Performance evaluation of reverse osmosis (RO) pre-treatment technologies for brackish ground water

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**Abstract:**

Desalination of brackish groundwater in Egypt has great potential with respect to the availability of the resource. All major aquifer systems in Egypt contain huge quantities of brackish groundwater. The exploitation of this resource is still limited. With the current cheap price of brackish water desalination, there is a growing interest towards its exploitation. Brackish water RO plants in Egypt confirm the potential of this solution. This paper presents the study of the effect of variation of different operating conditions on the performance of brackish groundwater RO unit. This was achieved experimentally by using brackish water RO (Reverse Osmosis) desalination test rig constructed to simulate environmental conditions and operational parameters for coastal Mediterranean brackish groundwater RO units. Results of experiments at constant feed water parameters showed that: Feed water pressure increases the permeate flow rate and the recovery ratio increase while brine rejected, permeate TDS and specific energy consumption decrease. Feed water TDS increases the permeate flow rate and the recovery ratio decrease while brine rejected, permeate TDS and specific energy consumption increase. Feed water temperature increases the permeate flow rate, permeate TDS and the recovery ratio increase while brine rejected and specific energy consumption decrease. Samples of experimental output parameters were used as ROSA input parameters to check the accuracy of experimental results. However, there were deviations between the experimental results and ROSA results that did not exceed 10 %.