

The Removal of Hardness and Fluoride in Drinking Water by Electrocoagulation

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Hardness of water decreases its suitability for drinking as well as leads to industrial problems. On the other hand presence of excess fluoride in drinking water has effects on human health such as dental fluorosis and skeletal fluorosis. Also excess fluoride indirectly helps to develop a kidney disease known as chronic renal failure. In the developed world household units are available for the removal of hardness which are not affordable in countries of our region due to high capital. and maintenance cost involved. The objective of this study is to devise a domestic water filter using locally available raw material thus reducing the cost to a great extent. Electro coagulation is used because of its simplicity. Six electrode plates of size 30 x10 cm and 5 mm thickness made of aluminum are dipped into the fluoride rich hard water in a 51 container. A current of 1 A is passed through for a period of 30 minutes while circulating the water. Thereafter water with the floc is allowed to settle overnight before filtration. After each operation it is necessary to clean the detachable electrodes well to get the optimum conditions. In Electro coagulation, aluminum (from anode) is electro chemically dissolved into the solution, reacting with the hydroxyl ion (from cathode) to form complexes of aluminum hydroxides and fluorides. In addition bicarbonates converted to carbonates deposit on the cathode. The Al hydroxides flocculate and coagulate the suspended solids purifying the water thus reducing hardness and fluoride. The percentage reduction of total hardness is in the range 40 to 50%, alkalinity 25 to 30% and fluoride 60 to 90%.The cost of the unit is Rs. 10,000/= and the maintenance cost is negligible. A vessel for settling the water and a normal water filter are also required for the complete operation.

Key words: Removal of Hardness, Fluoride, Electrocoagulation