Selection of nanofiltration membranes as pretreatment for scaling prevention in SWRO using real seawater

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ABSTRACT

Seawater contains high concentrations of sparingly soluble salts which can cause scaling of membrane surface, limiting the productivity and water recovery of seawater reverse osmosis (SWRO). Nanofiltration (NF) pretreatment of seawater, prevents scaling via preferential removal of scale-forming ions. Several studies have shown that the rejection of scale-forming ions is not the same for various membranes. In a previous study, a selection of the best NF membranes for scaling prevention in SWRO was developed using synthetic seawater. The main objective of this study is to test the same NF membranes using real seawater in order to compare the membrane performance using synthetic and real seawater. The seawater used in this study was collected in El Prat de Llobregat (Barcelona). The results obtained showed that the monovalent ions are less rejected in real seawater than in synthetic seawater. However, the rejection of scale forming ions has been practically the same for all membranes in both types of seawater, obtaining a sulphate rejection higher than 90% for the majority of membranes studied, which is highly important for scaling prevention.

Keywords: Nanofiltration; Scaling prevention; Seawater desalination

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