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Removal of volatile fatty acids and ammonia recovery from instable anaerobic digesters with a microbial electrolysis cell

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ABSTRACT

Continuous assays with a microbial electrolysis cell (MEC) fed with digested pig slurry were performed to evaluate its stability and robustness to malfunction periods of an anaerobic digestion (AD) reactor and its feasibility as a strategy to recover ammonia. When performing punctual pulses of volatile fatty acids (VFA) in the anode compartment of the MEC, simulating a malfunction of the AD process, an increase in the current density was produced (up to 14 times, reaching values of 3500 mA m^{-2}) as a result of the added chemical oxygen demand (COD), especially when acetate was used. Furthermore, ammonium diffusion from the anode to the cathode compartment was enhanced and the removal efficiency achieved up to 60% during daily basis VFA pulses. An AD-MEC combined system has proven to be a robust and stable configuration to obtain a high quality effluent, with a lower organic and ammonium content.

Keywords

Microbial Electrolysis Cell (MEC), Anaerobic digestion, Ammonia recovery, System stability, Volatile fatty acids (VFAs).

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