



Defluoridation of commercial and analar sodium fluoride solutions without using additives by batch electrocoagulation-flotation technique

Mona M. Naim^a, Abeer A. Moneer^{b,*}, Ghada F. El-Said^b

^aChemical Engineering Department, Faculty of Engineering, Alexandria University, Alexandria, Egypt

^bMarine Pollution Department, Environmental Division, National Institute of Oceanography and Fisheries, Qyet Bay, El-Anfoushy, Alexandria, Egypt

Tel. +01222590830; Fax: +2034801174; email:yrwah@yahoo.com

Received 20 April 2011; Accepted 29 November 2011

ABSTRACT

Electrocoagulation-flotation (ECF) process evades many of the defects of chemical processes and considered as a simple low cost one for fluoride removal. The present work deals with defluoridation of different sodium fluoride solutions of both analar (AR) and commercial grades using bipolar and monopolar ECF. The effect of different variables on the defluoridation process; the initial fluoride solution concentration, speed of agitation, number of electrodes and distances between them, volume of solution, time of experiment, presence of additives and coexisting anions were studied. Complete removal is obtained after 5 min for AR grade (5 mg l^{-1}) and for commercial (4.93 mg l^{-1}) solutions without adding any additives. Monopolar configuration showed more effective removal than the bipolar one. This method is considered as a perfect one in the removal of high concentrations of fluoride in AR and commercial solutions in short time with no environmental risk and can be used in the industrial field. Data was analyzed using statistical programs trying to derive a modeling equation representing the conditions of defluoridation process.

Keywords: Commercial and analar NaF solutions; Tap water; Electrocoagulation-flotation; Defluoridation; Monopolar; Bipolar

*Corresponding author.