

2019 8th International Conference on Nutrition and Food Sciences (ICNFS 2019)

May 27-29, 2019

Bali, Indonesia



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Conference Venue

Kuta Central Park Hotel

Address: Jl. Patih Jelantik, Kuta 80361 Bali, Indonesia

Website: www.kutacentralparkhotel.com

Contact email: info@kutacentralparkhotel.com

Tel: +62 361 769222



Kuta Central Park Hotel is a modern property in tropical Kuta, with an outdoor pool, kids pool, spa, and free WiFi. Guests can use the gym or play billiards. The property has indoor and outdoor playgrounds. Offering free parking, it also has a restaurant and a 24-hour front desk. There is free drop-off service to Kuta Beach and Legian Center based on schedule.

Kuta Central Park Hotel is approximately 3.7 mi from Ngurah Rai International Airport. It is within an easy 10-minute drive of dining options in both Kuta and Legian.

Fully air-conditioned, the modern rooms present a pleasant atmosphere with bright colors and beautiful wall murals. Each is equipped with a satellite TV, mini-bar and personal safe.

Guests may enjoy pampering treatments at Tunjung Spa which is equipped with a sauna and hot tub or read emails at the business center.

Local and international cuisine may be enjoyed at the hotel's restaurant, which also offers room service. A selection of wood-fired pizza is available at Lotus Pizzeria. A daily breakfast is available there as well.

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Bali Conference Introductions

Welcome to 2019 HKCBEEES Bali conference. This conference is organized by HKCBEEES. The objective of the Bali conference is to bring together academics and experts in the field of Nutrition and Food Sciences to a common forum

2019 8th International Conference on Nutrition and Food Sciences (ICNFS 2019)

Accepted papers will be published in the following Journal:



International Journal of Food Engineering (IJFE, ISSN: 2301-3664), and all papers will be included in the Engineering & Technology Digital Library, and indexed by WorldCat, Google Scholar, Cross ref.

Conference website and email: <http://www.icnfs.org/>; icnfs@cbees.org

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 of Presentation and **5** Minutes of Question and Answer

Instructions for Poster Presentation

Materials Provided by the Conference Organizer:

The place to put poster

Materials Provided by the Presenters:

Home-made Posters

Maximum poster size is A1

Load Capacity: Holds up to 0.5 kg

Best Presentation Award

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

Dress code

Please wear formal clothes or national representative of clothing.

Keynote Speaker Introductions

Keynote Speaker I



Prof. Hami Alpas

Middle East Technical University, Metu_ Food Eng. Dept, Ankara, Turkey

Prof. Hami Alpas is a Food Engineer and also holds an MBA degree from Dept. of Business Administration METU on Total Quality Management. He has served as a “visiting scholar” in 1996 and 1998 at University of Wyoming, USA; as a “visiting scientist” in 2001 and 2002 at Ohio State University, USA and as a “visiting professor” in 2006, 2007 and 2008 at University of Bordeaux I, France on the topic of Non-Thermal Food Processing Technologies (HHP). His main research areas are: Unit Operations in Food Engineering, Non-thermal Food Processing Technologies, Food Quality, Food Safety and Food Security through Total Food Protection. He is an expert in Food Defense training activities via NCFPD (USA). He has supervised 4 Ph.D and 11 M.Sc. thesis in Food Engineering Department. He has 72 international journal articles (SCI) and over 800 citations (ISI-Web of Sci; h-factor 18) as well as close to 55 academic presentations in 35 different international meetings. He has completed 15 national, 4 international projects including EU/JRC, CNRS-EGIDE and NATO ARW/ATC projects. He has authored 7 chapters in internationally edited books and has edited 3 international books by Springer. He has also organized and co-directed 3 NATO-workshops (ARW-ATC). He is currently the co-director of EU-FP7 project on “Plant Food Security”.

Topic: ‘HIGH HYDROSTATIC PRESSURE (HHP) ENGAGED WITH TIME DOMAIN NUCLEAR MAGNETIC RESONANCE (NMR)’

Abstract—Nuclear Magnetic Resonance (NMR) relaxometry is used as a non-destructive method to analyze the interior composition of complex food systems. It may provide characterization of such systems via proton relaxation experiments by measuring transverse relaxation time (T_2) (also known as spin-spin relaxation time). T_2 measurement is a good tool not only to reveal the internal compositions of foods, but also to characterize the degree of water-surrounding network interactions within a system. High hydrostatic pressure (HHP) is a non-thermal process which is used in food industry as an alternative method to heat pasteurization, or blanching.

In this respect High Hydrostatic Pressure (HHP) engaged with Time Domain Nuclear Magnetic Resonance (NMR) will be summarized by discussing recent scientific results of our research group in METU-Food Engineering Department.

In this respect:

- Hydration Behaviour of Quinoa Seed by Nuclear Magnetic Resonance (NMR) Relaxometry
- Use of Nuclear Magnetic Resonance (NMR) Relaxometry as a Tool to Assess Seed Characteristics Induced by Osmotic Stress (OS), Ultrasound (US) and High Hydrostatic Pressure (HHP),
- Investigation of Physical and Functional Properties of Insect Protein Extracts and their Glycated Forms,
- Effect of High Hydrostatic Pressure (HHP) in Physicochemical Properties of Starch by Nuclear Magnetic Resonance (NMR) Relaxometry,
- High Hydrostatic Pressure Induced Changes on Palm Stearin Emulsions,
- Effect of High Hydrostatic Pressure (HHP) on Cellulose Hydrolysis and Cellulase Activity

will be discussed.



Coffee Break & Group Photo Taking	10:50~11:15
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Keynote Speaker II



Assoc. Prof. Gun-Hean Chong
Universiti Putra Malaysia, Malaysia

Dr. Gun-Hean Chong is an Associate Professor at Universiti Putra Malaysia (UPM), and the Head of Department of Food Technology, Faculty of Food Science and Technology, UPM. At the Faculty, he teaches fundamental food engineering, food units operation and physical properties of food. He received his Bachelor's degree in Process and Food Engineering, Master's degree in Agricultural Engineering, and PhD in Chemical Engineering. His primary research interests are supercritical carbon dioxide and food engineering processes. In the past, he has been a visiting researcher at Delft University, Netherlands, and Tohoku University, Japan. Dr. Chong has been working on solubility of compounds in supercritical carbon dioxide and extraction of bioactive compounds from bio-matrices with supercritical carbon dioxide. Currently, he is working on hybrid extraction technique, such as ultrasonic and dense carbon dioxide for the separation of phyto-nutrients from industrial by-products, namely the palm oil industry. He is also working on tailored-made smart powder with supercritical carbon dioxide to produce "the delicious medicine". During his many years as a food engineer, Dr. Chong has been granted several research funding from industrial partners as well as the Malaysia's Government to tackle issues and problems related to food processing. He has supervised five PhD students and ten Master students. He has published 33 scientific papers, two books and two book chapters, and currently serves as one of the Associate Editors for the JCR-indexed International Food Research Journal.

Topic: 'A low temperature approach for producing and tailor-made powders: supercritical carbon dioxide'

Abstract—Supercritical fluid is referring to a state of substance above its critical temperature and critical pressure, i.e. critical point of carbon dioxide which normally been used as supercritical fluid is 31.1 °C and 7.3 MPa, supercritical carbon dioxide (ScCO₂). The behaviors of the fluid in this state are very attractive; such as it has gas like diffusivity and liquid like density. These special behaviors have been used as the main idea to develop supercritical fluid technology. ScCO₂ can be applied in the extraction, fractionation, particles formation, encapsulation, reaction medium and sterilization. In the particle formation and encapsulation applications, ScCO₂ can functions either as a solvent or solute or anti-solvent. Rapid Expansion Supercritical Solution (RESS): ScCO₂ as a solvent to solubilize the active ingredient follows by rapid depressurizing through nozzle into lower pressure region that results in supersaturation accompanied by very fast nucleation of actives and particles formation. Supercritical Anti-Solvent (SAS): The active ingredient dissolves in an organic solvent and sprayed in ScCO₂ environment. ScCO₂ plays an anti-solvent role for the active ingredient and solvent for the organic solvent, resulting a supersaturation conditions and precipitation occurs. Particles from Gas-Saturated Solution (PGSS): ScCO₂ as a solute, is dissolved into molten solid to form ScCO₂-saturated melt in saturator. Dissolved ScCO₂ into molten solid leads to reduction of solid viscosity and melting point. Rapid melt depressurization via nozzle causes vaporization, intense cooling effect of CO₂ release results in particle formation. The operating conditions are in the range of 10 – 18 MPa and 35 – 60 °C. The precipitates can be tailored to suit the application in the aspects of particle size and particles distribution, crystallinity as well as solubility in a solvent. ScCO₂ gives an alternative processing approach to produce powders in low temperature which may good for sustaining the thermal labile active ingredients.

Keynote Speaker III



Professor Tjokorda Gde Tirta Nindhia
Udayana University, Indonesia

Tjokorda Gde Tirta Nindhia received Doctor Degree from Gadjah Mada University (UGM) Yogyakarta, Indonesia on August 2003, with major field of study was Material Engineering. He participated in various international research collaborations such as with Muroran Institute of Technology Japan (2004), Toyohashi University of Technology Japan (2006), Leoben Mining University Austria (2008-2009), Technical University of Vienna Austria (2010), Institute Chemical technology of Prague Czech Republic (2012-now) and very recently with Michigan State University (MSU) and University of Hawaii in the USA under Fulbright Scholarship. His current job is as Full Professor in the field of Material Engineering at Engineering Faculty, Udayana University, Jimbaran, Bali, Indonesia. His research interest covers subjects such as, Biomedical Engineering, biosensor, biomaterial, waste recycle, failure analyses, advance ceramic, metallurgy, composite, renewable energy, and environmental friendly manufacturing.

