

Electrolytic treatment of Standard Malaysian Rubber process wastewater

Abstract

A new method of Standard Malaysian Rubber (SMR) process wastewater treatment was developed based on in situ hypochlorous acid generation. The hypochlorous acid was generated in an undivided electrolytic cell consisting of two sets of graphite as anode and stainless sheets as cathode. The generated hypochlorous acid served as an oxidizing agent to destroy the organic matter present in the SMR wastewater. For an influent COD concentration of 2960 mg/L at an initial pH 4.5 ± 0.1 , current density 74.5 mA/cm², sodium chloride content 3% and electrolysis period of 75 min, resulted in the following residual values pH 7.5, COD 87 mg/L, BOD₅ 60 mg/L, TOC 65 mg/L, total chlorine 146 mg/L, turbidity 7 NTU and temperature 48 °C, respectively. In the case of 2% sodium chloride as an electrolyte for the above said operating condition resulted in the following values namely: pH 7.2, COD 165 mg/L, BOD₅ 105 mg/L, TOC 120 mg/L, total chlorine 120 mg/L, turbidity 27 NTU and temperature 53 °C, respectively. The energy requirement were found to be 30 and 46 Wh/L, while treating 24 L of SMR wastewater at 2 and 3% sodium chloride concentration at a current density 74.5 mA/cm². The observed energy difference was due to the improved conductivity at high sodium chloride content.

Keyword: Electrolytic treatment, Standard Malaysian Rubber process wastewater, Hypochlorous acid, Chlorine, In situ oxidation, Electrochemical