in Tangerang District, Banten, Indonesia. But that strategic value has brings an impact in the form of water pollution, that comes from its popullation and economic activities. This water pollution load is necessary to know its source, and also how much, so that public, private and local governments can jointly take action to restore the water quality of the Cidasane River. The purpose of this study is to determine the pollution load in the Cidasane watersheds. The study will taking sample of Cisadane River water as an inputs in the isoyet map pollution dispersion modeling. And calculating the load in the river using QUAL2Kw modelling. The results of the modeling are then analyzed to obtain the amount of Cisadane River pollutant load. The pollution load in this study will be focused on BOD, NO3, and Total P, and Salinity. This research has shown the inter-regional pollution spread on the Cisadane river, which used This study will provide a measurable data of the type and scale of the pollution load in Cisadane, as an input for Cisadane River water quality restoration policy making by the Government of Tangerang.

Afternoon, December 25, 2016 (Sunday)

Time: 14:45~17:15

Venue: 204 Conference Room

Session 1 10 presentations-Topic: "Environmental Science & Engineering"

Session Chair: Prof. Kokyo Oh

B3007 Presentation 4 (15:30~15:45)

Managing Good Safety Culture and Practices at the Polytechnic

Joon Lin Chew, Mirko Stoll, Eric Tan, Boon Hwee Eng, and Hedy Goh

Ngee Ann Polytechnic, Singapore

Abstract—Incidents in academic laboratories have been observed to be caused by lack of strong safety skills and safety culture. Calls for improvements in safety culture and safety educational processes are becoming increasingly urgent within and beyond the academic community. At the School of Life Sciences and Chemical Technology (LSCT) at Ngee Ann Polytechnic, a safety management system is in place, which includes a comprehensive training programme for all staff and students. There is also a strict enforcement of lab safety violations that includes a database for monitoring student offenses and punitive actions. An innovative approach to training was implemented, where an online training platform for staff was created to enable new and existing staff to keep abreast with LSCT's approaches to safety. An online chemical inventory has also been established to maximize synergy between the many laboratories while minimizing waste of valuable chemicals. LSCT has over 100 risk assessments in place, regular external safety audits, as well as an internal audit scheme. The scheme ensures that every each of the 50 laboratories and workshops are audited at least twice a year. LSCT has procedures for handling biohazardous substances, incidents and emergencies. LSCT lecturers also teach workplace safety and health to working adults, school teachers and laboratory technicians to stay abreast with industry practices. The School has not had any major reportable incident for several years. The good safety culture provides value and impact to staff and students as the knowledge of safety is applicable to all seven LSCT diploma courses during their studies and work in NP. Irrespective of whether the students will be employed in a research laboratory, veterinary clinic, hospital pharmacy, petrochemical plant, horticulture company or analytical laboratory, students will be empowered to make the right decisions to ensure safety for themselves and their colleagues.

Afternoon, December 25, 2016 (Sunday)

Time: 14:45~17:15

Venue: 204 Conference Room

Session 1 10 presentations-Topic: "Environmental Science & Engineering"

Session Chair: Prof. Kokyo Oh

B0008 Presentation 5 (15:45~16:00)

Techno-Economic Analysis of Hybrid Drainage Systems in South Australia

Faisal Ahammed, Christian Somerville, Fergus Hamilton, and Robert Beardwell

University of South Australia, Australia

Abstract—The primary purpose of the Conventional Drainage System (CDS) is flood management; its primary focus is the rapid collection of stormwater runoff from all impervious surfaces and its discharge into the nearby water systems. Therefore, the system overlooks important utilization of stormwater as a valuable water resource. On the other hand, Water Sensitive Urban Design (WSUD) – an Australian innovation of sustainable urban water cycle management, is a decentralized stormwater management tool that aims to minimise hydrological impacts of urban development on the surrounding environments. A Hybrid Drainage System (HDS) is the combination of CDS and WSUD technologies. CDS and infiltration based WSUD technologies were designed using DRAINS and Argue's source control principles respectively for stage 1 of the Strathalbyn Residential Sub-division Project, which is located 60 km southeast of Adelaide CBD and consists of 55 residential allotments. Costings of CDS and WSUD technologies for 20 years life cycle were estimated using Rawlinson's Construction Handbook and a MUSIC (Model of Urban Stormwater Improvement Conceptualization), respectively. Historical water utility price was collected from SA Water to quantify the economic benefits of HDS. The benefit cost analysis of the designed technologies of HDS was performed using net present value, benefit cost ratio and internal rate of return and found that HDS is economically feasible for the project site. Results from monthly basis continuous simulations of three most critical rainfall events (December 1992, June 2005 and June 2012) show that HDS is also capable of reducing the flooding risk. Therefore, HDS could be the solution of everyday problems of stormwater management – quantity control (flood management), quality control (pollution management) and stormwater harvesting.

Afternoon, December 25, 2016 (Sunday)

Time: 14:45~17:15

Venue: 204 Conference Room

Session 1 10 presentations-Topic: "Environmental Science & Engineering"

Session Chair: Prof. Kokyo Oh

F1002 Presentation 6 (16:00~16:15)

Effects of Rainfall on Microbial Water Quality on Haeundae and Gwangan Swimming Beach

Seoung-Hwa Choi, Seung-Min Lee, Gyeong-Seon Kim, Mi-Hee Kim, and Hwa-Seong Ji, Yu-Na Jeong, Eun-Chul Yoo and Jeong-Gu Cho

Busan metropolitan city Institute of health & Environment, Republic of Korea

Abstract—The associations between storm events, urban runoff and costal water quality have not been well investigated in Korea. A temporal and spatial analysis during summer, 2015 was conducted to determine associates between urban runoff and fecal indicator bacteria (Escherichia coli, Enterococcus) levels at two popular coastal beaches (Gwanganri beach and Haundae beach) in Busan. In this study, a clear relationship between rainfall and elevated number of indicators was observed. Two beaches met the costal beach water health standards after less than 3.0 mm of rain. Only for storms less than 2.5 mm was no observable rainfall effect. Our results revealed that exceedances were greatest in 5 hours following 41.0~45.5 rainfall, then declined the bacterial concentrations in 8 hours after the storm and they generally returned to levels below water health standards within 10~14 hours. But it took 2.7 days to get the level of water quality of dry days. The time required for water quality recovery depends on the intensity and duration of rainfall. In the event of intense rainfall issuance of beach closure by public authorities is warranted to protect public health.

Afternoon, December 25, 2016 (Sunday)

Time: 14:45~17:15

Venue: 204 Conference Room

Session 1 10 presentations-Topic: “Environmental Science & Engineering”

Session Chair: Prof. Kokyo Oh

F1006 Presentation 7 (16:15~16:30)

A Comparison of Different Models for Collection of WEEE in Europe

Marcos Dieste, Arcione Ferreira Viagi, Roberto Panizzolo, and Stefano Biazzo

University of Padova, Italy

Abstract—This work studies the two Reverse Logistics models used in European countries for collection of Waste of Electrical and Electronic Equipment (WEEE), compares their advantages and disadvantages and proposes a framework that helps the decision making process. The paper is articulated as follows. First, a literature review has been carried out regarding the two systems of WEEE Collection in the European Union: i.e. National Collective Scheme and Clearing House Model. Second, an integrated framework is proposed for managing Reverse Logistics in the disposal of electrical and electronic products and their components at the end of their lifetime. The proposed model may help in the decision making process of which collection system better fits the specific characteristics of a country.

Afternoon, December 25, 2016 (Sunday)

Time: 14:45~17:15

Venue: 204 Conference Room

Session 1 10 presentations-Topic: "Environmental Science & Engineering"

Session Chair: Prof. Kokyo Oh

F1013 Presentation 8 (16:30~16:45)

Environmentally Relevant Levels of Chromium induces Histopathological Changes in Duttaphrynus melanostictus Tadpoles

Fernando, **Vindhya Ashvinie Kulasena Fernando**, Perera, I. C., Dangalle, C. D., Premawansa, S., Wijesinghe, M. R.

University of Colombo, Sri Lanka

Abstract—Heavy metal pollution continues to be a major threat to the survival of aquatic biota. In the present study we report the histopathological responses of the gill, liver and tail muscle tissues in tadpoles of the Asian Common Toad, *Duttaphrynus melanostictus* exposed to environmentally relevant levels of Cr under empirical conditions. Tadpoles of Gosner stages 25-26 were exposed to 5 concentrations of Cr (0.002, 0.02, 0.2, 1.0, 2.0 mg/ L) representing ecologically relevant levels, in triplicate for 28 days. Controls were also maintained. Histological alterations in the tissues of the surviving larvae were microscopically examined at the end of the exposure period. Significant histopathological changes were noted in the gills, liver and tail muscles of the tadpoles exposed to Cr above 0.02 mg/ L. The gills of exposed tadpoles showed architectural distortion resulting from reduced primary and secondary gill lamellae and blood vessels, and alterations in the gill epithelium. The mean thickness of the gill epithelium of tadpoles exposed increased at concentrations of 0.02 mg/ L and above varying significantly from that of the control ($F_{5,210}$ = 26.66, P < 0.001). Distortions observed in the liver tissue included sinusoidal congestion and dilation, inflammatory cell infiltration, increased cytoplasmic vacuolation and pyknotic nuclei in hepatocytes. The width of hepatocytes in tadpoles exposed to the two highest Cr levels had increased significantly in comparison to that of the control ($F_{5,210}$ = 7.39, P < 0.001). Tail muscle tissues in tadpoles exposed to Cr above 0.002 mg/ L showed severe atrophy and myotomal disintegration. The findings of the present study emphasize the potential of Cr to induce histopathological changes in amphibians at environmentally relevant concentrations, demonstrating the need to strictly control heavy metal pollution in natural habitats.

Afternoon, December 25, 2016 (Sunday)

Time: 14:45~17:15

Venue: 204 Conference Room

Session 1 10 presentations-Topic: “Environmental Science & Engineering”

Session Chair: Prof. Kokyo Oh

F2004 Presentation 9 (16:45~17:00)

Issues in Recycling of Post Industrial Plastics

Yushan Zhao

University of Wisconsin, Whitewater, USA

Abstract—The usage of plastics in the United States and the world as a whole has greatly increased over the past 60 years, and is not likely to decline in the near future. Significant portions of the world’s fossil fuel supplies are being used by the plastics industry to both fuel the facilities producing plastics and create the actual plastic compounds being used in products today. Current production, disposal, and recycling trends do not lend themselves to a sustainable future for the plastics industry. Based on research, for every ton of plastic bottles recycled, about 3.8 barrels of oil are saved. In addition, the extremely durable nature of plastics also leads to critical environmental problems. An important issue in environmental sustainability is post-industrial recycling, which is the recycling of plastic wastes resulting from the production of plastic products and packaging. The study will investigate important issues in the recycling of post-industrial plastics and explore efficient and effective ways to preserve the environment.

Afternoon, December 25, 2016 (Sunday)

Time: 14:45~17:15

Venue: 204 Conference Room

Session 1 10 presentations-Topic: "Environmental Science & Engineering"

Session Chair: Prof. Kokyo Oh

F2007 Presentation 10 (17:00~17:15)

The Development Model of the Policy Alternatives in Controlling Air Pollution in the Jakarta Province – Indonesia

Sri Listyarini and Lina Warlina

Universitas Terbuka, Indonesia

Abstract—The regulations issued by the Jakarta Provincial Government in order to maintain the perceived air quality have not functioned effectively. It is predicted the negative impacts of air pollution, with the huge of the money value. Therefore, it is necessary to conduct research to build an alternative policy that is expected to function effectively to reduce air pollution in Jakarta. Alternative policies was developed by the method of multi-criteria decision analysis (MCDA) with the software PRIME (Preference ratios in multiattribute evaluation) model is expected to control the environmental pollution, especially air pollution. The outcome from the MCDA model is the anticipation of a policy with an environmentally driven rather than economically driven approach as the developmental basis. The research recommends reducing emission of air pollution by combining command and control (CAC) policies with economic instrument (EI) policies. Additionally, all stakeholders must have access to the academic policy development in order to improve their concerns and commitments.

Session 2

Tips: The schedule for each presentation is for reference only. In case of missing your presentation, we strongly suggest that you attend the whole session.

Afternoon, December 25, 2016 (Sunday)

Time: 14:45~17:15

Venue: 205 Conference Room

Session 2: 10 presentations-Topic: "Environmental Science & Engineering"

Session Chair: Assoc. Prof. Teppei Nunoura

F0024 Presentation 1 (14:45~15:00)

Oil Palm Policy, Land Use Change and Community Livelihoods (OLCL) in Indonesia: A Sustainability Framework

Dennis Mark Onuigbo, Bonar Marulitua Sinaga, and Harianto

Bogor Agricultural University, Indonesia

Abstract—The global demand for crude palm oil (CPO) has continuously increased with enormous economic benefits for governments and producers. To maximize the benefits, government policies have aimed at increasing CPO production usually through increasing the total harvested area (THA). However, increasing CPO production with the increase in THA results in both land use and livelihood changes. Modeling the complex relationship that exists between oil palm production and issues of land use and livelihoods changes holds the key to understanding their determinants and sustainability approach. At this stage, the conceptual framework was developed with targets of formulating evidence based policies with better economic, environmental and social outcomes using a 24years historic data with the simultaneous equations modeling technique.

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Session 2: 10 presentations-Topic: "Environmental Science & Engineering"

Session Chair: Assoc. Prof. Teppei Nunoura

F0026 Presentation 2 (15:00~15:15)

MiSeq Sequencing Analysis of Prokaryotic Community Structures in Wastewater Treatment Plants in Eskisehir, Turkey

Mehmet Burcin Mutlu and Nilgün Poyraz

Anadolu University, Turkey

Abstract—The biologically activated sludge process is the most widely used biological process to treat municipal and industrial wastewater. The efficient and stable operation of a biological wastewater treatment plant (WWTP) depends on the relative abundance or activity of the microbial populations within it. lllumina MiSeq, developed by Illumina Inc., can generate several gigabases of DNA sequence per run more than other high-throughput sequencing technology. This new technique has been extended to various environmental systems in recent years.

In this study, archaeal and bacterial communities of activated sludge from 2 wastewater treatment plants (WWTPs) located in Turkey were examined using high-throughput MiSeq sequencing. The results showed that there were 6 family of bacterial populations commonly shared by both systems, including Pseudomonadaceae, Moraxellaceae, Bacteriodaceae, etc., indicating that there was a core microbial community in the microbial populations of WWTPs at different wastewater treatment plants. Wastewater characteristics had the greatest contribution to the bacterial community variance. This study provided insights into the diversity and bacterial community structures in two different WWTPs.

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Session 2: 10 presentations-Topic: "Environmental Science & Engineering"

Session Chair: Assoc. Prof. Teppei Nunoura

F2005 Presentation 3 (15:15~15:30)

Dynamic Model to Reduce the Impact of Climate Change on the environment and the Economy

Lina Warlina and Sri Listyarini

Universitas Terbuka, Indonesia

Abstract—Climate change is a global phenomenon will have a great impact for human life, such as the impact on the environment and the economy. To conduct research on climate change experimentally rather difficult to do, because it takes a long time and substantial funds, so one of the approach is to create a model. The purpose of this study was to develop a model that can be replicated for the response to climate change impacts on environmental and economic aspects. The method used in this research is a dynamic system model to simulate the impact of climate change. The results showed a reduction in the number of vehicles and fuel sold will have an impact on the reduction of CO_2 emissions, so it will reduce the incidence of diarrhea and dengue cases and automatically will reduce economic losses.

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Venue: 205 Conference Room

Session 2: 10 presentations-Topic: "Environmental Science & Engineering"

Session Chair: Assoc. Prof. Teppei Nunoura

F2006 Presentation 4 (15:30~15:45)

Historic and future trends in vehicle emissions and policy assessment of the emission control strategies in Shanghai, China

Rongrong Wu and Xie Shaodong

Peking University, China

Abstract—As an international metropolitan, Shanghai is one of the most prosperous and densely populated regions in China with large vehicle population, which is under tremendous pressure to reduce vehicular emissions and alleviate air pollution. It has adopted more stringent emission control policies and strategies to on-road vehicles compared to other cities in China. This study estimates the historical emissions and projects the future trends in vehicle emissions in Shanghai from 1990 to 2020 by using dynamic emission factors derived from COPERT IV model. Our results show that the emissions of CO, VOCs, NOx and $PM_{2.5}$ from on-road vehicles in Shanghai were 259.0, 63.5, 121.0 and 3.7 Gg in 2014, respectively, increasing by 294%, 303%, 488% and 355% based on 1990. The historical trends shows that the emissions of CO, VOCs and $PM_{2.5}$ would decline in the future years under current policies, while the emission reduction of NOx would be a severe challenge to Shanghai. With the implementation of more stringent emission controls including tighter emissions standard, improving fuel quality and scrapping of high-emitted vehicles, the emissions of CO, VOCs and PM2.5 would be reduced by 32%, 37% and 46%, respectively, in 2020 compared to the levels in 2014. However, the emissions of NOx would continue to increase by 2020. Consequently, additional control strategies were proposed to further reduce NOx emissions in Shanghai. Considering the severe vehicle pollution in most megacities in China nowadays, our research will provide a useful case study of vehicular emission control to policy-makers in China.