Topic: ‘Design and manufacturing small biogas fueled engine for electric generation’

Abstract—Anaerobic digester is solution for processing organic waste with providing useful side product such as biogas and fertilizer. anaerobic digestion has in recent years received attention among governments in a number of countries. A lot of biogas plant were built with incentive from the government that make biogas available abundantly. Biogas can be used as a fuel of internal combustion engine. The engine can be used to run electric generator and providing electricity. It is available in the market biogas electric generator bit big size to serve big biogas plant with certainly expensive since the engine should be design specifically for biogas combustion Engine. Small size biogas engine are not available in the market due to complexity arrangement in the biogas plant. This report is provided with succesfull desing of small size biogas electric generator that suitable for smaal size biogas plant. The engine can be made from 4 stoke engine or 2 stroke engine or more even can also by converting small diesel engine to be fueled with biogas. The technologies that are over in these work is not base on dual fuel of biogas and petroleum, but concentrate for flexible fuel, that is mean the engine is can be operated with biogas or if biogas not available the engine can be run with petroleum or LPG gas separatlle. By this technology, small biogas electric generator can be provided from around 1000 Watt up to 10 000 watt



Lunch	12:00~13:30
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Brief Schedule for Conference

Day 1	<p>May 27 (Monday) 10:00~17:00 Venue: Kuta Central Park Hotel (Lobby) (Add: Jl. Patih Jelantik, Kuta 80361 Bali, Indonesia) Participants Onsite Registration & Conference Materials Collection & Conference Reports</p>	
Day 2	<p>May 28 (Tuesday) 09:15~18:00 Venue: JEMPIRING(2nd Floor) (Add: Jl. Patih Jelantik, Kuta 80361 Bali, Indonesia) Participants Onsite Registration & Conference Materials Collection & Conference Reports</p>	
	<p>Opening Remarks 09:15~9:20 Professor Tjokorda Gde Tirta Nindhia Udayana University, Indonesia Keynote Speech I 09:20~10:05 Topic: ‘High Hydrostatic Pressure(HHP) Engaged With Time Domain Nuclear Magnetic Resonance (NMR)’ (Prof. Hami Alpas ,Middle East Technical University, Metu_ Food Eng. Dept, Ankara, Turkey)</p>	
	<p>Keynote Speech II 10:05~10:50 Topic: ‘A low temperature approach for producing and tailor-made powders: supercritical carbon dioxide’ (Assoc. Prof. Gun-Hean Chong, Universiti Putra Malaysia, Malaysia)</p>	
	<p>Coffee Break & Group Photo Taking 10:50~11:15</p>	
	<p>Keynote Speech III 11:15~12:00 Topic: ‘Design and manufacturing small biogas fueled engine for electric generation’ (Prof. Tjokorda Gde Tirta Nindhia, Udayana University, Indonesia)</p>	
	<p>Lunch 12:00~13:30 Venue: Restaurant in the Hotel (1st Floor)</p>	
	<p>Session 1 13:30~15:15 Venue: SOKA(2nd Floor) 7 presentations-Topic: “Food Science and Technology” Session Chair: Prof. Hami Alpas</p>	<p>Session 2 13:30~15:15 Venue: JEMPIRING(2nd Floor) 7 presentations-Topic: “Renewable Energy” Session Chair: Prof. Tjokorda Gde Tirta Nindhia</p>
	<p>Coffee Break 15:15~15:30</p>	

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	<p>Session 3 15:30~17:00 Venue: SOKA(2nd Floor) 6 presentations-Topic: “Food and Agricultural Engineering Session Chair: Assoc. Prof. Gun-Hean Chong</p>	<p>Session 4 15:30~17:30 Venue: JEMPIRING(2nd Floor) 8 presentations-Topic: “Environmental Science and Engineering Session Chair: Prof. Tjokorda Gde Tirta Nindhia</p>
	<p>Session 5 17:00~18:00 Venue: SOKA(2nd Floor) 4 presentations-Topic: “Electric Energy and Power Generation Session Chair: Assoc. Prof. Agus Sofyan</p>	
	<p>Poster Session: 09:00~18:00 Venue: JEMPIRING(2nd Floor)</p>	
	<p>Dinner 18:00 Venue: Restaurant in the Hotel (1st Floor)</p>	
Day 3	<p>May 29, 2019(Wednesday) 9:30~17:00 One Day Tour</p>	

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

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

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

(3) One Best Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session on May 28.

Session 1

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

Afternoon, May 28(Tuesday)

Time: 13:30~15:15

Venue: SOKA(2nd Floor)

7 presentations-Topic: “Food Science and Technology”

Session Chair: Prof. Hami Alpas

Y9012 Presentation 1 (13:30~13:45)

Antioxidant Capacity and Total Phenolic Content Variations against *Morinda citrifolia* L. Fruit Juice Production Methods

Malsha H. Samarasiri, Thushitha A. Chandrasiri, Diunuge B. Wijesinghe, Sanja P. Gunawardena
University of Moratuwa/Department of Chemical and Process Engineering, Moratuwa, Sri Lanka

Abstract—*Morinda citrifolia* L. juice which is widely known as “noni juice” has been popular for its amazing therapeutic values to prevent and cure many diseases. More than 150 bio-active compounds have been identified in noni juice, and among them, antioxidants and phenolic compounds are highly recognized. Antioxidants and phenolic compounds have an ability to contribute to free radical scavenging activity to prevent oxidation in cells. Hence, antioxidant capacity (AC) and total phenolic content (TPC) are the two major areas of research studies on noni juice due to their correlation with therapeutic properties. Traditional fermentation is the general method used for noni juice production, and the fermentation period can span up from ten days to two months. Therefore, precise studies are necessary to identify the variance of AC and TPC under different juice production methods, in order to produce a qualitative product. Traditional fermentation, fresh juice extraction, and fermentation of extracted fresh juice were three production methods used to study for their AC & TPC variations. Variation of AC and TPC of noni juice were determined by two methods, DPPH (2-diphenyl-1-picrylhydrazyl) scavenging activity, and Folin-Ciocalteu reagent assay. Results show that, in the traditional fermentation method, AC is maximum at the second fermentation week (83.84% of DPPH scavenging activity), while TPC is maximum at the first fermentation week (2698.89 mg gallic acid equivalent/L of noni juice), and the fresh juice has less AC (77.06% of DPPH scavenging activity) and more TPC (2898.89 mg gallic acid equivalent/L of noni juice) than the traditionally fermented juice. When fermenting the extracted fresh juice, AC (29% loss) and TPC (95% loss) were drastically reduced within one month of the fermentation period. Therefore, it can be concluded that the traditional fermentation method is the most suitable method to maximize the therapeutic values of noni juice with having only two weeks of the fermentation period. Fresh noni juice also has a satisfactory level of AC & TPC but allowing it for fermentation is not recommended for gaining maximum health benefit.

Session 1

Afternoon, May 28(Tuesday)

Time: 13:30~15:15

Venue: SOKA(2nd Floor)

7 presentations-Topic: “Food Science and Technology”

Session Chair: Prof. Hami Alpas

Y9008-A Presentation 2 (13:45~14:00)

Development and Characterization of Okra (*Abelmoschus esculentus*) Mucilage Edible Coating Against Oxidative Rancidity of Roasted Peanuts

Kristan Diane B. Canta and Rosario S. Sagum

MS Food Science / University of Santo Tomas The Graduate School, University of Santo Tomas, Manila, Philippines, 1015

Abstract—Okra, as a low-cost source of polysaccharide, has not been extensively studied as a potential edible coating. The study dealt with the development and characterization of okra mucilage as an edible coating against oxidative rancidity of roasted peanuts. The mucilage was extracted by subjecting okra to steam blanching and was characterized by various parameters such as pH, color, total dietary fiber, phytochemical and antioxidant properties. The average yield of extracted wet mucilage was found to be 18.77%. The results showed that okra mucilage is an acidic polysaccharide, with yellowish-green color, and contains total dietary fiber of 0.50 ± 0.02 mg/100g; total polyphenols of 30.43 ± 0.98 mg/100g; DPPH inhibition of 34.87 ± 2.41 mg TE/100g; and FRAP 30.40 ± 1.68 mg TE/100g. The effect of okra mucilage edible coating against oxidative rancidity of roasted peanuts was investigated in a four-week storage period. Results showed significant reduction on the peroxide values but increased moisture and free fatty acids of coated peanuts. All formulations did not contribute undesirable effects on coated roasted peanuts except for darker color but were still acceptable. Texture was not altered by the coating application. Moreover, addition of OM coatings prevented the occurrence of *Aspergillus* spp. on roasted peanuts. Based on the results obtained in this study, okra mucilage has a potential to be used as an edible coating, particularly in delaying oxidative rancidity of roasted peanuts.

Session 1

Afternoon, May 28(Tuesday)

Time: 13:30~15:15

Venue: SOKA(2nd Floor)

7 presentations-Topic: “Food Science and Technology”

Session Chair: Prof. Hami Alpas

Y1011 Presentation 3 (14:00~14:15)

Characterization and Identification of Fatty Acid Ethyl Esters in Used Oil Refining as Biodiesel Using Spectroscopic Techniques Approach

Ni Made Suanitia, I Wayan Bandem Adnyanab, and Oka Ratnayani

Department of Chemistry, Faculty of Mathematics and Natural Sciences, Udayana University
Bukit Jimbaran Bali 80361, Indonesia

Abstract—Fatty acids in used cooking oil are varied which need to be analyzed before making biodiesel to meet the requirement of a diesel engine. The purpose of this study was to identify and characterize fatty acid ethyl ethers in used cooking oil refined by using various acids after a one-stage transesterification process using a heterogeneous CaO catalyst to produce biodiesel. The analytical method applied was spectroscopic technique through Fourier Transform Infra Red (FTIR) and Gas Chromatography-Mass Spectrometry (GC-MS) instruments. The characteristic of the oil refined using phosphoric acid was better than sulfuric acid and hydrochloric acid. Six peaks with m/z 88 fragments as markers of fatty acid ethyl ester and two peaks were identified as ethyl linoleate and ethyl oleate as unsaturated fatty acids by GC-MS. FTIR also showed an increase of intensity at wave number of 2500-1500 cm^{-1} which was a weak bond. Similar functional groups identified by FTIR from different biodiesels, where low intensity was found for commercial diesel fuel but higher intensity for biodiesel from refined used cooking oil

Session 1

Afternoon, May 28(Tuesday)

Time: 13:30~15:15

Venue: SOKA(2nd Floor)

7 presentations-Topic: “Food Science and Technology”

Session Chair: Prof. Hami Alpas

Y8004-A Presentation 4 (14:15~14:30)

Characterization of the Physico-chemical and Functional Properties of Modified Starches from Giant Swamp Taro (*Cyrtosperma merkusii* Schott) "Palawan"

ROSE ELAINE E. PLACIO, ROSARIO S. SAGUM

University of Santo Tomas, Manila, Philippines

Abstract—Giant swamp taro (*Cyrtosperma merkusii* Schott) (GST) is an underutilized root crop that shows potential as a good source of starch. The study aimed to isolate and prepare modified starches from GST using heat-moisture treatment, sonication, acid hydrolysis, and enzymatic hydrolysis. Characterization of the physico-chemical and functional properties of the starch samples revealed that proximate composition of native GST starch was comparable to a commercially available cassava starch but with considerably higher Na, Ca, K, and amylose content. Physical modifications through heat-moisture treatment and sonication resulted to damages on the starch granules such as breakage and fissures, high swelling power, low solubility, and increased paste viscosity. On the other hand, acid and enzymatic hydrolysis had caused the formation of cracks, dents, and roughened granular surfaces, which revealed improved solubility, low swelling power, and reduced paste viscosity. Whiteness index of all starch samples were lower than the commercially available cassava starch but were still within the acceptable range ($L > 90$). Lastly, resistant starch content, gel strength, and freeze-thaw stability of GST starch were improved by all modification methods. The recorded variations in properties of modified GST starches can be used as basis of its possibly diverse applications in the food industry. From the results, it can be concluded that starches (native and modified) of high purity, good nutritional properties, and diverse functionality were successfully developed from GST. The observed characteristics therefore demonstrated the potential of GST as a new and alternative source of specialty starch.

