

Diversity of Anammox Bacteria Cultivated with Seawater from the Penjalinan Estuary, Indonesia

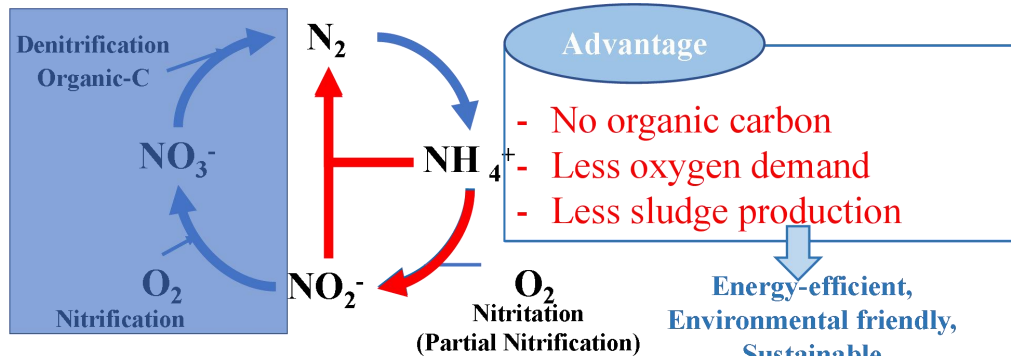
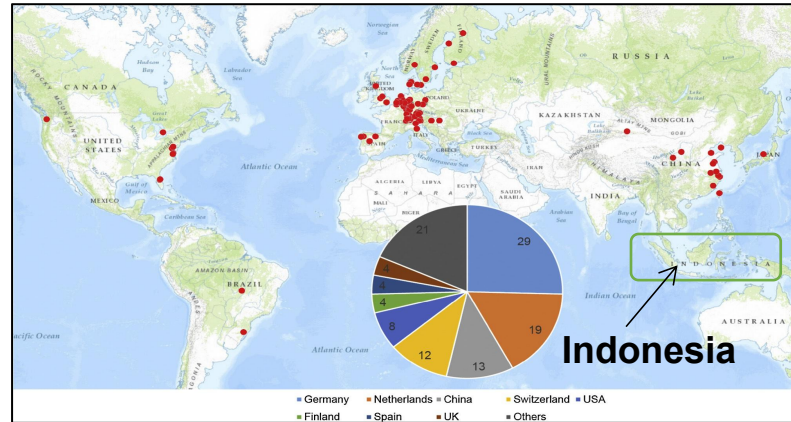


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1. Introduction

- ❖ Anaerobic ammonium oxidation (anammox) is an essential bioprocess of nitrogen cycle.
- ❖ Although anammox bacteria has been identified in estuaries of several countries, the limited information is available in estuaries of Indonesia.

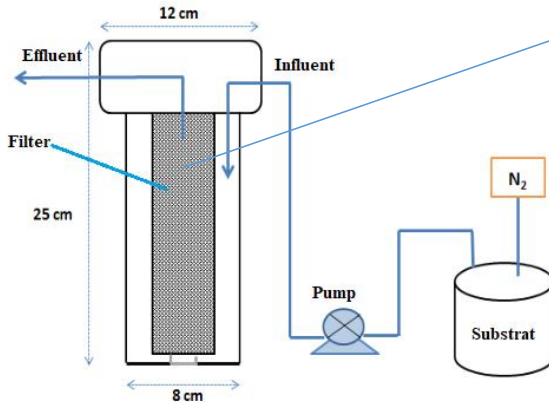


Purpose: enrichment anammox bacteria from the estuary environment in Indonesia using

2. Materials and Methods

A novel Filter Bioreactor (FtBR) conducted for cultivation in ambient temperature

