Effect of pressure and pH over the removal of disinfection by-products using nanofiltration membranes in discontinuous systems

Irene Sentana*, Manuel Rodríguez, Eloy Sentana, Daniel Prats

Water and Environmental Science Institute, University of Alicante, Spain
Tel. +34 965903400 (Ext. 3654); email: irene.sentana@ua.es

Received 29 April 2009; Accepted 13 May 2010

ABSTRACT

This work studies the reduction by three nanofiltration membranes (NF90, NF270 and Desal-HL) of byproducts of subjecting natural water to a chlorination disinfection method. The studied disinfection byproducts were haloacetic acids (HAAs) and trihalomethanes (THMs). The experiments were carried out using natural water from the Amadorio swamp, evaluating the effects of pressure (between 100 and 400 kPa) and pH (2.7–9.0). The NF270 membrane generated a greater permeate flow (J). An increase in pressure causes an increase in permeate flow without causing large variations in the ratio J/Jo. An increase in the pressure slightly increases the fouling of membranes. For all studied membranes and pressures, the percentage reduction in HAA5 and THMs formation was higher than 82%. An increase in pressure leads to greater generation of disinfection byproducts for NF90 and Desal-HL membranes. All membranes studied at natural water pH (8.2) had lower flow losses. More disinfection byproducts were generated at pH 2.7.

Keywords: Disinfection by-products; Haloacetic acids; Nanofiltration; Trihalomethanes

* Corresponding author.