



Enhanced removal of organics and phosphorus in a hybrid coagulation/membrane bioreactor (HCMBR) for real textile dyeing wastewater treatment

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ABSTRACT

In this work the performance of a hybrid coagulation/membrane bioreactor (HCMBR) was assessed for real textile dyeing wastewater advanced treatment. Poly-aluminum chloride (PACl) was selected and used in the experiments. Batch experiment results showed that the optimal dosage was 40 mg Al/L. During the pilot-scale experiment, the suitable dosage and dosing interval were once per day at the dosage of 40 mg Al per L of amount of mixed liquor into the HCMBR system. It was found that membrane fouling was effectively retarded by PACl addition in the running MBR system. Additionally, removal of pollutants according to influent and effluent quality was monitored. HCMBR achieved much higher removal efficiencies than membrane bioreactor (MBR) in COD_{cr}, UV₂₅₄, and total phosphate, due to PACl coagulation in the HCMBR bioreactor. And the application of PACl was effective in decreasing the content of extracellular polymeric substances and the membrane fouling resistances. The transmembrane pressure of HCMBR developed much slower than that of MBR, which indicated that coagulation with PACl in the MBR could alleviate membrane fouling. PACl addition was practically feasible for real textile dyeing wastewater advanced treatment without large excess sludge production.

Keywords: Hybrid coagulation/membrane bioreactor (HCMBR); Textile dyeing wastewater; Coagulation; Organics; Phosphate; Membrane fouling

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