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The Potentials of the Integrated Ultrasonic Membrane Anaerobic System (IUMAS) as a Single Unit for Industrial Sugarcane Wastewater Treatment

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EXTENDED ABSTRACT

Increasing the energy crisis makes it reconsider to reduce carbon dioxide reduction (CO₂) emission. Due to finding the high chemical oxygen demand (COD), biochemical oxygen demand (BOD) and total suspended solids (TSS) in the discharge of sugarcane mill effluent (SCME) wastewater which causes the earnest environmental issue. Membrane fouling became one of the main problems facing wastewater treatment. The overview of the conventional methods of wastewater treatment is disadvantageous from both environmental and economic perspectives. This study investigated the first time treated the SCME wastewater by an alternative cost-effective ultrasonic membrane anaerobic system (UMAS). The obtained results showed that the mixed liquor suspended solids (MLSS) were in the range of (8500 to 14700) mg/L, while the mixed liquor volatile suspended solids (MLVSS) results were in the range of (5874 to 13068) mg/mL. Three kinetic models were applied to evaluate the kinetic patterns of sugar cane processing at organic loading rates in the range of (3-15) kg COD/m³ /d. UMAS showed a removal efficiency in the range of (94-96.3) % with hydraulic retention time from 280.5 to 9.8 days.

Keywords: Membrane, COD reduction, methane, IUMAS, kinetics, SCME.

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