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Venue: 205 Conference Room

Session 2: 10 presentations-Topic: "Environmental Science & Engineering"

Session Chair: Assoc. Prof. Teppei Nunoura

F2009 Presentation 5(15:45~16:00)

Biosurfactant Facilitated Biodegradation of Naphthalene by *Pseudomonas Aeruginosa* SR17

Rupshikha Patowary and Suresh Deka

Institute of Advanced Study in Science and Technology, Guwahati, Assam, India

Abstract—Naphthalene is a ubiquitous pollutant which posses a pungent odor. It is released by several industries and production plants including petrochemical industries etc. Exposure to naphthalene is known to cause severe health hazards and mutagenic changes thereby leading to cancers. Thus, it is necessary to remove or degrade naphthalene in the environment. The main purpose of the study was to isolate bacteria that could potentially degrade naphthalene as well as produce biosurfactant that is supposed to facilitate the degradation step.

A new isolate, Pseudomonas *aeruginosa* SR17, was isolated from local (Guwahati, Assam, India) automobile garage soil. The ability to utilize naphthalene for growth and produce biosurfactant was evaluated by measuring the optical density (O.D. at 600 nm) and surface tension of the culture medium containing naphthalene as sole carbon source. The biosurfactant was characterized biochemically and by applying spectrophotometric tools –FTIR, LCMS. The degradation profile of naphthalene by SR17 was studied for 7 days at an interval of 24 hrs by GCMS.

It was observed that SR17 could utilize naphthalene for its growth and at the same time produce biosurfactant by utilizing naphthalene as the carbon source in mineral salt medium. The surface tension of the medium reduced from 70 mNm^{-1} to 34 mNm^{-1}.The biosurfactant was characterized to be rhamnolipid by nature. It was found that the growth and degradation of naphthalene by SR17 was augmented at 35 ℃ and pH- 8.0 and 0.4% naphthalene. The bacteria could potentially degrade naphthalene into its metabolic intermediates.

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Venue: 205 Conference Room

Session 2: 10 presentations-Topic: "Environmental Science & Engineering"

Session Chair: Assoc. Prof. Teppei Nunoura

F1001 Presentation 6 (16:00~16:15)

Reverse Logistics Models for the Collection of Waste Electrical and Electronic Equipment: the Brazilian Case

Marcos Dieste, **Arcione Ferreira Viagi**, Roberto Panizzolo，Reinaldo Fagundes dos Santos，and Fernando Augusto Silva Marins

Universidade de Taubaté, Brazil

Abstract—In 2010, legislation concerning the National Solid Waste Policy (PNRS) was introduced in Brazil. It is the regulatory framework in solid waste management that distinguishes what can be recycled and what is not prone to reuse. The PNRS features innovations such as Reverse Logistics (RL) which determines that manufacturers, importers, distributors and retailers must perform the collection of used packaging. Products as pesticides, batteries, tires, lubricating oils, and all sorts of lamps, light bulbs and electronics were included in this system. In addition, the use of the third-generation ERPs not only would help in meeting the legislation, also could allow the optimization of enterprise resources. The purpose of this article is to study the two Reverse Logistics models used in European countries for collection of Waste of Electrical and Electronic Equipment (WEEE), compare their advantages and disadvantages and propose a model to be adopted in Brazil. To Achieve this objective, some specific goals were set: Conducting a literature review involving WEEE Collection in the European Union and the models: National Collective Scheme and Clearing House Model, their definitions, characteristics and objectives; proposing an integrated model for managing the Reverse Logistics in the disposal of electrical and electronic products and their components at the end of their lifetime. The first boundary is placed on the study to be directed to the PNRS, a second one refers to the RL study of electrical and electronic products and their components. To meet the objectives of this work, the used research methodology was structured around four pillars: its nature, approach, objectives and technical procedures.

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Session 2: 10 presentations-Topic: "Environmental Science & Engineering"

Session Chair: Assoc. Prof. Teppei Nunoura

F1016 Presentation 7 (16:15~16:30)

Particles Exposure for Doing Particle Image Velocimetry (PIV) Test in the Wind Tunnel

Wei PAN and Wei-Zhen LU

City University of Hong Kong, China

Abstract—Particle image velocimetry (PIV) technology has been widely conducted in the wind tunnel aiming at air flow visualization to explore unknowns encountered in science and engineering. In general, in addition to the quality of the PIV image, the involved technicians have no idea about the particle number concentration (PNC) level in the wind tunnel. This study carried out a pioneer exploration and filled the gap of providing information on the particle concentration levels for particle image velocimetry testing in the wind tunnel. In this study, two TSI 3330 sets were used simultaneously for measurements. The results demonstrated that the PNC levels in the wind tunnel were considerable high and the I/O ratios were above 20 for submicron particles. Moreover, the PNC levels in the remote control room was growing during the PIV test and presented a trend that the finer the particle, the higher its concentration. Moreover, the pseudo-filtration efficiency test demonstrated that the filtration rate of particles was declined when the PNC increased and the size of particles decreased. Therefore, as the growing application trend of the PIV technique in air flow studies, to provide information for the protection of health-harmful test (not limited to PIV test) related participants, further monitoring and measures are needed.

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Session 2: 10 presentations-Topic: "Environmental Science & Engineering"

Session Chair: Assoc. Prof. Teppei Nunoura

F3005 Presentation 8 (16:30~17:45)

Effects of Graphene Oxides and Ag-graphene Oxides on Aquatic Microbial Activity

Kwanyoung Ko and Haegeun Chung

Konkuk University, Republic of Korea

Abstract—Graphene oxides (GOs) and Ag-functionalized GOs are widely produced nanomaterials for their usage on diverse fields including environmental fields, biotechnology, and medical science. This wide usage is likely to lead to the entrance of these nanomaterials to the aquatic environment, and sensitive organisms such as microorganisms may be affected. In this study, we determined the effects of GO and Ag-GO on aquatic microorganisms inhabiting natural surface water. For this, up to 100 mg GO L^{-1} and 100 mg Ag-GO L^{-1} were applied to unfiltered natural water sample and environmentally relevant exposure experiments were conducted. Within a 3-day exposure test period, the stability of GO and Ag-GO in natural water sample was observed, and microbial responses were determined by analyzing extracellular enzyme activity, nitrification, lactate dehydrogenase (LDH) release, and reactive oxygen species (ROS) production. GO started to aggregate after 1 h of exposure and stated to precipitate after 3 h, but Ag-GO was well dispersed throughout the 3-day exposure period. Activity of leucine aminopeptidase was lowered to 8 % by 100 mg GO L^{-1} and 3.8 % by 100 mg Ag-GO L^{-1} compared to the control (0 mg GO or Ag-GO L^{-1}, extracellular enzyme activity of 100 %). Membrane damage resulted in the release of LDH up to 5.2 % by 100 mg GO L^{-1} and 4.5 % by 100 mg Ag-GO L^{-1} compared to the control (LDH release of 0 %). ROS production was observed to be 81.1 % under 100 mg GO L^{-1} and 34.6 % under 100 mg Ag-GO L^{-1} compared to the control (ROS production of 0 %) after 1 h of exposure. Our results indicate that the activities of microorganisms inhabiting natural surface water can be lowered when exposed to GO and Ag-GO.

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Session 2: 10 presentations-Topic: "Environmental Science & Engineering"

Session Chair: Assoc. Prof. Teppei Nunoura

F3011 Presentation 9 (16:45~17:00)

The Effect of Irrigation with Urban Waste Water on Some Physical and Chemical Characteristics of Soil and the Growth of *Pinus nigra*

Seyed Mohsen Hosseini, Eng. Mehdi Faghanpour, **Moslem Akbarinia**, Mahmoud Shariat, Valiollah Azizifar

Islamic Azad University, Iran

Abstract—Using low quality water resources specially treated urban sewage is considered as a solution to eliminate the irrigational need of the urban green area section. Heavy and toxic metals and nutritional elements in waste water and the possibility of absorbing these elements by plants and their effect on plants should be considered in this regard. In order to study the possibility and the effects of irrigation with waste water on physical and chemical characteristics of soil and the growth of *Pinus nigra*, plots were implemented in a systematic randomly design in four replications and two treatments of well water and waste water in an urban greenspace which planted by *Pinus nigra*, irrigated during 8 years. The green spaces of Pardisan urban forest park of Tehran which irrigated with well water was selected as the control area and the green space of Ghods town sewage refinery in Tehran irrigated with waste water was selected as the waste water irrigation treatment experimental area. For comparison of well water and waste water the chemical composition of waters were measured during one year. In order to study the physical and chemical characteristics of soil and the aggregation of nutritional elements in tree leaves, leaves and soil samples (at a depth of 0-15 cm and a depth of 15-30 cm) were collected from each plot at four time series. The height and diameter at breast height of trees and the crown diameter of trees were measured in sample plots. Results showed that waste water showed significant increase in most of measured elements. *Pinus nigra* is very successful and capable in phytoremediation and irrigation with waste water causes the increase in the concentration of Cr, Cu, Ni, Cd, Zn, Pb, Mn, Mg, P and Na in soil and also K, N, Zn, Pb, Mn, Mg, P and Na in the leaves. Using urban waste water causes a significant increase in the growth of trees. Totally *Pinus nigra* is a suitable species in

phytoremediation and its irrigation with waste water is possible. Experimental results indicate no major limitations for the use of the municipal effluent as an irrigation source in *Pinus nigra*. The municipal effluent can be considered as an important source of fertilizer for some plants (e.g., *Pinus nigra*) With positive economic and environmental aspects related to reduction of synthetic fertilizers use

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Session 2: 10 presentations-Topic: "Environmental Science & Engineering"

Session Chair: Assoc. Prof. Teppei Nunoura

F3012 Presentation 10 (17:00~17:15)

The Capability of Magnetometery of Soil and Tree Leaves of *Fraxinus excelsior* in Mapping Air Pollution of Tehran City

Maryam Mollashahi, **Seyed Mohsen Hosseini**, Habib Alimohammadian, Alireza Riahi Bakhtiari

Tarbiat Modares University, Iran

Abstract—Air pollution occurs when the air contains gases, dust, fumes or odour in harmful amounts. That is, amounts which could be harmful to the health or comfort of humans and animals or which could cause damage to plants and materials. It is one of the most important anthropogenic related productions which have direct or indirect impact on environment during past recent century and this is the biggest environmental problem that Iran currently faces especially in the capital Tehran. This research investigate applying magnetic parameters of soil and leaves in urban greenspace. These elements deposited by vehicles and plants. Magnetic susceptibility, IRM, SIRM and S-ratio of *Fraxinus excelsior* was measured to examined the magnetic parameters particulate matter of these tree species. The chemical data, magnetic parameters and GIS software were used to map pollution of Tehran city. Type of pollutant elements (heavy metals) were determined by chemical analysis and SEM was used to examine and compare of pollution by leaves samples and soil samples. The result of magnetometry measurements showed the urban sectors which located in southern and south-eastern parts of Tehran city have highest pollution and the magnetic susceptibility showed a good correlation with heavy metal concentration. The IRM, SIRM and S-ratio showed a high degree of pollution in Tehran city air. The results indicate that a magnetic survey of tree leaves, which is relatively rapid and inexpensive, may be used in addition to the classical air quality monitoring systems to identify and delineate high-polluted areas in urban environments. Magnetic mineralogy indicates that the magnetite is the main carrier of magnetic property of examined *Fraxinus excelsior* leaves.

December 26, 2016 (Monday)

Venue: 201 Conference Room

9:00~9:50		**Opening Remarks & KN Speech II** Prof. Chiharu Ishii Hosei University, Japan Topic: "Applications of Robot Technology to Devices for Assistive Technology"
9:50~10:10		**Plenary Speech II** Assoc. Prof. Chi-wai Kan, Institute of Textiles and Clothing, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong Topic: "Dyeing Cotton with Reactive Dyes Using Solvent-assisted Dyeing System"
10:10~10:40		**Coffee Break & Photo Taking**

Let's move to the Sessions!

Session 3

Tips: The schedule for each presentation is for reference only. In case of missing your presentation, we strongly suggest that you attend the whole session.

Morning, December 26, 2016 (Monday)

Time: 10:40~12:10

Venue: 201 Conference Room

Session 3: 6 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Prof. Yuli Lin

F1011 Presentation 1 (10:40~10:55)

Identify the Odor Emission Sources in an Industrial Park by Integrated Data Mining Approach

Yu-Shiuan Cheng, Yen-Hsun Chuang, and Ho-Wen Chen

Tunghai University, Taiwan

Abstract—Gases that affect primarily the sense of smell are known as the "odorous gases". These gases usually convey a negative and unpleasant sense. When asked to describe the odorous compounds, most people refer to them as unpleasant odors. The serious damage by forcing in atmosphere come from the range of human activities, which expanded the types of change, including consumed a lot of energy, coupled with the development of science and industry. During use discharged into the atmosphere, many of which are difficult to decompose or natural ability diluted chemicals. The science park emitted some chemicals, among of them,"Odor Pollutants" major consist of n-Decylmethylsulfide, thiols, and methylamine. Odorous gases are the most significant pollution that resident argue about living in the surroundings by industrial park. Ammonia sustainable emission is the common odor source in an industrial areas. Human sensations of odor and upper airway irritation are often experienced as a unitary phenomenon, principally because most volatile chemicals have the potential to activate giving rise to sensations of odor and temporary burning, stinging, tingling or painful sensations in the eyes and upper airways. However, in the case of such multi-source odour emissions especially industrial park, common chemical analyses or odour concentration measurement methods are not often applicable. Although several studies have been conducted for prevention and control of odorous gases, no comprehensive research exists about recent achievements in this area. Undoubtedly, the growing of odor petition cases that people

emphasis on the quality of life have been reflected. With an eye to reducing the odor pollution diffuse continually, each countries have stood regulations about odors control and further improved the odor manufacture. Through measuring odor intensity and air pollutants over time in-site, with different seasons and wind directions. By odor intensity, weather conditions and air pollutant concentration as the relevant identification. Therefore, odor controlled need to start from the raw materials and process management side of the plant, and then choose the appropriate end control equipment after processing to comply with the relevant provisions of Government Regulation standards.Except government regulation, identify pollutant sources is more effectively to solve the odor problem. In discussing the air quality and pollutant problem, it is difficult to grasp the true atmosphere situation and analyze the possible pollutant sources impacting to environment. To simulate the real situation of the atmosphere and to understand the exact environment problem, many researchers have developed air quality models and statistical methods recently.For the pollutant sources identification and the amount of the contribution up to a certain effect, this study use ammonia as identification of pollutant sources. Researching odor source distribution and high pollution areas. Expected to Tainan Science Park as a research area, use different kind of historical data collection with possible odor emissions from industrial park, and apply the Gaussian diffusion model to simulate contamination of receptor. Following the Gaussian diffusion model steps, connect with linear programming method and also estimate pollution contribution. Then find out the sources of pollution, so that the future government utilize cases for this petition as valid reference.

Morning, December 26, 2016 (Monday)

Time: 10:40~12:10

Venue: 201 Conference Room

Session 3: 6 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Prof. Yuli Lin

F0025 Presentation 2 (10:55~11:10)

Eco-friendly treatment of Oil-contaminated Soil by Microwave Thermal Desorption Technology

Taehoon Koh and Donggeun Lee

Korea Railroad Research Institute, Republic of Korea

Abstract—In this study, the feasibility of an indirectly-heated microwave thermal desorption technology was investigated in order to treat the oil-contaminated soil, which has been recently developed in Korea. While conventional thermal desorption treatment (fossil fuel thermal desorption rotary-kiln) is a technically-effective to remediate even heavily polluted soil, it costs a lot to operate burner for directly heating the soil using fossil fuel and create a lot of CO2 emission comparing with other conventional treatments(physical, chemical and biological treatments).

In this study, to develop technically–effective as well as cost-effective technology for the remediation of oil-polluted soil, microwave was used which recently considered as an energy source to enhance the energy efficiency for the thermal treatment of the oil-polluted soil. In order to overcome disadvantage of conventional thermal desorption technology, developed technology uses microwave as well as microwave absorber in order to effectively and uniformly develop the temperature inside soil container. In other words, microwave irradiates to the microwave absorber attached outside container other than soil itself inside container, high temperature thermal energy developed outside container is transferred to the container which causes to significantly reduce the remediation time and energy cost without fossil fuel. Before treatment of the tested soil, the temperature developed inside soil container by interaction between microwave and microwave absorber was monitored around 670℃ which was much higher than the temperature (230℃) of the oil-polluted soil directly heated by microwave from the previous research result. Microwave absorber used in this study can efficiently enhance the heating temperature due to its high thermal performance to uniformly and highly heat the soil container for remediation of the oil-contaminated soil.

Based on a series of test results, it is found that this new technology can effectively complete the sustainable remediation process of the oil-contaminated soil. Conventional thermal desorption technology spends 74 USD/ton to remediate the oil-contaminated soil, while microwave thermal desorption technology can reduce the remediation energy cost by 70% based on effective microwave heating mechanism. And conventional thermal desorption technology shows 0.162ton-CO_2 emission to cleanup soil. However, fossil fuel-free, microwave thermal desorption technology can reduce CO_2 emission by 90%.

As one of solutions to oil-contaminated areas, indirectly-heated microwave thermal desorption technology can be strongly suggested to save remediation energy cost and to minimize CO_2 emission.

