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A study on removal of fluoride ions using Aloe Barbadensis as a low- cost natural adsorbent

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ABSTRACT

The study assessed the suitability of low-cost natural adsorbent to effectively remediate fluoride contaminated water. The removal of fluoride from aqueous solution by using Aloe Barbadensis was studied in batch technique. Influence of pH, adsorbent dose, contact time, co ions, speed and initial concentration on the adsorption were investigated. The maximum removal of fluoride ion was obtained at pH 7. The removal of fluoride was expressed with Langmuir and Freundlich isotherm. It was found that the sufficient time for adsorption equilibrium of fluoride ion is 1 hour. The removal of fluoride ions was maximum for the adsorbent dosage of AB is 10mg 50mL^{-1}. The fluoride adsorption was maximum at 60min. The adsorption of F^- ion was maximum in the shaking speed of 120 rpm. The presence of interfering ions such as nitrate showed positive effect while carbonate, sulphate, chloride showed little negative effect and phosphate showed high negative effect for the adsorbent. The optimum initial F concentration for AB adsorbent was 5mg 50mL^{-1}.

Keywords: Fluoride, AB-Aloe Barbadensis, low-cost natural adsorbent.