Session 1

Afternoon, May 28(Tuesday)

Time: 13:30~15:15

Venue: SOKA(2nd Floor)

7 presentations-Topic: “Food Science and Technology”

Session Chair: Prof. Hami Alpas

Y8001-A Presentation 5 (14:30~14:45)

Extraction of fucoxanthin from *Phaeodactylum tricornutum* Bohlin by enzyme hydrolysis method

Haoyue Yang, Rongge Xing, Pengcheng Li

Department of Mining and petroleum Engineering ,CAS Key Laboratory of Experimental Marine Biology, Institute of Oceanology, Chinese Academy of Sciences, , China

Abstract—*Phaeodactylum tricornutum* Bohlin is a diatom that contains large quantities of algal oil, pigments (mainly fucoxanthin), and other functionally active substances, and it also provides a wide range of possibilities for the development of marine-derived drugs and functional foods. However, its potential economic value has not been fully assessed because it has always been salvaged and only consumed as bait in the farming of aquatic organisms (i.e., aquaculture). Several studies have shown that fucoxanthin has considerable potential and promising applications in human health, such as a safe and effective dietary supplement. Therefore, fucoxanthin extracted from *P. tricornutum* Bohlin has potentially high economic value. In this study, the optimal conditions for extracting fucoxanthin from *P. tricornutum* Bohlin using enzyme hydrolysis were investigated. These conditions were as follows: enzyme activity coefficient, 100 u/L; enzymatic hydrolysis temperature, 50 °C; enzymatic hydrolysis time, 8 h; methanol concentration, 90%; solid–liquid ratio, 1:30; extraction temperature, 45 °C; and extraction time, 4 h. Under these conditions, 20 mg of fucoxanthin was extracted from each gram of *P. tricornutum* Bohlin. These results provide preliminary data demonstrating that fucoxanthin can be produced as a raw material from *P. tricornutum* Bohlin using the enzyme hydrolysis method. The results also provide a new approach to process and utilize *P. tricornutum* Bohlin.

Session 1

Afternoon, May 28(Tuesday)

Time: 13:30~15:15

Venue: SOKA(2nd Floor)

7 presentations-Topic: “Food Science and Technology”

Session Chair: Prof. Hami Alpas

Y8013-A Presentation 6 (14:45~15:00)

Nanofibers Mat as Sampling Module of Direct Analysis in Real Time Mass Spectrometry for Screening of Illegal Additives in Foods

Jiankun Cao, Ningge Jian and Qian Xu

School of Public Health, Southeast University, Nanjing, China

Abstract—Monitoring of pesticides and veterinary drug residues, harmful pollutants, or illegal additives in foods is of high importance to guarantee food safety. However, the most commonly used monitoring methods typically require tens of minutes for one sample analysis. It is definitely time-consuming for the detection of numerous and various foods existing in the market. Therefore, developing a high-throughput screening method to improve detection efficiency while maintain adequate sensitivity and acceptable accuracy is desperately needed. First reported by Cody et al. in 2005, direct analysis in real time mass spectrometry (DART–MS) is a novel ambient ionization source with easiness of sample introduction and operation, which has provided a powerful tool for high-throughput screening and accurate detection in various fields. However, when DART–MS is applied in food analysis or other sample systems, there are still some drawbacks in efficiency and stability of ionization due to the complexity and diversity of matrices. When directly ionized by DART source, trace-level analytes are unavoidably influenced by relatively large amounts of endogenous interfering substances in the matrices. In order to eliminate the matrix interferences, an efficient and effective sample preparation method is imperative for pre-separating the targets before DART–MS analysis. Therefore, ionic liquid functionalized polyacrylonitrile nanofibers mat (IL/PAN–NFsM) was prepared by photoinitiated radical– based thiol–ene “click” reaction and used as directly available sampling modules of DART–MS. Because of its excellent pre-separation efficiency, IL/PAN–NFsM can adsorb trace-level targets from complex sample matrix within tens of seconds by an optimal solid-phase extraction (SPE) process. Subsequently, the targets concentrated on IL/PAN– NFsM were directly desorbed, ionized, and detected by high resolution DART–MS without tedious elution process. Through the combination of IL/PAN–NFsM and DART–MS, a fast and sensitive method for high-throughput screening of illegal additives in foods was established.

Session 1

Afternoon, May 28(Tuesday)

Time: 13:30~15:15

Venue: SOKA(2nd Floor)

7 presentations-Topic: “Food Science and Technology”

Session Chair: Prof. Hami Alpas

Y9022 Presentation 6 (15:00~15:15)

The Association of Balanced Nutrition Practices With Stunting Among Adolescent Girls In School

Sitti Patimah, Amrah Husma, Sundari

Nutrition Department, School of Public Health, Universitas Muslim Indonesia, South Sulawesi, Indonesia

Abstract—Monitoring of pesticides and veterinary drug residues, harmful pollutants, or illegal additives in foods is of high importance to guarantee food safety. However, the most commonly used monitoring methods typically require tens of minutes for one sample analysis. It is definitely time-consuming for the detection of numerous and various foods existing in the market. Therefore, developing a high-throughput screening method to improve detection efficiency while maintain adequate sensitivity and acceptable accuracy is desperately needed. First reported by Cody et al. in 2005, direct analysis in real time mass spectrometry (DART–MS) is a novel ambient ionization source with easiness of sample introduction and operation, which has provided a powerful tool for high-throughput screening and accurate detection in various fields. However, when DART–MS is applied in food analysis or other sample systems, there are still some drawbacks in efficiency and stability of ionization due to the complexity and diversity of matrices. When directly ionized by DART source, trace-level analytes are unavoidably influenced by relatively large amounts of endogenous interfering substances in the matrices. In order to eliminate the matrix interferences, an efficient and effective sample preparation method is imperative for pre-separating the targets before DART–MS analysis. Therefore, ionic liquid functionalized polyacrylonitrile nanofibers mat (IL/PAN–NFsM) was prepared by photoinitiated radical– based thiol–ene “click” reaction and used as directly available sampling modules of DART–MS. Because of its excellent pre-separation efficiency, IL/PAN–NFsM can adsorb trace-level targets from complex sample matrix within tens of seconds by an optimal solid-phase extraction (SPE) process. Subsequently, the targets concentrated on IL/PAN–NFsM were directly desorbed, ionized, and detected by high resolution DART–MS without tedious elution process. Through the combination of IL/PAN–NFsM and DART–MS, a fast and sensitive method for high-throughput screening of illegal additives in foods was established.

Session 2

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

Afternoon, May 28 (Tuesday)

Time: 13:30~15:15

Venue: JEMPIRING (2nd Floor)

7 presentations-Topic: “Renewable Energy”

Session Chair: Assoc. Prof. Hiroshi Takagi

Y0013-A Presentation 1 (13:30~13:45)

Renewable energy production in a novel microbial electrolysis coupled anaerobic digestion (ME-AD) reactor

Thangavel Sangeetha, Wei-Mon Yan, Aijie Wang

Department of Energy and Refrigerating Air-Conditioning Engineering, National Taipei University of Technology, Taipei 10608, Taiwan

Abstract—Bio electrochemical systems (BESs) are electrochemical transducers capable of converting chemical energy into electrical energy with the aid of microbes. Recently more emphasis is being laid on enhancement of AD (Anaerobic Digestion) by integrating ME (Microbial Electrolysis) with it to convert CO₂ (Carbon dioxide) directly to CH₄ (Methane). The major of our research study was to optimize methane production in a novel microbial electrolysis assisted up flow anaerobic (Up flow-MEC) reactor for beer wastewater treatment. Two types of research works were carried out. One was to choose the best cathode material for the reactors and second was to investigate the effects of electrode positioning and arrangement along with hydraulic retention time (HRT), on performance of the ME-AD reactors. Beer wastewater was the substrate in both the reactors.

For the first work, three types of cathode mesh materials, such as Stainless steel (S1), Nickel (S2) and Copper (S3) were used as cathodes. S2 had maximum COD removal of 84.56%, methane yield of 142.8 ml/gCOD, TOC removal of 72.4%, Carbohydrate removal of 96.6%, Protein removal of 62% and current production of 0.086A. Compared with other cathode materials, Nickel mesh cathode remarkably affected the reactor performance.

For the second work, four reactors (S1, S2, S3 and S4) were designed with different electrode arrangements and run in four HRTs (12, 18, 24 and 36 h). The reactors with electrodes at the bottom were better than the reactors with electrodes at top. They had maximum COD, TOC and Carbohydrate removal of 92.1%, 64.2% and 98.9% respectively, high methane production rate (MPR) and methane yield (MY) with 304.5 mLCH₄/Lreactor/day and 275.8 mL/gCOD respectively and a maximum current generation of 10 mA, all at 36 h HRT. Pyrosequencing analysis was also performed to identify the prevalence of microbial communities with respect to electrode positions and HRTs.

Session 2

Afternoon, May 28 (Tuesday)

Time: 13:30~15:15

Venue: JEMPIRING (2nd Floor)

7 presentations-Topic: “Renewable Energy”

Session Chair: Assoc. Prof. Hiroshi Takagi

Y0042 Presentation 2 (13:45~14:00)

The Effect of Thermal Pretreatment on Cassava Rhizome Properties for Utilizing as Green Fuel in Gasification

Punchaluck Sirinwaranon, Duangduen Atong, Viboon Sricharoenchaikulc

Interdisciplinary Program in Environmental Science, Graduate School, Chulalongkorn University, Bangkok, Thailand.

Abstract—Cassava rhizome (CR) was torrefied to provide superior solid fuel quality for further gasification process. The torrefaction was carried out in the absence of oxygen at 220, 240, 260, and 280 °C with a fixed residence time. Solid fuel after torrefaction has a higher calorific value from that of reduced volatile matters. The energy yield of torrefied CR is 88.16% at 800 °C. The heating value of 20.86 MJ/kg for a torrefied product can be achieved compared to 15.37 MJ/kg for untreated CR. The subsequent gasification of torrefied CR at temperature of 800 °C yielded the highest gas product of 65 wt.%. The carbon and hydrogen conversions was 8.85% and 14.26%, respectively. Synthesis gas (syngas) from the conversion maintained the H₂/CO ratio of around 2–2.50, which is suitable for the Fischer–Tropsch process or can be used as the feedstock for steam cracking to olefin products.