Morning, December 26, 2016 (Monday)

Time: 10:40~12:10

Venue: 201 Conference Room

Session 3: 6 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Prof. Yuli Lin

B1004 Presentation 3 (11:10~11:25)

Simulating the Emergency Evacuation in an Operating Environment with Human Social Behaviors

Chu-Ting Sun, Ho-Wen Chen, and Wei-Yea Chen

Tunghai University, Taiwan

Abstract—It is very important from an engineering viewpoint to predict the time taken to evacuate an operating environment through the analysis of occupant evacuation. Especially, the frequency of earthquake is increasing in recent years. It has threated the safety of human beings. And the number of man-made disasters also has increased in the world with the science and technology development. The man-made disasters, such as hazardous material leakage and explosions, which are the most instantaneous characteristic that cannot be estimated beforehand and appear with explosion and fire. Therefore, preplanning is critical to the safe evacuation. When emergency situation occurred, the researchers should consider about how to let evacuees arrive place both rapidly and securely. And evacuees in emergencies often base their actions on their past experience, social structures, and perceptions also interactions with others to define an emergent understanding of the situation. As a result this study presents an agent based model to simulate some of the frequently observed human social behaviors in emergencies. For instance, herding behaviors, on the evacuation patterns has been simulated influences of individual agents and interactions among multiple agents during emergency evacuation indoor. The model that takes into consideration the human and social behavior of a crowd could serve as a viable alternative. According to the evacuation of human behavior in various emergency situations, the simulation results can give insights to planner for planning the most appropriate evacuation routes and strategies.

Morning, December 26, 2016 (Monday)

Time: 10:40~12:10

Venue: 201 Conference Room

Session 3: 6 presentations-Topic: “Environmental Science and Engineering”

Session Chair: Prof. Yuli Lin

B1005 Presentation 4 (11:25~11:40)

Forecasting Municipal Solid Waste Generation Using System Dynamic

Yi-Ping Shen, Ho-Wen Chen, and Wei-Yea Chen

Tunghai University, Taiwan

Abstract—With the rapid economic development and increasing population, the world is faced with challenges in a substantial increase of municipal solid waste. Municipal solid waste management is complex, it may involve different fields such as sociology, economics, environmental and legislation, etc. To address the different waste management issues, the government and environmental associations have developed numerouswaste management strategies and processing techniques. However,accurate projection of municipal solid waste quantities is important for the successful planning of efficient waste management system. Future estimations of municipal solid waste generation serve as a basis in the development of existing waste management infrastructures as well as their further sustainable development and optimization. The main objective of this study was to develop a model for accurate forecasting of municipal solid wastegeneration. Using the system dynamics has characterized by interdependence, mutual interaction, information feedback, circular causalityand time delay, etc. Model was built by integrated social, economic and environmental impact factors and considered sub-system with population, income, recovery that helps waste related organizations to better design and operate effective municipal solid wastemanagement systems.The results show the amount of waste generatedhas year by year the increase tendency.

Morning, December 26, 2016 (Monday)

Time: 10:40~12:10

Venue: 201 Conference Room

Session 3: 6 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Prof. Yuli Lin

B0017 Presentation 5 (11:40~11:55)

Influence of Dissolution on Fate of Nanoparticles in Freshwater

Yubing Pu, Bertrand Laratte, and Rodica Elena Ionescu

Université de Technologie de Troyes, France

Abstract—The fate of engineering nanoparticles (ENPs) determines how long they stay in a certain compartment such as freshwater. Many factors such as diameter of suspended particles in freshwater, depth of freshwater, etc., may affect the fate of ENPs in freshwater with different extent. Dissolution rate (k_{diss}) of ENPs has been demonstrated as one of the most significant parameters. However, the influences of k_{diss} on relative importance of the other parameters are still not clear. In this study, the relative importance of four parameters has been calculated with the k_{diss} being fixed to eight different values respectively. The relative importance decreases along with the increasing k_{diss} values. The results are well fitted (R^2 > 0.999) by an exponential associate function, which simplifies the calculation of the relative importance of the studied parameters.

Morning, December 26, 2016 (Monday)

Time: 10:40~12:10

Venue: 201 Conference Room

Session 3: 6 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Prof. Yuli Lin

B0026 Presentation 6 (11:55~12:10)

Effect of Seasons and Sources of Raw Water on the Properties of Water Treatment Residue Compacted Clay

Woottipong Prakongwittaya, Suwimol Asavapisit, and Rungroj Piyapanuwat

King Mongkut's University of Technology Thonburi (KMUTT), Thailand

Abstract—Seasons affect the rainfall and river current. Thus, the quality of raw water from rivers as well as the property of water treatment residue (WTR) from water treatment plant are season-dependent. In this research, the season-dependent properties of WTR as compacted clay from five treatment plants located in the central of Thailand has been studied. These properties included Liquid Limit (LL), Plastic Limit (PL), Shrinkage Limit (SL), particles size, Optimum Moisture Content (OMC), and Unconfined Compressive Strength (UCS). It is found that the seasons and the sources of raw water in Thailand slightly affected the properties of WTR. The highest quality WTR was obtained from Tha Chin River, especially, those collected at the end of winter. In addition, it was found WTR can be utilized as compacted clay replacement material since their properties were comparable.

Lunch	
12:10~13:00	**Hotel Restaurant**

Session 4

Tips: The schedule for each presentation is for reference only. In case of missing your presentation, we strongly suggest that you attend the whole session.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~15:00

Venue: 203 Conference Room

Session 4: 8 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Prof. Yushan Zhao

B0006 Presentation 1 (13:00~13:15)

Effect of Turbidity to the Clogging of the Subsurface Drain

Sunisa Smittakorn, Sasiphorn Sasinawaworakul, and Phattara Chutsikarinton

Thammasat University, Thailand

Abstract—Normally, the subsurface drain is benefit in agricultural area to lower the water table resulting in the increase of the plant productivity. To drain water in some particular areas such as a golf course or rather flat area, the subsurface drain can also be applied. A minor change in the subsurface drain which permeable material in the envelope be replaced by an adsorbent was suggested. This new type of subsurface drain will be served as a sustainable practice to simultaneously discharge surface runoff, reduce the runoff to the drainage system, remove any contaminant from the surface runoff and finally replenish the groundwater. However, clogging is highly possible to occur due to the size of the adsorbent. In this work, the effect of the turbidity to the hydraulic conductivity of two adsorbents; granular activated carbon and a composite material of sand and anthracite was investigated. The source of input water was from a drainage canal in order to have similar turbidity of the surface runoff. Results showed that steady state hydraulic conductivities of both adsorbents were still within the range of typical permeable materials in envelope in this case was gravel. However, it was recommended that granular activated carbon should be selected as a substitute because its steady state hydraulic conductivity was higher than that of a composite material of sand/anthracite and for the practicality during the construction.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~15:00

Venue: 203 Conference Room

Session 4: 8 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Prof. Yushan Zhao

B0009 Presentation 2 (13:15~13:30)

Electrical Performance Prediction of Line-focus Fresnel Concentrating PV Module based on MATLAB Algorithm

Mengya Zhang, Hongbo Li, Xiaojun Ye, and Ning Yang

Shanghai solar energy research center & East china university of science and technology, China

Abstract—Line-focus Fresnel concentrating PV module can improve the power efficiency because of concentration ratio growing. But there is another problem which non-uniform illumination can influence electrical performance parameters, such as short-circuit current Isc, open-circuit voltage Voc, fill factor FF and power efficiency η. How to assess the electric performance of non-uniform PV module is becoming an awkward problem. The whole equivalent circuit, including the darker and brighter PV parts, was analyzed. And electric performance forecasting algorithm was designed by MATLAB software according to equivalent circuit and basic principle of solar cell. In the end, actual electric performance of Line-focus Fresnel concentrating PV module was characterized by SourceMeter® instrument. The characterization shows that actual testing results were in accordance with forecasting algorithm.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~15:00

Venue: 203 Conference Room

Session 4: 8 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Prof. Yushan Zhao

B1006 Presentation 3 (13:30~13:45)

Boron-Modified Ni/Mo2C Catalysts for the Hydrogenation of Alkali Lignin

Lingfei Wei, Jiancheng Zhou, and Naixu Li

Southeast University, China

Abstract—Great attention has been put on the transfer of energy structure from traditional fossil fuels into renewable energy such as biomass energy. Hydrogenation of lignin to obtain bio-oil is one of the most promising processes and is being studied for many years. In this work, different amount of boron-modified Ni/Mo2C were synthesized, characterized and tested in the hydrogenation of alkali lignin, to evaluate the effect of boron on the Ni promoted behavior. Results show that decoration of boron significantly enhances the catalytic activity of Ni/Mo2C. The highest lignin conversion was obtained with 5B-Ni/Mo2C (70.85%) and the highest bio-oil yield was obtained with 1B-Ni/Mo2C (63.81%). Catalyst characterization (XRD, the Raman spectroscopy, SEM, TEM, XPS and H2-TPR) proves that the strong interaction between nickel and boron species contributes to the excellent behavior, which can effectively subdue the decomposition of Mo2C, promote the dispersion of Ni particles, and subsequently enhance the catalytic activity.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~15:00

Venue: 203 Conference Room

Session 4: 8 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Prof. Yushan Zhao

F0002 Presentation 4 (13:45~14:00)

10 Environmental Innovations in Harmony of Sustainable Electricity Generation: an Experience of Combined-Cycle Power Plant of Priok, Indonesia

Dewi Permatasari, **Flavianus Erwin Putranto, and Tri Tjahjonoputro**

PT Indonesia Power UPJP Priok, Indonesia

Abstract—This paper aims to promote a power generation company experience on non-renewable energy management within environmental preservation and commitment. The environmental commitment reflected on Sustainable Program to overall environmental aspects, social perspective also taken into account. Methods on this paper underlined the innovative programs that have been initiate or planned since previous year, and currently on going. First step of implementation of each program has done by bring together the local community, government, company, and other stakeholders.

Strategic Programs on each aspect shared in this paper consist of (1) Socialization of Environmental Policy and Environmental Team Incubation; (2) Solar Cell Utilization; (3) Replacement of Freon as Refrigerant for Operation Support; (4) Priok Vehicle-less in Red Zone Area; (5) Utilization of WWTP Sludge for Mixture Ingredients of Paving Block; (6) Solid Waste Preservation from Kali Japat Stream; (7) Utilization of Ablutions Water for Plants Watering; (8) Replacement of NaOCl as Water Biocide in Water Intake of CCPP 1-2; (9) 1,920 Endemic Crops Plantation in Setu Babakan – a Cultural Heritage Kampong of Betawi Community; (10) North Jakarta Local Community Development Through "Kampung Sehat". These ten noticeable programs in on going in 2016 with underlined purpose are to preserve and protect Jakarta's surround environment.

At the end of implementation of each program, it continued with monitoring and evaluation based on several indicators. It is also quarterly reported to local environmental agency in North Jakarta Area, environmental inspectorate in Jakarta Province, Ministry of Environment and Forestry, and many others related stakeholder. Annual progress has also reported on Environmental Compliance and Beyond Assessment, commonly known as PROPER, under

Directorate General of Control and Prevention of Environmental Damage, Ministry of Environment and Forestry, Ditjen PPKL - KLHK.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~15:00

Venue: 203 Conference Room

Session 4: 8 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Prof. Yushan Zhao

F0004 Presentation 5 (14:00~14:15)

UVA induced DNA damage and apoptosis in red blood cells of African catfish (Clarias gariepinus)

Alaa El-Din Hamid Sayed and Hiroshi Mitani

University of Tokyo, Japan

Abstract—UVA-induced DNA damage and repair in red blood cells was reported to investigate the sensitivity of African catfish to UVA exposure. Fishes were irradiated with different doses of UVA radiation (15 min, 30 min and 60 min/day for 3 days), morphological and nuclear abnormalities in red blood cells were observed in the UVA exposed fish compared with controls. The morphological alterations were as acanthocytes, crenated cells, swollen cells, teardrop-like cell, hemolyzed cells, and sickle cells. Those alterations were increased after 24 h UVA exposure then decreased at 14 days after UVA exposure. Moreover, apoptosis analyzed by acridine orange assay showed increased number of apoptosis in red blood cells at the higher UVA exposure dose. No micronuclei were detected but small nuclear abnormalities as deformed nucleus and eecentric nucleus were observed in some groups. We concluded that UVA exposure induced DNA damage, apoptosis and morphological alterations in red blood cells but less sensitive to UVA than Wild type in medaka fish (Sayed et al., 2016b).

Afternoon, December 26, 2016 (Monday)

Time: 13:00~15:00

Venue: 203 Conference Room

Session 4: 8 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Prof. Yushan Zhao

F0007 Presentation 6 (14:15~14:30)

Simultaneous Ibuprofen degradation and hydrogen production on silver doped TNAs by photoelectrochemical process

Liu Chih Chen and Peng Yen Ping

Thunghai University, Taiwan

Abstract—UVA-induced DNA damage and repair in red blood cells was reported to investigate the sensitivity of African catfish to UVA exposure. Fishes were irradiated with different doses of UVA radiation (15 min, 30 min and 60 min/day for 3 days), morphological and nuclear abnormalities in red blood cells were observed in the UVA exposed fish compared with controls. The morphological alterations were as acanthocytes, crenated cells, swollen cells, teardrop-like cell, hemolyzed cells, and sickle cells. Those alterations were increased after 24 h UVA exposure then decreased at 14 days after UVA exposure. Moreover, apoptosis analyzed by acridine orange assay showed increased number of apoptosis in red blood cells at the higher UVA exposure dose. No micronuclei were detected but small nuclear abnormalities as deformed nucleus and eecentric nucleus were observed in some groups. We concluded that UVA exposure induced DNA damage, apoptosis and morphological alterations in red blood cells but less sensitive to UVA than Wild type in medaka fish (Sayed et al., 2016b).

Afternoon, December 26, 2016 (Monday)

Time: 13:00~15:00

Venue: 203 Conference Room

Session 4: 8 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Prof. Yushan Zhao

F0021 Presentation 7 (14:30~14:45)

Removal of Phenanthrene in an Aqueous Matrix by Entrapped Crude Enzymes on Alginate Beads Combined with TiO_2-C-Ag Coated Fiberglass

D. F. González-Ramírez, P. Ávila-Pérez, L. G. Torres-Bustillos, R. Aguilar-López, M. C. Montes-Horcasitas, F. J. Esparza-García, R. Rodríguez-Vázquez

Centro de Investigación de Estudios Avanzados del Instituto Politécnico Nacional, México

Abstract—The polycyclic aromatic hydrocarbons (PAHs) are classified as a public health hazard, and priority pollutants to be eliminated from water. The degradation of PAHS is abetted by its low water solubility, yet countered by its attached to organic matter complicating the PAHs' removal from wastewater. In this study, the use of two different types of mechanisms to overcome the drawbacks of the presence of dissolved organic matter was evaluated in PHE (phenanthrene) removal. The combination of crude enzymes entrapped in alginate gels with heterogeneous photocatalysis adds the catalytic activity of the enzymes to PHE treatment without requiring special conditions. The application of photocatalysis techniques for water recuperation is subject to photon incidence over the catalyst, which affects the efficiency of the process. The combined system removed 94.3 ± 2.0% of PHE in the presence of polyoxyethylene sorbitan monooleate and dimethyl sulfoxide. The alginate gels were able to maintain the catalytic activity of the enzymes, while the TiO_2-C-Ag was activated under low-energy UV light (365-465 nm) with the Ag islands acting as electron donors. The latter was confirmed in the surface analysis by X-ray photoelectron spectroscopy, which presented an increase in carbonyl groups in both materials and a change from Ag^0 to Ag^{3+} after 13 h of treatment. The combination of both treatments improved removal in a single TiO_2-C-Ag treatment.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~15:00

Venue: 203 Conference Room

Session 4: 8 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Prof. Yushan Zhao

F1005 Presentation 8 (14:45~15:00)

The Sensitive Stages of Xenopus Laevis Exposed to Environmental Estrogen

Yuanyuan Li and Zhanfen Qin

Chinese Academy of Sciences, China

Abstract—The adverse influences of endocrine disrupting compounds (EDCs) on the reproductive systems of organisms in water, such as fish and amphibians, have received special attention. Some amphibian species can be feminized by EDCs that have potential to mimic estrogens or alter estrogen levels, such as 17α-ethinylestradiol (EE2), polychlorinated biphenyls (PCBs), atrazine, bisphenol A (BPA), dibutyl phthalate (DBP) (Mosconi et al., 2002; Orton and Tyler, 2015). Thus, estrogenic EDCs have become one of suspicious contributors to global amphibian declines in recent years.

Xenopus laevis is most used as an ideal model for detecting feminizing effects of endocrine disrupting chemicals on amphibians because its genetic males can be induced to phenotypic females by estrogenic chemicals (Kloas, 2002). In the literature, however, there are inconsistent results concerning feminizing effects of certain EDCs on X. laevis. To sensitively detect feminizing effects of EDCs on gonadal differentiation in amphibians, it is crucial that exposure begins at sensitive developmental stages for gonadal differentiation (Villalpando and Merchant-Larios, 1990).

