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Electrochemical oxidation process in application to raw and biologically pre-treated tannery wastewater

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ABSTRACT

This study on tannery wastewater treatment showed that indirect electrooxidation by chlorine generated at a Ti/SnO_2/PdO_2/RuO_2 (SPR) anode led to full ammonia removal and a decrease in chemical oxygen demand (COD) up to 58.9%. Summarized current efficiency of ammonia removal and apparent current efficiency of COD removal was very high and (up to 127.2%). Individual compounds present in raw and electrochemically treated wastewater and in synthetic tannin solutions were identified by GC-MS method. Dibutyl phthalate was determined in all samples of raw and/or wastewaters treated by electrooxidation and also in tannin solutions. For the wastewater sample *D*, current density of 1.0 A/dm^2 values of adsorbable organically bound halogens were: 15.7, 19.8 and 12.9 mg/L after 15, 30 and 46 min, respectively. Additionally, a cost evaluation of this process was established. At a current density of 1.5 A/dm^2, the energy consumption was in range from 78.2 to 171 kWh/kg of $N–NH_4^+$.

Keywords: Chemical oxidation; Electrochemical oxidation; Tannery wastewater; AOX; GC-MS

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