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Computational Fluid Dynamics and Experimental Evaluation of Two Batch Type Electrocoagulation Stirred Tank Reactors Used in the Removal of Cr (VI) from Waste Water

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Abstract : In this study, hydrodynamics analysis of two batch type electrocoagulation stirred tank reactors, used for the electrocoagulation treatment of Cr(VI) wastewater, was carried using computational fluid dynamics (CFD). The aim of the study was to evaluate the impact of mixing characteristics on overall performance of electrocoagulation reactor. The CFD simulations were performed using ANSYS FLUENT 14.4 software. The mixing performance of each reactor was evaluated by numerically modelling tracer dispersion in each reactor configuration. The uniformity in tracer dispersion was assumed when 90% of the ratio of the maximum to minimum concentration of the tracer was realized. In parallel, experimental evaluation of both the electrocoagulation reactors for removal of Cr(VI) from wastewater was also carried out. The results of CFD and experimental analysis clearly show that the reactor which can give higher uniformity in lesser time, will perform better as an electrocoagulation reactor for removal of Cr(VI) from wastewater.

Keywords : CFD, stirred tank reactors, electrocoagulation, Cr(VI) wastewater
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