In this study, we investigated feminizing effects of EE2 exposures beginning at stages 3/4, 45/46, 48 and 50 on gonadal differentiation of genetic male X. laevis and determined the most sensitive stages for gonadal feminization. To confirm high sensitivity of X. laevis gonads at stage 45/46 to low concentrations of EE2, we repeated 0.1 nM EE2 exposure experiment, in the presence or absence of the anti-estrogen fulvestrant (ICI 182780). We found that 0.1 nM and 1 nM EE2 resulted in partial or complete gonadal feminization when exposure was initiated at stages 3/4 and 45/46, whereas the proportions of intersexes and complete sex-reversals significantly decreased in a stage-dependent manner when initiating exposure delayed to stage 48 and 50. The results show gonadal differentiation at stages 45/46 or early

stages is the most sensitive to lower concentrations of EDCs, and the sensitivity decreases after stages 45/46, but not increases before the stages. In another experiment using the offspring of another pair of frogs, we confirmed high sensitivity of X. laevis gonads at stage 45/46 to low concentrations of EE2. Considering that stages 45/46 X. laevis are easier to manipulate and have higher survival rates than earlier embryos, we propose that stages 45/46 are the optimal stages for initiating exposure for detecting feminizing effects of EDCs on gonadal differentiation in X. laevis.

Session 5

Tips: The schedule for each presentation is for reference only. In case of missing your presentation, we strongly suggest that you attend the whole session.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~14:45

Venue: 204 Conference Room

Session 5: 7 presentations-Topic: "Food Science and Engineering"

Session Chair:

S0004 Presentation 1 (13:00~13:15)

Microbial strains as a Key Role Played on Aroma Profiles of Mao-Berry Fruit Wine

Wanphen Jitjaroen, Tunyaluk Bouphun and Lachinee Panjai

Department of Agro-industry, Rajamangala University of Technology Lanna Lampang, Thailand

Abstract—Using appropriate yeast strain and ammonium phosphate (DAP) was to evaluate aroma profiles in mao wine fermentation. The three different industrial yeast strains, and DAP levels: Rhône2323 with DAP 0.3, and 0.5 gL^{-1}, and GHM with DAP 0.5 gL^{-1} were added, and incubated at 20°C, consequently the malolactic fermentation by the commercial malolactic bacteria Ellios1. The modeling of mao wine aroma profiles by gas chromatography and descriptor intensity by quantitative descriptive analysis were determined. The matrix of fermentations affected the aroma constituents and flavors complexity. Fifty-five aroma components were identified, mainly acetate, fatty acid and acid esters, higher alcohol, and terpenes. The twenty nine descriptors were intensified by judgments and discriminated into six groups (fruity, vegetable, floral, spice, sugar and trait) in a spider graph. The attributes were intensified ranking from mao fruit, ripe tamarind, dried rosella, prune, orange, bell pepper, and honey, respectively. The yeast strains with different ammonium phosphate levels enhanced aroma compounds in the mao wine. Esters, terpenes, and higher alcohols were synthesized by yeast strain Rhône2323 in combination with DAP 0.5 gL^{-1}. While yeast strain GHM with DAP 0.5 gL^{-1} received the highest intensity scores in most attribute.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~14:45

Venue: 204 Conference Room

Session 5: 7 presentations-Topic: "Food Science and Engineering"

Session Chair:

S0008 Presentation 2 (13:15~13:30)

Effect of Washing Methods on Gelation of Hybrid Catfish Ball with Red Curry Paste

Warangkana Sompongse, Paveenuch Techathadamit, and Naphasploy Wannakitpaisal

Department of Food Science and Technology, Faculty of Science and Technology, Thammasat University, Khlong Luang, Pathum Thani, Thailand

Abstract—This study compared washing methods for minced hybrid catfish meat, and improvements to the taste of the washed meat by the addition of red curry paste. The first experiment compared four different treatments methods: washing with cold water, washing with 0.3% (w/w) brine, protein isolation by alkaline solubilization (pH 10.0), and non-washing (control). The most successful method was 0.3% (w/w) brine washing, with a yield close to that of cold water washing. The fish ball made from brine-washed meat had a significantly higher gel strength than the cold water washed meat and lower expressible water than the unwashed meat. Red curry paste was then added at 0, 5, 7.5, 10, and 12% by minced fish weight. The 7.5% mixture had a higher gel strength than the control with no change in expressible water, and was higher in both fiber and ash. In all cases, the addition of curry paste increased sensory scores in color, flavor, taste, and overall liking.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~14:45

Venue: 204 Conference Room

Session 5: 7 presentations-Topic: "Food Science and Engineering"

Session Chair:

S0009 Presentation 3 (13:30~13:45)

Antioxidant Capacity and Total Phenolic Compound, Anthocyanin, and Carotenoid of Yam (Dioscorea alata) Cultivars in Indonesia

Lula Nadia, Koji Ishiguro, Tutisiana Silawati, Takahiro Noda, and Nuri Andarwulan

University Terbuka, South Tangerang, West Java, Indonesia

Abstract—The purpose of this study was to investigate antioxidant capacity and total phenolic compound, anthocyanin and carotenoid of yam cultivars (yellow/YY, orange/OY, light purple yam/LPY, purple yam/PY and dark purple yam/DPY). The flour was obtained by freeze dryer method (-30°C, 74 hours), with moisture content 5.19-10.18% dw. Folin Ciocalteu reagent and chlorogenic acid was used as the standard for investigating total phenolic compounds, and high performance liquid chromatography (HPLC) was used to investigate the content of anthocyanins and carotenoids. It is found that the content of phenolic ranges 812 to 2755 mg/100 g dw and OY has the highest value, anthocyanin is 0,01 to 101,27 mg CGE eq/100g dw and DPY has the highest value. The carotenoid content is obtained in very small amounts in OY and YY which is 77,93-128,35 μg/100 g dw. Using Trolox equivalent, it is found that the antioxidant capacity of yam flour ranges 1,13 – 5,9 trolox eq g /100 g dw and OY has the highest value.

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Venue: 204 Conference Room

Session 5: 7 presentations-Topic: "Food Science and Engineering"

Session Chair:

S0013 Presentation 4 (13:45~14:00)

Pathogenic Ability of *Salmonella* spp. Isolated from Pork Products Retailed in Sakon Nakhon Province, Thailand

Chuenjit Chancharoonpong

Department of Food Technology and Nutrition, Faculty of Natural Resources and Agro-Industry, Kasetsart University, Chalermprakait Sakon Nakhon Province Campus, Sakon Nakhon, Thailand

Abstract—Safety of food consumption especially pork product is important for consumer in Thailand. This study aims to estimate the pathogenic ability of *Salmonella* Enteritidis and *Salmonella* Kentucky isolated from pork products by evaluation heat resistance and survival of these bacteria when exposed to simulated gastrointestinal system. D-value at 50℃ of *S.* Enteritidis and *S.* Kentucky were 30.49 and 21.55 min, respectively. D_{55} of these 2 strains were decreased to 6.49 and 8.22 min, respectively. While D_{60} were 2.79 and 2.62 min, respectively. To evaluate the survival of these bacteria in simulated gastrointestinal system, *S.* Enteritidis and *S.* Kentucky were exposed to the acid broth system (pH 2.0) and the simulated small intestinal system (bile broth system, pH 6.5). After 110 min of incubation time in acid broth system, the survival rates of *S.* Enteritidis and *S.* Kentucky were 80.29% and 82.11%, respectively. Furthermore, the survival rate of *S.* Enteritidis and *S.* Kentucky in bile broth system demonstrated that these bacteria were able to resist in the simulated small intestinal system (pH 6.5) due to they showed high survival rate as 86.72% and 102.51%, respectively. As these results, if these bacteria contaminate in food products, it will increase the risk of foodborne disease to consumer. To prevent the risk from *Salmonella* spp. in these products, the food safety during handling and the appropriate thermal process for these products should be concerned.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~14:45

Venue: 204 Conference Room

Session 5: 7 presentations-Topic: "Food Science and Engineering"

Session Chair:

S0017 Presentation 5 (14:00~14:15)

Effect of Whey Protein Concentrate on Gel-forming Ability of Rohu (*Labeo rohita*)

Phatthira Sutloet, Warangkana Sompongse and Katsuji Morioka

Department of Food Science and Technology, Faculty of Science and Technology, Thammasat University, Pathum Thani, 12120 Thailand

Abstract—The gel-forming ability of rohu (*Labeo rohita*) was investigated. Unwashed and washed gel was prepared under different setting conditions including kamaboko gel (40^{o}C, 30 min) and modori gel (60 and 65^{o}C for washed and unwashed gel, respectively, 30 min), then both gels were heated at 90^{o}C for 20 min. The gel-forming ability was investigated using the folding test, gel strength, and water-holding capacity expressed by the expressible water content. The addition of whey protein concentrate (WPC) at 3% improved the folding test, gel strength, and water-holding capacity of unwashed modori gel. The addition of (WPC) at 2% increased the gel strength of unwashed kamaboko gel and improved the water-holding capacity. The increases in gel strength of both washed gels were found with WPC at 1%. The water-holding capacity of washed modori gel was improved at this concentration, while the addition of WPC did not affect the water-holding capacity of the washed kamaboko gel. Although WPC improved the modori gel, the increases were not as high as those for the kamaboko gel either unwashed or washed. Determinations of whiteness showed that the addition of WPC affected the whiteness of unwashed gel, while not affecting the washed gel.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~14:45

Venue: 204 Conference Room

Session 5: 7 presentations-Topic: "Food Science and Engineering"

Session Chair:

S0024 Presentation 6 (14:15~14:30)

Effects of the tomato pomace oil extract on the physical and antioxidant properties of gelatin films

Natcharee Jirukkakul and Jedsada Sodtipinta

Faculty of Applied Science and Engineering, Khon Kaen University, Nong Khai Campus, Muang Nong Khai 43000, Thailand

Abstract—Antioxidants still remain in the tomato pomace which is generated as a by-product from industry and the extraction of tomato pomace oil may useful in edible film production. The edible film solution was prepared by mixing gelatin (2, 4, and 6%). The effects of the tomato pomace oil (TPOE) were evaluated at 0, 0.5, and 1%. The results showed that an increase in gelatin concentration had caused an increase in the tensile strength, moisture content, solubility and swelling power. The edible film with TPOE appeared as a rough film having oil droplets dispersed throughout. The addition of TPOE caused an increase in lightness, redness, and yellowness, while tensile strength, moisture content, and solubility were decreased. The films, made with TPOE at 0.5 and 1%, exhibited antioxidant properties. However, those properties were not significantly different ($p<0.05$) between film incorporated with TPOE 0.5 and 1%. The suitable conditions for film production in this study were 4% of gelatin and 0.5%.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~14:45

Venue: 204 Conference Room

Session 5: 7 presentations-Topic: "Food Science and Engineering"

Session Chair:

S0039 Presentation 7 (14:30~14:45)

Ethanol Extracts of Lotus Roots Improves the Qualities of the *Yackwa*, the Korean Traditional Cookies

Gi-Seok Lee, Jeong-Hee Cho, Jung-Min Kim, Myung Ho Lee and **Eun Kyoung Mo**

Research and Development Center, DBIO Incorporation, Daejon, KOREA

Abstract—Present study was performed to increase the preservation period of the *Yackwa*, the Korean traditional cookies which were frying and soaking into sugar syrup. The amount of total polyphenol compound of ethanol extracts of lotus roots (LE) was 86.80±6.34 mg gallic acid/100 g dry weight, and the relative inhibition rate of TBARS was 43.27±2.29%. Qualities such as oil absorption ratio, puffing ratio, and texture of the *Yackwa* containing LE (YLE) were not different from that of the control group. The DPPH radical scavenging abilities of the YLE were significantly higher than that of the control group ($p = 0.001$) after 14 days stored at 60℃. The acid value (AV) and the peroxide value (POV) of the YLE were significantly decreased in proportion to the LE addition ($R2=0.7558$ for AV and $R2=0.8325$ for POV). The malondialdehyde production was significantly inhibited by the addition of the LE. Based on the sensory evaluation, the YLE qualities such as color, flavor, taste, and overall acceptability were significantly higher than that of the control group. Thus, the LE could extend the storage time of the *Yackwa*.

Session 6

Tips: The schedule for each presentation is for reference only. In case of missing your presentation, we strongly suggest that you attend the whole session.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~15:00

Venue: 205 Conference Room

Session 6: 8 presentations-Topic: "Agricultural Science and Engineering"

Session Chair: Asso. Prof. Yorianta Sasaerila

S0001 Presentation 1 (13:00~13:15)

Effects of Fertilizer Management Practices on Yield-Scaled Ammonia Emissions from Croplands in China: A Meta-Analysis

Shan Huang, Yongjun Zeng, Xiaohua Pan, Qinghua Shi

Jiangxi Agricultural University, Nanchang, China

Abstract—China is the world's largest emitter of gaseous ammonia (NH_3), a compound carrying severe human health and ecosystem risks. Fertilizer N application is a major source of this atmospheric NH_3. Although many studies have measured NH_3 emissions from croplands in China, the effect of fertilizer management on yield-scaled NH_3 emissions (i.e., NH_3 intensity defined as NH_3 emissions per unit crop yield) is not so clear. Thus, we performed a meta-analysis to quantify the effect of fertilizer management on NH_3 emissions and NH_3 intensity in China's croplands. Results showed that the increases in NH_3 emissions and NH_3 intensity over a control were greater at high N rates (averaging 305 kg N ha^{-1}) than at low and moderate N rates (average of 130 and 206 kg N ha^{-1}, respectively), while crop yields stayed flat over this range. Rice had greater increases in NH_3 emissions and NH_3 intensity in response to inorganic N addition than other crops. The emission factor for NH_3 was also higher for rice than other crops, and increased with increasing proportions of basal N and soil organic carbon and total N content. Relative to surface application, deep placement of fertilizer N significantly decreased NH_3 emissions and NH_3 intensity. Increasing the number of split applications of fertilizer N significantly reduced NH_3 emissions and NH_3 intensity. Organic manure amendments substituting for all or part of inorganic fertilizer N significantly mitigated NH_3 emissions and led to a reduction in NH_3 intensity but without statistical

significance. The use of slow release fertilizers (SR) and urease inhibitors (UI) significantly reduced NH_3 emissions and NH_3 intensity, whereas application of nitrification inhibitors actually increased both. Overall, this meta-analysis demonstrates that appropriate fertilizer management practices such as reducing inorganic N rates, deep placement and split applications of fertilizer N, and using SR and UI can all reduce NH_3 emissions and NH_3 intensity in China's croplands.

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Venue: 205 Conference Room

Session 6: 8 presentations-Topic: "Agricultural Science and Engineering"

Session Chair: Asso. Prof. Yorianta Sasaerila

S0002 Presentation 2 (13:15~13:30)

Assessing the Existence Spread and Control Strategies of Parasitic Weed (*Cassytha Filiformis*) on Cashew Trees in Tanzania

Bakari R. Kidunda, Louis J. Kasuga and Gerald Alex

Naliendele Agricultural Research Institute, P.O Box 509 Mtwara, Tanzania, East Africa

Abstract—Cashew production and productivity has been constrained by biotic and abiotic factors which resulted in a large loss of revenue for both growers and the government. Currently a parasitic weed known as *Cassytha filiformis* also seems to be of economic importance in reducing cashew yields. Due to this importance from 2006/7 season, Naliendele Agricultural Research Institute (NARI) conducted a field survey to assess the existence, spread and control strategies used by farmers and this was followed by research trials in order to address the problem. A total of 350 cashew farmers from major cashew growing areas were interviewed. The survey findings revealed that the parasitic weed was prevalent in most cashew farms particularly to those villages along the coast. Existence of dodder weed was high to those villages located close to the sea compared to those which are far away from the sea. Also the preliminary research findings to date revealed that there is no biological or chemical control for the parasitic weed rather than physical or farm management practices. Correspondingly, several efforts have been done by NARI on awareness creation and also control strategies.