Reactor configuration
V: 1.8 L,
sludge 2/3 volume



Reactor operation
HRT 24 h



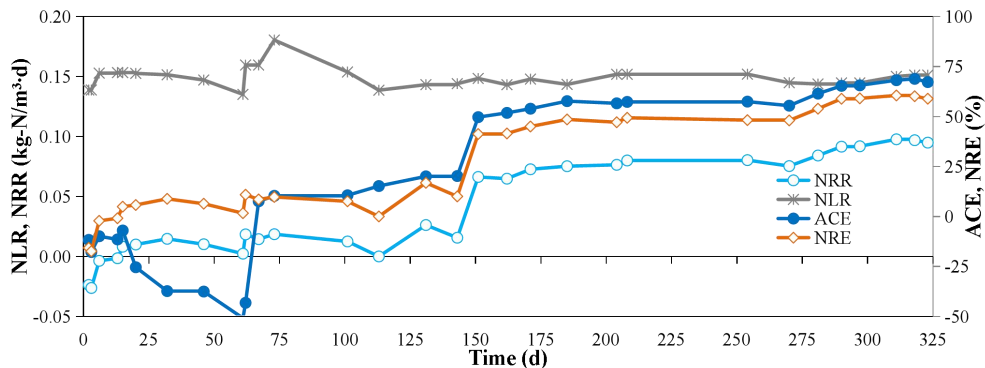
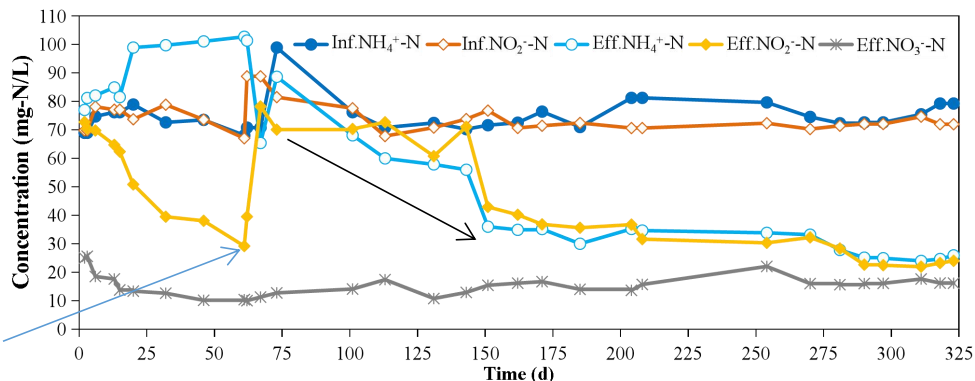
The abundance of microbes was analyzed using Illumina MiSeq sequencing.

- ❖ Mud from the Penjalinan estuary as inoculum
- ❖ Seawater supplemented with 70 mg-N/L NH₄⁺-N and 70 mg-N/L NO₂⁻-N.

3. Results

- ✓ The maximum nitrogen removal efficiency and nitrogen removal rate were 49.39% and 0.08 kg-N/m³.d during 208 days operation.

Inoculum
take out
from FtBR
at day-60

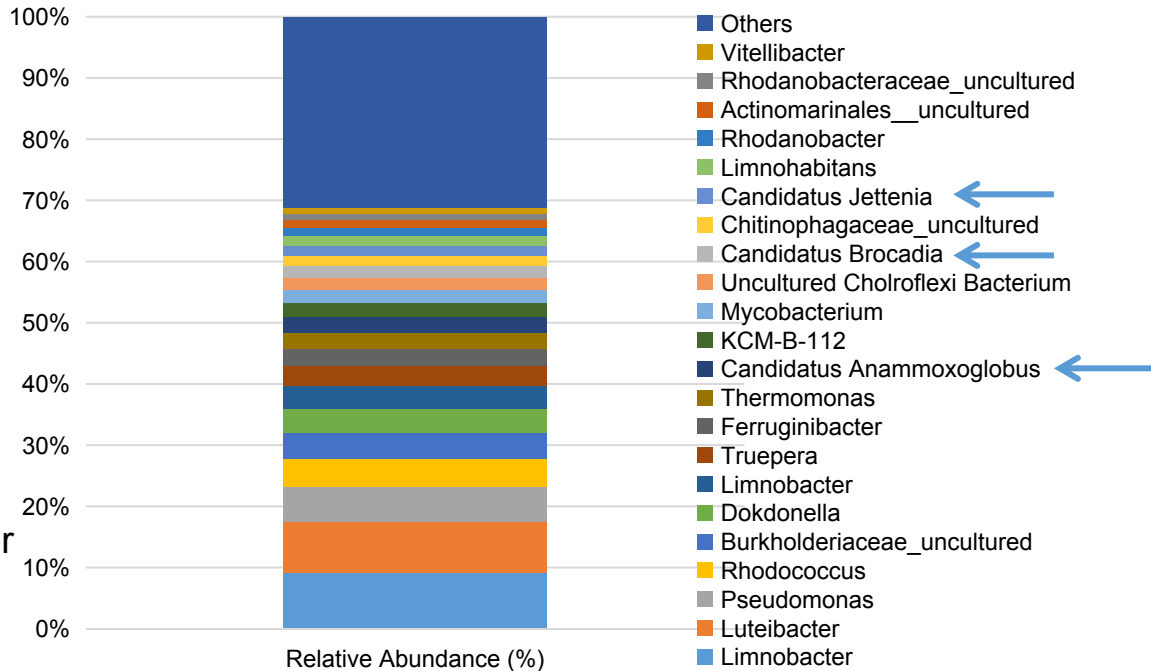


3. Results

□ *Candidatus Anammoxoglobus propionicus* (2.65%), *Candidatus Brocadia sinica* (1.95%), *Candidatus Jettenia unclassified* (1.64%), *Candidatus Brocadia fulgida* (0.51%), *Candidatus Jettenia sp.* (0.37%) were detected in the reactor.

✓ Source of inoculum influence diversity of anammox bacteria.

