Desalination and Water Treatment
www.deswater.com
5 (2009) 119–123
May
1944-3994 / 1944-3986
doi: 10.5004/dwt.2009.573

Boron removal by membrane processes

Amine Mnif[a], B. Hamrouni[a], M. Dhahbi[b]

[a]*UR Dessalement et Traitement des Eaux, Faculté des Sciences de Tunis, 2092 Manar II, Tunisia*
Tel/Fax : +216 71 87 12 82, email: amine.mnif@gmail.com
[b]*Laboratoire Eau et Technologies Membranaire, CERTE, Technopôle Borj Cédria, BP 273, Soliman 8020, Tunisia*

Received 8 October 2008; Accepted 23 February 2009

ABSTRACT

Boron has been widely distributed in the environment, in most cases at low concentrations. Due to its detrimental effect on the reproducibility of living organisms, the European Union stipulates the maximum admissible value for the concentration of boron at 1 ppm and the World Health Organisation at 0.3 ppm as the non-observed effect level (NOEL) for drinking water. The aim of this work is the boron removal by membrane processes, in particularly the evaluation of the effect of nanofiltration and reverse osmosis membranes, as their coupling was also studied on the elimination of boron. The RO and NF tests were carried out with the use of an Osmonics spiral module equipped with AG 2514 TF and HL 2514T membranes respectively. Using conventional membranes, significant removal of boron has been observed only in its ionic form. Our experimental results indicated that boron rejection mostly depends upon membrane type, pH level, and to a lesser extent on the recovery. More detailed analysis of the above-mentioned results showed that boron can be effectively removed only at a pH shifted feed water close to 11. Initial data on coupling of the two RO/NF membranes are discussed.

Keywords: Boron removal; Reverse osmosis; Nanofiltration

* Corresponding author.

Presented at EuroMed 2008, Desalination for Clean Water and Energy Cooperation among Mediterranean Countries of Europe and the MENA Region, 9–13 November 2008, King Hussein Bin Talal Convention Center, Dead Sea, Jordan.