

The combination of air flotation and a membrane bioreactor for the treatment of palm oil mill effluent

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Abstrak

The combination of baffled air flotation and a membrane system for the treatment of palm oil mill effluent (POME) was studied. The POME was obtained from a palm oil factory in PTPN I Tanjung Seumantoh, Aceh, Indonesia. Operation variables and conditions, such as the hydraulic retention time and air flow rates, were varied to find the optimum process. The air flotation process is able to reduce the concentration of suspended solids and fats/ oils contained in the wastewater, which increases the performance of the membrane by reducing clogging. The results showed that this method was promising for POME treatment. The optimum organic removal efficiency of the air flotation pretreatment was obtained at HRT = 5 days and at an air flow rate of 11 L/min. The effluent was subsequently passed through an anaerobic membrane system to achieve the highest removal efficiency treatment. The removal efficiency of chemical oxygen demand (COD), total suspended solids (TSS), turbidity, mixed liquor suspended solids (MLSS), mixed liquor volatile suspended solids (MLVSS), and fats/oils after passing through the membrane system were 97%, 93.9%, 99.8%, 94.5%, 96.2%, and 99.9%, respectively. The results also showed that the pH could be neutralized to 6.18, while a dissolved oxygen (DO) level of 1.60 mg/L could be achieved. A high quality of effluent was obtained, which met the standards for POME effluent.