Session 2

Afternoon, May 28 (Tuesday)

Time: 13:30~15:15

Venue: JEMPIRING (2nd Floor)

7 presentations-Topic: “Renewable Energy”

Session Chair: Assoc. Prof. Hiroshi Takagi

Y0043 Presentation 3 (14:00~14:15)

Experimental Studies of Performance Savonius Wind Turbine With Variation Layered Multiple Blade

Yudi Kurniawan, Dominicus Danardono Dwi Prija Tjahjana, Budi Santoso

Mechanical Engineering Department, Faculty of Engineering, Sebelas Maret University, Surakarta 57126, Indonesia

Abstract—The solution to various environmental problems now is the development of renewable energy. One of the renewable energy that was sociable to the environment and easily obtained is wind energy. Savonius wind turbines are proper to be applied in Indonesia which have low wind speeds, besides that Savonius also has many advantages over other wind turbines. In this paper experimental study is done a study on conventional Savonius wind turbine and modified Savonius wind turbine by added multiple layer 90°, 115°, 135° at positions 0° and 30°. The schematic supportive testing is done by blower fan. The wind speed used in testing with a range of 4.99 m/s to 7.27 m/s. The test results showed that the addition of multiple layers could be increased Savonius's power coefficient to 17.6%. The maximum power coefficient obtained by Savonius turbine was 0.120 with variations multiple layer 90° at 0° position. So, the addition of multiple layer can be improved the performance of the Savonius wind turbine

Session 2

Afternoon, May 28 (Tuesday)

Time: 13:30~15:15

Venue: JEMPIRING (2nd Floor)

7 presentations-Topic: “Renewable Energy”

Session Chair: Assoc. Prof. Hiroshi Takagi

Y1021 Presentation 4 (14:15~14:30)

Performance of 500 liters stainless steel portable biogas anaerobic digester with agitator designed for the tropical developing country

I Kadek sebayuana, Tjokorda Gde Tirta Nindhia, I Wayan Surata, **Tjokorda Sari Nindhia**, Shailendra Kumar Shukla, Samir Kumar Khanal

Study Program of Mechanical Engineering, Engineering Faculty, Udayana University, Jimbaran, Bali,80361 Indonesia

Abstract—It is established that 2 types of biogas anaerobic digester that usually found in developing country. First type is fixed dome type of anaerobic digester and secondly is floating drum biogas anaerobic digester. Both of this type have draw back that the anaerobic process is not completed with agitation process that yield low rate of biogas production. Other serious problem is the release of slurry cannot optimal. Some of the slurry will still remain stay in the anaerobic digester especially scum. To drain and cleaning the fixed dome or floating drum biogas anaerobic digester is mandatory to be done regularly that consume time and cost. The fixed dome types as well as floating drum type are usually not portable which cause no possibility to relocate in the new site. It is the purpose of this work to introduce portable biogas anaerobic digester that suitable for developing country with volume of digester around 500 liter of slurry. The requirement of agitator is facilitated and the anaerobic digester is possible to be operated in batch system or continuous system. The material that is used for anaerobic digester is stainless steel 304 with tungsten inert gas welding technology that is used for the manufacturing. With this design the anaerobic digester are easy to be maintenance. The batch system can keep producing biogas until 52 day with total production of biogas around 3320 liters. The continuous system was conducted by releasing for about 5 liters slurry from the outlet and after that filled with new slurry with stirring with agitator was conducted for about 10 minutes for 3 times in a day (morning, noon, and evening). The result for continuous system is a linear biogas production with rate biogas production is around 51.7 liter/day (1550 liter/30days).

Session 2

Afternoon, May 28 (Tuesday)

Time: 13:30~15:15

Venue: JEMPIRING (2nd Floor)

7 presentations-Topic: “Renewable Energy”

Session Chair: Assoc. Prof. Hiroshi Takagi

Y0047 Presentation 5 (14:30~14:45)

The Effect of a Heat Pump on The Performance of a Portable Solar-Driven Desalination (SDD) System using Vacuum Membrane Distillation process

Achmad Chafidz, Fadilla Noor Rahma, Siti Nurkhamidah, Saeed Al-Zahrani

Chemical Engineering Department, Universitas Islam Indonesia, Yogyakarta 55584, Indonesia

Abstract—In this work, a portable solar-driven desalination system has been designed and developed. The system is comprised of three major sub-systems, namely solar-thermal system, solar-PV system, and Memsys Vacuum Multi Effect Membrane Distillation (V-MEMD) unit. In order to improve the performance of the solar-driven desalination system, a heat pump was integrated with the Memsys V-MEMD unit. The purposes of the heat pump are to cool the cooling water before entering the condenser and also to pre-heat the feed water before entering the steam raiser. Therefore, to investigate the effect of a heat pump on the performance of the system, two of one-day operation based tests were carried out (i.e. with and without heat pump). The test results showed that the T_{Feed} of the test with a heat pump drastically increased at the beginning of the test from 18 °C to about 45 °C and then stable at approximately 49 °C in the rest of the test. Whereas, T_{Feed} profile of the test without a heat pump showed a little increase in the temperature of about 6 °C only. The higher the temperature of T_{Feed}, the feed water will evaporate faster than the lower one. Additionally, the T_{Cond_IN} for the test with a heat pump were about 5 °C lower than the test without a heat pump throughout the hours of the test. With lower temperature of T_{Cond_IN}, the temperature difference between the steam raiser and the condenser became higher. These two factors (i.e. higher T_{Feed} and lower T_{Cond_IN}) have resulted in higher distillate production rate. It was found that the average distillate production rate of the test with the heat pump (i.e. 11.62 L/h) was almost double of that of the test without the heat pump (i.e. 5.98 L/h). Furthermore, the total distillate produced during the test with the heat pump (i.e. 70.1 L) was also almost double of that of the test without the heat pump (i.e. 34.72 L).

Session 2

Afternoon, May 28 (Tuesday)

Time: 13:30~15:15

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7 presentations-Topic: “Renewable Energy”

Session Chair: Assoc. Prof. Hiroshi Takagi

Y1022 Presentation 6 (14:45~15:00)

The effect of methane and carbon dioxide ratio in the biogas to the fuel consumption of 2 stroke single cylinder (63 cc) engine of 750 watt electric generator

I Wayan Guna Wijaya, **Tjokorda Gde Tirta Nindhia**, I Wayan Surata, Ni Made Dewi Dian Sukmawati

Study Program of Mechanical Engineering, Engineering Faculty, Udayana University, Jimbaran, Bali, 80361 Indonesia

Abstract—The 2 stroke single cylinder (63 cc) engine of 750 watt electric generator is very popular in the application because providing enough amount of electricity for small house hold with compact size, light weight with reasonable price. Usually this type of electric generator is fueled with gasoline that mixed with oil as lubricant. The cylinder volume of the engine is usually around 63 cc. This type of engine can be fueled with biogas with addition component to mix biogas together with air and lubricant, and set the compression pressure at 10 bar. Biogas mainly contain methane (CH₄), carbon dioxide (CO₂), moisture (H₂O), and hydrogen sulfide (H₂S). The CH₄ is combustible gas and can be used as a fuel for internal combustion engine. Moisture and H₂S are easily removed from biogas. To remove CO₂ from biogas is about difficult and costly, therefore acceptable content of CO₂ in the biogas should be investigate related with the fuel consumption. This research is conducted to understand the influent of ratio CH₄ and CO₂ in the biogas to fuel consumption of the 2 stroke single cylinder engine of 750 watt electric generator. The variations ratio of CH₄ and CO₂ were obtained from anaerobic digester with batch system. The results indicate that the CH₄ and CO₂ ration in the range 1.667-1.967 will yield optimum efficiency that reach biogas consumption in the range of 9.1-9.8 liter/minute.

Session 2

Afternoon, May 28 (Tuesday)

Time: 13:30~15:15

Venue: JEMPIRING (2nd Floor)

7 presentations-Topic: “Renewable Energy”

Session Chair: Assoc. Prof. Hiroshi Takagi

Y1005 Presentation 7 (15:00~15:15)

Financial engineering to promote renewable energy in Indonesia: Case study bioethanol

Purwoko

Peneliti Badan Kebijakan Fiskal, Kementerian Keuangan RI Jl. Dr. Wahidin no. 1, Jakarta Pusat

Abstract—In line with the improving economy, fuel consumption in Indonesia is increasing. Unfortunately, the production of fossil-based fuels is declining, and oil reserves are running low. If there is no serious effort from the government, it is predicted that national energy security will be disrupted. The government has set up an energy mix policy, with targets such as reducing the consumption of fossil fuels and increasing the consumption of renewable fuels, including bioethanol.

Government program on bioethanol is currently unworkable, since its cost of production is more expensive than the price of fossil fuels. This study aims to find policies to encourage the bioethanol production. This study uses secondary data analyzed by the qualitative descriptive approach.

The results of this study indicate that financial engineering can be used by the Government to accelerate the bioethanol programs, by using excise tax and subsidies as instruments. Excise tax for fossil fuel will increase prices, and are expected to reduce the consumption of fossil fuels. The excise revenue can be earmarked to provide subsidies for bioethanol producers. This policy will make the bioethanol production cost lower and is expected to attract producers to produce bioethanol.



Coffee Break

15:15~15:30

Session 3

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

Afternoon, May 28 (Tuesday)

Time: 15:30~17:00

Venue: SOKA (2nd Floor)

6 presentations-Topic: “Food and Agricultural Engineering”

Session Chair: Assoc. Prof. Gun-Hean Chong

Y9002 Presentation 1 (15:30~15:45)

Insecticide residue removal by microbubble treatments in fresh consumed agricultural products: A preliminary study.

Janyawat T. Vuthijumnonk, Warawaran Shimbhano

College of Integrated Science and Technology, Rajamangaka University of Technology
Lanna, Chiang Mai, Thailand

Abstract—Four major groups of insecticide, organophosphate, carbamate, organochlorine, pyrethroid, are used in agricultural cultivation to achieve high and constant product quality. However, insecticide residue contamination is one of the major problems that effect human health widely. In this study, two fresh consumed agricultural products, orange and banana, were treated with three types of microbubble, air microbubble (AMB) or oxygen microbubble (OMB) for 15 or 30 min. Then the products were tested for insecticide residue contamination using GPO-TM kit, a test kit for detection of all four insecticide groups. After 15 minutes of treatments with microbubble both AMB and OMB, insecticide residues was still found. Interestingly, both AMB and OMB effectively removed all four-insecticide residue from the products after 30 minutes of the treatments..

Session 3

Afternoon, May 28 (Tuesday)

Time: 15:30~17:00

Venue: SOKA (2nd Floor)

6 presentations-Topic: “Food and Agricultural Engineering”

Session Chair: Assoc. Prof. Gun-Hean Chong

Y9010 Presentation 2 (15:45~16:00)

Effect of transglutaminase on the quality of dried alkaline noodle from rice flour

Anocha Suksomboon ,Onuma Pleansri

Department of Food Science, Faculty of science, Burapha University, Bangsean, Thailand

Abstract—The aim of the present study was to improve quality of dried alkaline noodle made from rice flour by utilization of transglutaminase at difference concentrations (0, 1, 2, 3 and 4 g/ 100 g flour). The transglutaminase activated protein crosslinking according to SDS-PAGE protein patterns and the decrease amount of free amino groups. The increase amount of transglutaminase increased cooking yield, hardness, and tensile strength, while decreased cooking loss and adhesiveness of alkaline rice noodle. According to the optimum of cooking properties, textural properties and sensory characteristics, the 3 and 4 % of transglutaminase was recommended for quality improvement of alkaline noodle from rice flour.

Session 3

Afternoon, May 28 (Tuesday)

Time: 15:30~17:00

Venue: SOKA (2nd Floor)

6 presentations-Topic: “Food and Agricultural Engineering”

Session Chair: Assoc. Prof. Gun-Hean Chong

Y2001 Presentation 3 (16:00~16:15)

Mixing of Bidisperse Cohesive Granular Materials in Food Processes

Jarray Ahmed, Mehdi Habibi, Bert J. Scheper, Hao Shi & Stefan Luding

Multi Scale Mechanics (MSM), University of Twente, NL-7500 AE Enschede, The Netherlands.

