



Role of EPS in membrane fouling of a submerged anaerobic-anoxic-oxic (A-A-O) membrane bioreactor for municipal wastewater treatment

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Received 3 September 2010; Accepted 3 January 2011

ABSTRACT

An anaerobic-anoxic-oxic membrane bioreactor for real municipal wastewater treatment was operated under various conditions in order to investigate extracellular polymeric substances (EPS) properties and their role in membrane fouling. Test results showed that EPS, proteins in EPS (EPS_p) and carbohydrates in EPS (EPS_c) had correlations with membrane fouling. EPS_p were found to have more significant correlations with membrane fouling while EPS and EPS_c had loose correlations with membrane fouling, indicating that EPS_p were an important factor in membrane fouling. Three-dimensional excitation-emission matrix fluorescence spectra analysis revealed that Peak C had potential correlations with the membrane fouling. Peak C, which was associated with fulvic acid-like substances, should be mainly originated from microbial metabolism. Gel filtration chromatograph (GFC) demonstrated that the EPS had narrower molecular weight (MW) distribution compared to the influent wastewater. It was also found that the number-average MW (M_n) and the weight-average MW (M_w) of EPS increased with the increase of operation time.

Keywords: Anaerobic-anoxic-oxic (A-A-O) process; Biological nutrient removal; Extracellular polymeric substances (EPS); Membrane bioreactor (MBR); Membrane fouling; Wastewater treatment

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