Optimization study of biosorption parameters for removal of fluoride using *Murraya koenigii* leave biomass by response surface methodology

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Abstract

The present research work highlights the effective application of *Murraya koenigii L* leave biomass as a new and alternative biosorbent for effective removal of fluoride from drinking water. Biomass derived from the leaves of *Murraya koenigii L* was investigated for the removal of fluoride ions from synthetic solutions. Batch response surface methodology experiments were performed to examine the efficiency of the biosorbent. The optimum conditions for *Murraya koenigii L* for maximum removal of fluoride found to be pH=6.5, biosorbent dose of 100mg, contact time 75 minutes and initial fluoride ion concentration 4mg/L. Before and after experiment *Murraya koenigii L* leave sorbent was examined for its morphological and functional groups presence on the surface by using Scanning Electron Microscope (SEM) and Fourier Transform infra red spectroscopy (FTIR) respectively. The SEM and FTIR data reveals the suitable surface and the presence of chemical functional groups such as hydroxyl, amide, carbonyl acid and primary amine on the biosorbent surface contributes to biosorption. Isothermal and kinetic models applied to know the sorption mechanism. These findings revealed that prepared biosorbent based on *Murraya koenigii L* leaves can be used as an effective, low-cost, eco friendly biosorbent for the removal of fluoride from aqueous solutions as well as real field water samples.

Key words: Fluoride, biosorption, pH, contact time, biosorbent dose.