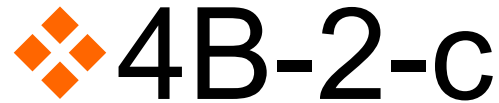
✓ Fresh anammox species could survive in seawater for nitrogen removal.



4. Conclusions

- Fresh anammox species enriched in FtBR using seawater.
- Mikrobial community analysis revealed the diversity anammox bacteria from the estuary in Indonesia of *Candidatus Anammoxoglobus propionicus* (2.65%), *Candidatus Brocadia sinica* (1.95%), *Candidatus Jettenia unclassified* (1.64%), *Candidatus Brocadia fulgida* (0.51%), *Candidatus Jettenia sp.* (0.37%).

CONTACT FOR FUTURE DISCUSSION



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The Water and Environment Technology Conference
9th-10th July 2022
Online

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Session 1A Saturday, July 9th, Chair: XX, Xx			
Oral presentation: 11:00-12:10, Poster viewing (Breakout Room): 12:10-13:10			
lecture No.	Speaker	Title	Page
1A-1-a	TOMITA Ryuya (00026193)	Formate: A Promising Electron Donor to Enhance Trichloroethene-to-ethene Dechlorination in <i>Dehalococcoides</i> -augmented Groundwater Ecosystem with Minimal Microbial Growth	
1A-1-b	NAKAMURA So (00026159)	Potential of Predatory Bacteria to Modify Duckweed Microbiome	
1A-1-c	KOBAYASHI Hiroki (00026151)	Disinfection of Extracellular Antimicrobial Resistant Genes (ARGs) Using Free Chlorine (Cl) and Peracetic Acid (PAA), Performic Acid (PFA)	
1A-1-d	SONG Yapeng (00026188)	Performance and Microbial Community Structure of Anaerobic Digestion of High-Solid Feeding Chicken Manure under Extreme Ammonia Nitrogen Level	
1A-1-e	SAMUDRO Ganjar (00026106)	Relationship between Organic Removal and Power Generation in the Single Chamber and Double Chamber Microbial Fuel Cells	
1A-2-a	HIKI Kyoshiro (00026071)	Microplastic Ingestion by a Benthic Amphipod in Different Feeding Modes	
1A-2-b	TRIHAMOKO Kharisrama (00026245)	Investigation of Tapioca Wastewater Ethanol Fermentation in Anaerobic Baffled Reactor	
1A-2-c	MITARAI Yukine (00026166)	Growth Characteristics of a Thraustochytrid and Its Application for Utilization of Wheat-flour Noodle Boiling Wastewater	
1A-2-d	JAYASEKARA Dasun (00026181)	Growth, Oxidative Stress and Odor Compound Production of <i>Pseudanabaena galeata</i> Under Extreme Light Exposure	
1A-2-e	ISHIZAWA Hidehiro(00026160)	Spontaneous Cell Lysis by <i>Pelomonas saccharophila</i> MRB3 Provides Plant-Available Macronutrients in Hydroponic Growth Media and Accelerates Biomass Production of Duckweed	
1A-3-a	SAMUDRA Thoriq Teja(00026121)	Control of <i>Microcystis</i> Buoyancy by Reducing Cellular Carbohydrate Content at High Temperature	
1A-3-b	OGINO Mizuki (00026156)	Abundance of Antimicrobial Resistant Bacteria and Their Resistance Profiles in Sagami River Basin	
1A-3-c	XIE Hui (00026117)	Transmission of resistance from ESBL-producing coliforms in treated wastewater to susceptible <i>Escherichia coli</i> in a river using filter mating method	
1A-3-d	ELSAMADONY Mohamed (00026142)	Concerns about Sustainable Development Progress in The Wake of COVID-19 Pandemic	
1A-4-a	SORN Sovannlaksmy (00026197)	Enrichment of Perfluoroalkyl Substances (PFAS) Degrading Bacteria from Activated Sludge	
1A-4-b	SODA Satoshi (00026204)	Wastewater Treatment Systems Using Trickling Filters and Constructed Wetlands Planted with Ornamental and Edible Plants	
1A-4-c	KARIM Md. Razaul (00026083)	Analysis of Development and Decline of Hypoxia by Using Monitoring Data Collected Near Tama River Estuary of Tokyo Bay	
1A-4-d	ABDULLAH Norhayati (00026124)	Microbial Population Dynamics for Aerobic Granulation Technology using Agro-industrial Wastewater	

