2019 10th International Conference on Biology, Environment and Chemistry (ICBEC 2019)

September 25-27, 2019

Bangkok, Thailand

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Conference Venue

Rembrandt Hotel Suites and Towers

Add: 19 Sukhumvit Soi 18, Klong Toei, Khlong Toei

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Hotel Introduction:

In a variety of sizes and configurations catering to the diverse needs of guests traveling alone, as couples or in family groups, all of the guest accommodation at Rembrandt Hotel Bangkok feature a contemporary yet elegant design that reflects this centrally located Sukhumvit hotel's international standard while honoring the traditional grace and style for which Bangkok is renowned. To ensure a comfortable and homely stay for guests traveling on business or for leisure, all of the spacious rooms and suites at Rembrandt Hotel Bangkok are tastefully furnished and fitted with a selection of modern amenities.

Transportation:

45 minutes from Suvarnabhumi International Airport

5 minutes walking from Asoke BTS sky train and Sukhumvit MRT subway

Nearby landmarks:

Only 1.0 Km from the city center

630 meters From Terminal 21 Shopping Center

4.18 km from Thompson Museum

The organizer doesn't provide accommodation, and we suggest you make an early reservation. (The price of per night is about 2500 to 3000 THB.)

For the personal and property safety of the participants, please pay attention to notes below:

1-Please take care of your belongings all the time in case of any loss.

2-Participants are required to wear the conference representative card near the conference venue in the hotel, please do not lend the representative card to the irrelevant people and not "carry" irrelevant people into the venue.

3-The organizer is not responsible for the loss of participants.

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Poster Session (9:20~17:40)

Bangkok Conference Introductions

Welcome to 2019 HKCBEES Bangkok conference. This conference is organized by HKCBEES. The objective of the Bangkok conference is to bring together innovative academics and industrial experts in the field of Biology, Environment and Chemistry to a common forum.

2019 10th International Conference on Biology, Environment and Chemistry (ICBEC 2019)

Papers will be published in the following journal:

International Journal of Life Sciences Biotechnology and Pharma Research (IJLBPR, ISSN:2250-3137), all accepted papers will be indexed by Embase; International Committee of Medical Journal Editors(ICMJE); Health sciences library(NYU); HINARI Access to Research in Health Programme; etc.

Conference website and email: http://www.icbec.org/; icbec@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 **22** 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 September 26, 2019.

Dress code

Please wear formal clothes or national representative of clothing.

Keynote Speaker Introductions

Keynote Speaker I

Prof. Shen-Ming Chen

National Taipei University of Technology, Taiwan

Biography: Prof. Shen-Ming Chen (h-index > 60) received his PhD degrees in chemistry from National Taiwan University, Taipei, Taiwan. He was a visiting postdoctoral fellow with the Institute of Inorganic Chemistry, Friedrich-Alexander University Erlangen-Nuremberg, Germany in 1997. He joined Department of Chemical Engineering, National Taipei Institute of Technology, Taipei, Taiwan in 1985. He had been an associate professor of Department of Chemical Engineering, National Taipei Institute of Technology, Taipei, Taiwan from 1991 to 1997. Since August 1997, he has been a full professor of Department of Chemical Engineering and Biotechnology, National Taipei University of Technology. He has been the Dean (Curator) of library, National Taipei University of Technology, Taiwan from 2000 to 2006 and the Director of Extracurricular Activity, office of student affairs, National Taipei University of Technology, Taiwan from 1995 to 2000.

Prof. Shen-Ming Chen has published over 500 research and review papers in internationalSCI journals. Some of their papers have been selected as the most cited papers in theJournal of Electroanalytical Chemistry and Biosensor & Bioelectronics. He received threetimes Distinguish Professor awards. He also received three times Outstanding Research Award from National Taipei University of Technology, Taiwan. He have edited or attended two books for NOVA publications titled “Nanostructured Materials for Electrochemical Biosensors” and “Biosensors: Properties, Materials and Applications” and contributed four book chapters.

His research interest includes nanocomposites, bionanomaterials, bionanotechnology, electrochemical biosensor, biosensors, bioelectrochemistry,, chemical materials, electroanalytical Chemistry, electrocatalysis and electroanalysis, photoelectrochemistry, metalloproteins, metalloporphyrins, nanotechnology, spectroscopic techniques, scanning probe techniques, quartz crystal microbalance, materials research, fuel cells, solar cell and photovoltaic cells.

