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REMOVAL OF ORGANIC MATERIALS FROM TANNERY WASTEWATER CONTAINING AMMONIA FOR REUSE USING ELECTRO-OXIDATION

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Abstract

Leather manufacturing process generates significant volume of wastewater. Deliming is one of the unit processes, in which about 4.5 L of wastewater is generated per one Kg of pelt. Reuse of wastewater from the unit processes, where significant volume of wastewater is generated is much important to address pollution mineralization and water conservation. Presence of significant level of organic pollutants is the primary factor that deters reuse of waste streams. In this paper, the Electro-Oxidation (EO) of deliming waste streams was carried out. It was found that EO was found to be effective in removing organic pollutants. The effect of process parameters such as pH, current density and duration on removal of organic pollutants was studied. Treatment efficiency was evaluated in terms of Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Kjehldahl Nitrogen (TKN). Results indicate that the pollution reduction was better during electro-oxidation at current density 0.015 A/cm^2 and pH 8.0 for 90 min. The kinetics of pollutants removed by electro-oxidation was found to obey pseudo-first order with an R^2 value of 0.9963. The reduction in BOD, COD, TKN, chloride and TDS was 87.37%; 81.95%; 82.67%; 5.75% and 6.56% respectively. The possibility of reuse of treated wastewater was also assessed. Treated deliming wastewater was reused for soaking did not show any impairment in quality of pelt and leather. It is concluded that EO was very effective in treating the deliming waste streams rendering the same suitable for reusing for soaking.

Key words: electro-oxidation, reuse, tannery wastewater, zero discharge

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