Session 1B Saturday, July 9th, Chair: XX, Xx			
Oral presentation: 11:00-12:10, Poster viewing (Breakout Room): 12:10-13:10			
lecture No.	Speaker	Title	Page
1B-1-a	NAKANO Hiroto (00026134)	Effect of Chemical Surface Modification of Carbon Felt on Preventing Methanogen Adhesion	
1B-1-b	OTOMO Shohei (00026144)	A Comprehensive Modeling Analysis of Nitrous Oxide Emission in Oxidation Ditch Reactor	
1B-1-c	WIJESINGHE Ashika (00026183)	The Allelopathic Inhibition of Cyanobacteria using Macrophyte Extracts	
1B-1-d	To Uyen DINH THI (00026112)	Evaluation of Tetracycline and Nutrient Removal Potential of Duckweeds (<i>Spirodela</i> sp. and <i>Lemna</i> sp.) In Lab-Scale Cultivation	
1B-1-e	MING Jie (00026066)	Bactericidal Mechanism of Ag/Ag ₂ O/BiPO ₄ /Bi ₂ WO ₆ for Inactivation of <i>Escherichia coli</i> under Solar Light Irradiation	
1B-2-a	MAGHFIROH Miratul (00026075)	Air Stripping of Ammonia Using Water Spray Reactor: An Evaluation on Performance	
1B-2-b	LIU Jibao (00026192)	Network Analysis for Detecting Microbial Interactions and Keystone Species in Engineered Biological Systems	
1B-2-c	YAN Hongyu (00026173)	Recover Ability of <i>Microcystis aeruginosa</i> after Prolonged Darkness Treatment	
1B-2-d	CONDE Kaba (00026105)	Chemical Fertilizer Substitution with Composted Sewage Sludge for Sustainable Forage Rice Cultivation	
1B-2-e	BATINOVIC Steven (00026216)	A Metabolic Model for a Member of the Genus <i>Kouleothrix</i> , Responsible for Activated Sludge Bulking in Japan	
1B-3-a	Enjeh Y FOBANG(00026141)	Treatment of Cow Manure Effluent Using Electro-flotation Method with Polyacrylamide Polymer	
1B-3-b	SAKURAI Riku (00026131)	Novel Method for Quantification of Free and Esterified Long-chain Fatty Acid without Extraction by High-performance Liquid Chromatography	
1B-3-c	SHRESTHA Ashok Kumar(00026127)	Microscopic Visualization of Zinc Uptake in Organs from Different Route of Exposure in True Flies Larvae	
1B-3-d	OKAMOTO Masaru (00026089)	Countermeasure against Eutrophication Using Labor Saving Macroalgae Cultivation	
1B-4-a	Thi Thu Huong NGUYEN (00026080)	Synthesis and Optimization of Visible-light-driven g-C ₃ N ₄ /CoMoO ₄ for the Application of Tetracycline Antibiotic Removal	
1B-4-b	LIN Min (00026207)	Comparing Methane Production from Pig Manure in Single-Stage Mesophilic and 55°C/70°C-37°C Two-Stage Anaerobic Digestion Processes	
1B-4-c	SUDIARTHA Gede Adi Wiguna (00026103)	An Investigation of The Downshift Temperature Effect on Anaerobic Digestion in Treating Municipal Wastewater Sludge	
1B-4-d	WADA Kyouta (00026209)	Control of Biofouling Combined with Mineral Scaling on Reverse Osmosis Membrane using Nanobubble	

Session 2A Saturday, July 9th, Chair: XX, Xx			
Oral presentation: 14:10–15:20, Poster viewing (Breakout Room): 15:20–16:20			
lecture No.	Speaker	Title	Page
2A-1-a	MENG Lingyu (00026176)	Identification of the Functional Microorganisms for Achieving Electrode-driven Dechlorination Employed <i>Dehalococcoides</i> Species	
2A-1-b	WANG Jing (00026148)	Effect of Nitrogen-containing Adsorbent for Nitrate/nitrite Adsorption in Aqueous Solution	
2A-1-c	UENO Masato (00026129)	Comparison of the Effectiveness of Charcoals for Microbial Fuel Cell Semi-Wet Methanogen Cathode Electrodes	
2A-1-d	BAI Yuge (00026214)	Characterization of Green Microalga <i>Chlamydomonas reinhardtii</i> –associated Bacteria	
2A-1-e	STHAPIT Niva (00026110)	Application of Wastewater-based Epidemiology to Enteric Viruses in the Kathmandu Valley, Nepal	
2A-2-a	PANDEY Aishwarya (00026086)	Concurrent Analysis of 84 Compounds among Emerging Contaminants Listed by the Ministry of Environment, Japan, in Domestic Wastewater Treatment Plants Using Liquid Chromatography and High-Resolution Mass Spectrometry (LC-HRMS)	
2A-2-b	KAMEI Tatsuru (00026218)	Polyhydroxyalkanoates (PHAs) in the Hydrogenotrophic Denitrification Reactor: Effect of Phosphorus Concentration on Sludge PHA Content	
2A-2-c	ALI Manal (00026065)	Potential of Using Multiwall Carbon Nanotubes as a booster for Efficacious Hydrogen Production from Saline Wastewater Using Halophiles	
2A-2-d	LI Jingnan (00026132)	Growth Competition Model Improvement Overcoming the Overestimation in Nutrient Uptake Term between <i>Microcystis</i> sp. and <i>Cyclotella meneghiniana</i> under Low Temperature	
2A-2-e	SHIBUYA Shusuke (00026161)	Development of High-efficiency Treatment Technology Based on Ozone-based Advanced Oxidation Processes for Non-biodegradable Colored Effluents from Biogas Power Plants	
2A-3-a	MAHEEPALA Shehani Sharadha (00026104)	Enhanced Denitrification of Modified Aerobic/Anaerobic DHS Reactor for Sewage Treatment	
2A-3-b	NGUYEN Huong Thu (00026070)	Enhancement of Azo Dye Anaerobic Bio-treatment Performance with Ferrous Oxide Supplement	
2A-3-c	DEWI Nadia Usmah (00026149)	Enhanced Nitrogen Removal by Anammox on Tidal Flow Constructed Wetlands	
2A-3-d	PHUNG Oanh Thi (00026170)	Modelling Sulphide Inhibition on Methanogen's Decay	
2A-4-a	Wang SIYU (00026061)	Comparison of Performance of Organics and Nutrients Removal in Tidal Flow and Horizontal Flow Constructed Wetlands	
2A-4-b	OKA Shunsuke (00026126)	Qualitative Comparative Analysis of Official Development Assistance Projects for Raising Water and Sanitation Awareness in Developing Nations	
2A-4-c	LIN Lan (00026118)	Fast Formation of Anammox Granules Using Fluidized Bed Type Nitrification-Denitrification Sludge and Transformation of Microbial Community	
2A-4-d	ANDRIAMANOHIARI Fetra Jules (00026178)	The Roles of Tannery Wastewaters in the Anaerobic Co-digestion of Primary Sludge and Leather Fleshing Waste	

