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Special Issue on

Municipal Wastewater Treatment: Challenges, Issues, and Solutions in Water-Energy-Greenhouse Gas Nexus

CALL FOR PAPERS

Current state-of-the-art of municipal wastewater treatment systems typically expends substantial amounts of energy. Increasing sensitivity to the carbon footprint has resulted in movement towards revising the treatment train of unit processes. Two-stage (or A/B) process has recently regained its popularity in the research field. In such process, organic matters can be captured and/or removed in the first stage and nutrients can be removed or recovered in the second stage. A/B process can be configured with different process combinations.

For A-stage process, chemically enhanced primary treatment (CEPT) and high rate activated sludge (HRAS) for carbon capture have been explored. Captured organic matters are further treated in anaerobic digester. However, the long term effect on chemical accumulation by CEPT in AD systems has not been revealed yet. There is now movement towards anaerobic led process as A-stage. One of the major challenges is dissolved methane in the low-strength liquid phase that may account for 45% of methane produced in a mesophilic anaerobic wastewater treatment system which can be even higher under low temperature.

B-stage can be designed as nutrient removal stage. Microbial community elimination and modification have been developed and implemented to achieve energy reduction in this stage. For instance, nitrite short-cut and Anammox processes can reduce 50-70% energy consumption. Unfortunately, concerns of N_2O emission, nitrite accumulation and inhibition, and retention of slow growing functional microbial communities hinder their application. Microalgae systems as B-stage for nutrient removal can be explored further towards more energy efficient design. B-stage can also be designed as resources recovery stage. Besides organic matter recovery in the form of biogas and bioplastic, other resources, such as nitrogen, phosphorus, and water, can also be considered for recovery and reuse. The process design for nutrient recovery shall again require comprehensive analysis on energy and cost needs as well as potential GHG emission.

We invite investigators to contribute review and original papers describing recent development of energy efficient bioprocesses for municipal wastewater treatment and methods for resources recovery, control, and/or mitigation strategies for the issues that arise from novel treatment processes.

Potential topics include, but are not limited to:

- Novel energy efficient municipal wastewater treatment processes
- Microbial community responses to process inhibition and enhancement and mitigation strategies
- GHG emission detection and control
- Novel concept and processes for resources recovery
- Integrated decentralized wastewater treatment systems

Authors can submit their manuscripts via the Manuscript Tracking System at http://mts.hindawi.com/submit/journals/bmri/biotechnology/wtci/.

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