29 June 2021 (Tuesday)

7.00pm-8.30pm (SGT) (GMT +8)
Session 3.12 – Microbial Ecology

Session Chair(s): Kartik Chandran, Columbia University (USA)

Mechanistic Modelling Provides Useful Operational Guidance For Highly Loaded Anaerobic Sludge Bioprocesses

C. Wilson. Hampton Roads Sanitation District (HRSD) (United States)
Presenter is an invited speaker. No executive summary is available

Microbial Ecology Of Anaerobic Membrane Bioreactor (AnMBR) And Its Relevance In Mitigating Membrane Biofouling

P. Hong. King Abdullah University of Science and Technology (Saudi Arabia)
Presenter is an invited speaker. No executive summary is available

Managing Emerging Contaminants In Biological Treatment When Developing A Broad Reuse Portfolio

S. Sathyamoorthy, C. Hoar, CA. Ramsburg, K. Chandran. Binnies (United States)

Widespread application of energy intensive processes abiotic processes to manage emerging contaminants will ultimately be unsustainable. This is particularly relevant in water scarce regions where infrastructure may not be as well developed. There is a need to better understand of the fate of ECs in biological treatment processes. Our research focuses on two pathways relevant to microconstituent removal: cometabolism and the links between microbial community structure and catabolism. Results suggest that ammonia oxidizing bacteria play a role in the cometabolism of certain ECs. Results assessing catabolism using DNA stable isotope probing (DNA-SIP) suggest that only a small subset of the microbial community capable of biodegradation can catabolize BPA or other ECs. Results from our research hold utility to develop a more comprehensive framework of understanding of the fate of microconstituents in biological wastewater treatment processes.

Microbial Acclimation Towards Substrate Overloading Via Recurring Solids Retention Time Disturbances in Anaerobic Digesters

AF. Mohidin Batcha, TCA. Ng, AA. Cokro, Y. Lu, S. Wuertz. Nanyang Technological University (Singapore)

Anaerobic digestion (AD) is a biological degradation process for treating organic wastes to produce renewable energy. Anaerobic digesters are generally operated at long solids retention time (SRT) to ensure stable digester operation. In this study, we investigated the prospect of evolving a resilient and robust AD microbiome through repeated severe SRT perturbations. We postulated that microbial communities may adapt to and recover from recurring severe SRT perturbations.

Novel Nutrients Removal Pathway in Wastewater Treatment Plants

Q. Wang, G. Tao, SL. Low, J. He. National University of Singapore (Singapore)

Characterization of the underlying mechanisms for nutrients removal and linking bioreactor performance with operational conditions can help to inform the design and development of future full-scale facilities. In this study, we compared the microbial community structures with the variation of operational parameters and the nutrient removal mechanisms. Nitrosomonas and Nitrospira were the dominant AOB and NOB genera, respectively. Much higher NOB relative abundance than AOB showed the less possibility of partial nitrification. Even though over 0.4% of anammox bacteria with the dominant genus of Brocadia was found, how these bacteria in different abundance contribute to nitrogen loss has yet to be studied. The alternating aerobic/anoxic condition provides around 1 mg/L in the aerobic zones, creating an environment that possibly favors the generation of nitrate. To date, the main nitrogen removal mechanism was nitrification/denitrification, and nitrification/partial denitrification as supported by the ammonium converted mostly to nitrate and the low C/N ratio in reactor B resulting in the lower TIN removal efficiency as well as the residual nitrite found in the effluent.