



Bench-scale assessment of membrane pre-treatment and seasonal fouling potential variations

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ABSTRACT

Fouling is widely recognized as an important challenge to the widespread use of membrane filtration technologies in water and wastewater treatment. Unfortunately fouling by natural waters is complex and its mechanisms are not presently well understood. Pre-treatment of feed water is part of a successful fouling control strategy. The aim of this study was to gain a better understanding of membrane fouling by characterizing two natural waters seasonally using the modified fouling index-ultrafiltration (MFI-UF) and other various traditional water quality parameters (turbidity, NOM, UV₂₅₄, etc.). In addition, fouling prevention by automatic backwash filtration was studied at a bench scale using samples of filter screens and thread filters. Apparent relationships between typical water parameters and fouling potential were explored through partial least square regression and pre-treatment performance was evaluated via particle counts and MFI-UF measurements. Results showed that it is not feasible to identify foulants using traditional water quality parameters as they lack the precision to specifically describe the actual foulants and also pre-treatment that only removes large particles (>2 µm) only is ineffective at reducing fouling potential.

Keywords: Membrane; Fouling; Pre-treatment; MFI-UF; Particles

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