Afternoon, December 26, 2016 (Monday)

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Venue: 205 Conference Room

Session 6: 8 presentations-Topic: "Agricultural Science and Engineering"

Session Chair: Asso. Prof. Yorianta Sasaerila

S0011 Presentation 3 (13:30~13:45)

Investigation on the Effect of Various Storage Conditions on the Quality of Two Upland Varieties

Suntaree Thapmanee and **Siraprapa Brooks**

School of Science, Mae Fah Luang University, 333 Moo1, Thasud, Muang, Chiang Rai, 57100, Thailand

Abstract—Upland rice (*Oryza sativa*) is an important staple crop especially for farmers in rural poverty areas. Low temperature and low humidity is an ideal condition for storage of the seed; however, most upland rice growers have low income resulting in an impossible way to store seeds in ideal conditions. In this study, we monitored seed quality from seeds that were stored in four storage conditions for fourteen months. Seeds from both varieties were able to maintain their quality in all storage conditions until seven months after harvested. This suggests that it is acceptable to store seeds at room temperature if the seeds will be used before seven months after they were harvested. On the other hand, seeds that were stored in room temperature with silica gel, 4 ℃ and 4 ℃ with silica gel were able to maintain their quality (86.70, 90.00 % viability and 67.50, 69.25 % germination) until twelve months after they were harvested. Interestingly, no significant difference found in 'Knaow Jhaow Doi' seeds that were stored at those conditions at twelve months after harvested. Therefore, low humidity without controlling temperature can be an alternative way to store upland rice. Because this storage method is easy to handle, and is suitable for upland rice growers.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~15:00

Venue: 205 Conference Room

Session 6: 8 presentations-Topic: "Agricultural Science and Engineering"

Session Chair: Asso. Prof. Yorianta Sasaerila

S0021 Presentation 4 (13:45~14:00)

A case study of energy balance and economic analysis of castor cultivation in Iran

Arefe Razzazi, **Majid AghaAlikhani**, Barat Ghobadian, Behnam Zand and Mohammad Safieddin

Tarbiat Modares University, Agronomy Department, Tehran, Iran

Abstract—Castor bean (*Ricinus communis* L.**)** with 50 percent of oil content and high- quality, is one of the best crop used to produce biodiesel. The first step toward introduction and widespread cultivation of the crop is to investigate the energy balance and economic analysis for its production in the field. To do so, energy input (include renewable and nonrenewable) and output were calculated during a two years field experiment (2012-2014) in Tehran-Iran. Energy indicators were also assessed. Result showed Indirect and non-renewable sources of energy with 59.68 and 80.86 percent of 11245.64 Mega Joule energy consumption respectively, and comprise the major part of the consumable energy in castor bean cultivation. Moreover, fertilizers and pesticides considered as the most energy inputs, i.e. 55.26 percent of the total consumable energy. Fuels follow that with 21.28 percent and formed a large part of the total consumable energy. Energy use efficiency in Castor seed production was calculated to be 3.81, which is a considerable amount when compared with other crops used to produce biodiesel. According to economic analysis result, castor is an affordable source for biodiesel production. But the height of this plant is a major problem to expand the cost efficient and mechanized system of castor production. Therefore, breeding of the current local ecotypes is recommended.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~15:00

Venue: 205 Conference Room

Session 6: 8 presentations-Topic: "Agricultural Science and Engineering"

Session Chair: Asso. Prof. Yorianta Sasaerila

S0027 Presentation 5 (14:00~14:15)

Effects of Malachite Green Contaminated Water on Production of Pak Choy and Chinese Convolvulus

Narumol Piwpuan, Julara Tosalee and Nutchanat Phonkerd

Faculty of Applied Science and Engineering, Khon Kaen University, Nong Khai Campus, Muang, Nong Khai 43000 Thailand

Abstract—Malachite green is used in industries and aquaculture and disposed in the effluents. In this study, effects of malachite green on growth of *Brassica chinensis* and *Ipomoea aquatica* were studied in order to evaluate possibility of using dye-contaminated wastewater for irrigation. Seedlings of the plants were grown in growing material and watered with tap water containing malachite green at the concentrations of 0 (control), 1, 2, 10, and 20 mg/L for 21 days. At harvest, number of leaf and shoot and root dry weight of all plants were measured. For both species, biomass values of treated plants were similar to the control (dry weight were 0.6-1.0 and 1.1-1.7 g/plant for *B. chinensis* and *I. aquatica*, respectively) and *B. chinensis* was more sensitive to contaminant compared to *I. aquatica*. There was no sign of MG and leucomalachite green detected in root and shoot tissues of plants treated with MG at 20 mg/L, tested by TLC. After plant harvest, toxicity of the growing material was tested on mung beans. Percent germination (83-97%), seedling fresh weight (0.3-0.5 g/plant), and shoot length (11-12.5 cm) were similar to the control indicating that contaminant in growing material did not pose detrimental effect on mung beans. Based on these results, the water contaminated with low concentration of MG may serve as fertirrigation water to compensate water shortage.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~15:00

Venue: 205 Conference Room

Session 6: 8 presentations-Topic: "Agricultural Science and Engineering"

Session Chair: Asso. Prof. Yorianta Sasaerila

S0036 Presentation 6 (14:15~14:30)

Susceptibility of a Cloned Cell Line from *Helicoverpa armigera* to Homologous Nucleopolyhedrovirus

Sudawan Chaeychomsri, Win Chaeychomsri, Motoko Ikeda and Michihiro Kobayashi

Central Laboratory and Greenhouse Complex, Faculty of Agriculture at Kamphaeng Saen, Kasetsart University, Kamphaeng Saen, Nakhon Pathom 73140, Thailand

Abstract—A cloned cell line designated B-5 was isolated from the parental HAPO2 cell line, which derived from pupal ovarian tissues of *Helicoverpa armigera*. This cell line was cultured in Grace's medium supplemented with 10% fetal bovine serum (FBS), and continuously subcultured at 4-day intervals. The population doubling time of this cloned cell line during the logarithmic phase was 22.8 h. RAPD and DAF analyses confirmed the identity of the B-5 cell line as *H. armigera* and clearly distinguished it as a new, unique cell line derived from the pupal ovaries. The susceptibility of B-5 cells to the *H. armigera* nucleopolyhedrovirus (HearNPV) was high and a higher yields of occlusion bodies (OBs) were obtained when compared to the parental HAPO2 cells. Infection of HearNPV in B-5 cells was successfully completed and produced the infectious OBs. Ultrastructural studies of infected *H. armigera* tissues revealed evidence of virus infection and OBs formation in the infected fat cells. The results and observations strongly indicated that B-5 cells were fully permissive for HearNPV infection. The data described in this study indicate that B-5 cell line is a highly productive new cloned cell line and will be useful for the production of HearNPV, and other applications in biotechnology.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~15:00

Venue: 205 Conference Room

Session 6: 8 presentations-Topic: "Agricultural Science and Engineering"

Session Chair: Asso. Prof. Yorianta Sasaerila

S0038 Presentation 7 (14:30~14:45)

Optimization of Cassava (*Manihot esculenta Crantz*) Bars with Peanuts (*Arachis hypogaea Linn.*) and Malunggay (*Moringa oleifera Lam.*)

Jessa B. Gisulga and Lorina A. Galvez

Mindoro State College of Agriculture and Technology/ Department of Agriculture and Allied Courses, Oriental Mindoro, Philippines

Abstract—Snack bars made from cassava along with the fortification of peanuts and malunggay uplifts the utilization of cassava as a key commercial crop with high-value and nutritious products. Optimization of the formulation of cassava bars with peanuts and malunggay was done using Response Surface Methodology. Plackett-Burman (PB) variable screening design and a 3^3 fractional factorial experiment following Central Composite Design with different levels of cassava grates (20, 40, 60% w/w), peanuts (10, 20, 30% w/w) and malunggay (8, 16, 24% w/w). Response Surface Regression analyses revealed significant influence of the three variables on the total regression models for the color, texture and bitter taste acceptability response of the product. Verification study confirms a high predictive ability of the model in generating the acceptability responses. Optimum product formulation was at 35% w/w cassava grates, 22% w/w peanuts and 10% w/w malunggay satisfying an acceptability of ≥ 7.4 for all sensory parameters and at the cost of Php 20.00 per 50 g of product.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~15:00

Venue: 205 Conference Room

Session 6: 8 presentations-Topic: "Agricultural Science and Engineering"

Session Chair: Asso. Prof. Yorianta Sasaerila

S3004 Presentation 8 (14:45~15:00)

Effect of light growing conditions on the susceptibility of *Canna indica* L. to insect attacks

Yorianta Sasaerila, Teuku Tajuddin and Saskia Asri

Biology Department Universitas Al Azhar Indonesia, Jl. Sisingamangaraja, Samping Kompleks Masjid Agung Al Azhar, Kebayoran Baru, Jakarta Selatan, Indonesia

Abstract—*Canna indica* L. is an edible and medicinal crop, traditionally consumed as boiled rhizomes or noodles in South America and Asia. Recent study confirmed that *C. indica* is a shade tolerant species and performed best at low light environment. This finding has the implication that this species could be cultivated under the tree canopies, such as under the oil palms. Large scale planting of this species, however, will increase the possibility of pest infestations. Here we report study on the effect of light growing conditions on the susceptibility of to cultivars of *C. indica* (red and white) to insect attacks. The list of insects that fed on *C. indica* leaves were: *Valanga nigricornis* (Orthoptera: Acrididae), *Systoloderus* sp. (Orthoptera: Tetrigiidae), Lepidoptera: Nymphalidae, Pyralidae and Psychidae. These defoliators have never been reported to feed on *C. indica* before. Shade treatments had a significant effect on *C. indica* susceptibility to insect. More leaves of full sun grown seedlings were consumed by defoliators (611.71 cm^2 and 478.69 cm^2 for red and white cultivars, respectively), compared to leaves of seedlings grown under 25% light (31.29 cm^2 and 63.87 cm^2 for red and white cultivars, respectively). No root infestation by insects was observed in this experiment. This finding support the notions to utilize areas under oil palms for *C. indica* cultivation.

15:00-15:20	**Coffee Break**

Session 7

Tips: The schedule for each presentation is for reference only. In case of missing your presentation, we strongly suggest that you attend the whole session.

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:35

Venue: 203 Conference Room

Session 7: 9 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Asso. Prof. Alaa El-Din Hamid Sayed

F3007 Presentation 1 (15:20~15:35)

Defeating the Deadly Duo: Mercury and Greenhouse Gas Emissions: Improving Laws to Regulate Emissions from the Electricity Sector in Asia

James Prest

Australian National University, Australia.

Abstract—This paper considers the regulatory and environmental implications of present plans to build more than 1800 coal fired power stations throughout Asia. The purpose is to raise questions about the effectiveness of regulation of pollution from coal fired power stations, by discussing national-level implementation of international environmental laws. The preliminary results of an investigation of the implementation of pollution control law regarding mercury emissions from coal fired power stations in Australia is presented. It is found that EPA regulation in New South Wales allows high levels of mercury emissions and in Victoria there are no apparent controls within pollution control licences. This has implications for the implementation of the *Minamata Convention*. It is argued that stricter mercury regulation may have environmental and health co-benefits beyond mercury hazard reduction, in terms of reduction of greenhouse gas emissions from conventional electricity generation sources

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:35

Venue: 203 Conference Room

Session 7: 9 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Asso. Prof. Alaa El-Din Hamid Sayed

B0007 Presentation 2 (15:35~15:50)

Novel Proposed Biodegradation Pathways of the Organophosphate Trichlorfon by Aspergillus Sydowii PA F-2

Jiang Tian and Lanzhou Chen

Wuhan University, China

Abstract—Trichlorfon (TCF) is one of the most widely used organophosphate pesticides in agriculture. However, limited information is known about the biodegradation behaviors and kinetics of this pesticide at present. In our research, we discuss the TCF biodegradation potentials of the newly isolated strain Aspergillus sydowii PA F-2, and show that dimethyl phosphite and trichloroethanal are the two main biodegradation intermediates under the conditions that TCF is supplemented as sole carbon source. Recently we build up a novel TCF biodegradation pathway and demonstrate that hydrolyzation and P-C bond cleavage are the two main reactions during the TCF biodegradation. By comparative analysis of the gas chromatography-mass spectrometry results, we further show that (i) trimethy phosphonacetate, (ii) phosphonic acid, ethyl-dimethy ester, (iii) trimethyl orthophosphate and (iv) acetic acid, dichloro-methyl ester are the four important intermediates that are newly investigated under the conditions that TCF is supplemented as sole phosphorus and sole carbon-phosphorus sources. These novel findings indicate that oxidation and reductive dechlorination are also the two main reactions besides hydrolyzation during TCF biodegradation. Our identification of the specific biodegradation intermediates and reactions in the novel proposed TCF biodegradation pathways may give us approaches to understand the TCF degradation behaviors in microorganisms. The model strain Aspergillus sydowii used in this study also exhibit significant potential in TCF bioremediation in the contaminated environment.

Afternoon, December 26, 2016 (Monday)

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Venue: 203 Conference Room

Session 7: 9 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Asso. Prof. Alaa El-Din Hamid Sayed

B0012 Presentation 3 (15:50~16:05)

Analysis of High-Power LED Packages with Diamond and CNT Film

Cheng Yi Hsu and **Yuli Lin**

Chung Hua University, Taiwan

Abstract—In this study, analysis using high thermal conductive material for measuring junction temperature (Tj) in high power GaN-based light emitting diodes (LED) was presented. Thermal characteristics of high power Light-emitting-diode have been analyzed by using various different structure conduction models. The forward operation voltage is advantageously used to measure the junction temperature of light emitting diodes. Using this method, junction temperature (Tj) of LED under various structures and chip mounting methods was measured. It was found that the junction temperature can be reduced considerably by using diamond film substrates and CNT film substrates. In this study, for model F structure, the junction temperature using diamond film can be decreased by about 10.8% under 1.5W power, decreased by about 12% under 2.6W power and decreased by about 11.6% under 4.2W power for 1 mm square die. The junction temperature using CNT film can be decreased by about 12.7% under 1.5W power, decreased by about 14.1% under 2.6W power and decreased by about 14.2% under 4.2W power for 1 mm square die. The thermal resistance (RT) of diamond film can be measured to be 12.6℃/W under 4.2W power and the thermal resistance (RT) of CNT film can be measured to be 12.2℃/W under 4.2W.

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Venue: 203 Conference Room

Session 7: 9 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Asso. Prof. Alaa El-Din Hamid Sayed

B0021 Presentation 4 (16:05~16:20)

MWCNT@PI Core-Shell Structured Composites with High Dielectric Permittivity and Low Dielectric Loss

Junchuan Wang and Baoping Lin

Southeast University, China

Abstract—The amino-modified multi-walled carbon nanotubes (NH_2-MWCNTs) coated with polyimide (PI) (MWCNT@PI) nanofillers were prepared by in situ polymerization. Dielectric PI based composites reinforced by MWCNT@PI showed high dielectric permittivity and low dielectric loss. When the NH_2-MWCNTs content is 15 wt%, the composite film exhibits a high dielectric constant (31.2) and a rather low dielectric loss (0.041) at 1 kHz and room temperature. Core-shell nanostructure strategies are effective tools for the design of high-dielectric-constant polymer composites. The suppressed dielectric loss originates from the shell PI, which is electrically barrier and low loss. This work provides a novel approach to fabricate PI composites with high dielectric constant and low dielectric loss.

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Session Chair: Asso. Prof. Alaa El-Din Hamid Sayed

B0022 Presentation 5 (16:20~16:35)

Utilization Ceramic Wastes from Porcelain Ceramic Industry in Lightweight Aggregate Concrete

Rungorj Piyaphanuwat and Suwimol Asavapisit

King Mongkut's University of Technology Thonburi (KMUTT), Thailand

Abstract—This research investigated the possibility of ceramic wastes such as deteriorated working mold (DWM) and biscuit as a coarse and fine aggregate in lightweight aggregate concrete (LWAC), which divided to two parts; effect of coarse aggregate (CA) replacement with DWM and effect of biscuit replacement fine aggregate (FA)on properties of LWAC.The ratio of ordinary Portland cement (OPC): FA: CA are 1: 2.21: 3.03 and replaced CA with DWM and FA with biscuit at the levels of 0, 25, 50, 75 and 100 wt.%. All conditions of LWAC were tested for compressive strength at 7, 14, 28 and 56 days, unit weight, water absorption and thermal conductivity at the age of 28 day. The results showed that increasing the levels of DWM decreased density and compressive strength but increased the water adsorption and thermal conductivity. At 28 days, the compressive strength and bulk density of LWAC decreased from 55.4 to 11.4 MPa and 2394 to 1362 kg/m3 with increasing of DWM replaced CA from 0 to 100 wt.%. The optimum ratio of lightweight aggregate concrete with DWM was the level of 50 wt.% that gave the compressive strength and density at 28 days of 38.1 MPa and 1803 kg/m3 respectively. This mix was collected to study the effect of biscuit replaced FA on mechanical properties. The compressive strength increased when levels of biscuit increased from 0 to 50 wt.% but decreased with the levels of biscuit excess 50 wt.%. The bulk density and thermal conductivity decreased from 1803 to 1584 kg/m3 and 0.689 to 0.592 W/m ℃K. The optimum mix of LWAC was found in LWAC containing 50 wt.% of DWM and 100 wt.% of biscuit that meet the ASTM C330 : standard range for structural lightweight aggregate concrete.

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Session Chair: Asso. Prof. Alaa El-Din Hamid Sayed

B1001 Presentation 6 (16:35~16:50)

Improvement of TiO2 Photocatalytic Performance with SnS2 Heterojunction Composites for Removal of Pharmaceutical Micropollutants

Marin Kovacic, Hrvoje Kusic, and Ana Loncaric Bozic

University of Zagreb, Republic of Croatia

Abstract—Diclofenac is one of the most commonly used nonsteroidal anti-inflammatory drugs, therefore its presence as a micropollutant in the environment is ubiquitous. Conventional wastewater treatment technologies are inadequate for removal of many pharmaceutical micropollutants, necessitating research for viable alternatives such as advanced oxidation processes. Among AOPs, TiO_2 photocatalysis is particularly attractive because TiO_2 is environmentally safe, inexpensive, and readily available. TiO_2 is currently the *de facto* standard photocatalyst. However, its application in solar driven processes is limited due to the relatively wide band gap. Composite heterojunction TiO_2/SnS_2 photocatalysts were prepared and investigated for removal of diclofenac from aqueous solution under simulated solar irradiation. The purpose of SnS_2 in the composite is to lower the band gap. The composites were immobilized on glass substrates by sol-gel technique and their photocatalytic activity was evaluated by experiments carried out under simulated solar irradiation. The experimental plan was developed in accordance to Box-Behnken experimental design. Removal and conversion rates were monitored by high performance liquid chromatography and total organic carbon analysis. Toxicity and biodegradability parameters of the byproducts were also assessed. In comparison to pristine TiO_2, the composites have shown enhanced photocatalyitic activity under solar irradiation and yielded improved quality of treated water.