Topic: ‘Electrochemical Deposition and Synthesis of Advanced Nanomaterials for Biosensors, Sensing of Environmental Molecules, Electrocatalysis and Real-time Detection’

Abstract—Hydrogen peroxide (H2O2) is an eminent biomarker in pathogenesis; a selective, high sensitive real-time detection of H2O2 released from live cells have drawn a significant research interest in bio-analytical chemistry. Binary transition metal oxides (BTMOs) displayed the recognizable benefit in enhancing the sensitivity of H2O2 detection, though reported BTMOs based H2O2 sensor’s detection limit is still insufficient, is not appropriate for in-situ profiling of trace amounts of cellular H2O2. In this, we describe an efficient, reliable electrochemical biosensor based on Mn2CuO4 microspheres to assay cellular H2O2. The MCO modified electrode delivered a broad working range (36 nM to 9.3 mM) appreciable detection limit (13 nM), with high selectivity towards H2O2. To prove its practicality, the developed sensor was applied in the detection of cellular H2O2 release by Raw 264.7 cells in presence of CHAPS. These results label the possible appliance of the sensor in clinical analysis, and pathophysiology. Thus, BTMOs are evolving as a promising candidate in designing catalytic matrices for biosensor applications. The existing carbon materials can be classified into activated carbon (0-dimensional), carbon nanotubes (CNT) (1-dimensional), graphene (2-dimensional) and carbon foams (3-dimensional). Among these, graphene is well known to be the top candidate; However, preparation of graphene from graphite is an intricate procedure that can lead to an explosion during the oxidation of graphite. Similarly, the preparation of CNT also has some practical difficulties due to the complicated instrument setup. Fascinatingly, the preparation of ACs is simple, environmentally friendly and cost-effective. For the first time, Pongam seed shells-derived activated carbon and cobalt oxide (~2-6 nm) nanocomposite (PSAC/Co3O4) is prepared for the high performance non-enzymatic glucose sensor and supercapacitors. Remarkably, the fabricated glucose sensor is found to be exhibit an ultra-high sensitivity with a lower detection limit, and long-term durability. Moreover, the PSAC/Co3O4 electrode possess an appreciable specific capacitance and long-term cycle stability. The high surface area carbon porous materials (CPMs) synthesized by the direct template method via self-assembly of polymerized phloroglucinol-formaldehyde resol around a triblock copolymer template were used as supports for nickel nanoparticles (Ni NPs). Further electrochemical measurements by cyclic voltammetry (CV) and differential pulse voltammetry (DPV) also revealed that the Ni/CPM modified electrodes showed excellent sensitivity (59.6 μA μM 1 cm 2) and relatively low detection limit (2.1 nM) toward the detection of Hg(II) ion. The system is also been successfully applied for detection of mercuric ion in real sea fish samples. In addition, the synthesis of highly dispersed and stable ruthenium nanoparticles (RuNPs; ca. 2–3 nm) on porous activated carbons derived from Moringa Oleifera fruit shells (MOC) is reported. The as-prepared MOC carbonized at 900 oC was found to possess a high specific surface area (2522 m2 g−1) and co-existing micro- and mesoporosities. Upon incorporating RuNPs, the Ru/MOC nanocomposites loaded with modest amount of metallic Ru (1.0–1.5 wt%) exhibit remarkable electrochemical and capacitive properties, achiving a maximum capacitance of 291 F g–1 at a current density of 1 A g–1 in 1.0 M H2SO4 electrolyte. These highly stable and

durable biomass carbons modified electrodes, which can be facily fabricated by the eco-friendly and cost-effective route, should have great potentials for practical applications in energy storage, biosensing, and catalysis.

Keywords: Electrochemical Deposition; Nanomaterials; Biosensors, Environmental Molecules; Electrocatalysis; Real-time Detection; activated carbon, biowaste; environmental friendly; supercapacitor.