Session 2B Saturday, July 9th, Chair: XX, Xx			
Oral presentation: 14:10–15:20, Poster viewing (Breakout Room): 15:20–16:20			
lecture No.	Speaker	Title	Page
2B-1-a	TAKEZAWA Tsubasa (00026152)	Investigation of Antibiotic Resistance Genes in River Water and Household Water in the Kathmandu Valley, Nepal	
2B-1-b	RAHMANI Aulia Fajar (00026186)	Quantification of SARS-CoV-2 RNA in Wastewater Demonstrates Applicability of Wastewater-Based Epidemiology in Bandung City, Indonesia	
2B-1-c	Illangakoon I. M. V. U. (00026050)	Treatment of Palm Oil Mill Effluent (POME) Using Electrocoagulation as a Post Treatment Method in Anaerobic Ponding System	
2B-1-d	LASANTHA Vajira (00026240)	Spatial Optimization of A Sanitation Portfolio Consisting of Centralised and Decentralised Options, Using Spatial Analysis and Data-driven Modelling Approaches	
2B-1-e	AKOH Keisuke (00026164)	N ₂ O Emission Behavior of Anammox Sludge and Its Mitigation Strategies.	
2B-2-a	SAKAMOTO Akihito (00026202)	Environmental Dynamics and Source Analysis of Organic Micropollutants in Water in Cambodia	
2B-2-b	TSUDA Kohei (00026139)	Prevalence of ESBL-Producing <i>Escherichia coli</i> and Coliforms in Municipal Wastewater	
2B-2-c	MANSO Nana Frempong (00026172)	Fate of Somatic Coliphages as a Microbial Genetic Marker in Environmental Water	
2B-2-d	Chinh Thi Kieu PHAM (00026092)	Characterization of <i>Desulfotribrio</i> sp. Strain LBN6 Isolated from an Enrichment Culture from Lake Biwa for Antimony Removal	
2B-2-e	SHINTOKU Masaya (00026085)	Investigation of Spring Water and The Surrounding Sites in Ishiwaki Area, Yurihonjo City, Akita	
2B-3-a	Thi An Hang NGUYEN (00026113)	Brilliant Green Biosorption from Aqueous Solutions on Okara: Equilibrium, Kinetic and Thermodynamic Studies	
2B-3-b	KHODSEEWONG Sirapat (00026143)	Effect of Initial Turbidity on The Removal of Particles by Coagulation and Sedimentation	
2B-3-c	Tiffany Joan SOTELO (00026057)	The Effect of Anionic Surfactants on the Aerobic Organic Matter Removal Performance of Enhanced In-sewer Purification by Porous Media	
2B-3-d	SATO-SOTO Silvia (00026242)	Evaluation of Redox Mediator-modified Anodes for Microbial Fuel Cell Performance Improvement	
2B-4-a	AFRIANI Shinta Dhewi (00026078)	Effects of ZnO Nanoparticles in Irrigation Water on Rice-Soil Systems Continuously Sub-Irrigated with Treated Municipal Wastewater	
2B-4-b	REN Yuanyuan (00026119)	Biogas Production Performance and System Stability Monitoring of Thermophilic High-solid Anaerobic Co-digestion with Lipids and Food Waste	
2B-4-c	CHANTHAVONG Souphaphone (00026231)	Sludge Generation in the Membrane Aerated Biofilm Process Under Different Organic Loadings	
2B-4-d	KATSURA Tsunenobu (00026237)	New Hollow Fiber Direct Nanofiltration Technology for Organic Micropollutant Removal	

