

## **Write up for news item in Abdul Kalam Technology Innovation National Fellowship**

### **Adsorption based fluoride removal technology from ground water by Aluminum substituted hydroxyapatite (Al-HAp) incorporated wood charcoal**

Presence of excess fluoride ( $F^-$ ) in groundwater from geogenic sources is one of the major environmental issues of drinking water contamination across the Globe. Around 200 million people in numerous locations in Asia, Europe and Africa are suffering from drinking water with an excess amount of fluoride. Excess fluoride can cause dental and skeletal fluorosis and also cause neurological disorder in severe cases. In India, fluoride concentration in groundwater is found as high as 35 mg/l, whereas, the guideline value of  $F^-$  in drinking water as suggested by World Health Organization (WHO) is 1.5 mg/l. A wide range of methods have been utilized to remove fluoride from drinking water, including adsorption, chemical precipitation, membrane separation, ion exchange etc. Among these, adsorption is the most commonly utilized method using activated alumina, bone char, carbons, metal oxides etc., as adsorbents. These adsorbents may not be appropriate for commercial applications due to their low efficiency, difficulty to run in packed column, and sometimes religious issues (e.g., bone char).

Under the ambit of Abdul Kalam Technology Innovation National Fellowship, Prof. Sirshendu De and his team have developed an innovative technology for fluoride removal. In this technology, Aluminum substituted hydroxyapatite (Al-HAp) incorporated wood charcoal was synthesized by very simple chemical route at room temperature. Al-HAp was synthesized by soaking the aqueous solution of  $Al^{3+}$ ,  $Ca^{2+}$  and  $PO_4^{3-}$  ions into the porous wood charcoal matrix followed by precipitation of Al-substituted HAp by alkali treatment. The material was washed and dried in oven to get the final adsorbent. The adsorbent shows excellent fluoride removal capacity of 24 mg/g. The adsorbent was packed in a column to develop a domestic Two of such domestic filters of maximum filtration capacity of 100 l/day have been deployed in Bankura district of West Bengal and those are running successfully for last two months with an expected life of about one year without regeneration. Till now three entrepreneurs showed their interest to procure this technology.