

CESE 2019

THE TWELFTH ANNUAL CONFERENCE ON THE CHALLENGES
IN ENVIRONMENTAL SCIENCE AND ENGINEERING

ABSTRACTS BOOK

3-7 NOVEMBER, 2019
KAOHSIUNG, TAIWAN

CESE Conference Series Co-Chairs



Dr Li Shu
LJS Environment, Australia



Professor Chia-Yuan Chang
Chia Nan University of Pharmacy & Science, Taiwan

CESE-2019 Committee Members

CESE-2019 Chair

Distinguished Professor Cheng-Di Dong, National Kaohsiung University of Science and Technology, Taiwan

CESE-2019 Co-Chairs

Professor Chiu-Wen Chen
National Kaohsiung University
of Science and Technology
Taiwan

Professor Piet N. L. Lens
National University of Ireland Galway
Ireland

Dr. Eldon R. Rene
IHE-Delft Institute of Water Education
The Netherlands



Organising Committee Members

Professor Cheng-Di Dong, Professor Chiu-Wen Chen, Professor Chang-Mao Hung, Dr. Yee Cheng Lim, Dr. Ming-Huang Wang, Miss. Zoei Ma, Miss. Jackie Lin, Miss. Hu Yu Chuang, Mr. Jia-Wei Zheng, Mr. Han Wei Yu, Miss. Bao Chau Ho Thi, Miss. Pi-Chen Wei, Miss. Yu-Shan Wu.

CESE 2019 - Abstracts Book

The Twelfth Annual Conference on the Challenges in Environmental Science and Engineering

ISBN: 978-0-646-81022-5

Publication Date: 11/2019

Contributors: Li Shu, Veeriah Jegatheesan, Greg Keir, Merrin Keir

Cover image: "CiSingTan Bay with the Central Mountain Range in the background, in Hualien County in Taiwan" by Fred Hsu

		Chair Person: Dr. Tanapon Phenrat Chair Person: Dr. Hitoshi Ogawa	Chair Person: Dr. Shanika Nanayakkara Chair Person: Dr. Tadashi Toyama	Chair Person: Assoc. Professor Qianwei Li Chair Person: Dr. Abdullah Almatouq	
13:30	-	13:45	1-036S Hybrid forward osmosis/membrane distillation process with anaerobic fluidized bed bioreactor for low-strength wastewater treatment Woobin Bae	2-034S Steroid hormones residues from livestock farms in Phayao, Thailand Nawaphop Sutaswiriya	8-015S Using lead isotope to assess potential lead leakage from abandoned mine tailing storage ponds to Klity Creek in Kanchanaburi Province, Thailand Supawan Srirattana
13:45	-	14:00	1-020S Iron nanoparticles incorporated with holey graphene (Fe/HrGO) as electrodes for capacitive deionization (CDI) to treat lead (Pb) Yi-Fang Chen	2-041S Aerobic-facultative autotrophic denitrification by <i>Pseudomonas</i> sp. Y5-11: a novel nitrate removal way Yaxi Han	8-020S Microbial community analysis of extremely halophilic bacteria from a salt pan and salt damaged soil in Thailand for biohydrogen production from lignocellulosic biomass Dyah Asri Handayani Taroepratjeka
14:00	-	14:15	1-045S Application of Ferrate(VI) on the treatment of As(III) in the presence of different contaminants Jong-Soo Choi	2-046S Removal of algae using micro-bubble generator with low pressure Donghyun Kim	8-006S Design and function of nitrogen and sediment removal system in recirculating aquaculture optimized for aquaponic approach Siriwanee Supajaruwong
14:15	-	14:30	1-048S Porous Gadolinium doped Graphene oxide Synthesis for enhanced adsorptive removal of heavy metals Suhyun Lee	2-052S Pilot-scale study on nutrients remove of denitrifying phosphorus removal process for treating urban sewage with low C/N ratio Dong hui Li	2-025S Mesoporous and adsorption behavior of spent coffee ground activated carbon prepared via sequential hydrothermal carbonization and potassium hydroxide activation Ravi Katiyar
14:30	-	14:45	1-049S Adsorption of acetaminophen onto reduced graphene oxide aerogel decorated with manganese oxide Billie Yan Zhang Hiew	2-064S MOF- modified composite membrane for improving dichloroacetic acid removal from tap water through indirect electrochemical oxidation Toungnutcha Chantaramusagarn	2-005S Fabrication of nano-textured metal and bimetal oxides in indirect-electrochemical oxidation of ammonia in the aquaculture water Yu-Jen Shih
14:45	-	15:00	2-012S Single and competitive adsorption of micropollutants using the pristine and alkali-modified biochars from spent coffee grounds Jae Gwan Shin	2-098S Anaerobic co-digestion of food waste and sewage sludge using combined thermal-alkali pre-treatment and anaerobic digestion elutriated phased treatment DoKyun Kim	2-120S Exploration of an odorous metabolite of <i>uroglena americana</i> using high resolution mass spectrometry, GC-Olfactometry, and multivariate analysis Yuta Shinfuku
15:00	-	15:15	2-014S Comparison of three viability monitoring methods for disinfecting <i>Vibrio harveyi</i> in artificial seawater at quarantine Hong Keun Yoon	2-099S Estimation of shortcut nitrogen removal performance of SBR-ECOPAT using landfill leachate and external carbon source from acid fermentation Minkyung Kim	2-117S Transfer of pharmaceutical and personal care product during in-vessel co-composting of septage and mixed organic wastes Anu Rachel Thomas

