

Application and optimization in chromium-contaminated wastewater treatment of the reverse osmosis technology

H. Mohammadi^a, M. Gholami^{b*}, M. Rahimi^b

^a*School of Public Health, Zanjan University of Medical Sciences, Zanjan, Iran*
email: hamedmohammadi1@yahoo.com

^b*School of Public Health, Iran University of Medical Sciences, Tehran, Iran*
Tel. +98 88779118; Fax +98 88779487; email: mitra326@yahoo.com

Received 15 September 2008; Accepted 23 June 2009

ABSTRACT

Chromium (Cr) is essential element used to plate other metals. Electroplating industry's effluents are the most important sources of chromium pollution in the environment. This paper describes a study conducted to determine the efficiency of reverse osmosis (RO) as a membrane filtration technique for removal of Cr from synthetic wastewater samples prepared similar to electroplating effluents. The RO unit used in this study was a spiral wound module of 2521 TE made by a Korean CSM company. Synthetic wastewater samples containing Cr ions at various concentrations of 1–20 mg/L prepared and subjected to treatment by RO, and quantitative analysis accomplished by a colorimetric method. Evaluation of optimized conditions of treatment had also been carried out by determining the effects of changing operating pressure, temperature, and pHs of samples. Optimum conditions of Cr-treatment by RO in 10 mg/L feed Cr concentration were determined to be in pH range of 6–7 and in temperature of about 25°C at an applied pressure of 200 psi. Considering the efficiency of Cr removal, which was as high as 99% at the optimized conditions it could be, concluded that RO membrane process may selected and developed as an effective alternative for treatment of metal-contaminated effluents of electroplating and similar industries.

Keywords: Reverse osmosis (RO); Chromium; Electroplating industry; Wastewater treatment

* Corresponding author.