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Session 7: 9 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Asso. Prof. Alaa El-Din Hamid Sayed

B1003 Presentation 7 (16:50~17:05)

Light-Driven Removal of Rhodamine B over SrTiO3/Bi2WO6 Composites

Wei Tian, Jiancheng Zhou, and Naixu Li

Southeast University, China

Abstract—$SrTiO_3/Bi_2WO_6$ hybrids were hydrothermally prepared and structurally examined by means of various chemical and physical techniques. Formation of heterojunction is well confirmed via HRTEM, XPS and PL and contributes immensely to the enhanced catalytic function of a composite in an assay of Rhodamine B (Rh B) photodegradation due to accelerated migration and separation of charge carriers at it. Among as-prepared samples, Bi_2WO_6 loaded with 8 wt.% $SrTiO_3$ proves most photocatalytically active in light of a top degradation rate (*D*) of ca. 98.4% and a peak apparent kinetic rate (*k*) of 0.0463 min^{-1}. Besides, h^+ and •OH turn out to be the major reactive species for Rh B degradation. Finally, based on theoretical and experimental results, a possible reaction mechanism was proposed.

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Session Chair: Asso. Prof. Alaa El-Din Hamid Sayed

B1009 Presentation 8 (17:05~17:20)

Engineering Biofilm for Remediation of Environmental Chromium(VI) Contamination

Chun Kiat Ng and Bin Cao

Nanyang Technological University, Singapore

Abstract—Chromium is commonly used in various industries and its widespread use has contributed to the release of chromium ions via wastewater into the environment. Hexavalent chromium, Cr(VI), mainly in the form of $Cr_2O_7^{2-}$ and CrO_4^{2-}, is toxic and carcinogenic to living organisms, and can cause serious consequences to aquatic ecosystems due to its high water solubility and mobility in the environment. It is in global interest to develop an effective and sustainable system to remediate Cr(VI) from water for environmental conservation and water reclamation purposes. In this study, we developed a biotic and an abiotic catalytic system for the remediation of Cr(VI) contaminated water. The biotic catalytic system, known as nanocatalytic biofilm, consists of *in-situ* fabricated palladium nanoparticles in a living *Shewanella oneidensis* MR-1 biofilm. The nanocatalytic biofilm was then subjected to controlled pyrolysis to produce a biofilm-templated heteroatom-doped carbon-palladium nanocomposite – an abiotic catalytic system. The Cr(VI) reduction activities of both catalytic systems were characterised. Both the biotic nanocatalytic biofilm and the abiotic carbon-palladium nanocomposite catalytic systems were able to remediate Cr(VI) contaminated water under hydrodynamic conditions with varied degrees of success. This proof-of-concept demonstrates for the first time the interdisciplinary engineering of biofilms to develop biotic and abiotic nanocatalytic systems for sustainable remediation of environmental Cr(VI) contamination.

Afternoon, December 26, 2016 (Monday)

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Venue: 203 Conference Room

Session 7: 9 presentations-Topic: "Environmental Science and Engineering"

Session Chair: Asso. Prof. Alaa El-Din Hamid Sayed

B1018 Presentation 9 (17:20~17:35)

Retention Mechanisms of Lead on Thermoacidophilic Red Algae – Cyanidiale

Yen Lin Cho, Liang Ching Hsu, Pin-Chen Chen, Chia Jung Hsieh, Shao Lun Liu, Yen Ping Peng, and Yu Ting Liu

National Chung Hsing University, Taiwan

Abstract—Cyanidiales are the unicellular and eukaryotic red microalgae that consist of three genus and seven species including *Cyanidium caldarium*, *Cyanidioschyzon merolae*, *Galdieria sulphuraria*, *Galdieria maxima*, *Galdieria partita*, *Galdieria daedala* and *Galdieria phlegrea*. The red algae can tolerate high temperature and acidic environments. Due to such attributes, Cyanidiales have been considered as a superior material to remove heavy metals such as lead from industrial and mining wastewater. In this study, we aimed to determine the retention capacity and develop the retention mechanisms of lead on Cyanidiales in relation to the lead speciation. The sorption isotherm of lead on six species of red algae including *Galdieria maximum* (Gm), *Galdieria partita* (Gp), *Galdieria phlegrea* (Gph), *Galdieria sulphuraria* (Gs), *Cyanidium caldarium* (Cc), and *Cyanidioschyzon merolae* (Cm) at pH 5.0 showed multiple steps for lead sorption behaviors. In the first step of sorption behaviors that generally followed the L-curve shape, the sorption capacity of lead on red algae was in the sequence of Cm (67.57 mg g^{-1}) > Gs (34.84 mg g^{-1}) > Cc (29.07 mg g^{-1}) > Gph (24.33 mg g^{-1}) > Gp (22.42 mg g^{-1}) > Gm (12.85 mg g^{-1}). After the first step, however, the greatest sorption capacity for each read algae was found in the sequence of Cc (299.36 mg g^{-1}) > Cm (214.04 mg g^{-1}) > Gp (128.64 mg g^{-1}) > Gph (115.53 mg g^{-1}) > Gs (108.77 mg g^{-1}) > Gm (38.20 mg g^{-1}). Lead retention mechanisms were determined using the Fourier Transform Infrared Spectroscopy (FTIR) and the linear combination fitting (LCF) of lead L_{III}-edge X-ray absorption spectroscopy (XAS). The FTIR analyses revealed that Amide I (C=O) and Amide II (C-N) functional groups were mainly responsible for the sorption of lead. Linear combination fitting of the XAS data showed that lead reacted with organic fractions of read algae. The organic species of lead was determined as lead bound to the cell wall of plant and

humate. The XAS data also suggested that lead might be precipitated on the surfaces of red algae. Collectively, the retention mechanisms of lead on Cyanidioales might be (1) lead bound with proteins and surface organic functional groups of the algae and (2) lead precipitated on the surfaces of the algae.

Session 8

Tips: The schedule for each presentation is for reference only. In case of missing your presentation, we strongly suggest that you attend the whole session.

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:20

Venue: 204 Conference Room

Session 8: 8 presentations-Topic: "Food Science and Engineering"

Session Chair:

S0034 Presentation 1 (15:20~15:35)

Banana Quality Attribute Prediction and Ripeness Classification using Support Vector Machine

Segun E. Adebayo, **Norhashila Hashim**, Khalina Abdan, Marsyita Hanafi and Manuela Zude-Sasse

Department of Biological and Agricultural Engineering, Faculty of Engineering, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

Abstract—Five laser diodes of 532, 660, 785, 830 and 1060 nm laser light backscattering imaging (LLBI) were employed for quality attribute prediction and ripening stage classification of banana. A support vector machine (SVM) was tested to establish the theoretical prediction and classification models to predict chlorophyll, elasticity and soluble solids content (SSC) and also to classify the bananas into six ripening stages. The classification was set up with six ripening stages 2-7. Wavelengths of 532, 660 and 785 nm gave high correlation coefficients both for banana quality prediction and ripeness classification. The results show that the highest correlation coefficients of 0.912, 0.945 and 0.872 were obtained for chlorophyll, elasticity and SSC at 785, 660 nm respectively. An overall classification accuracy of 92.5 % was recorded at 830nm. These results show that LLBI with the SVM model can be used for non-destructive estimation of banana quality attributes and the subsequent ripeness classification.

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:20

Venue: 204 Conference Room

Session 8: 8 presentations-Topic: "Food Science and Engineering"

Session Chair:

S0041 Presentation 2 (15:35~15:50)

Quality Properties of Shell Chocolate Filled with Ethanol Extract of Black *Panax Ginseng*

Jeong-Hee Cho, Gi-Seok Lee, Eun-Ju Sok, Myung Ho Lee and **Eun Kyoung Mo**

Research and Development Center, DBIO Incorporation, Daejon, KOREA

Abstract—This study compared washing methods for minced hybrid catfish meat, and improvements to the taste of the washed meat by the addition of red curry paste. The first experiment compared four different treatments methods: washing with cold water, washing with 0.3% (w/w) brine, protein isolation by alkaline solubilization (pH 10.0), and non-washing (control). The most successful method was 0.3% (w/w) brine washing, with a yield close to that of cold water washing. The fish ball made from brine-washed meat had a significantly higher gel strength than the cold water washed meat and lower expressible water than the unwashed meat. Red curry paste was then added at 0, 5, 7.5, 10, and 12% by minced fish weight. The 7.5% mixture had a higher gel strength than the control with no change in expressible water, and was higher in both fiber and ash. In all cases, the addition of curry paste increased sensory scores in color, flavor, taste, and overall liking.

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:20

Venue: 204 Conference Room

Session 8: 8 presentations-Topic: "Food Science and Engineering"

Session Chair:

S1007 Presentation 3 (15:50~16:05)

Antidiabetic and anticancer activities of *Mangifera indica* cv. Okrong leaves

Aunyachulee Ganogpichayagrai, Chanida Palanuvej and Nijsiri Ruangrungsi

College of Public Health Sciences, Chulalongkorn University, Bangkok 10330, Thailand

Abstract—Diabetes and cancer are a major global public health problem as the leading causes of death. Many chemical agents usually related with undesirable side effects; accordingly, plant-derived drugs with less or no adverse side effects have become the important alternatives in recent years. The purpose of this study was to assess antidiabetic and anticancer activities of *Mangifera indica* cv. Okrong leaves extract and mangiferin, which is its active phytochemical compound. For antidiabetic activities, 1 mM of p-nitrophenyl-α-D-glucopyranoside (PNPG) were used as substrate against yeast -glucosidase and rat intestinal -glucosidase; whereas, 1 mM of 2-chloro-4 nitrophenol- -D-maltotroside (CNPG-3) were used as substrate against porcine pancreatic -amylase. Nitrophenol product was spectrophotometrically measured at 405 nm. For anticancer activity, they were judged against five human cancer cell lines compared to two human normal cell lines using MTT assay. Mango leaf extract and mangiferin showed dose-dependent inhibition against yeast -glucosidase with the IC50 of 0.0503 and 0.5813 mg/ml respectively, against rat -glucosidase with the IC50 of 1.4528 and 0.4333 mg/ml respectively, compared to acarbose with the IC50 of 11.9285 and 0.4493 mg/ml, respectively. Furthermore, mango leaf extract had a potential to inhibit all tested cancer cell lines; the most inhibition was found against gastric carcinoma cell line with the IC50 of 0.43 μg/ml. Mangiferin revealed slightly to moderately activity to inhibit all tested cancer cell lines with no significant antiproliferative affected against normal cell lines. Mango leaf has a potential to be an alternative plant-derived drugs, helpful to control diabetes and cancer diseases.

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Venue: 204 Conference Room

Session 8: 8 presentations-Topic: "Food Science and Engineering"

Session Chair:

S1013 Presentation 4 (16:05~16:20)

Encapsulated Tomato Pomace Extract Improved Redness and Microbial Stability of Low Nitrite Chicken Sausage

Bung-Orn Hemung, Nachayut Chanshotigul and Koo Bok Chin

Faculty of Applied Science and Engineering, Khon Kaen University, Nong Khai Campus, Nong Khai, 43000 Thailand

Abstract—Tomato pomace (TP) is the waste from tomato processing plants and its utilization as food ingredient may provide sustainable industry by reducing waste. TP was extracted by ethanol using microwave-assisted method at 180W for 90s. The ethanol was evaporated out and an extract was encapsulated with maltodextrin (1:10) by spray drying to obtain an encapsulated TP extract (ETPE). The redness (a value) of ETPE powder was 6.5±0.05 and it was used as natural ingredient in the low-nitrite chicken sausage. Chicken emulsion sausage was prepared at 25 mg/kg of nitrite for being control. Effect of ETPE (1.0%) was evaluated along with the reference (150 mg/kg of nitrite without ETPE). The redness (a value) of sausage with ETPE was found at 6.8±0.03, which was higher than those of reference and control, which were at 4.8±.022 and 5.1±0.15, respectively. However, hardness, expressible moisture content and cooking yield values were reduced slightly. During storage at 10 °C in the air packed condition for 1 week, changes in color, pH, redness, and thiobarbituric acid reactive substances value were not significantly different. However, total microbial count of sausage samples with ETPE was lower than control for a 1 log cycle, suggesting microbial stability. Therefore, the addition of ETPE could be an alternative strategy to utilize TP as a natural colorant and antimicrobial agent to extend the shelf life of low-nitrite chicken sausage.

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:20

Venue: 204 Conference Room

Session 8: 8 presentations-Topic: "Food Science and Engineering"

Session Chair:

S3002 Presentation 5 (16:20~16:35)

Experimental Study the Effect of Fine Powder on Density-Driven Granular Segregation Mechanisms in a Rotation Drum

Chun-Chung Liao and Yu-Ru Chen

National Kaohsiung University of Applied Sciences, Taiwan

Abstract—Granular materials (e.g. wheat, soy beans, coffee beans, pills, sugar, and salt) are widespread in our daily life. Granular materials are also widely used in industrial processes such as food industry, pharmaceutical, pyrolysis, gasification, additive manufacturing, polymer, and metallurgical processes. Rotating drums have been employed for investigating the mechanics of granular flows and segregation mechanisms in the past few years because the flowing field is relatively simple. Two important flow regions exist in a rotating drum: the flowing layer region and the fixed-bed region. The physical mechanisms occur chiefly in the flowing layer. The repose angle of the granular materials is a critical parameter for examining the granular flow behavior in a rotating drum. Understanding the granular segregation mechanism is crucial for improving industrial processes and ensuring high product quality. In the current study, the quasi-2D rotating drum is used to investigate the granular segregation behavior. Two types of beads of the same size (3 ± 0.1 mm in diameter), but with different densities (white glass particle = 2.48 g/cm3, and red polypropylene particle (PP) = 0.90 g/cm3) were used as the granular materials. The density ratio of the particles was 2.76. A DV camcorder (Sony DCR-TRV900 NTSC) was used to record the flow motion inside the drum, with a capture speed of 30 frames per second (FPS). Image processing and a particle-tracking method were used for determining the segregation index and dynamic repose angle of granular materials. The results indicate that the addition of a little amount of fine powder plays a crucial role in density-induced granular segregation behavior. The results showed that the final steady segregation index and repose angle are enhanced with the increase of the amount of fine powder.

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:20

Venue: 204 Conference Room

Session 8: 8 presentations-Topic: "Food Science and Engineering"

Session Chair:

S3005 Presentation 6 (16:35~16:50)

Protein Pattern and Amino Acid Profile of Siamese Crocodile (*Crocodylus siamensis*) Egg White

Win Chaeychomsri, Manadsaree Klomtun, Pannapa Pinweha, Sudawan Chaeychomsri, and Jindawan Siruntawineti

Department of Zoology, Faculty of Science, Kasetsart University, Bangkok 10900, Thailand

Abstract—Siamese crocodile (*Crocodylus siamensis*) has been considered as an economic animal of Thailand. The mature female lays 20-50 eggs per year which 60% of total eggs are fertilized and 40% are unfertilized. Egg is a good source of proteins and amino acids. However, nutrition facts and information for Siamese crocodile eggs have been limited. For guidelines on the usage of unfertilized crocodile egg white in the future, twenty-three crocodile eggs were collected and determined protein pattern and amino acid profile. The results revealed that glutamic acid was the most abundant in crocodile egg white (6,776.76 mg/100 g), followed by aspartic acid (5,291.08 mg/100 g), serine (4,768.03 mg/100 g), leucine (4,602.48 mg/100 g) and lysine (3,277.45 mg/100 g). The three minor amino acids were tryptophan (561.87 mg/100 g), methionine (988.52 mg/100 g) and histidine (1,386.67 mg/100 g). The protein patterns were studied by sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) in the condition that containing mercaptoethanol reducing agent. The concentration of polyacrylamide in the separating gel was 7.5% (w/v). The SDS-PAGE patterns of fresh crocodile egg white were not different from those of freeze-dried egg white, which showed six bands of protein with the molecular weight of 231.8, 175.4, 135.5, 91.3, 65.1 and 37.2 kDa. Therefore, crocodile egg white is an inexpensive source of high quality protein for food industries.

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:20

Venue: 204 Conference Room

Session 8: 8 presentations-Topic: "Food Science and Engineering"

Session Chair:

S3006 Presentation 7 (16:50~17:05)

Study of Food Distribution Using Reliability Center Maintenance And Geographical Information System to Increase Continuity Flow of Daily Product

Henny Pramoedyo, Sudarto, **Zefry Darmawan**, Sativandi Riza and Ghufrillah Navratilova

University of Brawijaya, Malang, Indonesia

Abstract—Food distribution is one of important component in food life stock in strategic way. It should maintain carefully to engage availability for society needs. Food distribution should achieve effective, efficient, and spread continually in every market or grocery center. Food production usually located at country side or specific factory area which different from communities center as primary consumer. Distribution of food will employ many road infrastructures. Disruption in food distribution will impact on scarce of life stock and raise the price in the market. Solution to overcome those problems is to provide transportation infrastructure with reliable service. Poor quality services of road will great impact on continuity of distribution. One of main problem of food distribution in development countries is low service of road infrastructure. Quality of road are decrease while its service. Vehicle Load is suppressed daily and will reduce endurance of road surface. Good maintenance schedule are needed to keep the road service.