Room C

Using lead isotope to assess potential lead leakage from abandoned mine tailing storage ponds to Klity creek in Kanchanaburi Province, Thailand

Supawan Srirattanaa, Kitsanateen Piaowana, Thanyathit Imthieanga, Jiraporn Suk-ina, Tanapon Phenrata,b,c*

* Department of Civil Engineering, Faculty of Engineering, Naresuan University, Phitsanulok, Thailand, 65000 (E-mail: supawan.basketball@gmail.com; piaowan.k@hotmail.com; bayblade.118@gmail.com; s.jirapon@hotmail.com; pomphenrat@gmail.com)

^b Research Unit for Integrated Natural Resources Remediation and Reclamation (IN3R), Department of Civil Engineering, Faculty of Engineering, Naresuan University, Phitsanulok 65000, Thailand

^c Center of Excellence for Sustainability of Health, Environment, and Industry (SHEI), Faculty of Engineering, Naresuan University, Phitsanulok 65000, Thailand

Corresponding author

Tanapon Phenrat, Department of Civil Engineering, Faculty of Engineering, Naresuan University, Phitsanulok, Thailand, 65000 (E-mail: pomphenrat@gmail.com)

Abstract

Klity Creek is Thailand's first remediation ordered by the court in 2013, 15 years after the spill of lead (Pb)-contaminated mine tailing into the creek. As of now, the project is ongoing. Even after 20 years, nature cannot recover the Pb contamination in sediment, arguably due to continuous leakage of Pb from three abandoned tailing storage ponds (TSP) upstream of Klity Creek, which contain 940,000 metric tons of tailing, or the high Pb geological background. In this study, Pb stable isotope ratios ($^{206}\text{Pb}/^{207}\text{Pb}$ and $^{208}\text{Pb}/^{207}\text{Pb}$) and Pb radionuclide (^{210}Pb) were used to apportion sources between the tailing and geological background. The analysis of 135 soil and 6 sediment samples revealed that the isotope ratios of the tailing were 1.130–1.142 ($^{206}\text{Pb}/^{207}\text{Pb}$) and 2.416–2.441 ($^{208}\text{Pb}/^{207}\text{Pb}$), while those of the geological background were 1.190–1.239 ($^{206}\text{Pb}/^{207}\text{Pb}$) and 2.506–2.605 ($^{208}\text{Pb}/^{207}\text{Pb}$). The stable isotopic characteristics of downstream sediments were consistent with the tailing being the dominant source (95.60%±7.80%, n=5). Likewise, by analyzing ^{210}Pb , the age of Pb-contaminated sediment is relatively new, i.e. 5 years, suggesting that the source of Pb contamination was a recent leakage from the TSP rather than the remaining of spill of tailing in the creek since 15 years ago. In conclusion, all downstream sediments have young age, but high Pb concentration coupled with stable isotope ratios in range of tailing. Thus, leakage of tailing from TSP is a critical source of long-term Klity Creek contamination. These need to be properly managed in order to achieve Klity Creek restoration goal.

