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RO membrane treatment of domestic grey-water containing different detergent types

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ABSTRACT

Water reclamation from grey-water containing detergent and salinity (~2,000 ppm) was carried out using indigenously developed brackish water TFC membrane module (4040 size) at 250 psi operating pressure. Reusable water with <300 ppm inorganic solutes and trace amounts of organic content of detergent origin was produced upon reverse osmosis (RO) treatment of grey-water. The RO module performance in terms of product flux was influenced by the detergent type present in the feed water. While the product flux was rather unchanged for the feed containing a commercial linear alkyl benzene-alfa olefin sulfonate-soda ash based detergent, a significant flux decline (~25%) was observed for the feed containing a commercial C_8–C_{24} primary/secondary ethoxylates based detergent. However, the membrane selectivity in terms of salt rejection was slightly higher for the feed with detergent than that of the detergent-free feed. This can be due to the surface-active agent of the detergent which alters the surface potential of the membrane. This is in agreement with the changes observed by atomic force microscopy (AFM) and the Zeta-potential measurements.

Keywords: Membrane treatment; Wastewater; Grey-water; Surfactant

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