Keynote Speaker II

Prof. Hyo Choi

Gangneung-Wonju National University, South Korea

Biography: Dr. Hyo Choi is meteorologist, environmental scientist and physical oceanographer with over 40 years experiences in numerical modeling researches as Overseas invited senior researcher by Korean Government of Korea Ocean Research & Development Institute (KORDI (now, KIOST) of KAIST), Ministry of Science & Technology, a high-level Researcher (nominated by President of Korean Government) of National Fisheries & Research Development Institute (NFRDI), Ministry of Maritime Affairs & Fisheries, and Full Professor of Gangneung-Wonju National University. He obtained 2 Ph.D. degrees from Dept. of Civil Engineering, University of Texas at Austin, USA (1984) and College of Environmental Sciences, Peking University, Beijing; China (2004). His research interests cover a variety of fields in Meteorology, Environmental Science & Engineering and Physical Oceanography. He acted as not only Interpreter and Investigator of Korea Antarctic Scientific Expedition Team for two times (1985~1987), but also Korean Government Representative for Inter-governmental Meetings on Antarctic Treaty and Science Policies. He has been President of Korean Environmental Sciences Society (2002~2003), President and Vice President of Asia-Oceania Geosciences Society, Singapore (Atmospheric Section-60 Nations), Director General of Donghae Coastal Region Research Institute (1989~1991) and Dean of the Graduate School, Gangneung-Wonju National University, Korea (2009~2011, 2011~2012). In present, he is Director General of Atmospheric & Oceanic Disaster Research Institute, Korea (2014~Present), High-end Foreign Expert of South China Sea Institute of Oceanology, China (CAS; 2015~Presen), and also acting as Editor-in-Chief of 13 international journals (USA, Singapore, India) and Editor of 25 ones (USA, UK, Italy, Canada, etc.) in Environmental Pollution, Disaster, Agriculture, Food sciences, Water resources, Lake and rivers, GIS, Physical sciences, Oceanography, Fishery and Meteorology.

Topic: ‘Characteristics of High Particulate Matter Concentrations in Seoul in the late Spring of 2018’

Abstract—From 00:00LST May 12 to 00:00 LST May 18, 2018 in the late spring, the characteristics of high PM1, PM2.5 and PM10 concentrations measured by GRIMM-1107 aerosol sampler were investigated at Seoul city of Korea. From 00:00LST, May 12 to 00:00LST May 14, PM10, PM2.5 and PM1 were very low less than 50 ug/m3 and their maxima were 54.15 ug/m3, 43.47 ug/m3, and 32.85 ug/m3, respectively. However, from 00:00LST May 14, their concentrations rapidly increased to 118.72 ug/m3 at 01:00LST May 15, maintaining over 50 ug/m3 to 05:00LST May 16. After then, their concentrations decreased again with their values less than 50 ug/m3 until 00:00LST May 18. The ratios of (PM10-PM2.5)/PM2.5 and (PM2.5-PM1)/PM1 were less than 1, which explained the contributions of fine particulate matters with diameters less than 2.5 um and 1 um to each PM10 and PM2.5 concentrations, differently from the case of normal yellow dust storm period in spring. For whole period, the correlation coefficients of PM2.5 to PM10, PM1 to PM2.5 and PM1 to PM10 were 0.99, 1.0, 0.99, respectively, showing very good relationships among them. Furthermore, COMS Korean satellite images showing the distribution of aerosols, HYSPLIT model of backward trajectory of dusty air and Weather Research Forecasting Model (WRF)-version 3.6 were used for investigating any effect of meteorological elements such as the variation of Atmospheric Boundary Layer during the day and night, Atmospheric stability and wind field to the occurrence of the high PM concentrations.

Keywords: PM10, PM2.5, PM1, COMS satellite images, atmospheric boundary layer, wind, WRF model, atmospheric stability.

Keynote Speaker III

Prof. Nyuk Ling Chin

Department of Process and Food Engineering, Universitys Putra Malaysia

Biography: Nyuk Ling Chin obtained her Ph.D in Chemical Engineering from University of Manchester Institute of Science and Technology (UMIST), United Kingdom at the age of 26. She is now a Professor with the Department of Process and Food Engineering, Faculty of Engineering, Universiti Putra Malaysia. She is a registered professional food engineer with Board of Engineers Malaysia and a chartered chemical engineer with Institute of Chemical Engineer, UK. She lectures on food engineering operations and systems. Her research is on physical and engineering properties of food and natural products with aims of structuring food tailored towards end-user functionality for improved texture, appearance, perception, shelf life stability, consumer acceptability and healthiness. Her focus operations include mixing, heating, baking, spray-drying, freeze-drying and extraction where physical properties including rheological aspects are studied fundamentally. Her most recent projects are on food authentication; in particular, honey and bird nest origin traceability. She has 125 journals published. She receives recognitions from the many professional services rendered being an invited foreign lecturer, an editor of Journal of Food and Bioproducts Processing and others, an invited speaker in local and international conferences and seminars, a panel judge for research competitions, a panel reviewer for research grant proposals, a panel examiner for curriculum and programme reviews, and a visiting professor to other institutions.

