

Performance of a novel dynamic membrane bioreactor in treating synthetic domestic wastewater

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ABSTRACT

This article introduced an approach using cross-linked polyvinyl alcohol microspheres (PVA-MS) to form dynamic membrane on the surface of the industry filter cloth instead of the conventional MF/UF membrane to build a membrane bioreactor (MBR) for wastewater treatment. The performance of the dynamic MBR for treating synthetic domestic wastewater and membrane fouling were investigated. For treating synthetic domestic wastewater sequentially, the results of the batch tests showed that the effluent turbidity was less than 4 NTU and SS was zero at the most operation time. The average removal efficiency of COD_{Cr} and $\text{NH}_4^+\text{-N}$ were 93.18 and 98.6%, respectively. Membrane fouling was mainly caused by sludge layer. The sludge cake and precoated dynamic membrane could be easily removed by brushing. The support membrane permeate flux was almost recovered fully and could be reused again. These results indicated that the precoated dynamic membrane could prevent pollutants and biomass intervening to the surface and interior of the support membrane which was helpful to alleviate support membrane fouling. The experimental results demonstrated that the novel dynamic membrane showed highly anti-fouling characteristics in the MBR and could be a potential technology for wastewater treatment.

Keywords: Industry filter cloth; Dynamic membrane; Membrane bioreactor; Synthetic domestic wastewater; Membrane fouling

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