

Fouling control of a pilot scale self-forming dynamic membrane bioreactor for municipal wastewater treatment

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ABSTRACT

A pilot scale self-forming dynamic membrane bioreactor (SFDMBR) was used for municipal wastewater treatment and its fouling control was investigated. Two methods, on-line bottom aeration flushing and off-line high-pressure water flushing, were applied to control the self-forming dynamic membrane (SFDM) fouling. Aeration intensity of $22 \text{ m}^3/(\text{m}^2 \cdot \text{h})$ and aeration time of 2 min were the optimized operational conditions. Fouling of SFDM could be on-line controlled by bottom aeration flushing to keep the bioreactor continuously working for about 50 days. However, the intervals of bottom aeration flushing were gradually shortened which suggested that fouling could be controlled to some extent but gel layer could not be removed effectively. High-pressure water flushing could remove cake layer and most gel layer, and the membrane flux could be almost 100% recovered. Through the convenient fouling control by combination of bottom aeration and high-pressure water flushing, the present SFDMBR has been normally operated for more than one year and the effluent was suitable for urban miscellaneous water consumption if disinfection was added.

Keywords: Membrane fouling; Pilot scale experiment; Self-forming dynamic membrane; Municipal wastewater

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