

Retention of soluble microbial products in submerged membrane bioreactors

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ABSTRACT

The retention of soluble microbial products (SMP) is significant for the operation of membrane bioreactors (MBRs) from the aspect of both effluent quality and membrane fouling. Constant flux stirred dead-end filtration of a MBR sludge supernatant was conducted. The SMP retention by the membrane is dynamic rather than consistent during filtration. Polysaccharides and proteins are the major components of SMP that are most easily retained by the membrane. The framework of the gel layer is mainly formed from polysaccharides, which controls its permeability. The SMP proteins appear to be trapped in the gel layer by steric and/or adsorptive effects but play little structural role. The underlying mechanism for adsorptive retention may arise from intermolecular electrostatic attraction or chemical complexation involving metal ions.

Keywords: Activated sludge; Size fractionation; Free EPS; Wastewater treatment; Proteinase

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