



## Biosorption of fluoride from drinking water using spent mushroom compost biochar coated with aluminum hydroxide

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### ABSTRACT

A low-cost and highly efficient biosorbent for the removal of fluoride from drinking water from spent mushroom compost (SMC) that was carbonized (spent mushroom compost biochar, SMCB) coated by aluminum hydroxide. Adsorption studies were performed to investigate the influence of adsorbent dosage, initial fluoride concentration, contact time, pH, and coexisting ions on fluoride adsorption. The fluoride adsorption capacity of the coated SMCB was greater than that of uncoated SMCB. Fluoride adsorption by coated SMCB followed the Langmuir isotherm model, and the maximum adsorption capacity was 36.5 mg/g. The fluoride concentration could be reduced to below 1 mg/L from an initial fluoride concentration of 10 mg/L. While the pH of the solution did play an important role in the fluoride removal capacity, with the SMCB performed well under a wide pH range, from 6.0 to 8.0. These findings indicate that fluoride can effectively be removed from drinking water using modified mushroom cultivation waste biomass.

*Key words:* Spent mushroom compost (SMC); Fluoride; Adsorption; Aluminum hydroxide; Drinking water

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