



Membrane fouling control in anaerobic submerged membrane bioreactor

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ABSTRACT

In this study, the aim was to assess the impact of different membrane modules such as cylinder-shaped, funnel-shaped, and U-shaped on the membrane fouling behavior in a laboratory-scale submerged anaerobic membrane bioreactor (AnSMBR) treating the synthetic wastewater for over 124 days. A series of analysis, including soluble microbial products (SMP), extracellular polymeric substances (EPSs), scanning electron microscopy, energy dispersive X-ray spectroscopy, particle size distribution, and filtration resistances, was performed by considering all membrane modules. The results showed that difference between COD and TOC removals was negligible in membrane modules designed at different forms. However, the priority of the membrane modules in terms of providing high permeate fluxes was found to be cylinder-shaped > funnel-shaped > U-shaped bundle. Both SMP and EPS within cake formed on the fibers in the cylinder-shaped module were lower than those in the U-shaped and funnel-shaped modules. The particles in the U-shaped module were smaller than those in other modules while they were coarse in the cylinder-shaped module. The results demonstrate that cylinder-shaped module was the most suitable module of hollow fiber to control the membrane fouling in a AnSMBR.

Keywords: Submerged anaerobic membrane bioreactor; Membrane module type; Membrane fouling; SMP and EPS

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