Indonesia is one of development countries which have many diverse areas. It has country side, rural, mountain region, coastal area, and many others. Those areas were connected by road service in many categories. There are highway, toll road, artery, and collector. To keep the road service there are many maintenance activities generate annually. Some activities conduct in predicted schedule but some is unpredicted. Unpredicted schedule make transport problem, traffic jam is most problem occur at maintenance road. Reliable center maintenance (RCM) schedule will overcome this problem by determine and calculate time to failure of road. Also to simplify identification of maintenance location, engineer need to integrate geographical information system (GIS) as indexing tools.

This research objective is to implement integration RCM with geographical information system as tools to generate road maintenance. RCM will determine failure time of road and

schedule activity while GIS will help to indexing location and show possibility of traffic jam. Object of this research is artery road in Malang city Indonesia. These roads are located inside the city and connected city side with market or groceries center.

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:20

Venue: 204 Conference Room

Session 8: 8 presentations-Topic: "Food Science and Engineering"

Session Chair:

S0006 Presentation 8 (17:05~17:20)

Effect of Magnesium Treatment on the Production of Hydroponic Lettuce

Viktor József Vojnich, Attila Hüvely and Judit Peti

Pallasz Athénée University, Faculty of Horticulture and Rural Development, Hungary

Abstract—The species of lettuces are grown in extraordinary wide variety, nowadays. Hydroponic lettuce growing, make possible continuous cultivation of lettuce all the year. Lettuce is an economically very important vegetable. When grown in a glasshouse, in hydroponics the vegetation cycle is shorter (2 months), because the environmental factors (e.g. climate) are not affecting the culture, the presence of pests and diseases can be excluded, bigger crop yields can be achieved, so this is more profitable. In the course of the experiment, the following doses of magnesium were added to the standard nutriment solution: 50-, 100-, 150-, 200- and 250 mg l-1. The magnesium supplements were added in the form of Mg(NO3)2 solution in our experiment. The treatments were carried out with 4 repetitions in randomized block design.

Session 9

Tips: The schedule for each presentation is for reference only. In case of missing your presentation, we strongly suggest that you attend the whole session.

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:05

Venue: 205 Conference Room

Session 9: 7 presentations-Topic: "Chemical Engineering Technology and Bioengineering"

Session Chair: Assoc. Prof. Chi-wai KAN

CA435 Presentation 1 (15:20~15:35)

Copolymer-Graphene Oxide Composite/Carbon Cloth for Flexible Supercapacitor Electrode Materials

Jinho Hwang, Deivasigamani Ranjith Kumar, Marjorie Baynosa, Jae-Jin Shim

School of Chemical Engineering, Yeungnam University, 280 Daehak-ro, Gyeongsan, Gyeongbuk, 38541, Republic of Korea

Abstract—Recently, flexible wearable devices such as smart watches, wearable computers, and smart clothes have been getting significant attention. These devices require rechargeable batteries and supercapacitors. In this study, a supercapacitor material was prepared using carbon cloth as substrate (0.356 mm in thickness) for the active electrode materials. Graphene oxide (GO), which can easily form composites with other functional nanomaterials, was employed. Poly(diphenylamine)-polyaniline (PDPA-PANI) copolymer was selected owing to its several advantages such as higher conductivity, flexibility, and higher mechanical strength. GO was coated on carbon cloth by using layer-by-layer (LBL) method, and the PDPA-PANI copolymer was deposited on the graphene oxide surface by electrodeposition, forming a composite wide potential window and high conductivity as well as good stability. And the actual supercapacitor was fabricated by using two electrode and separator as PVA gel electrolyte. Also, the fabricated device is flexible. It can be bent up to some degree and still give good stability.

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:05

Venue: 205 Conference Room

Session 9: 7 presentations-Topic: "Chemical Engineering Technology and Bioengineering"

Session Chair: Assoc. Prof. Chi-wai KAN

CA436 Presentation 2 (15:35~15:50)

A two–step synthesis of ZnO@rGO nanocomposites for photocatalyst applications

Nguyen Van Quang, Van Hoa Nguyen, Jae-Jin Shim

School of Chemical Engineering, Yeungnam Universitry, Gyeongsan, Republic of Korea

Abstract—Zinc oxides with three different morphologies (short nano-rods, nano-ovals, nano-spheres) anchored uniformly on reduced graphene oxide (RGO) were synthesized successfully using a two-step synthesis method. Firstly, ZnO seed crystals were sowed on RGO sheets by hot argon gas flow. Secondly, particles of different structures were developed from ZnO seeds in solvent mixture. The optical band gap energy of as-prepared ZnO/RGO composites (ca. 2.65 eV) is much lower than that of bulk ZnO (3.37 eV), which may promote photocatalytic activity under visible light. The photocatalytic activity of samples was evaluated for the degradation of methylene blue (MB) and rhodamine B (RhB). Among the three types of nanocomposite catalyst, the spherical ZnO@rGO exhibited the highest removal efficiency of 98.8% and 97.7% for MB and RhB, respectively, within 60 min under UV light at a low power of 40 W and a very low catalyst concentration of 0.1 g/L. This catalyst showed a very high activity retention of 96.0% after recycling 15 times. Furthermore, the detailed degradation mechanism of the dyes was also discussed.

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:05

Venue: 205 Conference Room

Session 9: 7 presentations-Topic: "Chemical Engineering Technology and Bioengineering"

Session Chair: Assoc. Prof. Chi-wai KAN

CA437 Presentation 3 (15:50~16:05)

A novel and facile one-pot synthesis of MoS_2@$NiCo_2S_4$ nanotubes and nanoflakes for enhancing performance of hybrid capacitors

Le Nhu Minh Tue, Nguyen Van Hoa, Jinho Hwang, Jae-Jin Shim

School of Chemical Engineering, Yeungnam University, 280 Daehak-ro, Gyeongsan, Gyeongbuk, 38541, Republic of Korea

Abstract—The combined nanosheet materials, molybdenum disulfide (MoS_2) can enhance the performance of electrochemical energy storage devices when is mixed with a good capacitive material like $NiCo_2S_4$ because of the high surface area and high electrical conductivity. MoS_2@$NiCo_2S_4$ formed nanotubes and nanoflakes. Furthermore, a high specific capacitance of 2036 F/g for the hybrid material was observed at a current density of 1 A/g.

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:05

Venue: 205 Conference Room

Session 9: 7 presentations-Topic: "Chemical Engineering Technology and Bioengineering"

Session Chair: Assoc. Prof. Chi-wai KAN

CA439 Presentation 4 (16:05~16:20)

Hydrocracking of Crude Palm Oil over NiMoW-ZSM-5 Catalyst and Gas Chromatographic Identification of Biofuel Products

Maliwan Subsadsana and Chalerm Ruangviriyachai

Materials Chemistry Research Center, Department of Chemistry, Faculty of Science, Khon Kaen University, Khon Kaen, Thailand

Abstract—In this study, the catalytic performance of metallic modified ZSM-5 zeolite for hydrocracking conversion of crude palm oil (CPO) to biofuels is presented. The different metals (mono-, bi-, and trimetallic) of Ni, NiW, NiMo and NiMoW deposited on ZSM-5 zeolite, determined by X-ray fluorescence spectroscopy (XRF), were synthesized via impregnation method. The catalysts were characterized by X-ray diffraction (XRD) spectrometry, Attenuated total reflectance - fourier transform infrared spectroscopy (ATR-FT-IR), N2 adsorption and desorption measurement, scanning electron microscope (SEM) and NH3- temperature-programmed desorption (NH3-TPD). These catalysts were evaluated on the basis of their catalytic activity in the hydrocracking of CPO for the production of biofuels, which was conducted in a batch bioreactor at 400 ℃ and for 2 h of reaction time. Moreover, the different metals on ZSM-5 zeolite affected their catalytic activity and NiMoW-ZSM-5 gave an excellent conversion. These obtained hydrocarbon products were gasoline, kerosene, and diesel, identified by simulated distillation gas chromatography-flame ionization detector (SimDis GC-FID).

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:05

Venue: 205 Conference Room

Session 9: 7 presentations-Topic: "Chemical Engineering Technology and Bioengineering"

Session Chair: Assoc. Prof. Chi-wai KAN

CA440 Presentation 5 (16:20~16:35)

Liquid-phase hydrogen storage materials using ReaxFF: micro-kinetic analysis of dehydrogenation

Sung Jin Pai

Computational Science Research Center, Korea Institute of Science and Technology (KIST), Republic of Korea

Abstract—Reaction rate constant commonly can be obtained by examining the evolution of products according to appropriate time scale. In this work, a new approach to obtain the reaction rate constant was proposed for the dehydrogenation of liquid-phase hydrogen storage materials such as 3-methyl-1,2-BN-cyclopentane (CBN) using reactive force field (ReaxFF). The macroscopic behavior of the studied materials can be extracted from the molecular-level dynamic simulations composed of amorphous phase. Force field parameters for the target system to implement the ReaxFF MD simulation were developed in advance using database built by quantum mechanical calculations. ReaxFFCBN for BN/CC isosteres was developed from the appropriate parameter fitting procedure and was verified the justification by comparing with core reactions such as the uni-molecular dehydrogenation reaction. NVT-MD simulations were carried out for liquid-phase systems at several high temperatures and the target reaction rate constants were obtained for each temperature with first-order approximation and extrapolated to the experimental temperatures. We suggest that ReaxFFCBN is useful for designing new liquid-phase hydrogen storage material and can predict fairly accurate kinetic information from micro level dynamics.

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:05

Venue: 205 Conference Room

Session 9: 7 presentations-Topic: "Chemical Engineering Technology and Bioengineering"

Session Chair: Prof. Chiharu Ishii

B0005 Presentation 6 (16:35~16:50)

Polymethoxyflavones Prevented benzo[a]pyrene/dextran Sulfate Sodium-Induced Colorectal Carcinogenesis in ICR Mice

Jia-Ching Wu, Ching-Shu Lai, Mei-Ling Tsai, Cheng-Di Dong, Chi-Tang Ho, Ying-Jan Wang, and Min-Hsiung Pan

National Cheng Kung University, Taiwan

Abstract—Food safety became an importance issue elicited studies focus on food toxicology and food contaminations. Colorectal cancer (CRC) is relationship with unhealthy diet habits and food contaminants (partially derived from environmental contamination). Polycyclic aromatic hydrocarbons (PAHs) are widespread environmental carcinogenic and mutagenic pollutants and found in smoking and process of roasted foods. Polymethoxyflavones (PMFs) are effective on prevention carcinogen induced CRC. In this study, we investigated the inhibitory effect of PMFs on Benzo[*a*]pyrene (B*a*P), as a prototype for carcinogenic PAHs in food, induced CRC in colitis ICR mice. We found that dietary administration of PMFs could preventive B*a*P/DSS-induced colon tumors formation and colon length reduced. Additionally, PMFs exhibited regulate BaP bioactivation and detoxification metabolites from feces. Besides, the level of DNA adducts and 8-OH-dG were also significantly decrease in PMFs-treated groups in colonic mucosa. At the molecular levels, PMFs suppressed B*a*P-induced colorectal tumorigenesis through regulated programmed cell death and inhibited cell proliferation. Taken together, these results reveal that B*a*P is a strongly colorectal carcinogen from dietary intake with colitis and PMFs may have preventive potential in colorectal cancer chemoprevention on PAHs or BaP induced colorectal cancer.

Afternoon, December 26, 2016 (Monday)

Time: 15:20~17:05

Venue: 205 Conference Room

Session 9: 7 presentations-Topic: "Chemical Engineering Technology and Bioengineering"

Session Chair: Prof. Chiharu Ishii

B0019 Presentation 7 (16:50~17:05)

An Inertial Sensor Based System for Real-Time Biomechanical Analysis during Running

Xinyao Hu, Zhonghao Huang, Jianxin Jiang, and Xingda Qu

Shenzhen University, China

Abstract—Running is a popular form of physical exercise. However, runners often experience a high number of running-related injuries. This is partially due to the fact that runners are lack of knowledge about their running postures during running. This paper describes a preliminary study of using an Inertial Measurement Unit (IMU) based wearable system for real-time biomechanical analysis during Running. This system consisted four IMU sensors. Two were strapped to the toes of a subject's shoes and another two were attached to the subject's medial and lateral ASIS. The foot and pelvis positions were estimated by the IMU acceleration and a linear regression model. The lower limb joint angles were estimated by combining these position information with a planar 3R serial chain and solving its inverse kinematics. The results show that joint angles of lower limbs (i.e. hip, knee and ankle angles) can be accurately estimated by this wearable system. This study can benefit the future research on conducting complete lower limbs kinematics analysis with minimal and unobtrusive wearable sensors and provide real-time feed back during running exercise.

Poster Session

Tips: The schedule for each presentation is for reference only. In case of missing your presentation, we strongly suggest that you attend the whole session.

Afternoon, December 25, 2016 (Sunday)

Time: 13:00~17:15

Venue: 204 Conference Room

Topic-Environmental Science and Engineering

F0001 Presentation 1

Assessment of heavy metals accumulation and translocation potential in some native plants species collected from contaminated soils of Pakistan

Sadia Kanwal

University of Tokyo, Japan

Abstract—The purpose of the present research was to evaluate the potential of native plant species for accumulation and translocation of selected metals (Cd, Cr, Cu, Ni, Pb, Zn) and checked their phytoextraction efficiency. Twenty one plant species were collected form the 10 contamianted sites of twin cities (Rawalpindi and Islamabad), Pakistan. Plants tissues (shoots and roots) were assessed for the heavy metals accumulation and metals accumulation index (MAI) was also evaluated for the selected plants species. Heavy metals concentrations was in the order of; Zn > Cu > Ni > Pb > Cr > Cd. Overall, it was observed that nine plants species named; *R. communis, C. dactylon, C. sativa, P. hysterophorus, P. plebeium, F. Adiantum, C. didymis, R. muricatus* and *T. officinale* had higher accumulation and translocation potential for heavy metals contents. In root part of plants, more concentrations of metals were observed as compared to shoot part of plants. Furthermore, higher MAI was observed in some plants species named; *R. communis, P. hysterophorus* and *P. Plebeium*, and can be suitable to use for phytoextraction and phytostabilization of contaminated soils. Hence, pollution loads in contaminated soils can be reduced by using native plants species for removal of metals in soils and phytoextraction can be used as an effective tool for improving the quality of food and to achieve the sustainable ecosystem.

Afternoon, December 25, 2016 (Sunday)

Time: 13:00~17:15

Venue: 204 Conference Room

Topic-Environmental Science and Engineering

F0019 Presentation 2

Intrinsic Kinetics Study of Platy Hydrated Magnesium Silicate (talc) for Direct CO_2 Carbonatization

Taeyoon Kim, Sungmin Cha, Youngsu Jang, Jaerock Park and Hyunsuk Shin

Pusan National University, Republic of Korea

Abstract—Using fossil fuel in large number recently, it results in high emissions of greenhouse gases, which causes global warming subsequently. Since sea level rises and precipitation increment caused by global warming effect, abnormal climate change has been taken place worldwide, leading to drought, flood, heat wave, ecocide. CO_2 is representatively known as a greenhouse gas, accounting for 72% in the whole greenhouse gas of the earth; thus, the study researching the prevention of CO_2 emission has been proceeding worldwide. Mineral carbonation method is one of the way to capture and store CO_2 into the underground so that it cannot interact with the atmosphere for CO_2 sequestration. Among various minerals, hydrated magnesium silicate ($Mg_3Si_4O_{10}(OH)_2$), commonly known as talc, can be a direct carbonation agent. Herein, we investigated the utility of the carbonation reaction for CO_2 sequestration. To gain insight into talc carbonation, we carried out CO_2 temperature-programmed desorption and dynamic flow system experiments, which suggests that CO_2 adsorption takes place on the surface of the talc adsorbents to form carbonates. We achieved stable carbonation activities of talc by varying the temperature. In addition, we investigated the reaction kinetic model of talc carbonation based on the changes of CO_2 concentration. From the observation that the activation energy of talc-based carbonation using the Arrhenius equation is 51.4 ± 4.8 kJ/mol, it is inferred that the chemical reaction is a rate determining-step for talc sequestration, based on relatively high activation energy.

Afternoon, December 25, 2016 (Sunday)

Time: 13:00~17:15

Venue: 204 Conference Room

Topic-Environmental Science and Engineering

F0020 Presentation 3

Efficiency Evaluation of Pollutant Control using Developed Agitation System for Non-point Sources at Low Impact Development Facility

Yongju Kwon, Hyunsuk Shin, **Junbae Lee**, Jaehyuk Lee, and **Soonchul Kwon**

Pusan National University, Republic of Korea

Abstract—Recently, Korean Government proceeds various guidelines and plans of pollution management for non-point source, such as optimum management guidelines, the evaluation of management areas for total loading management system of water pollution. However, It is difficult to quantitatively assess the treatment efficiency of non-point source at pollution control facilities. These are the types of non-point source control facilities, LID&GI facility and rainfall disposal facility. These facilities need a way to verify the efficiency. Herein, we carried out the development of rainfall simulation stirring system considering rainfall events and pollution level of rainfall effluent. We also developed the efficiency evaluation system of non-point sources removal from catched rainfall using filtration system and evaluated the water quality. Rainfall simulation stirring system consists of portable water tank capacity of ten tons with specially designed impellers and nozzles. With that, we evaluated the effect of improving the water quality on non-point source pollution control at LID facility through the assessment items (e.g. TSS, TN, TP, TOC, COD, BOD, and concentration of Zn and Pb) using the designed stirring system with the contaminated water. In particular, we evaluated the purification system of contaminated rainfall water to determine purifying capacities of pollution control facilities for non-point sources dependant on clogging tests, Solid loading tests with TSS.

