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Investigation of the electro-coagulation treatment process for the removal of total suspended solids and turbidity from municipal wastewater

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Abstract

In this work, raw municipal wastewater was electro-coagulated for the removal of total suspended solids (TSS), turbidity, and particulate BOD using stainless steel electrodes. The removal efficiency of TSS and turbidity is shown to depend on the amount of iron generated from the anode of the reactive electrode used in this study, when applying the lower currents of 0.05 A and 0.1 A. For such lower currents, the results suggested that the removal is consistent with charge neutralization coagulation mechanism. When applying higher currents of 0.2 A, 0.4 A, and 0.8 A, the results suggested that the dominant removal mechanism is sweep-floc coagulation as the generated soluble ferrous ions are converted to insoluble ferric ions due to oxidation with chlorine generated during the electrochemical process at the higher currents. The highest TSS removal efficiency of 95.4% occurred at a current of 0.8 A and contact time of 5 min. The effect of electro-coagulation on the removal of particulate BOD was shown to depend on the TSS removal efficiency.

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