Topic: ‘Authentication of Food using DNA-based Methods’

Abstract—Food authentication refers to the process of verifying that the food is incompliance with its label description. It includes the claim of the product origin, purity and genuineness along the entire movement of food from its production to processing and distribution which requires tracing of the source and ingredients used. Authentication of food is an important measure in combating food frauds which arise in many unexpected ways. It is needed to ensure food is safe, consumers are protected and authorities have measures of control and inspection on food quality. Methods used for authenticating food are mostly instrumental and requires analysis which consumes time. The diversity and complexity of nature often result in subjectivity of information. Of late, the DNA-based methods have been popularly used to proof authenticity of food as it gives precise and accurate information. It can also be very objective to the point of tracing specific origins of foods. This presentation illustrates the use of DNA-based methods in identifying two highly priced and sorted food in the eastern community, i.e. honey and the edible birdnests. It introduces the different approach of honey identification by its bees speciation rather than its botanical or geographical origins. The identification of edible birdnests by its swallow species helps to differentiate edible birdnests originating from the white or black swallows and distinguish them from the fake and adulterated versions. This DNA approach is reliable and suitable for other targeted food frauds commonly found like the olive oil, milk, wine, coffee, saffron, maple syrup, and juices from the apple and orange.

Brief Schedule for Conference

Day 1	**September 25, 2019 (Wednesday)** 10:00~17:00 **Venue: Rembrandt Hotel Suites and Towers(Lobby)** (Add: 19 Sukhumvit Soi 18, Klong Toei, Khlong Toei) Participants Onsite Registration & Conference Materials Collection
Day 2	**September 26, 2019 (Thursday)** 9:20~17:40 Arrival Registration, Keynote Speech, Conference Presentation
	Morning Conference **Venue: Boardroom 1**
	Opening Remarks 9:20~9:25 Prof. Nyuk Ling Chin (Department of Process and Food Engineering, University Putra Malaysia) **Keynote Speech I** 9:25~10:10 **Topic: 'Electrochemical Deposition and Synthesis of Advanced Nanomaterials for Biosensors, Sensing of Environmental Molecules, Electrocatalysis and Real-time Detection'** (Prof. Shen-Ming Chen, National Taipei University of Technology, Taiwan)
	Coffee Break & Group Photo Taking 10:10~10:35
	Session 1:10:35~12:15 **Venue: Boardroom 1** 4 presentations-Topic: "Environmental and Biological Engineering" Session Chairs: Prof. Shen-Ming Chen, Prof. Hyo Choi, Prof. Nyuk Ling Chin
	Lunch 12:15~14:00
	Afternoon Conference **Venue: Boardroom 1**
	Keynote Speech II 14:00~14:45 **Topic: 'Characteristics of High Particulate Matter Concentrations in Seoul in the late Spring of 2018'** (Prof. Hyo Choi, Gangneung-Wonju National University, South Korea)
	Keynote Speech III 14:45~15:30 **Topic: 'Authentication of Food using DNA-based Methods'** (Prof. Nyuk Ling Chin, Department of Process and Food Engineering, University Putra Malaysia)
	Coffee Break 15:30~16:00
	Session 2:16:00~17:40 **Venue: Boardroom 1** 4 presentations-Topic: "Environmental and Biological Engineering" Session Chairs: Prof. Shen-Ming Chen, Prof. Hyo Choi, Prof. Nyuk Ling Chin
	Dinner 17:40

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

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 September 26, 2019.

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Session 1

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

Morning, September 26, 2019 (Thursday)

Time: 10:35~12:15

Venue: Boardroom 1

4 presentations- Topic: "Environmental and Biological Engineering"

Session Chairs: Prof. Shen-Ming Chen, Prof. Hyo Choi, Prof. Nyuk Ling Chin

B0002-A Presentation 1 (10:35~11:00)
Preparation of Gas Diffusion Electrode and Degradation of Pollutants by AO-H2O2 System

Xiuping Sun, Zhirong Sun

Beijing University of Technology, Beijing, China

Abstract—Electro-generation of hydrogen peroxide (H2O2) has potential application in advanced oxidation processes. Carbon black is well known as catalyst for oxygen reduction reaction (ORR) through two-electron pathway. In this work, gas diffusion electrode (GDE) was designed by pressing method, using CB as catalyst, PTFE as binder and PTFE as coating to degrade three different pollutants (atrazine, atenolol and phenol). A series of trials were carried out to optimize the preparation conditions of the GDE (mass ratio of CB to PTFE, PTFE coating mass fraction, pressing pressure and calcination temperature). The main factors (solution pH, current density and air feeding flow rate) affecting the H2O2 yield were investigated in an undivided cylindrical glass cell using the Pt anode and GDE cathode in Na2SO4 solution of 0.05 M. The optimal experimental parameters of fabricated GDE were mass ratio 1:1 of CB to PTFE, 10Mpa pressing pressure, 30% PTFE coating film, 350°C calcination temperature. The maximum concentration of H2O2, up to 278 mg·L-1, is achieved under the conditions of solution pH 7,current density 10 mA·cm−2 at 0.9 L·min-1 air feeding flow rate after 120 min. The degradation of three different pollutants (atrazine, atenolol and phenol) with the initial concentration 20 mg·L-1 reached 46%, 52%, 32%, respectively, by anodic oxidation with cathodic eletrogeneration of H2O2 (AO-H2O2) after 120 minutes electrolysis.

