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Use of Box–Behnken design of experiments for the adsorption of chromium using immobilized macroalgae

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ABSTRACT

Optimization experiments were carried using three-level Box–Behnken design for the adsorption of chromium onto immobilized macroalgae. The influence of independent parameters such as pH (2–8), temperature (303–333 K), and initial chromium concentration (20–100 mg/L) towards chromium ions removal has been performed. Second-order polynomial models were developed for the responses. The significance of the independent parameters and their interactions were investigated using the analysis of variance. The three-dimensional (3-D) response surface plots were used to study the interactive effects of the independent parameters on the chromium removal efficiency. The maximum Cr(VI) removal efficiency of 90.52, 90.86 was observed for *Enteromorpha* sp. immobilized in sodium alginate (ESA), *Enteromorpha* sp. immobilized in polysulfone (EPS), and maximum observed total chromium removal efficiency of 81.14, 79.90 was obtained for ESA, EPS, respectively. The observed value was in good agreement with the predicted values. These results indicated that immobilized macroalgae could be used for the removal of chromium from aqueous solution.

Keywords: Box–Behnken design; Adsorption; Immobilization; Macroalgae; Chromium removal

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