Session 3A Sunday July 10th, Chair: XX, Xx			
Oral presentation: 8:40-9:50, Poster viewing (Breakout Room): 9:50-10:50			
lecture No.	Speaker	Title	Page
3A-1-a	JI Jiayuan (00026220)	Application of Computational Fluid Dynamics in Anaerobic Membrane Bioreactors to Study the Scouring Effect of Biogas on Membrane Surface	
3A-1-b	NARIYAMA Yuki (00026137)	Growth Characteristics and Changes in Elemental Composition of <i>Microcystis</i> sp. under Various N: P Mass Ratios	
3A-1-c	XIE Li (00026190)	Qualitative and Quantitative Analysis of Biomass to Elucidate the Mechanism of Low Biomass Yield in Microbial Fuel Cell in Wastewater Treatment	
3A-1-d	TOSA Koji (00026232)	Adsorption of Geosmin and 2-MIB to Porous Coordination Polymer MIL-53(Al)	
3A-1-e	LIU Zhaozhi (00026174)	Morphological and Physiological Responses of <i>Myriophyllum roraima</i> to Exposure of Microplastic under the Coexistence with <i>Microcystis aeruginosa</i>	
3A-2-a	YAMADA Koyo (00026213)	Biomethanation of Hydrogen and Carbon Dioxide by Anaerobic Digested Sludge Using a Down-Flow Hanging Sponge Reactor	
3A-2-b	NETSU Hirotooshi (00026233)	Methane Fermentation Promotion by Using Microbial Carrier Containing Conductive Materials	
3A-2-c	ATMAJA Tri (00026238)	Coastal Floods Exposure to Population and Settlement across LLMIC	
3A-2-d	HINNEH Klion D. C.(00026125)	Oxidative Degradation of Nitrogenous Organic Compounds and N-nitrosodimethylamine	
3A-2-e	KAKITA Hirotaaka (00026167)	Durability and nutrient uptake of Gracilariaceae Seaweeds in Fish Aquaculture Wastewater	
3A-3-a	FUNABIKI Tatsuya (00026219)	Partial Nitrification of Ammonium Nitrogen Using Polymer Gel-Immobilized Bacteria	
3A-3-b	LIU Zhiyuan (00026076)	Photon Number Based Light Stimulation Strategy for Improving Bio-Hydrogen Production	
3A-3-c	MOROISHI Suzuha (00026155)	Capture and Inactivation of Fecal Indicator Bacteria in Aerosols by Applying Pulsed Electric Field	
3A-3-d	OKUDA Tetsuji (00026226)	Microplastic Origin of a Lake Water	
3A-4-a	TWUM-AMPOFO Daniel (00026215)	Antibacterial Activity of Cu- and Zn-exchanged Zeolites for Disinfection of Wastewater	
3A-4-b	YOKOYAMA Shota (00026154)	Hydrogenation Reaction of Azo-Dyes by High Entropy Alloy Catalysts	
3A-4-c	MATSUYAMA Ryutarō (00026101)	Survey on the Existence of Shiga Toxin-Producing <i>Escherichia Coli</i> in the Oyodo River	
3A-4-d	YOU Jingyi (00026179)	The Role of Acidogenic and Methanogenic Phases on the Survival of Antibiotic-Resistant Bacteria in the Batch Mesophilic Anaerobic Digestion with Cefazolin-Contaminated Cow Manure	

