



Pilot scale investigation of low pressure nanofiltration and reverse osmosis membrane techniques for the treatment of El-Salaam canal water, Sinai, Egypt

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ABSTRACT

El-Salaam canal water in Sinai, Egypt is a mixture of agricultural drainage water and Nile water. The canal water is characterized by remarkable monovalent, divalent and trivalent ions and moderate total dissolved solids (TDS) (1300–2400 mg/L). Biologically the raw water is characterized by the existence of total coliform and pathogenic bacteria. The present study is concerned with the treatment investigation of El-Salaam canal water by using pilot plant low pressure nanofiltration (LPNF) and low pressure brackish water reverse osmosis (LPBWRO) membrane separation units to produce water for irrigation and drinking purposes. Hence, the raw water is allowed to be pretreated by using 2.5 mg/L nonionic polymer for coagulation then followed by nanofiltration (NF) separation to produce water of quality suitable for irrigation or followed by brackish water reverse osmosis (BWRO) to produce water of quality suitable for drinking purposes. The LPNF treatment system removed 82% of the TDS, 71–74% monovalent ions and 96% of divalent ions. The LPBWRO system removed 98% of divalent ions (sodium), 98–100% of the divalent ions (calcium and magnesium) and 94% of iron as trivalent ions. Both the NF and BWRO systems remove totally the chemical oxygen demand (COD), biological oxygen demand (BOD), total organic matters (TOC) and suspended solids (SS) the total coliform and the pathogenic bacteria.

Keywords: El-Salaam canal; Pretreatment; Nanofiltration; Reverse osmosis; Economic; Design

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