Abstract—Particulate mixing is one of the most common unit operations in food processes. Yet, mixing phenomena are still not fully understood. In this study, we investigate experimentally the ability of cohesion to enhance mixing in dry cohesive particulate systems. Extensive chemical silanization is used to produce cohesive dry glass particles and the cohesive force is measured using an in-house setup. The effect of the cohesive force on the flow and mixing is then explored using a rotating drum. We found that high cohesive forces clumps the small particles together and hence weaken the percolation segregation and improve mixing. These results have important implications for food industrial processes (e.g., flowability control, engineered mixing and blending of multicomponent particulate systems).

Session 3

Afternoon, May 28 (Tuesday)

Time: 15:30~17:00

Venue: SOKA (2nd Floor)

6 presentations-Topic: “Food and Agricultural Engineering”

Session Chair: Assoc. Prof. Gun-Hean Chong

Y2010 Presentation 4 (16:15~16:30)

Safety assessment of calcium supplementation under cadmium exposure in the general population: a study in a rat model exposure to this heavy metal

Xiao Huang, Teng Liu, Meng Zhao, Qian Xu

Key Laboratory of Environmental Medicine Engineering, Ministry of Education, School of Public Health, Southeast University, Nanjing 210009, China

Abstract—Calcium (Ca) supplements or usual Ca intake may be exposed to dietary cadmium (Cd) from food. The aim of this study was to evaluate the safety of Ca supplementation exposed to normal dietary Cd levels (i.e., in unpolluted areas) in the general population, using a rat model. Forty young female Sprague–Dawley rats were administered calcium carbonate in their diet for 13 weeks at a Ca content of 0.5%, 0.65%, 0.9%, and 1.1%, with exposure to a 1 mg Cd/kg diet. Tubular epithelia cell calcification and tubular vacuolation in the kidney were seen in the 0.9% and 1.1% Ca groups. This is associated with slight increases in blood urea nitrogen. As for hematology, increases in white blood cell count, monocytes, and lymphocytes were also seen in the 1.1% Ca group. Thus, the lowest observed adverse-effect level of calcium carbonate exposure to a 1 mg Cd/kg diet in this 90-day feeding study was considered to be <0.9% Ca content in the diet for females. In addition, an increase in Cd accumulation was observed with 0.65% Ca content in the diet. The results from the animal model may help identify adverse effects of co-exposure of Ca to Cd for the general population’s dietary exposure level.

Session 3

Afternoon, May 28 (Tuesday)

Time: 15:30~17:00

Venue: SOKA (2nd Floor)

6 presentations-Topic: “Food and Agricultural Engineering”

Session Chair: Assoc. Prof. Gun-Hean Chong

Y0001-A Presentation 5 (16:30~16:45)

Is dietary metal exposure relevance to aquatic biota?

Agus Sofyan

Big Sandy Community & Technical College (BSCTC), Kentucky, USA.

Abstract—This study was designed to compare relative importance of water and dietary metals on *Ceriodaphnia dubia* reproduction, survival, and feeding rates. Results showed that uptake from water were more rapid than from diet. Both uptakes occurred significantly independent and body burdens were additive from both sources in combined exposure. Furthermore, metal trophic transfer between primary producers (i.e., *Pseudokirchneriella subcapitata*) and primary consumers (i.e., *C. dubia*) was observed. Results showed that both water, dietary, and combined exposure of metal were chronically toxic for all three endpoints. The result also showed that combination route (i.e., water plus dietary exposures) had additive effect on *C. dubia*. For example, the lowest observable effect concentrations (LOECs) for cadmium on *C. dubia* were 5mg/L, 0.60mg/g dry wt, and 2mg/L+0.26mg/g dry wt for water, dietary, and combined exposures, respectively. These results suggested that the response was independent of exposure avenues, and the effects in combined exposures were additive. This study demonstrates that dietary metals is toxicologically relevance and should be carefully interpreted and considered as part of regulatory assessment of metals.

Session 3

Afternoon, May 28 (Tuesday)

Time: 15:30~17:00

Venue: SOKA (2nd Floor)

6 presentations-Topic: “Food and Agricultural Engineering”

Session Chair: Assoc. Prof. Gun-Hean Chong

Y1007-A Presentation 6 (16:45~17:00)

Facing drought challenges in Sumba, Indonesia; Smallholder farmers use water powered pumps for sustainable irrigation

Kharis Erasta Reza Pramana, Pratap Thapa, Tei Overgoor, Martin van Beusekom, Annisa Annidita, Adrianus Petrus Lagur, Heinrich Dengi, Maurits Willem Ertsen aQysta, Delft University of Technology, Delft, The Netherlands.

Abstract—We provide to tens of communities of smallholder farmers in Sumba, Indonesia with an environmentally friendly irrigation technology. For more than two years, these smallholder farmers irrigate their land using water powered pumps called Barsha pumps during eight months of dry season annually. A Barsha pump can pump water from a river about half liter per second 24/7 without fuel or electricity and requires almost zero operation and maintenance costs. It contributes to both climate mitigation and adaptation, and is also more robust than other renewable energy based irrigation systems. Nowadays, these smallholder farmers have year-round farming, increase their income and ecologically sustain their food production without damaging the environment. Potentially for upscaling on Sumba Island, about 30,000 hectares of land close to the rivers is estimated to be suitable for Barsha pumps.

Session 4

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

Afternoon, May 28 (Tuesday)

Time: 15:30~17:30

Venue: JEMPIRING (2nd Floor)

8 presentations-Topic: “Environmental Science and Engineering”

Session Chair: Prof. Tjokorda Gde Tirta Nindhia

Y0022-A Presentation 1(15:30~15:45)

Potential Use Scenarios of Hybrid Biological Reactor for Petrochemical Industry Wastewater Treatment

Jianhua Zhang, Yongzhen Peng, Qiong Zhang, Xiyao Li

National Engineering Laboratory for Advanced Municipal Wastewater Treatment and Reuse Technology, Key Laboratory of Beijing for Water Quality Science and Water Environment Recovery Engineering, Beijing University of Technology, Beijing 100124, PR China

Abstract—Partial nitrification-anammox (PNA), which was considered as a promising technology to make wastewater treatment energy-efficient, was established for domestic wastewater treatment in a sequencing batch biofilm reactor (SBBR). The SBBR was operated over a period of 340 days at ambient temperature in anaerobic/aerobic/anoxic (A/O/A) mode. Efficient nitrogen removal was achieved despite the fluctuation in inflow quality. For the average influent ammonium of 45.7 mg N/L, the effluent total nitrogen was only 4.4 mg N/L. Nitrogen removal was steady even at low temperatures (<15 °C). For the efficient nitrogen removal performance, the A/O/A operation mode could play an important role. During the anaerobic phase, the influent carbon source could be transformed into intercellular polyhydroxyalkanoate (PHA), reducing the inhibition effect of organic matter on anammox bacteria and promoting the PNA reaction in the aerobic stage. According to the quantitative microbial analysis, anammox bacteria were enriched in the SBBR and its abundance was stable during operation. PNA reaction could be the main pathway for nitrogen removal, according to the results of continuous and cyclic tests. Furthermore, endogenous denitrification driven by PHA could occur in the post-anoxic stage, resulting in improved nitrogen removal performance. Overall, this study provided a novel process for enhancing nitrogen removal of domestic wastewater via combining PNA and endogenous denitrification, and desirable average nitrogen removal efficiency of 90.3% was obtained

Session 4

Afternoon, May 28 (Tuesday)

Time: 15:30~17:30

Venue: JEMPIRING (2nd Floor)

8 presentations-Topic: “Environmental Science and Engineering”

Session Chair: Prof. Tjokorda Gde Tirta Nindhia

Y1012: Presentation 2(15:45~16:00)

A detergent destruction method used for aerobic treatment of wastewater high in detergent content (WHD)

Alexey M. Konovalov, Galina V. Baturova

MIREA - Russian Technological University, Moscow, Russia

Abstract—The article is devoted to the methods and algorithm for ranking of environmental indicators depending on their impact on infrastructure for long-term planning of infrastructure development in the Arctic zone of the Russian Federation in the context of global climate change. The article presents the environmental indicators critical values database focused on supporting decision-making as well

Session 4

Afternoon, May 28 (Tuesday)

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Venue: JEMPIRING (2nd Floor)

8 presentations-Topic: “Environmental Science and Engineering”

Session Chair: Prof. Tjokorda Gde Tirta Nindhia

Y1017: Presentation 3 (16:00~16:15)

Arsenic pollution assessment in surface sediment of the inner Gulf of Thailand

Anutsara Yottiam, P Chaikew and S Srithongouthai

Interdisciplinary Program in Environmental Science, Graduate School, Chulalongkorn University, Bangkok, TH

Abstract—Surface sediments of the inner Gulf of Thailand and four main river estuaries were collected for total arsenic analysis in order to assess spatial distribution pattern, contamination status, regulating factors and potential ecological risk. The study reveals that the arsenic concentrations in the surface sediment samples varied from 5.43–18.01 mg/kg dry weight. Higher arsenic concentrations were found in the Chao Phraya river estuary toward in the eastern of the inner Gulf of Thailand. Based on the sediment quality guidelines (SQGs), arsenic was investigated most unlikely to cause any adverse effects. The result of geo-accumulation index (Igeo) was found to be less than 1, which indicated "unpolluted" state. Moreover, the potential risk of individual metal (Er) values directed that arsenic at all stations posed low ecological risks.

Session 4

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Venue: JEMPIRING (2nd Floor)

8 presentations-Topic: “Environmental Science and Engineering”

Session Chair: Prof. Tjokorda Gde Tirta Nindhia

Y1016: Presentation 4 (16:15~16:30)

Techno-Economic Optimization and New Modeling Technique of PV-Wind-Reverse Osmosis Desalination Plant at Variable Load Conditions

Supannapa Maklai and S Srithongouthai

International Program in Hazardous Substance and Environmental Management, Graduate School, Chulalongkorn University, Bangkok 10330, Thailand

Abstract—Surface sediments were sampled at 22 locations in marine transshipment area in order to evaluate the distribution pattern, contamination status and ecological risk of Cu and Cr. The results of the metals distribution demonstrated that high concentrations of both Cu and Cr were found in the transshipment area, while lower concentrations were observed at the reference sites. Likewise, there were significant differences between the transshipment area and the reference site, indicating these were consequences of different outputs and activities. For comparison of the guidelines, concentrations of Cu and Cr were in a range that biological effects occasionally occur. Based on EF, concentrations of Cu and Cr indicated minor contamination. Also, all of the entire study area had low ecological risk.

