Desalination and Water Treatment
www.deswater.com

27 (2011) 8–17
March

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doi: 10/5004/dwt.2011.2034

Nanofiltration membranes applied to the removal of saxitoxin and congeners

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Received 20 May 2010; Accepted 20 February 2011

ABSTRACT

Cyanobacterial toxins pose a potential threat to human health and wildlife. Effective treatment processes are essential for the removal of these constituents in drinking water. The efficiency of two nanofiltration membranes (NF-270 and NF-90) in the removal of cyanotoxins of the saxitoxin group from water was investigated. In this work, these toxins were extracted from a laboratory culture of *C. raciborskii* and added to surface water. A working pressure of 8 bar was applied. A filtration time of 180 min was used for each experiment. Total removal (100%) of the identified toxins was obtained with the NF-90 membrane throughout the filtration period. A lower degree of toxin removal was observed with the NF-270 membrane, decreasing with filtration time. Different rejection mechanisms can be considered in the process: size exclusion, electrostatic interactions and hydrophilic interactions, as well as the mechanism of concentration polarization. A larger influence of fouling phenomena was considered for the NF-270 membrane, with a larger drop in the permeate flux. A more stable permeate flux was observed for the NF-90 membrane. These results indicate that the use of nanofiltration technology is effective in the removal of dissolved cyanotoxins in water intended for human consumption.

Keywords: Water supply source; Nanofiltration; Cyanobacteria; Saxitoxin and congeners

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Presented at the VII Ibero-American Conference on Membrane Science and Technology (CITEM 2010), April 11–14, 2010, Sintra, Portugal