



Color and chemical oxygen demand removal using homogeneous and heterogeneous Fenton oxidation of sugar industry wastewater

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ABSTRACT

In this study, color and chemical oxygen demand (COD) removal efficiencies from sugar industry wastewater were compared by applying homogeneous and heterogeneous Fenton oxidation processes. The parameters effecting the oxidation process such as iron ion concentration, catalyst amount, hydrogen peroxide concentration, pH, temperature and reaction time were examined and optimum experimental conditions were determined. Synthesized Fe(III)/SnO₂ was used as catalyst in the heterogeneous Fenton process. It was aimed to eliminate the iron-containing sludge formation, which was the disadvantage of the homogeneous Fenton process, by the heterogeneous Fenton process. Under the optimum conditions, in the homogeneous Fenton process 81% color and 70% COD removal efficiency and in the heterogeneous Fenton process 94% color and 80% COD removal efficiency were achieved. Finally, a cost analysis was made. The cost analysis result showed that the heterogeneous Fenton was more economical. These results showed that the heterogeneous Fenton method is more suitable for sugar industry wastewater treatment.

Keywords: Sugar industry wastewater; Color and chemical oxygen demand removal; Fenton process; Cost analysis

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