Session 4

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8 presentations-Topic: “Environmental Science and Engineering”

Session Chair: Prof. Tjokorda Gde Tirta Nindhia

Y0021-A: Presentation 5 (16:30~16:45)

In-situ enrichment of anammox combined with partial-denitrification in a continuous flow reactor from sewage

Jianwei Li, Yongzhen Peng, Liang Zhang, Xiyao Li, Qiong Zhang, Shuying Wang

National Engineering Laboratory for Advanced Municipal Wastewater Treatment and Reuse Technology, Beijing University of Technology, Beijing 100124, PR China

Abstract—In this study, a lab-scale bioreactor (42L) with anaerobic-anoxic-oxic (AAO) process was modified by adding carriers in the anoxic zone to form an anoxic-FBBR (Fixed Bed Biofilm Reactor). The anoxic-carrier biofilms effectively enhanced the nitrogen removal through long-term monitoring (over 500 days). Focusing on the anoxic-carrier biofilms, microbial community analysis using metagenomic gene sequencing reveals that the improvement of denitrifying and anammox bacteria contributes to nitrogen removal. Furthermore, batch tests showed that anammox bacteria could obtain nitrite from partial-denitrification (NO₃--N to NO₂--N) within the anoxic-carrier biofilms, which was supported by high ratio of narG / (nirK + nirS) observed in anoxic-carrier biofilms. Overall, this study, for the first time, suggests the coexistence and collaboration of denitrifying and anammox bacteria in anoxic biofilms could be a novel strategy in the AAO process for sewage treatment.

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8 presentations-Topic: “Environmental Science and Engineering”

Session Chair: Prof. Tjokorda Gde Tirta Nindhia

Y0023-A Presentation 6 (16:45~17:00)

The inhibition and recovery of anammox bacteria subjected to long-term exposure of Fe²⁺ in an upflow biofilter reactor

Zhixing Li, Yongzhen Peng, Lei Wu , Rui Du

Department of Environment and Energy Engineering, University of Beijing University of Technology, Pingleyue No. 100, Chaoyang District, Beijing, China.

Abstract—Excessive ferrous ion (Fe²⁺) can cause failure of N-removal processes relying on anaerobic ammonium oxidation (anammox) bacteria. In this work, we investigated the inhibitory effect of Fe²⁺ on anammox bacteria and the feasibility of using ethylene diamine tetraacetic acid disodium salt (EDTA-2Na) washing followed by betaine regulation for the recovery of anammox reactor inhibited by Fe²⁺. The Fe²⁺ inhibition on anammox bacteria was investigated using a continuous upflow biofilter (UBF) reactor fed with ever increasing Fe²⁺ (0-13.0 mM) and constant ammonium (NH₄⁺) (around 140 mg/L) and nitrite (NO₂⁻) (around 182 mg/L). The anammox reactor first appeared obvious ammonium accumulation and then was fully inhibited at the influent Fe²⁺ concentration of 7.8 and 13.0 mM, respectively. Single EDTA-2Na (0.5, 1, 1.5 and 2 mM) washing had little effect on the recovery of anammox performance, and the total nitrogen removal efficiency (TNRE) was no more than 25% all the time. The betaine addition (2 mM) that followed led to an accelerated nitrogen removal rate recovery and the total nitrogen removal efficiency (TNRE) returned to 75% within 18 days. A prolonged betaine addition is not recommended since that would cause an unintended enrichment of denitrifying bacteria and the anammox performance was nearly destroyed, though betaine below 5 mM was ever reported to be beneficial for the stable operation of anammox reactor. The TNRE of anammox reactor returned to 76% by withdrawal of betaine within 34 days.

Overall, above results demonstrate that external removal of the adsorbed Fe²⁺ by EDTA-2Na followed by dislodging internal stored Fe²⁺ by betaine may be a useful recovery method for anammox bacteria inhibited by Fe²⁺. However, the need to pay attention to is that the period in which betaine could be used must be strictly limited to avoid potentially occurring nitrite competition between anammox bacteria and denitrifying bacteria. The performance of anammox reactor can be further improved to the original state by gradually increasing the substrate concentration and the experiment is still under way.

Session 4

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8 presentations-Topic: “Environmental Science and Engineering”

Session Chair: Prof. Tjokorda Gde Tirta Nindhia

Y1015 Presentation 7 (17:00~17:15)

Oxidation leaching of tin anode slime by controlling potential

Wei-Sheng Chen, **Yi-Fan Zhong**, Li-Pang Wang

Department of Resources Engineering, National Cheng Kung University, Tainan 70101, Taiwan

Abstract—The selective leaching of tin anode slime was extremely important in the process of the recovery of tin anode slime. With the successful leaching, the efficiency of value metals recycling was elevated obviously. Hence, the pretreatment of tin anode slime was studied in this paper by using the environmental technology and hydrometallurgical approach to achieve the goal of valuable metal recovery from traditional waste tin anode slime. It is worth noting that there are a large amount of value metals including Sn, Sb, Bi, Cu and Ag in the tin anode slime. The results indicated the optimal conditions of leaching process are 3.0 M HCl with 0.1M NaClO₃ and liquid-solid mass ratio of 30 ml/g in 30 minutes at 45 degrees of Celsius and about Sn 85.32%, Sb 96.93%, Bi 97.63%. Meanwhile, silver and copper were all leached out by HCl solution in the leaching of tin anode slime.

Session 4

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8 presentations-Topic: “Environmental Science and Engineering”

Session Chair: Prof. Tjokorda Gde Tirta Nindhia

Y1020 Presentation 8 (17:15~17:30)

The utilization of long residue to improve the briquette quality of Terminalia catappa fruit charcoal and Borassus flabellifer L fruit skin charcoal in the present of 5 % amylum using a manual briquette equipment

Suparno, W.R. Hatiningrum; A. Huzein; R.D. Syahputra H.H. Niam; A.D Rahangmetang
Senior Lectures at The Energy and Mineral Polytechnic , Cepu,Central Java, Indonesia

Abstract—Ketapang is a local name of Terminalia catappa. Ketapang trees grow in area of PEM Akamigas Cepu , Central Java. These trees could also be found in cities in Bali, Jogjakarta Central Java, East Java province and others, which grow along side of the main road. While siwalan is a local name of Borassus flabellifer L, found in Rembang Sub province of Central Java and Tuban Sub province of East Java a long side of the beach area. Their dry fruits, during dry season, spoil as biomass waste. Ketapang fruit and siwalan fruit skin have been already observed, nevertheless the result shows that their calorific value below the National Indonesian Standard (SNI). Thus, it is necessary to conduct more research for improving their briquette quality. This research determines briquette quality of ketapang fruit and siwalan fruit skin charcoal mixed with long residue of crude oil as an additive. The long residue origins from a traditional distillation unit in rural crude oil mining in Bojonegoro sub province, East Java, Indonesia. The research elaborates impacts of long residue as briquette additives (10 % ; 20 %; 30 %) in the present of 5 % amylum as a glue in an each charcoal mixture. The mixture then, was moulded in a 5.5 cm in diameter of a briquette mould with a manual pressure. The height of briquette was adjusted between 1.5 cm up to 2 cm. The research result shows the improvement of the briquette quality both for the ketapang fruit and siwalan fruit skin charcoal in terms of their porosity, calorific value , moisture content, ash content, volatile matter and fixed carbon. The results of ketapang fruit charcoal briquettes and siwalan fruit skin charcoal briquettes, with the addition of 10% ; 20% and 30% long residue respectively which were forced by human naturally provide the good qualities in term of their porosities and these are in accordance with SNI. Nevertheless their qualities are still need to be observed in terms of their compressive stress according to the Forest Products Research and Development Center (P3HH) standard. An increase of long residue percentage into a charcoal briquette mixture for ketapang fruit and siwalan fruit skin rises a briquette porosity. In term of moisture content (MC). all ketapang charcoal briquette compositions meet SNI and P3HH requirements, except their ash content for some composition. In Addition, the use of long residue additive for briquetting increases a calorific value of ketapang fruit charcoal briquettes. The overall calorific value of ketapang fruit charcoal produced meets SNI standard. In terms of calorific value and moisture content, the briquettes of siwalan fruit skin charcoal with 10 % , 20 % and 30 % of long residue respectively meet the SNI standard, excluding their ash content.

Session 5

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

Afternoon, May 28 (Tuesday)

Time: 17:00~18:00

Venue: SOKA(2nd Floor)

4 presentations-Topic: “Wastewater Treatment and Health”

Session Chair: Assoc. Prof. Agus Sofyan

Y0029 Presentation 1 (17:00~17:15)

Optimal Capacitor Placement for IEEE 33 Bus System by Using Genetic Algorithm

Hartono, Rika Rahmawati

Electrical Engineering, Universitas Sultan Ageng Tirtayasa, Cilegon, Indonesia

Abstract—One way to reduce reactive power in the distribution system is by installing bank capacitors. bank capacitors can increase the voltage profile on the system. optimal capacitor bank placement can reduce costs incurred. in this study discusses the optimization of capacitor bank placement using genetic algorithms on the IEEE 33 bus system. Genetic Algorithm (GA) is a method that mimic the mechanism of the evolutionary process. This evolutionary process is carried out on a set of candidate solutions (chromosomes) by following the natural selection principle developed by Darwin. The results of this study show that using the genetic algorithm method can reduce power loss by 33.4% Case 2 and 31,75 Case 3 on the 33 bus IEEE system and can improved the voltage profile with a minimum voltage in the system.

Session 5

Afternoon, May 28 (Tuesday)

Time: 17:00~18:00

Venue: SOKA(2nd Floor)

4 presentations-Topic: “Wastewater Treatment and Health”

Session Chair: Assoc. Prof. Agus Sofyan

Y1010 Presentation 2 (17:15~17:30)

Utilization of Gas Exhaust Diesel Power Generation For Micro Turbine Organic Rankine Cycle (ORC)

Harry Indrawan and Almas Aprilana

PT PLN (Persero) RESEARCH INSTITUTE, INDONESIA

Abstract—This study aims to study the reuse of heat from exhaust gas diesel by using micro turbine ORC to improve thermal efficiency of diesel. The methodology undertaken is as follows: conducting studies on heat exhaust potential, designing and optimizing PFD and appropriate working thermodynamics working fluids; design and optimize all required equipment: water heater, preheater, evaporator, turbine-generator, air cooler system or cooling tower and pumps.

The results of the discussion and analysis obtained the following conclusions: the study of the utilization of exhaust gas Diesel Power Generation micro turbine takes place in Lombok. From field survey results and optimization results of available space in unit 2 & 3 engine configuration and or engine configuration of units 5 & 6 which will be utilized exhaust gas for generator micro turbine ORC; in this study it has been determined that the design of ORC to generate 100 kW electrical energy and will be used for its own use; system design has 2 alternative system design that is simple ORC and ORC with precuperator; 4 alternative working fluids are n-butane, n-pentane, R-134a and R-245fa; 4 thermal fluid alternatives ie hot water, saturated steam, Dowtherm A and Thermo XT 32; based on simulation results to generate 100 kW electrical energy with the above design alternatives obtained optimal conditions on ORC system with precuperator, n-pentane working fluid, thermal fluid Thermo XT 32, with heat and mass balance model as follows; thermal efficiency 11,81%, mass flowrate n-pentane 1,92 kg / s and thermo XT mass flowrate 3,67 kg / s and turbine inlet temperature 160.

