



## Efficiency analysis of electro-Fenton combined with coagulation process for the degradation of natural rubber latex processing and production waste waters using bench-scale reactor

S. Devi<sup>a</sup>, S. Adishkumar<sup>b,\*</sup>, J. Rajesh Banu<sup>c</sup>

<sup>a</sup>Department of Civil Engineering, Government Polytechnic College, Thoothukudi, India, Tel.+91 9940214464, email: devi\_selvaraj07@yahoo.co.in (S. Devi)

<sup>b</sup>Department of Civil Engineering, University V.O.C College of Engineering, Anna University, Thoothukudi Campus, Thoothukudi, India, Tel. +91 9841339016, Fax 0462-2552877, email: adishk2002@yahoo.co.in (S. Adishkumar)

<sup>c</sup>Department of Civil Engineering, Regional Campus of Anna University, Tirunelveli, India, email: rajeshces@gmail.com (J.R. Banu)

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### ABSTRACT

Degradation of latex wastewater contaminated with a mixture of organic compounds has become a unique challenge among the researchers. An effort was initialized to treat the latex wastewater using electro-Fenton process followed by coagulation. Wastewater collected from the natural rubber latex processing and production industries were treated using bench scale reactor with hopper bottom of 5 L working volume equipped with iron anode and graphite cathode and the effect of COD and colour removal were studied. Response surface methodology based on central composite design (CCD) was performed to evaluate the optimal values of parameters such as pH, Fe<sup>2+</sup> concentration, H<sub>2</sub>O<sub>2</sub> concentration and current intensity of electro-Fenton process. In latex processing wastewater, 82% COD removal and 92% colour removal were achieved in 30 min reaction with an optimal values of pH-3.5, Fe<sup>2+</sup> -573 mg/L and H<sub>2</sub>O<sub>2</sub> -7424 mg/L. In case of latex production wastewater, COD removal and colour removal were 85% and 91% corresponds to an optimal values of pH -4.1, Fe<sup>2+</sup> -378 mg/L and H<sub>2</sub>O<sub>2</sub> -3170 mg/L. The worked out operational cost per kg of COD reduction were 7 \$ and 8.5 \$ for production and processing wastewater respectively. The results obtained revealed that electro-Fenton process could be a valuable treatment against the conventional treatment methods for latex wastewater.

*Keywords:* Latex wastewater; Coagulation; Electro-Fenton; Bench-scale reactor; Iron anode; Graphite cathode; Response surface methodology; CCD.

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\*Corresponding author.