Afternoon, December 25, 2016 (Sunday)

Time: 13:00~17:15

Venue: 204 Conference Room

Topic-Environmental Science and Engineering

F1009 Presentation 4

Assessing the Background Concentrations of Groundwater Quality Using Fractal Filter Technique

Hsin-Yi Chen, Xiao-Yu Lin, Yen-Hsun Chuang, Yu-Shiuan Cheng, and Ho-Wen Chen

Tunghai University, Taiwan

Abstract—Groundwater resources are playing an important role in most of developing countries. Because extreme weather and uneven hydrological conditions in Taiwan, groundwater has been the main water resources near the coastal area to meet the need of high density human activities. However, the local groundwater has been polluted by unexpected pollution leakage and seawater intrusion. In order to effectively distinguish the sources of high concentrations of pollutants, this study selects the coastal areas of Changhua county in central Taiwan as a case study and uses fractal filter technique to determine the background concentrations of various pollutants, and then polluted area derived from human activities can be indicated. Results show that the concentrations of chloride, sulfate and total dissolved solids (TDS) in coastal areas are higher than the other sites. Finally, this study suggests that the fractal filter technique can effectively identify the local background concentrations of groundwater and contaminated region, in addition, it can provide local government as a reference.

Afternoon, December 25, 2016 (Sunday)

Time: 13:00~17:15

Venue: 204 Conference Room

Topic-Environmental Science and Engineering

F1015 Presentation 5

The Dynamics of PM2.5 in Urban by Traffic Regulation: A case study of Taichung City

Yung-Sen Chen, Wei-Yea Chen, and Ho-Wen Chen

Tunghai University, Taiwan

Abstract—PM2.5 takes a huge impact to human respiratory system. The PM2.5 source probably come from stationary sources and mobile sources. According to statistic data from Environmental Protection Administration(EPA), emission of mobile sources was accounted by 36% in TAIWAN. Developed transport network in urban caused mobile sources to PM2.5 become one of the most contribution source. In order to figure out mobile sources related to environmental loading in urban, this study emphasize the mobile sources in Taichung. Discussion about PM2.5 in polluted spatial situation with the local atmospheric environment, and subsequently use the air pollution model (TAPM) to research the possible traffic flow measurement by studying mobile sources combined with space and time deployment in order to reduce pollution. According to the data collected, the highest amounts of PM2.5 dispersion is during 12:00 a.m to 20:00 p.m at Taichung Interchange. In future, it is hope that through traffic flow control formulated by simulation result of TAPM, the amount of PM2.5 by mobile sources can be reduced.

Afternoon, December 25, 2016 (Sunday)

Time: 13:00~17:15

Venue: 204 Conference Room

Topic-Environmental Science and Engineering

F3018 Presentation 6

Evaluation of CO_2 emissions of food waste disposal systems through life cycle assessment (LCA)

Sung Soo Yoo, Jeong-ik Oh, Kyoung Hee Lee and Kwang Baik Ko

Yonsei University, Republic of Korea

Abstract—This study was conducted to evaluate amount of CO_2 emitted from separation discharge stage to final disposal stage of food waste disposal systems such as large-scale recycling facilities, disposer, household disposal machine, automatic vacuum waste collection system, on-site recycling facilities through life cycle assessment. In order to calculate more accurate CO_2 emissions compared to the previous studies, the systems considered in the separation discharge stage and collection transportation stage, were diversified, and avoided impacts due to by-product production were additionally analyzed. As a result of analysis, total CO_2 emissions of each disposer system was 29.88 kg CO_2/f.u. for large-scale composting, 58.41 kg CO_2/f.u. for large-scale feeding, 185.40 kg CO_2/f.u. for disposers, 1517.88 kg CO_2/f.u. for household disposal machine, 227.48 kg CO_2/f.u. for automatic vacuum waste collection system on-site anaerobic digestion, -25.07 kg CO_2/f.u. for on-site composting and 41.42 kg CO_2/f.u. for disposers on-site composting. In terms of CO_2 emission reduction, the optimal disposal system determined based on this, was the disposal system which contained on-site composting, and it was considered that it was not necessary to collect, transport food waste and treat food wastewater and screenings. In addition, sensitivity analysis was conducted to examine effects of input materials into each disposal system on the CO_2 emissions, and to propose a CO_2 emission reduction method for each disposal system based on the results.

Afternoon, December 25, 2016 (Sunday)

Time: 13:00~17:15

Venue: 204 Conference Room

Topic-Environmental Biological

F0015 Presentation 7

Photoelectrochemical Degradation of Ibuprofen and Hydrogen Generation via Cu_2O/ TiO_2 Nanotube Arrays

Yi-Ching Lin and Yen-Ping Peng

Tunghia University, Taiwan

Abstract—A green method was employed to synthesize Cu_2O/TNAs for simultaneously ibuprofen oxidation and hydrogen generation. Cu_2O/TNAs heterojunction were synthesized through square wave voltammetry electrochemical (SWVE) deposition method. Results illustrated that the highly ordered Cu_2O/TNAs display an average inner diameter of 100 nm. There is no significant change after Cu_2O doping compared to pure TNAs. SEM image showed that Cu_2O nanoparticles were successfully deposited on the surface of TNAs. Results of XRD analysis indicated that Cu2O/TNAs were dominated by anatase phase. Characteristic peak of Cu_2O, corresponding to $2\theta = 36.52°$, was observed after sintering at 450°C. XPS showed that the spectra were consisting of two clear peaks at 932.5 and 952.3 eV referring to Cu_2O loading. The absorbance edge of Cu2O/TNAs extended to the visible spectrum at approximately 600 nm after Cu_2O loading. The bandgap of Cu_2O/TNAs reduce to 2.1 eV. The photocurrent of Cu_2O/TNAs was 2.4 times higher than that of TNAs under irradiation. Under 100 W Hg light irradiation, ibuprofen was complete removal and the amount of hydrogen yield was 2,132$\mu M/cm^2$ after 4 h reaction time. A significant improvement of photoelectrocatalytic efficiency was attributed to Cu_2O modification.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~17:20

Venue: 204 Conference Room

Topic- Food Science and Engineering

S0015 Presentation 1

Response of Two Different Age Group Spague-Dawely Rats to white Ginseng(Panx ginseng Meyer) Dietary Supplementation

Jeong-Hee Cho, Hae-Jeong Kim, Sangshetty Balkunde, Gi-Seok Lee, Eun-Kyung Mo, Chang-Keun Sung, Can Yin and Yu Li

Chungnam National University, Korea

Abstract—Ginseng is a popular dietary supplement for various health benefits and is currently one of the most frequently prescribed botanical ingredient in Asian countries.
In the current study, male Sprague-Dawely rats at 8 (young, n = 15) and 44 (old, n = 15) weeks of age were randomly divided into three groups and fed a standard rodent chow control diet or a diet containing 200 mg/kg (low dose) or 500 mg/kg (high dose) dry ginseng powder. The primary findings of this study are to compare the magnitude of age-associated changes in expression of genes in colon and duodenum, and physiological changes in response to ginseng supplements.
Old rats treated with low-dose and high-dose ginseng had higher body weight (10.90 and 22.22 %), daily food intake (36.51 and 28.50 %), and feed efficiency ratios (141 and 369 %), compared with old control rats. Whereas, all of these parameters showed no significant difference in young rats fed standard rodent chow supplemented with ginseng powder. In our study, low-dose and high-dose ginseng feeding led to significant elongation ($p < 0.05$) of both the small and large intestine in old rats. Blood serum transaminase (GOT and GPT) activities of young rats decreased ($p < 0.05$) with increase in supplementation of ginseng powder. Old rat's serum GPT activity significantly decreased and GOT activity increased ($p < 0.05$) with increase in ginseng concentration. Preliminary microarray analysis revealed differential expression of colon and duodenum genes associated with high-dose ginseng powder diet.
Conclusion: These data suggests that, rat physiology, digestion related body organs, food efficiency ratio, body weight gain, and expression of genes associated with duodenum and colon of old rats were modulated by different doses of ginseng.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~17:20

Venue: 204 Conference Room

Topic- Food Science and Engineering

S0016 Presentation 2

Potential Therapeutic Effects of Black Ginseng against Neurodegeneration Caused by Aluminum in Sprague-Dawley Male Rats

Jeong-Hee Cho, Vu-Thuy Hong, Sangshetty Balkunde, Gi-Seok Lee, Kang-Ju Choi, Eun-Kyung Mo, Chang-Keun Sung and **Beibei Duan**

Chungnam National University, Korea

Abstract—Ginseng is the most studies herbal medicine that is often prescribed as a dietary supplement or remedies for diverse nerve disorders. Forty male Sprague-Dawley rats were divided into five equal groups: group I served as control; group II received 80 μmol aluminum (Al); group III, IV and V received 80 μmol Al and black ginseng (BG) in the concentration of 10, 20 and 40 mg, respectively. The experiment lasted for 56 days. Bielchowsky and Walton staining methods were used to give the evidence of neurofibrillary tangles (NFTs) formation and Al levels. The objective of this study was to evaluate the anti-neurodegenerative potential of black ginseng. Administration of Al alone with standard rodent chow significantly reduced body weight compared to control group. The body weight did not vary in response to the combined action of Al and BG in low–higher doses, which seems to suggest the additivity of the BG action. There was marked decrease in Al level in the brain (6.3%, 17.6%, and 58.5%) and in brain tissues in black ginseng treated groups as compared to Al injected rats. Formation of NFTs was found higher in the Al alone injected rats compared to Al-BG co-treated groups. We also observed relatively positive sign of the improvement in kidney's Bowman space with BG treatments. These findings reveal that BG supplementation can lighten the Al levels in the nervous system. Further, BG proved to be effective against prevention of neurodegeneration due to Al accumulation.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~17:20

Venue: 204 Conference Room

Topic- Food Science and Engineering

S0042 Presentation 3

Production of Active Ginseng Saponin Using B. Cinerea and A. Niger

Gi-Seok Lee, Jeong-Hee Cho, Sangshetty Balkunde, **Yu Li**, Kyung-Hyun Min and Chang-Keun Sung

Chungnam National University, Daejeon, South Korea

Abstract—How to convert activity of 42 saponin contents of a ginseng to a high active ginseng component as herbal medicine word wide. The saponin component present in the ginseng is called as ginseng saponin (Ginsenoside), which on decomposition by heat or enzymes produces new saponin products. The primary components of ginseng Rg2, Rg3 are known for their effective role in immune, fatigue, increased blood circulation, and improving memory. The main objective of this study was to examine whether consumption of ginseng by Botrytis cinerea, Aspergillus niger (fungi) can modulate the specific ginseng saponin component. Therefore in this study, we prepared PDA media with 10 mg / ml concentration of ginseng extract. Botrytis cinerea, Aspergilus niger were inoculated for a period of 2-week along with control. After two weeks the mold was separated and crude saponin analyzed via a washing and drying process. In the present study, it was confirmed that B. cinerea, and A. niger fungi consumed ginseng saponin which was further confirmed by the presence of Rg2, Rg3 component using HPCL. It is reported that production of red ginseng saponins using a specific mold is harmless to the human and can be used as functional foods.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~17:05

Venue: 205 Conference Room

Topic- Agricultural Science and Engineering

S0010 Presentation 1

Investigation of *Pid3* Rice Blast Resistant Gene in Northern Upland Rice Varieties (*Oryza sativa* L.), Thailand Using Molecular Markers

Atchara Promchuay, Somrudee Nilthong, Chatchawan Jantasuriyarat

School of Sciences, Mae Fah Luang University, Chiang Rai, Thailand

Abstract—Ensemble learning algorithms are one of the most popular pattern classification methods. In this study, electrocardiogram (ECG) records are investigated to classify them as arrhythmia or normal sinus. Various classifiers such as REPTree, K- Nearest Neighbour Classifier (k-NN) and support vector machines (SVM) are performed as base learners of ensemble learning algorithms. At the same time, adaboost, bagging and random subspaces (RSS) ensemble learning algorithms are utilized and compared each other. Besides, random subset filter are used for reduced dimension of data. When obtained results with reduced features are examined, the highest percentage of accuracy achieved without the using of ensemble algorithm (individual classifier) is obtained with the support vector machine as 78.68%. While the support vector machines are used with random subspace method, accuracy has been observed as 85.29 %. These results show that ensemble classifiers are more useful than individual classifiers to classify cardiac arrhythmias.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~17:05

Venue: 205 Conference Room

Topic- Agricultural Science and Engineering

S0028 Presentation 2

Effects of injection of Esteya sp. to control pine wilt disease

Can Yin, Yunbo Wang, Beibei Duan, Haihua Wang, Yongan Zhang, Jeoenghee Cho and Changkeun Sung

Chungnam National University,Korea

Abstract—Esteya sp., as the first recorded endoparasitic fungus of pinewood nematode, exhibits great potential as a biological agent against nematodes. It produces two types of conidiogenous cells and conidia, and to parasitize nematodes with blastospore. Using of injection of E. sp. to prevent or treat pine wilt disease has been tested. The effect of preventing pine wilt disease is high, and 72.5% trees survived. To treating pine wilt disease, 57.5% trees survived. The density of PWN in dead pine seedlings was 665/g, but in the preventing group and treating group was 89/g, 128/g respectively which was 7.5 and 5.2 times lower than control. And it was found that infected PWNs with blastospore exist in pine seedlings which treat with preventing group and treating group.

Afternoon, December 26, 2016 (Monday)

Time: 13:00~17:05

Venue: 205 Conference Room

Topic- Agricultural Science and Engineering

S0029 Presentation 3

The different between conidia and blastospores of Esteya sp., a biocontrol agent fungus for pine wilt disease

Can Yin, Yunbo Wang, Beibei Duan, **Haihua Wang**, Yongan Zhang, Jeoenghee Cho, Ki-Suck Lee and Chang-Keun Sung

Chungnam National University, Korea

Abstract—Esteya sp. exhibits great potential as a biological control agent against pinewood nematode (PWN), Bursaphelenchus xylophilus , the pathogeny of pine wilt disease. E.sp. produces blastospores in liquid media and aerial conidia on solid media.

The agent was mass-produced using two kinds of culture media: S (50 % wheat bran and 50 % pine wood powder), L (0.25% wheat bran and 0.25% pinewood powder with potato dextrose broth), and two controls: SC (potato dextrose agar), LC (potato dextrose broth). The spore yields, new generation conidial number, and nematode mortality rates of blastospores were higher than those of conidia. However, the conidia had a higher germination rate than the blastospores during the storage process and multiple stress treatments. The blastospores from L survived most from the process of the storage and multiple stress treatments per unit of mass media. Comprehensive analysis indicates that the L culture medium is the most optimal medium for mass production relatively.

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Dinner	
18:00	**Hotel Restaurant**

Conference Venue

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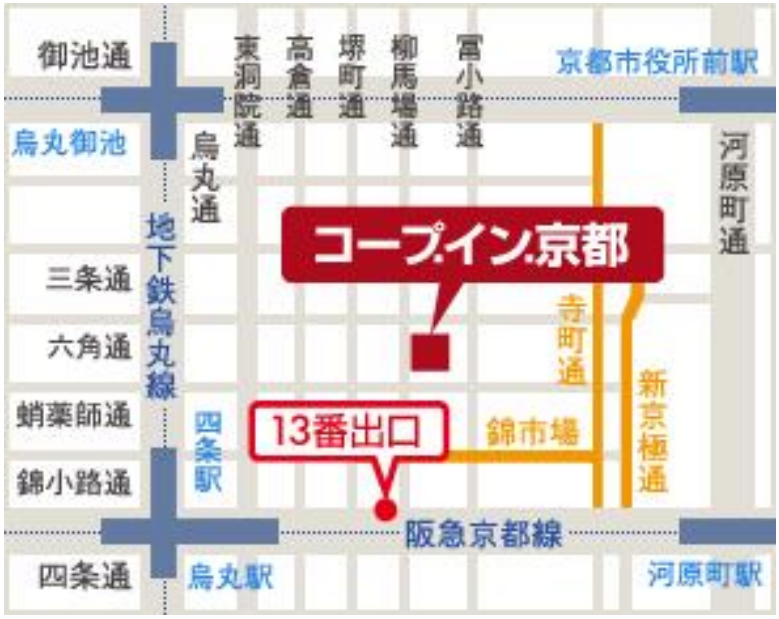

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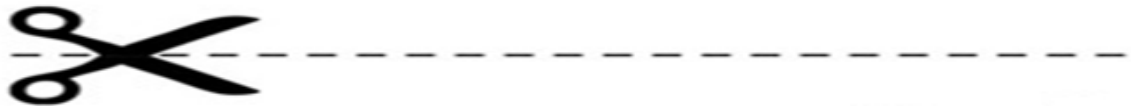

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