

Removal of fluoride on bone and its composites from aqueous solution

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Background and Aims: The presence of fluoride in drinking water has dual significance. At lower concentrations, it guards our teeth against cavities, but at higher concentrations impart ' fluorosis ' in varying proportions. In some parts of Iran especially in Kerman Province, the severe contamination of drinking water with excess fluoride, acquired a public health problem triggering defluoridation research. In this research powdered bone and powdered composite including bone was used as an efficient adsorbent for removal of fluoride from drinking water.

Methods: Fluoride concentration was determined using an ion selective electrode and potentiometric method. It was optimized regarding to the pH of fluoride solutions. The sorption of fluoride on powdered bone and powdered composite including bone was carried out both in continuous flow column and batch type system. Parameters such as time, pH, kind and amount of adsorbent, capacity of the adsorbent, ionic strength, temperature and effects of some anions were investigated.

Results: Dynamic range of the method was obtained in the range of 0.05-9.00 mg/L. RSD% of the method for both inter- and intra- day precision was less than 0.3%. Accuracy of the method was greater 98.1% (error% less than 2.8). Results showed that around 97.2 and 98.7% of fluoride content of drinking water after first pass through the columns containing of adsorbents (powder bone and powder composite including bone) was rapidly removed. Results of adsorption were best fitted on Langmuir equation that describes its monolayer adsorption.

Conclusions: These types of adsorbents are cheap, have less pollution and easily operated. It can be concluded that a filter composed of powder bone as powder composite including bone can be successfully used for removing excess amounts of fluoride from drinking water .

Keywords: Fluoride; Bone; Bone Composite