Keywords: Abandoned tailing storage pond; Pb stable isotope ratios; source apportionment; Klity Creek

Microbial community analysis of extremely halophilic bacteria from a salt pan and salt damaged soil in Thailand for biohydrogen production from lignocellulosic biomass

Tsuyoshi Imai^{a,*}, Dyah Asri Handayani Taroepratjeka^{a,b}, Prapaipid Chairattanamanokorn^c, Alissara Reungsang^{d,e}

^a Graduate School of Sciences and Technology for Innovation, Yamaguchi University 755-8611, Japan (E-mail: imai@yamaguchi-u.ac.jp)

^b Department of Environmental Engineering, Institut Teknologi Nasional, Bandung, Jawa Barat 40124, Indonesia (E-mail: dyahasri@itenas.ac.id)

^c Department of Environmental Engineering and Management, Faculty of Environment, Kasetsart University, Bangkok 10900, Thailand (E-mail: fscipck@ku.ac.th)

^d Department of Biotechnology, Faculty of Technology, Khon Kaen University, Khon Kaen 40002, Thailand (E-mail: alissara@kku.ac.th)

^e Research Group for Development of Microbial Hydrogen Production Process from Biomass, Khon Kaen University, Khon Kaen 40002, Thailand

Corresponding author

Tsuyoshi Imai, Graduate School of Sciences and Technology for Innovation, Yamaguchi University 755-8611, Japan (E-mail: imai@yamaguchi-u.ac.jp)

Abstract

Alkaline pretreatment with NaOH is considered the most cost-effective method for biohydrogen production from lignocellulosic biomass. However, a considerable amount of water is needed to wash Na⁺ ions before continuing to the next process. Extremely halophilic bacteria can help reduce water usage owing to their ability to produce hydrogen under conditions of high NaCl concentrations. The aim of this study was to find out extremely halophilic bacteria genus suitable for biohydrogen production under nearly saturated NaCl condition. Three soil samples from a salt pan and salt damaged soil have been cultivated and acclimatized in 26% (w/w) of NaCl to screen for biohydrogen producing extremely halophilic bacteria. High-throughput sequencing of V3-V4 regions of 16S rRNA amplicons with average length of 428 bp, average total of 113,620 sequence reads, and average OTUs of 115, revealed that *Halanaerobium* sp. was the predominant genus in two of the samples (97-98%), while *Halanaerobacter* sp. was predominant in the other (61%). Biohydrogen production experiments with inoculums from those acclimatized samples gave hydrogen molar yields of 1.20 and 1.08 mol H₂/mol glucose in serum bottles with inoculums predominant with *Halanaerobium* sp., while the serum bottles with *Halanaerobacter* sp. predominant inoculum gave a lower yield of 0.78 mol H₂/mol glucose at 37 °C. The results from this study showed that inoculums predominant with *Halanaerobium* sp. were able to produce higher biohydrogen yield compared to inoculum predominant with *Halanaerobacter* sp. under nearly saturated NaCl condition.

Keywords: extreme halophiles; *Halanaerobium* sp.; *Halanaerobacter* sp.; 16S rRNA; NGS



The 2019 International Conference on the "Challenges in Environmental Science and Engineering" (CESE-2019) will take place in Kaohsiung, Taiwan. This is the twelfth international conference in the CESE series. Researchers, policy-makers, academics, students and the broader community active in contributing solutions to the myriad of environmental questions that are posed to ensure sustainability, are welcome to meet in Kaohsiung to share their knowledge and visions for the future.

Full papers submitted to the conference will be peer reviewed for publication in the following refereed journals: *Chemosphere*, *Desalination and Water Treatment (DWT)*, *Environmental Science and Pollution Research (ESPR)*, *International Biodeterioration and Biodegradation (IBB)*, *Journal of Environmental Engineering and Science (JEES)*, *Journal of Water Sustainability (JWS)*, *Membranes (by MDPI)*, *Process Safety and Environmental Protection (PSEP)* and *Sustainable Environment Research (SER)*.

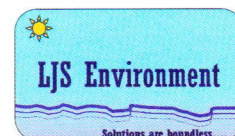
The conference is proudly sponsored by:

Ministry of Science and Technology (Taiwan), *Membranes* (MDPI Journal), IHE Delft Institute for Water Education, MABEEL

JOURNALS



ORGANISERS



SPONSORS



membranes



Including:

- 海洋產業創新研究中心 Marine Industry Innovation Research Center
- 永續環境研究中心 Sustainable Environment Research Center
- 水圈學院 College of Hydrosphere Science
- 底泥研究中心 Center for the Study of Sediments
- 海洋環境工程系 Department of Marine Environmental Engineering