Session 5

Afternoon, May 28 (Tuesday)

Time: 17:00~18:00

Venue: SOKA(2nd Floor)

4 presentations-Topic: “Wastewater Treatment and Health”

Session Chair: Assoc. Prof. Agus Sofyan

Y0003-A Presentation 3 (17:30~17:45)

Importance of common occupational health and safety standards for offshore wind sector: An evidence from Denmark

Dewan Ahsan

Department of Sociology, Environmental and Business Economics University of Southern Denmark, Esbjerg 6700, Denmark

Abstract—The offshore wind sector is one of the key sources for producing renewable energy. Though there is a rapid growth in the offshore wind energy sector, there is still a dearth of synchronization in HSE (Health, Safety and Environment) standards. Therefore, this paper attempts to ascertain what are the major challenges of the company specific HSE standards, why does the offshore wind industry need a standardized HSE management system and which stakeholders can play the key role in this process? To achieve these objectives, this research applies the interview and survey techniques. The results of this study reveal that too many different HSE standards from different clients, too many extra documents and complex HSE guidance leaflets, lack of HSE leadership training, gap in reporting/disclosure of incident, lack of safety information (/experience) sharing between operators and sub-contractors and blame culture among the workers are perceived as the most important management problems by the interviewed technicians. Whereas, the respondents of this research believe that creation of common HSE standards applicable for all operators, assurance of active participation of technicians in the safety culture assessment, access to the central safety meeting, development of a good safety leadership, providing strong support and opportunity for increased dialogue with safety leader and enhancement in knowledge sharing among different stakeholders are the most important strategies to overcome the existing problem. Seven stakeholders are identified who can influence the development process of a harmonized HSE management system. However, the relationships among the stakeholders are very complex. In conclusion, this study would like to address that common HSE standards specifically for the offshore wind sector (which could be widely applicable for all operators and turbine supplying companies) are very crucial not only to manage HSE in synchronized way but also to have the cost-efficient services from the sub-contractors.

Session 5

Afternoon, May 28 (Tuesday)

Time: 17:00~18:00

Venue: SOKA(2nd Floor)

4 presentations-Topic: “Wastewater Treatment and Health”

Session Chair: Assoc. Prof. Agus Sofyan

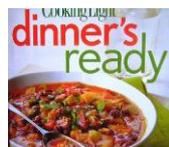
Y1013 Presentation 4 (17:45~18:00)

Grid parity analysis of rooftop photovoltaic in Jakarta and Surabaya

Harry Indrawan, **Fajar Haryadia**, Meiri Triani

PT PLN (Persero), Research Institute, Jl. Duren Tiga 102 Jakarta 12760, Indonesia

Abstract—The growth of rooftop photovoltaic users in Indonesia has been very rapid since 2017, which around 85 percent of rooftop photovoltaic users in Indonesia are scattered in Jakarta, West Java and East Java regions. In order to deal with the trend of rooftop photovoltaic in Indonesia, the study related to the analysis of rooftop photovoltaic grid parity was carried out specifically for the Jakarta region, considering that the region includes the most rooftop users, while East Java represented by Surabaya is chosen because it has the highest solar power potential compared the two regions others. Grid Parity is the time when the electricity price equals the levelised cost of photovoltaic energy generation. To analyse the dynamics of the generation costs of a rooftop photovoltaic we use the Levelised Cost of Electricity (LCOE). To determine the average rooftop photovoltaic energy production in 2018, a model of 3 years Automatic Weather System (AWS) history data was used. For the same calculation in the uyear, it is corrected by the derating factor of the system assuming a 13 percent decrease from the previous energy production each year. For the scenario of a battery-free rooftop photovoltaic system, the grid parity condition in Surabaya is expected to be achieved as early as 2021 for a capacity of 3,500 Wp and 5,500 Wp, while in Jakarta with the same capacity it will only be reached by 2022. For the scenario of a rooftop photovoltaic system with battery storage, the grid parity condition in Surabaya is expected to be achieved as early as 2024 for a capacity of 3,500 Wp, 4,400 Wp and 5,500 Wp, while in Jakarta with the same capacity it will only be reached by 2025. The Grid Parity in Surabaya is faster than in Jakarta because LCOE projections for Surabaya is cheaper than LCOE in Jakarta due to the average energy production in one year for the Surabaya region is higher than in Jakarta.



Dinner

18:00

Poster Session

May 28 (Tuesday)

Time:09:00~18:00

Venue: JEMPIRING (2nd Floor)

Y8005 Presentation 1

Influence of cold storage and processing of edible mushroom on ergothioneine concentration

Shu-Yao Tsai, Zih-You Chen

Department of Food Nutrition and Health Biotechnology, Asia University, Taichung, Taiwan

Abstract—Edible and medicinal mushrooms are healthy foods relatively low in calories and fat but rich in proteins, vitamins, minerals and ergothioneine. After mushrooms are harvested, they continue to breathe and metabolize. Therefore, many physiologically active contents will change after harvest. Due to the different storage time and cooking ways, we studied a variety of ergothioneine content to determine the content of ergothioneine in *Flammulina velutipes*, *Pleurotus citrinopileatus* and *Pleurotus eryngii* after processing and cold storage. We compared the ergothioneine after different storage days in 4°C, dry way (freeze dry, cold air dry, hot air dry), radiation dose (pulsed light), cooking method (boil, stir-fry, gas fry) with high performance liquid chromatography to determine the process that can keep most ergothioneine. Ergothioneine content decreased while *P. citrinopileatus* storage days increased, and the highest content of ergothioneine was found to be 2241.6 µg/g on the third day. After irradiation of different dose of pulse light, the content of ergothioneine had no significant difference between 30 and 50 pulse form three types mushroom. The lowest content is to cook in boiled water for 3~10 minutes. Therefore, storage for 3 days, irradiation 50 pulse light, boiling for 3~5 minutes, gas-frying for 6 minutes, stir-frying for 10 minutes, and freeze drying was the best way to keep the ergothioneine in *P. citrinopileatus*. However, the processing treatment had little effect on *F. velutipes* and *P. eryngii*, except for boil treatment. Food processing and storage has the potential to slightly alter the stability of ergothioneine in mushrooms. Consumer guideline for estimating dietary intake of ergothioneine is to not boil mushrooms for too long, in order to retain more ergothioneine content.

Poster Session

May 28 (Tuesday)

Time:09:00~18:00

Venue: JEMPIRING (2nd Floor)

Y9006: Presentation 2

The Optimal Formula of Longan Energy Gel Drink Containing of High Bioactive Compounds and Antioxidant Activities

Kochkaew Suriya, Somchai Jomduang

Division of Food Science and Technology, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai 50100

Abstract—Energy gel drink tends to be more popular as functional drink. Bioactive compounds and antioxidant activities were interested to study in this type of drink. The objective of this study was to find out the optimal formula for main ingredient, minor ingredient and gelling agent of longan energy gel drink. It was found that the optimal formula for main ingredient consisted of 69.5% longan juice, 30% longan honey and 0.5% citric acid which had 25 °Brix TSS and 0.5% TA (as citric acid). The mixture of main ingredient was added with minor ingredient which consisted of 0.54% branch chain amino acid (BCAA), 0.11% vitamin B complex and 0.03% commercial caffeine powder. Carboxymethyl cellulose (CMC) was selected to be added at 0.7% for gelling agent since no syneresis and the high acceptance sensory scores. Longan energy gel drink mixture was filled (150 g), sealed in retortable pouch and boiled in water (95-97 °C) for 5 min. One serving size (150 g) of this product had 165 kcal. In addition, it also had high bioactive compounds such as 0.401 ± 0.009 mg GAE/ml of total phenolics, 0.013 ± 0.002 mg/ml of gallic acid and 0.005 ± 0.001 mg/ml of ellagic acid. These bioactive compounds could also provide high antioxidant activities. This longan energy gel drink had high potential to produce at commercially scale.

Poster Session

May 28 (Tuesday)

Time:09:00~18:00

Venue: JEMPIRING (2nd Floor)

Y9007 Presentation 3

Product Development of Rice Energy Gel and Effect on Blood Glucose and Lactate Concentration in General Sport Subject

Nutt Tharnpichet, Wachira Jirarattanarangsri, Sukhuntha Osiriphun, Prasit Peepathum and Witid Mitranun

Division of Food Science and Technology, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai 50100, Thailand

Abstract—Endurance sport training using long exercise time caused athlete to use blood glucose and glycogen resulting in fatigue in hour after session. Although athletes were encouraged to take electrolyte drinks (liquid form) before and during exercise session, these products generally require high volume to be effective. Athlete may carried more weight with them when exercising. The aim of this study was to develop rice energy gel from Thai Hommali Rice containing maximum oligosaccharides, vitamin B, and vitamin C for this purpose. Rice flour (Khao Dawk Mali 105 variety) was prepared and digested using α -amylase according to central composite design, varying in concentration of α -amylase (30, 50, 80AAU/ml), temperature (35, 45, 55°C), and time (60,100,140 min). Optimized formula was used to produce energy rice gel and tested on 10 volunteer participants with the L.I.S.T protocol. Participants consumed rice energy gel (REG) or placebo (PLA). Results showed that the maximum mean blood glucose level of the REG ingestion group significantly ($P<0.05$) increased during training (127 mmol/L). Furthermore significantly different ($P<0.05$) compared to those of the PLA group (96.8 mmol/L) and maintained throughout the 75 min throughout the L.I.S.T training (111126 mmol/L). Similar trend was found with blood lactate concentration at the beginning of training session but the effect was not retained after 30 min. However PLA group has significantly different ($P<0.05$) between after the last block when compare with the resting. Therefore, consumption of energy rice gel could be an alternative option for athletes who want to exercise longer without fatigue.

Poster Session

May 28 (Tuesday)

Time:09:00~18:00

Venue: JEMPIRING (2nd Floor)

Y0034-A Presentation 4

Long-Term Assessment of Danube River Water Quality Before its Discharge into the Danube Delta

Mihaela Timofti, Catalina Iticescu, Madalina Calmuc, Valentina Andreea Calmuc, Adrian Rosu, Maxim Arseni, Lucian P. Georgescu

Dunarea de Jos", University of Galati, Faculty of Sciences and Environment, European Center of Excellence for the Environment, Domneasca Street, No.111, Galati 800008, Romania

Abstract—Considering the fact that a pan-European interdisciplinary research infrastructure is envisaged to be built in the near future with a aim of substantiating the integrated management of freshwater and seawater systems, special attention is paid to the quality of the water in River Danube which flows into the Black Sea through a delta.

The scientific results obtained in the framework of a series of support and research projects will represent the basis for integrated solutions suggested with respect to the management of freshwater - seawater systems as a whole.

One of these projects, which was active in 2018, evaluated the Danube water quality, both chemically and physico-chemically, over a distance of approximately 75 km, in 15 points which were set up so as to cover both the confluence area with two other major rivers of Romania and the predeltaic area.