Session 1

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Morning, September 26, 2019 (Thursday)

Time: 10:35~12:15

Venue: Boardroom 1

4 presentations- Topic: "Environmental and Biological Engineering"

Session Chairs: Prof. Shen-Ming Chen, Prof. Hyo Choi, Prof. Nyuk Ling Chin

B0004-A Presentation 2 (11:00~11:25)

Development and Application of a Gas Chromatography – Mass Spectrometry Method for Detection and Quantification of Polycyclic Aromatic Hydrocarbons in Smoked Food Products

Radu C. Racovita, Florentina Israel-Roming

University "Politehnica" of Bucharest,Bucharest, Romania

Abstract—Polycyclic aromatic hydrocarbons (PAHs) are food contaminants resulted from smoking, drying, roasting, baking, grilling, barbecuing, and frying of certain foodstuffs. Perhaps more than other processing or cooking methods, smoking leads to accumulation of particularly high amounts of these dangerous carcinogens in meat and fish products. Undoubtedly, it is thus mandatory to carefully monitor the PAH content of smoked food products. Suitable analytical methods are needed for this task, which are accurate and precise enough to detect trace amounts of PAHs dispersed in the food matrix.

In this paper, we describe the development and in-house validation of a gas chromatography-mass spectrometry (GC-MS) hyphenated method for the qualitative identification of PAHs and quantitative assessment of PAH contamination levels in smoked foodstuffs. In addition, we present a selection of data on the detection and quantification of PAHs in some smoked food products commercially available on the Romanian market.

According to the recommendation of the Panel on Contaminants in the Food Chain (CONTAM Panel) of the European Food Safety Authority (EFSA), which later led to European Commission (EC) Regulation No. 835/2011, four PAHs that are especially genotoxic and carcinogenic were monitored by GC-MS analysis, following extraction from the food matrix with organic solvent, partitioning with high ionic strength aqueous solution, and clean-up by dispersive solid phase extraction (dSPE) using C18-silica, primary-secondary amine and anhydrous magnesium sulfate (QuEChERS protocol). Some analytical performance parameters

are discussed, under variable extraction and/or chromatographic conditions, including limits of detection and quantification, repeatability, relative response factors, and recoveries from spiked samples. These parameters meet the specific criteria defined in EC Regulation No. 333/2007 for methods of sampling and analysis of benzo[a]pyrene.

With regards to the food samples analyzed, none of these raised any concerns, as PAH levels detected were consistently below EC Regulation 835 thresholds.

In conclusion, our GC-MS method is suitable for the both the identification and quantitative assessment of PAH contaminants in retail smoked foods.

Session 1

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

Morning, September 26, 2019 (Thursday)

Time: 10:35~12:15

Venue: Boardroom 1

4 presentations- Topic: "Environmental and Biological Engineering"

Session Chairs: Prof. Shen-Ming Chen, Prof. Hyo Choi, Prof. Nyuk Ling Chin

B2002 Presentation 3 (11:25~11:50)

The Comparison of Environmental Impacts of Carbonized Briquettes from Rain Tree Residues and Coffee Grounds/Tea Waste and Traditional Waste Management

Chaisuwan N., Kansai N., **Supakata N.**, and Parpong S.

Department of Environmental Science, Faculty of Science, Chulalongkorn University, Bangkok, Thailand

Abstract—The objective of this research was to investigate and compare the cradle-to-grave environmental impacts of five ratios of carbonized briquettes obtained from rain tree (Samanea saman) residues and coffee grounds/tea waste and traditional waste management including landfill disposal and composting. The SimaPro 8.0.5.13 software was used for life cycle assessment analysis. The results were grouped into six impact categories: acidification, eutrophication, global warming, ozone layer depletion, human toxicity and photochemical oxidation. The results showed that carbonization and briquetting processes were the main source of global warming, ozone layer depletion and photochemical oxidation due to the pollutants emitted from an electric briquetting machine and the diesel fuel used for carbonization. Composting rain tree residues had the lowest impact on global warming at 0.02%. Conversely, the carbonized briquette obtained from coffee grounds/tea waste had the highest impact on global warming at 21.57%. This impact resulted from the high amount of electricity used for briquetting and the diesel fuel used for carbonization. On the other hand, composting rain tree residues had the highest impact on acidification and eutrophication with 90.01% and 82.85%, respectively, due to utilization of the compost for soil amendment. Thus, carbonized briquettes from rain tree residues and coffee grounds/tea waste were an alternative way to reduce waste to landfill and to add value to biomass residues for use as raw materials for producing fuel products.

