

Fixed bed column performance of *Tinospora cordifolia* for defluoridation of water

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ABSTRACT

A continuous adsorption study in a fixed-bed column was carried out by using *Tinospora cordifolia* as an adsorbent for the removal of fluoride from aqueous solution. The effect of flow rate, influent fluoride concentration and bed depth on the adsorption characteristics of adsorbent was investigated at pH 7. The dependencies of breakthrough curves on these parameters were confirmed from the data obtained. Modeling of data was done. Thomas, Yoon–Nelson and Adams–Bohart models were applied to experimental data to predict the breakthrough curves. These kinetic models were helpful to determine the characteristic parameters of column designing for defluoridation on a large scale. Thomas and Yoon–Nelson models were found to be more suitable for the description of the breakthrough curve than the Adams–Bohart model in the present study. It was concluded that the *Tinospora cordifolia*-packed column can be used for effective defluoridation of water.

Key words | adsorption, fluoride, kinetic studies, mathematical models, Menispermaceae

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HIGHLIGHTS

- Large scale removal of fluoride from waste water.
- Low cost removal method of removing fluoride from water.
- Environment-friendly defluoridation method.
- Removal at neutral pH.
- Effective regeneration of adsorbent.

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