

Fouling inhibition of RO membrane separation by two-stage H₂O₂/UV pre-oxidation for municipal wastewater reuse

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ABSTRACT

This study evaluated the performance of combining two-stage H₂O₂/UV pre-oxidation with RO post-separation for the reuse of municipal wastewater. The results demonstrated that the two-stage H₂O₂/UV (H₂O₂ = 0–30 mg/L) process was more effective than the one-stage (H₂O₂ = 0–60 mg/L) process for mitigating RO membrane organic-fouling and bio-fouling. In the two-stage operation, the inactivated log reduction of microorganisms reached 4.96-logs, and the total organic carbon (TOC) was reduced from 18.0 to 2.98 mg/L. The silt density index (SDI) decreased from 9.8 to 3.9; the normalized flux decline (*r*) of RO separation was enhanced from 36% to 91%.

Keywords: Membrane; Fouling; H₂O₂/UV; Municipal wastewater; Reuse

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