Session 3B Sunday July 10th, Chair: XX, Xx			
Oral presentation: 8:40-9:50, Poster viewing (Breakout Room): 9:50-10:50			
lecture No.	Speaker	Title	Page
3B-1-a	MIWA Toru (00026073)	Application of Coconut Shell Mat to trickling filter process in sewage treatment	
3B-1-b	TIARETI Areke Alexander(00026111)	Evaluation of Oxidation Reduction Potential for the Mitigation of Methane Emissions from Septic Systems	
3B-1-c	TANAKA Fumichika (00026191)	Effect of Carbon Brush Anode Loading on Microbial Fuel Cells Performance in Long- term operation in Full-scale Wastewater Treatment Plant	
3B-1-d	NISHIMINE Ryugo (00026097)	Aerobic Degradation of Chlorinated Ethenes without Auxiliary Substrates by <i>Pseudonocardia</i> sp. D17	
3B-1-e	MIAO Jia (00026088)	Risk Assessment and Discharge Limit Proposed for the Antibiotics Discharged from Sewage Treatment Plants (STPs) on the Perspective of Environmental and Human Health	
3B-2-a	LI Jing (00026230)	Analysis of the Long-term Adsorption Behavior of Chlorinated Volatile Organic Compounds on Soils with Considering Soil Property Values	
3B-2-b	SAMARAKOON Thilomi (00026120)	Effects of Humic Acid and Cadmium on Life-history Traits of the Freshwater Cladoceran <i>Moina macrocopa</i> upon Mixed Exposure	
3B-2-c	OTAKA Satoru (00026234)	Expansion on Application Range of Simultaneous Monitoring to Japanese PRTR Chemicals	
3B-2-d	KAMURUANA Christopher Gideon Gitonga (00026099)	Reducing Apparent Losses Caused by Meters Inaccuracies in Embu County, Kenya	
3B-2-e	Yuno MEUCHI (00026196)	Applicability of F-specific Bacteriophage Subgroups as Indicators of Viral Contamination and Inactivation in Rivers in Toyama Prefecture	
3B-3-a	SHINFUKU Yuta (00026205)	Exploration and Structural Elucidation of Biodegradable Organic Matters in Tap Water Using High Resolution Mass Spectrometry	
3B-3-b	NAKAZAWA Yoshifumi (00026067)	Estimation of the Amounts of Per- and Polyfluoroalkyl Substances (PFAS) Released from Spent Activated Carbon	
3B-3-c	RAYA Sunayana (00026199)	Development and Application of High-throughput qPCR for Detection of Microbial Source Tracking Markers in Environmental Water Samples	
3B-3-d	AHMED Marjuk (00026051)	Investigation on the Effects of Space Velocity on Fluorine Removal Ability by Using Granular Si-Al-Mg Mixed Hydrous Oxides.	
3B-4-a	OGASAWARA Yoshino (00026130)	Arsenic Insolubilization and Re-elution Inhibition by Combined Use of Ferrate(VI) and Water Treatment Sludge	
3B-4-b	POKHREL Preeti (00026098)	Integrated Biomarker Responses of a Brackish Water Clam to Global Warming Conditions: Water temperature, salinity, and food availability	
3B-4-c	TAKAHASHI Katsuya (00026222)	Development of Ultra-High-Speed Treatment Technology for River Turbid Water Using Ballasted Flocculation	
3B-4-d	SASAI Takahisa (00026157)	Spatial Distribution and Pollution Sources on River Water Quality in Noda River Basin	

Session 4A Sunday July 10th, Chair: XX, Xx			
Oral presentation: 11:10~12:20, Poster viewing (Breakout Room): 12:20~13:20			
lecture No.	Speaker	Title	Page
4A-1-a	WU Zhiyue (00026189)	The Membrane Filtration Performance of a High-solid Anaerobic Membrane Bioreactor for OFMSW Leachate Treatment	
4A-1-b	ONO Yurika (00026198)	Distribution Survey of the Japanese Eel by using Environmental DNA: a Case Study in Nagasaki with Rivers Connecting to Diverse Seas	
4A-1-c	PHAM Viet Dung (00026224)	Growth and Quality of <i>Plecoglossus Altivelis</i> (Ayu Fish) Cultured from a Land-based Aquaculture Fed by Secondary Treated Municipal Wastewater in a Tokyo Wastewater Treatment Plant	
4A-1-d	POOPIATTANA Chomphunut (00026138)	Improving model accuracy of <i>E. coli</i> inactivation behavior in the CSO-impacted estuary in Tokyo considering effects of salinity and solar radiation	
4A-1-e	SANGCHAROEN Rutrawee (00026175)	Biogas Production from Matured Mung Bean Biomass	
4A-2-a	ZENG Jie (00026084)	Potential of Nanopore Sequencing of Full-length 16S rRNA for Identification of Pathogenic Bacteria in Small-scale Water Supply Systems	
4A-2-b	SUN Meng (00026229)	Benchmark of Chemostat Methane Production from Acetate and Its Dynamic Modelling	
4A-2-c	GAN Yalan (00026079)	Quantitative Microbial Risk Assessment of Nontuberculous Mycobacteria in Water Supply System in Japan	
4A-2-d	MURATA Yuichiro (00026093)	Effects of UV/PS and UV/H ₂ O ₂ on Degradation of Natural Organic Matter and Formation Potential of Haloacetonitriles in Surface Water	
4A-2-e	SUGIYAMA Wataru (00026223)	Potential as a Pollution Source for Bacteria Inhabiting Plants That Grow on Riverbanks	
4A-3-a	SANGKHARAK Kanokphorn (00026169)	Isolation of Basic Red 9-Degrading Bacteria from Textile Wastewater and Its Ability to Produce Novel Polyhydroxyalkanoates	
4A-3-b	SABAR Muhammad Adnan (00026206)	Dynamics of Antimicrobial Resistome in the River Affected by Wastewater Treatment Effluent and Combined Sewage Overflow	
4A-3-c	SHIMODA Wataru (00026128)	Adsorptive Removal of Soluble Heavy Metals from Anaerobic Digested Sewage Sludge under Acidic Conditions using Fibrous Chelating Agents	
4A-3-d	Mohomed Niyaz MOHOMED SHAYAN (00026241)	Seasonal Synchrony of Evenness of Planktonic Bacterial Community in Urban Rivers	
4A-4-a	KANAI Miyuka (00026145)	Development of Ballast Flocculation Using Seawater Bittern for Sewage Treatment	
4A-4-b	Tatsuki IGUSA(00026236)	Chemical Profiling and Identification of River Waters at the East of Shiretoko Peninsula Using Heavy Elements	
4A-4-c	SHIMURA Erina (00026165)	Microbial Composition Involved in Cultivation of <i>Aurantiochytrium</i> sp. Stain L3W Using Unsterile Food Wastes and Its Control.	
4A-4-d	KISHIMOTO Naoyuki (00026055)	Effect of Intermittent Electrolysis on Electrolytic Removal of an Organic Pollutant	