This paper presents the results obtained by comparing the values which were obtained in 2018 with those obtained 10 and 20 years ago, respectively, for one of the 15 sampling points, i.e. for the point situated between two major confluences of River Danube with River Prut and with River Siret. Since the number of indicators studied over the 20-year period differs to a great extent (29 in 2018, 23 in 2008 and 19 in 1998), only 17 quality indicators, which were common throughout this 20-year period, were taken into consideration. The present study revealed the fact that the pH of the Danube River water increased, in some cases, by one point in 2018 as compared to the values obtained 20 years ago. Significant differences were also found for other indicators, differences which could indicate a decrease in the self-draining capacity of this river. This decrease may be an alarm signal for the water quality of the Danube Delta, a delta which has been a UNESCO heritage since 1991.

Poster Session

May 28 (Tuesday)

Time:09:00~18:00

Venue: JEMPIRING (2nd Floor)

Y1003 Presentation 5

Design and Simulation of a Solar Photovoltaic System for a Sports Stadium in Saudi Arabia

Abdullah M. Maghfuria, Andrew Chiasson

Mechanical Engineering, faculty of Engineering, Jazan university, Jazan , 82822, Saudi Arabia

Abstract—In this article, we describe the design and simulation of an uncommon use of solar photovoltaics (PV), which is for the King Abdullah Sport City stadium in Jeddah, Saudi Arabia. The PV array is proposed to be installed as a parking lot canopy to meet electricity needs of 111,000 kWh per day on average. Much of the loads are at night, but battery storage is impractical due to the large load. Thus, the PV electricity generated is proposed to be net-metered by the utility company. First, a preliminary scoping analysis was conducted on a monthly basis using satellite-derived weather data from NASA to prove the concept. Next, a detailed hourly simulation using SAM software was conducted in order to perform 25-year life-cycle cost analyses to determine economic viability and annual cash flows. The simulation results yielded a design of 53,374 modules of 250 W nominal power output, covering an area of 87,000 m². Positive cash flow is realized in 16 years after installation.

Poster Session

May 28 (Tuesday)

Time:09:00~18:00

Venue: JEMPIRING (2nd Floor)

Y0010 Presentation 6

Reliability analysis of micro grid based on load control of electric vehicle

Jiachao Chen, Xu Chen, Linhao Ye, Tingcheng Huang and Yongjun Zhang

School of Electric Power, South China University of Technology, Guangzhou, 510000, China

Abstract—As a kind of controllable load, electric vehicles can make up for the impact on the microgrid when they are connected to the microgrid in large quantities, so as to avoid load cutting due to insufficient power generation. In this paper, the reliability of microgrid island operation with wind power generation is studied based on the control strategy of electric vehicle. Firstly, the minimum peak load model of electric vehicles is established to evaluate the regulatory potential of electric vehicles during the island operation of microgrid. Secondly, the source-load-storage joint control strategy of microgrid with power supply reliability is proposed. Then, based on Monte Carlo simulation, a microgrid reliability assessment method based on the minimum peak load model of electric vehicles is proposed. Finally, a numerical simulation is carried out through the modified RBTS Bus6 F4 feeder system. Simulation results verify the effectiveness of the proposed model and strategy.

Poster Session

May 28 (Tuesday)

Time:09:00~18:00

Venue: JEMPIRING (2nd Floor)

Y1009 Presentation 7

Sustainable management of coffee fruit waste biomass in ecological farming systems at West Lampung, Indonesia

Anna Brunerová

Department of Material Science and Manufacturing Technology, Faculty of Engineering, Czech University of Life Sciences Prague, Kamýcká 129, 165 00 Prague, Czech Republic

Abstract—Present study focuses on fruit waste biomass generated during the postharvest treatments of coffee cherries (*Coffea* spp.) and its subsequent utilization within the waste-less, sustainable and ecological farming systems. Investigated samples were collected at the organic shaded multi-culture coffee plantations in West Lampung, Indonesia. Within the determination of most suitable subsequent utilization, the samples were subjected to the analysis of their basic chemical parameters, energy potential and ash composition. Three samples kinds were defined: I. CP (outer skin, pulp), II. CH (husk, silver skin, parchment) and III. CA (burned mixture of previous two waste materials). Obtained values proved following results; CP: Mc - 79.21%, Ac - 2.05%, CV - 17.19 MJ/kg; CH: Mc - 21.08%, Ac - 6.50%, CV - 18.14 MJ/kg; CA: Mc - 30.79%, Ac - 28.11%. Measured values proves the suitability of tested materials for combustion processes as a renewable source of clean energy (high energy potential), but also for the composting purposes (Potassium content K₂O - 10.946%). A great potential of tested materials within their subsequent reuse was proved, as well as the fact that they represent a commodity suitable for further valorization.

Poster Session

May 28 (Tuesday)

Time:09:00~18:00

Venue: JEMPIRING (2nd Floor)

Y0017-A Presentation 8

The Impact of Industrial Pollution on Water Quality in Galati City

Cătălina Iticescu, Lucian Georgescu, Mihaela Timofti, Cătălina Țopa, Camen Cătălina Angheluță, Gabriel Murariu, Mădălina Călmuc, Valentina Călmuc, Maxim Arseni, Adrian Roșu

Dunărea de Jos” University of Galați, European Centre of Excellence, ECEE Domnească Street, no. 111, Galați, Romania

Abstract—An important research topic approached by our team of experts is represented by the identification and inclusion of the Danube water in Galati city in water quality classes based on an algorithm which takes into consideration various physico-chemical and biological parameters upstream and downstream, in the lower Danube area up to the point where the river flows into the Danube Delta and in some lakes found in the Danube Delta. This area is sensitive due to the industrial agents existing in the area (a steel mill and two important shipyards), to the two major urban centers Galați and Brăila (with over 500,000 inhabitants) and to the two large rivers the Siret and the Prut whose points of confluence with the Danube are in this area.

The present paper provides the values measured for 17 physico-chemical and biological parameters which were monitored for a three-year period (2016-2018): pH, BOD, COD, OD, P-PO₄⁺, N-total, N-NO₃⁺, N-NH₄⁺, SO₂⁻, Cl⁻, Cr³⁺, Pb⁶⁺, Total Fe, Zn²⁺, phytoplankton and chlorophyll. The sampling and physico-chemical analyzes of the samples were performed according to the standards in force.

The inclusion/ categorization of the Danube water in quality classes was achieved/made by using the WQI and the Water Pollution Index (WPI).

The conclusions drawn pointed out the fact that the Danube water in the area of Galati corresponds to Quality Class 2 and that the industrial waters from the industrial agents in the area are treated properly.

Poster Session

May 28 (Tuesday)

Time:09:00~18:00

Venue: JEMPIRING (2nd Floor)

Y0032-A Presentation 9

Assessing the air pollution conditions in which outdoor cultural heritage objects from Galați city (Romania) are found

Adrian Roșu, Daniel-Eduard Constantin, **Mihaela Timofti**, Mirela Voiculescu, Cătălina Iticescu, Bogdan Roșu, Arseni Maxim

Dunarea de Jos", University of Galati, Faculty of Sciences and Environment, European Center of Excellence for the Environment, Domneasca Street, No.111, Galati 800008, Romania

Abstract—Air pollution may affect negatively the quality of cultural heritage objects through direct and indirect corrosion effects. The direct effect is mainly visible in the degradation of various outdoor objects or to those directly exposed to high concentrations of corrosive gases. A number of 263 outdoor cultural heritage objects, monuments or historical buildings are identified inside Galati County (Romania) with 125 inside of Galati City. Air pollution measurements have been performed for a sufficiently long time in the area of Galati city in order to present an evolution of the most damaging trace gases such as SO₂, NO₂, and O₃. In this study, we present the assessment of the air quality from Galați city (45°26' N, 28°2' E) using remote sensing observations from the spaceborne instrument OMI (Ozone Monitoring Instrument) compared to in-situ data from National Network for Air Quality Monitoring (NNAQM), information freely available at www.calitateaer.ro. The results show the evolution of trace gases over Galati city, and will help in identifying the exposure and degradation risk for part of the above mentioned objects. These can be later used for indoor studies and for implementing measures for conservation and protection of exposed cultural heritage objects.

Poster Session

May 28 (Tuesday)

Time:09:00~18:00

Venue: JEMPIRING (2nd Floor)

Y0009 Presentation 10

Analysis on Charging Demand of Shared Vehicle Based on Spatiotemporal Characteristic Variable Data Mining

Haolin Wang, Yongjun Zhang , Haipeng Mao

School of Electric Power, South China University of Technology, Guangzhou 510640, Guangdong Province, China

Abstract—The wide application of shared vehicles in the future will bring about tremendous importance to the power grid and planning of charging facilities. At present, there are flaws in the prediction methods for shared vehicles charging demand. Based on data mining of national household travel survey(NHTS), this paper constructs a two-dimensional dynamic traffic behaviour model supported by spatiotemporal feature variables. Then, in order to explore the characteristics of continuous charging and centralized charging of shared vehicles, two charging scenarios are set to construct a charging behaviour model. Finally, the Monte Carlo method is used to simulate the shared vehicle traffic charging behaviour, and get the result of the shared vehicle charging demand at different times and regions. The impact of the load on the grid is analyzed in the same time. The results show that the interactive spatial-temporal characteristic variables can reasonably describe the characteristics of time-space two-dimensional uncertain changes in shared vehicles and the method can make a scientific prediction of the shared vehicle charging demand.

One Day Visit

May 29, 2019. (Wednesday) 9:30~17:00

(Tip: Please arrive at "Kuta Central Park Hotel" at 9:20 a.m. The following places are for references, and the final schedule should be adjusted to the actual notice.)

1. (9:30-12:00am) Morning Visit



Pura Lempuyang Temple

This temple group is located at an altitude of over 1000 meters. It is one of the most important temples in Bali, Indonesia. Also known as the 1000 step temple, the gate of the sky. Mount Agung is a backdrop and the scenery is beautiful. This temple is like a cloud.

Lembongan Island

Lembongan Island is a small island located on the southeastern side of Bali. It is also known as the devil's tears. The blue sea of Lembongan Island is clear and pollution-free. The underwater creatures are clearly visible. The island is full of coconut trees and the residents live peacefully. fun. On the island you can enjoy diving, water surfing and more.

Most of the island's residents live on the cultivation of seaweed, which is also a breeding base for Bali seaweed.



2. (12:00-13:30) Lunch time

3. (14:00-16:30) Afternoon visit

Tirta gangga secret garden

The center of the tirta gangga secret garden is a large giant fountain. And there are different idols in the waterway to decorate the wide pool surface, and the different koi in the water. The whole plant layout of the garden is also quite beautiful, patchwork, and enjoyable



Taman Ujung Water Palace

Built in 1921, Taman Ujung Water Palace covers an area of 12 hectares and is comparable to most European palaces. The Taman Ujung Water Palace is surrounded by water and is a natural cold spring. It is a rare monument in Bali. In 1921, the last king of Karangasem admired the beautiful scenery and decided to build a palace to enjoy the gift of nature.



The designer's unique ingenuity integrates the beautiful botanical landscape with the abundant water features such as the ocean and the lake into the design, making the whole palace a magnificent atmosphere without losing its agility!

4. (16:30) Back to Kuta Central Park Hotel

(Please note that the tickets will be at guest's own expense)



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