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FLUORIDE REMOVAL FROM GROUNDWATER USING HYBRID CYLINDRICAL ELECTROCOAGULATION REACTOR

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Long-term consumption of water containing excessive fluoride can lead to fluorosis of the teeth and bones. Electrocoagulation is an electrochemical technique, in which a variety of unwanted dissolved particles and suspended matter can be effectively removed from an aqueous solution by electrolysis. Semi-continuous flow experiments for fluoride removal were undertaken to investigate the effects of the different parameters such as: applied voltage (10 – 20 V), flow rate (150 – 450 mL/min), initial pH (6 – 8), and initial fluoride concentration (2 – 10 mg/L) at lowest cost with novel reactor. The maximum of 8 mg/L fluoride was treated up to the World Health Organization drinking limits within 30 min residual time at a flow rate of 300 mL/min, with an applied voltage of 15 V at influent pH 7. The results obtained, showed that this novel semi-continuous flow electrocoagulation reactor is efficient for defluoridation of ground water supplies at lower cost.

Keywords: defluoridation, coagulant, ground water, flocs, sludge.

Introduction

Fluoride is an essential element to the human body. But at higher levels above than 1.5 mg/L consumption causes fluorosis. The main source of fluoride intake to the human being is drinking water. Groundwater is an important source of drinking water in widely ranged arid and semi-arid area [1]. Fluoride pollution in environment occurs through two different channels: natural sources and anthropogenic sources. Geochemical reactions in sub-surface and erosion of fluoride bearing rocks contribute fluoride to ground water. The discharge of industrial wastewater, such as semiconductor industries, aluminum industries and glass manufacturing industries, also contributes fluoride into water reserves, especially to groundwater [2]. Because of this the concentration

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Received 17.10.2016
Revised 23.05. 2017
Accepted 21.03. 2019