



Optimization of filtration to relaxation mode using woven fiber microfiltration system for water and wastewater treatment

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ABSTRACT

In this study, the fouling behavior of flat sheet woven fiber microfiltration (WFMF) system for water and wastewater treatment was investigated. In the first phase, WFMF system was operated for treating wastewater under filtration to relaxation mode (FRM) of 30_{min}–10_{min}, 45_{min}–15_{min} and 60_{min}–20_{min} corresponding to 36, 24 and 18 cycles/d, operated at an average flux of 8 L/m²/h. Results revealed that 45_{min}–15_{min} was optimum FRM while variation in removal rate of COD, PO₄³⁻-P and NH₄⁺-N was 58%–71%, 21%–34% and 16%–30%, respectively. In the second phase, WFMF system was evaluated for water treatment having turbidity of 23–50 NTU, total suspended solids (TSS) 200–400 mg/L and fecal coliform (FC) 120 ± 20 CFU/100 mL under optimized FRM. The removal rates of turbidity, TSS and FC were 64%–96%, 58%–85% and 2–3 log, respectively. Physical and chemical cleaning were applied separately on the membrane and it was found that pore blockage causing irreversible fouling can only be removed by chemical cleaning.

Keywords: Chemical cleaning; Filtration cycles; Flat sheet membrane; Membrane-based septic tank; Water quality

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