

Zero Valent Iron Algal Biocomposite for the Removal of Crystal Violet from Aqueous Solution: Box-Behnken Optimization and Fixed Bed Column Studies

Authors : M. Jerold, V. Sivasubramanian

Abstract : In this study, nano zero valent iron *Sargassum swartzii* (nZVI-SS) biocomposite a marine algal based biosorbent was used for the removal of simulated crystal violet (CV) in batch and continuous fixed bed operation. The Box-Behnken design (BBD) experimental results revealed the biosorption was maximum at pH 7.5, biosorbent dosage 0.1 g/L and initial CV concentration of 100 mg/L. The effect of various column parameters like bed depth (3, 6 and 9 cm), flow rate (5, 10 and 15 mL/min) and influent CV concentration (5, 10 and 15 mg/L) were investigated. The exhaustion time increased with increase of bed depth, influent CV concentration and decrease of flow rate. Adam-Bohart, Thomas and Yoon-Nelson models were used to predict the breakthrough curve and to evaluate the model parameters. Out of these models, Thomas and Yoon-Nelson models well described the experimental data. Therefore, the result implies that nZVI-SS biocomposite is a cheap and most promising biosorbent for the removal of CV from wastewater.

Keywords : algae, biosorption, zero-valent, dye, wastewater

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