Session 1

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Morning, September 26, 2019 (Thursday)

Time: 10:35~12:15

Venue: Boardroom 1

4 presentations- Topic: "Environmental and Biological Engineering"

Session Chairs: Prof. Shen-Ming Chen, Prof. Hyo Choi, Prof. Nyuk Ling Chin

B0001-A Presentation 4 (11:50~12:15)

Amoxicillin Degradation by Electro-Fenton using Graphite Felt Loaded with Carbon Nanotubes as Cathode

Guifang Pan, Zhirong Sun

Beijing University of Technology, Beijing, China

Abstract—Amoxicillin is a β-lactam antibiotic that has been widely used in human medicine and veterinary. Amoxicillin is released into environment because of its lower metabolism rate in humans. One of the most effective advanced oxidation processes is electro-Fenton, which has been studied for degradation of organic pollutants in waste water. In this study, a graphite felt loaded with carbon nanotubes as cathode for the in-situ electro-generation of hydrogen peroxide was used to degrade amoxicillin by electro-Fenton process. The degradation of amoxicillin was performed in an undivided cylindrical glass cell using a DSA electrode as anode. Several manufacturing parameters like the current intensity, the concentration of Fe2+ and the initial pH were optimized. Also, the stability and the ability to produce hydrogen peroxide of graphite felt loaded with carbon nanotubes were investigated. The removal efficiency of amoxicillin reached 98.78% within 25 min when the current intensity was 60 mA, the concentration of Fe2+ was 0.3 mM and the initial pH was 3.0. Under the same conditions, the production of hydrogen peroxide reached 57.7 mg/L， current efficiency was 91% and electric energy consumption was 5.5 kWh/kg within 25 min. The stability test showed that the removal efficiency of amoxicillin was over 95% and the concentration of hydrogen peroxide was over 55 mg/L after 10 cycles. The reaction kinetics research of amoxicillin showed that the decay of amoxicillin fitted to pseudo-first order reaction kinetics.

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, September 26, 2019 (Thursday)

Time: 16:00~17:40

Venue: Boardroom 1

4 presentations- Topic: "Environmental and Biological Engineering"

Session Chairs: Prof. Shen-Ming Chen, Prof. Hyo Choi, Prof. Nyuk Ling Chin

B0006-A Presentation 1 (16:00~16:25)

The role of ATF3 in ZnO nanoparticle-induced genotoxicity and cytotoxicity in bronchial epithelial cells

Jie Xiang, Saisai Wei, Tiezheng Li, Xiangwei Gao

Zhejiang University School of Medicine, Hangzhou, China

Abstract—ZnO nanoparticle (ZnO NP) exposure leads to pulmonary damage while its mechanism remains to be elucidated. In the current study, we explored the role of activating transcription factor 3 (ATF3), a common stress sensor, in ZnO NP genotoxicity and cytotoxicity in human bronchial epithelial (HBE) cells. We showed that ZnO NP treatment reduced cellular viability and induced DNA double strand breaks, as evidenced by the increase of γH2AX foci number. Concomitantly, the expression of ATF3 was dramatically upregulated, which was mediated by the nuclear factor erythroid 2-related factor 2 (Nrf2). ATF3 was required for the DNA repair as gamma foci number increased when endogenous ATF3 was silenced. Moreover, ATF3-deficient cells were resistant to ZnO NP-induced cell apoptosis. Collectively, our findings demonstrated ATF3 as an important regulator of epithelial homeostasis by promoting both DNA repair and death of damaged cells under ZnO NP-induced genotoxic stress.

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, September 26, 2019 (Thursday)

Time: 16:00~17:40

Venue: Boardroom 1

4 presentations- Topic: "Environmental and Biological Engineering"

Session Chairs: Prof. Shen-Ming Chen, Prof. Hyo Choi, Prof. Nyuk Ling Chin

B2010 Presentation 2 (16:25~16:50)

A Zebrafish Thrombosis Model for Assessing Antiplatelet Drugs

Yanjun Jiang, Ye Rong, Ruixue Wu, **Yi Wen**, Liu Hu

Zhejiang Yangshengtang Institute of Natural Medication Co., Ltd., Hangzhou, China

