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Performance enhancement of MBR operated with aerobic granules on membrane filterability improvement

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ABSTRACT

Due to the classic pitfalls of activated sludge processes and increasingly stringent water quality requirements, leading to progressively tighter limits on BOD and nutrient discharge, there is a need to remediate and manage our water resources more efficiently and in a more cost-effective and sustainable manner. Although membrane bioreactor (MBR) has been considered as a technology that guarantees a relatively small footprint and high water quality, they are still susceptible to membrane fouling. Membrane fouling in MBRs is mainly caused by the accumulation of microbial substances, such as extracellular polymeric substances and soluble microbial substances on or in the membrane. Here, an aerobic granule is suggested as a solution to reduce membrane fouling; accordingly, a compact MBR with aerobic granules was studied in an attempt to improve the quality of effluent related to activated sludge processes. Even though various granular sizes were formed, the granule sizes were from 0.1 ± 0.15 to 0.5 ± 0.25 mm, rarely exceeding 0.75 mm.

Keywords: Aerobic granules; Extracellular polymeric substance (EPS); Fouling; Membrane bioreactor (MBR); Soluble microbial substances (SMP)

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