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Hybrid growth membrane bioreactor (HG-MBR): The indirect impact of sludge retention time on membrane fouling

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ABSTRACT

Membrane fouling in a hybrid-growth membrane bioreactor (HG-MBR) is a complex process affected by many parameters that include operational and environmental conditions, wastewater characteristics, and membrane properties. In this study, we investigated the role of the solid retention time (SRT) on fouling of an ultrafiltration (UF) membrane in an HG-MBR system. Under constant organic loading rate, a decrease in SRT caused a reduction in both mixed liquor suspended solids and sessile biomass. Even though biomass concentration in the reactor was lower, the fouling rate was accelerated. The highest extracellular polymeric substances (EPS) concentration adsorbed to the membrane was observed at the lowest SRT of 2.7 d as compared to SRT of 10 and 26.7 d. The higher organic loading rate per biomass unit tends to increase production of either EPS or soluble microbial products (SMP) that directly induce fouling.

Keywords: Hybrid growth-MBR (HG-MBR); Wastewater; Fouling; Extracellular polymeric substances (EPS)

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