Abstract—This study aimed to develop a larval zebrafish (Danio rerio) thrombosis model for antiplatelet drug discovery by adopting CD41-eGFP (yst101) transgenic zebrafish. In this model, the thrombocytes expressed the enhanced green fluorescent protein driven by the zebrafish CD41 promoter. Briefly, fish at 2 days post-fertilization (dpf) were treated with ponatinib for 24 h by direct soaking, resulting in the caudal vein thrombus. The transparent larvae were used, and the thrombi were clearly observed and quantitatively evaluated by the image analysis of the red blood cells stained with o-dianisidine in the caudal vein. Meanwhile, thrombocyte aggregation was also observed at the site of the caudal vein by confocal microscopy. In addition, the thrombosis-preventive effects of aspirin and tirofiban, both FDA -approved antiplatelet drugs, were demonstrated and validated. However, clopidogrel, the other human antithrombotic drug, was found to have no or little antithrombotic effect on this zebrafish-based thrombosis model, which might be due to a hepatic metabolic defect of the transgenic line used in this study.

Session 2

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Afternoon, September 26, 2019 (Thursday)

Time: 16:00~17:40

Venue: Boardroom 1

4 presentations- Topic: "Environmental and Biological Engineering"

Session Chairs: Prof. Shen-Ming Chen, Prof. Hyo Choi, Prof. Nyuk Ling Chin

B2007-A Presentation 3 (16:50~17:15)

Indicators of the Planktonic Network of a Shallow, Temperate Lagoon: Complementary Graph and Structural Modeling Approach

Marek Kruk, Ewa Paturej

University of Warmia and Mazury in Olsztyn, Poland

Abstract—The aim of the study was to investigate the biocenotic structure of relations among zooplankton and phytoplankton taxa using graph theory and structural equation modeling (SEM). The analysis focused in the biocenosis of the Vistula Lagoon (southern Baltic) that included 32 zooplankton species and eight phytoplankton associations, and it is presented as a graph model in which negative interactions are designated that indicate predatory trophic relations and feeding and also competition among species and taxonomic groups. Based on the analysis of the graph attributes, the picophytoplankton, Chlorophyceae, Diatomophyceae, and Cyanobacteria phytoplankton groups, among which communication proceeds mainly through the zooplankton species that feed on them, were the most important for communication within the biocenosis. High closeness centrality indicators were noted for the Copepoda species Eurytemora affinis, because of its feeding on a few groups of phytoplankton, and Eurytemora lacustris, because of its numerous relations with predation and competition. In turn, the Rotifera species Polyartha vulgaris and Brachionus calyciflorus spinosus were characterized by complex competition with other Rotifera species, and they were also prey for predatory crustaceans. The relation between the Cladocera genus Ceriodaphnia sp. and the phytoplankton groups of Dinoflagellata and Cryptophytes, as measured with the edge betweenness indicator, had the greatest impact on network cohesion, and this revealed the role of rare taxa in maintaining biocenotic structural cohesion. Data from

the SEM graph model that was obtained based on regression analysis indicated the domination of co-occurring taxa when the algal food base was abundant and the negative dependence of zooplankton species feeding on the main groups of phytoplankton. The dominating crustacean in the model was Calanoida nauplii, which initiated a few relational sequences in this trophic system. Among the Rotifera, the dominating species in this instance was Keratella c. cochlearis. Two Rotifera species co-occurred with Cyanobacteria, and this could be evidence of the ineffective “purification” function of zooplankton aggregations in Vistula Lagoon waters. The complementary use of modeling based on graph theory and SEM to characterize the ecological systems appeared to be an effective tool with significant research and practical potential.

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, September 26, 2019 (Thursday)

Time: 16:00~17:40

Venue: Boardroom 1

4 presentations- Topic: "Environmental and Biological Engineering"

Session Chairs: Prof. Shen-Ming Chen, Prof. Hyo Choi, Prof. Nyuk Ling Chin

B0007-A Presentation 4 (17:15~17:40)

Triptolide Attenuates Colorectal Tumorigenesis by Inhibiting RNA Polymerase III Transcription

Sujun Yan, Renxiang Xie, Bingqi Ye, Xiangwei Gao

Zhejiang University School of Medicine, Hangzhou, China

Abstract—Purpose: Upregulation of RNA polymerase (Pol) III products, including tRNA and 5S rRNAs, in tumor cells leads to enhanced protein synthesis and tumor formation, making it a potential target for cancer treatment. In this study, we evaluated the inhibition of Pol III transcription by triptolide and the anti-cancer effect of this drug in colorectal tumorigenesis.
Experimental Design: The effect of triptolide on colorectal cancer development was assessed in 3D organoids, and cultured cells. Colorectal cancer cells were treated with triptolide. Pol III transcription was measured by real-time quantitative PCR. The formation of TFIIIB, a multi-subunit transcription factor for Pol III, was determined by chromatin immunoprecipitation (ChIP), co-immunoprecipitation (Co-IP), and fluorescence resonance energy transfer (FRET).
Results: Triptolide effectively inhibited colorectal cancer cell proliferation, colony formation, and organoid growth in vitro, which was associated with decreased Pol III target genes. Mechanistically, triptolide treatment blocked TBP/Brf1interaction, leading to the reduced formation of TFIIIB at the promoters of tRNAs and 5S rRNA.
Conclusion: Taken together, our data suggest that inhibition of Pol III transcription with existing drugs such as triptolide provides a new avenue for developing novel therapies for colorectal cancer.