Session 4B Sunday July 10th, Chair: XX, Xx			
Oral presentation: 11:10~12:20, Poster viewing (Breakout Room): 12:20~13:20			
lecture No.	Speaker	Title	Page
4B-1-a	NISHIMURA Yuri (00026163)	Comparative Study of Various Oxidation Processes to Remove Residual Antimicrobials in Actual Wastewaters	
4B-1-b	NGUYEN Nga Thi(00026194)	Impact of Water Stagnation on Antimicrobial Resistance Profiles of Bacterial Community in Premise Plumbing	
4B-1-c	SAO Sochan (00026077)	Effect of Flood Duration on Water Extractable Dissolved Organic Matter Concentration and Composition of Flood Plain Soil	
4B-1-d	FADHILAH Arriel (00026096)	Assessment of small-scale freshwater microplastics spatial abundance and characterization: A case study in the Metro River, Indonesia	
4B-1-e	KOBAYASHI Shiho (00026212)	Impact of Heavy Rainfall on the Seawater Exchange Rate of Hypoxic Area in a Semi-enclosed Bay (Nanao Bay, Japan)	
4B-2-a	TAMAI Soichiro (00026090)	Development of High Sensitive Detection and Quantification of Free Extracellular DNA Using Colloid Adsorption and Foam Concentration	
4B-2-b	CAI Jing (00026091)	Biodegradation of Ethers, Chlorinated Aliphatic Hydrocarbons and Aromatics by <i>Pseudonocardia</i> sp. D17	
4B-2-c	ZULKARNAINI Zulkarnaini (00026123)	Diversity of Cultivated Anammox Bacteria from The Penjalinan Estuary, Indonesia	
4B-2-d	ANGGA Made Sandhyana(00026171)	Rapid Methods for Efficient Virus Detection in Wastewater: Comparison of Column-based Direct Capture Method and Automated Filtration Method	
4B-2-e	NGUYEN Thuong Thi(00026072)	Removal of Multiple Heavy Metals from Simulated Acid Mine Drainage Mixed with Domestic Wastewater Using Lab-Scale Constructed Wetlands Planted with Iris and Cattail	
4B-3-a	CHEN Yujie (00026180)	Enhanced Nitrogen and Phosphorus Removal Performance by Hydroxyapatite (HAP) formation in a One-stage Partial Nitrification/anammox Process with HAP-based Micro-granules	
4B-3-b	ZHANG Bei (00026058)	Kraft Lignin-derived Carbon Cathode for Electro-Fenton Degradation of Emerging Contaminants	
4B-3-c	CHAM Huiuru (00026217)	Improvement in the Surface Structure of Porous Concrete by Adhesion of Bamboo Powder	
4B-3-d	DENINDYA Zefanya Alovya Petra (00026082)	Assessment of Mulch Material Effect on Surface Runoff, Soil Loss, and Water Quality in an Agricultural Region	
4B-4-a	DEVIANTO Luhur Akbar(00026201)	The ELISA-Based Detection of SARS-CoV-2-Specific Human Immunoglobulin Type A from Wastewater	
4B-4-b	MAKINO Soyoka (00026185)	Causal Relationship between Stream NO ₃ ⁻ Concentration at Baseflow Condition and Key Regulating Factors in Kinki Region of Japan, Encompassing a Climatic Gradient	
4B-4-c	FUJINAGA Aiichiro (00026109)	Model Based Evaluation of the Effect of Series and Parallel Connected Microbial Fuel Cells	
4B-4-d	KOBAYASHI Norihiro (00026210)	Development and Validation of an Analytical Method for Simultaneous Determination of Perfluoroalkyl Acids in Drinking Water by Liquid Chromatography/Tandem Mass Spectrometry	



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August 08, 2022

This is to certify that

Dr. Zulkarnaini, Zulkarnaini
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had participated in the Water and Environment Technology Conference Online 2022 (WET2022-online) officially organized by Japan Society on Water Environment from 9th to 10th August, 2022, and had presented the presentation entitled “Diversity of Cultivated Anammox Bacteria from The Penjalinan Estuary, Indonesia”.

Taku Fujiwara

*Taku FUJIWARA,
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