Poster Session

September 26, 2019 (Thursday)

Time: 9:20~17:40

Venue: Boardroom 1

B0008-A Presentation 1 (9:20~17:40)

The effect of polymeric biodegradable materials on the cell-mediated immune response

Lyubov Domracheva, Yelena Shapovalova, Irina Kurzina, Vladimir Botvin, Liubov Pokrovskaya

Tomsk State University, Tomsk, Russia

Abstract—Inflammation, both acute and chronic, is the main clinical problem in the application of implantable materials. The key cells that can both stimulate and suppress inflammatory reactions in the microenvironment of the implant are tissue macrophages. By the reaction of macrophages to the implant materials, one can draw conclusions on the rejection or acceptance of the implant by the patient's body in order to predict the response of the immune system1. The authors investigated the effect of monocytic macrophages of individual human donors on the materials based on hydroxyapatite and on a copolymer of lactide and glycolide. Monocyte macrophages were isolated by magnetic separation from the buffy coats of individual human donors and cultured on the materials' surface for 20 days. It was found that secretion of TNF-α, IL-6, and IL-1β by macrophages in presence of materials does not exceed the control level, therefore, it does not cause a chronic inflammatory response. Scaffolds have insignificantly affected the stimulation of TNF-α and IL-1β by macrophages from all the three donors, but secretion of IL-6 gives a donor-specific response. With long-term cultivation, there is a high concentration of IL-8, which can be explained not only by its pro-inflammatory effect, but also by its properties to cause cell migration and promote its adhesion at the sites of material implantation.

Poster Session

September 26, 2019 (Thursday)

Time: 9:20~17:40

Venue: Boardroom 1

B0011-A Presentation 2 (9:20~17:40)

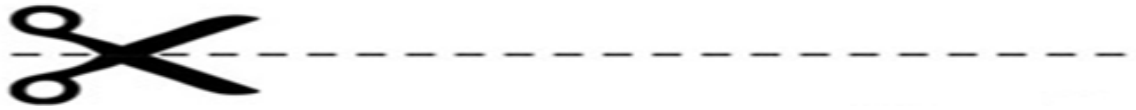
Enhanced Anaerobic Digestion of Phenol via Electrical Energy Input

Dong-Hoon Kim, Alsayed Mostafa, Seongwon Im, Mo-Kwon Lee, Young-Chae Song

Inha University, Incheon, Korea

Abstract—The goal of this study was to investigate the potential of bioelectrochemical enhancement of CH4 production from phenol through promoting direct interspecies electron transfer (DIET). Two electrochemically assisted up-flow anaerobic sludge blanket reactors (EA-UASB), EA-UASB-0.3 V and EA-UASB-0.6 V, supplemented with electrical energy input (EEI) of 0.3 and 0.6 V, respectively, and tested versus control reactor (C-UASB). The three reactors were fed by phenol at organic loading rates (OLRs) starting from 0.5 to 14.0 kg COD/m3/d. Due to the phenol toxicity, drastic decline in biogas production was noticed in C-UASB to 1.0 ± 0.6 m3/m3/d at OLR of 9.0 kg COD/m3/d. However, EA-UASB-0.3 V and EA-UASB-0.6 V showed high resistance against such inhibitory impact and successfully revealed stable biogas production of 4.6 ± 0.3 and 4.7 ± 0.2 m3/m3/d, respectively even at OLR of 11.0 kg COD/m3/d. Interestingly, selective microbial enrichment was found to be correlated to the applied EEI. In specific, by applying EEI of 0.3 and 0.6 V, Methanobacterium and Methanthrix were selectively enriched; besides, Syntrophorhabdus sp. abundance has increased by 118.0 and 50.0%, compared to control, respectively. Moreover, investigating main granules characteristics i.e., settling velocity, porosity, permeability, diameter, integrity, hydrophobicity referred to improvements of these features after DIET-promotion. Energy efficiency calculation referred to the superiority of EA-UASB-0.3 V at OLRs that are higher than 5.3 kg COD/m3/d. This is the first work to explain DIET-enhanced CH4 productivity based on both of physico-chemical and microbial evidences.

Note



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