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Integrated approach for brackish water desalination and distribution: which desalination technology to choose?

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ABSTRACT

In the southern part of Tunisia, brackish water is desalinated and blended with raw water to be delivered to the consumer. The desalination technique used is reverse osmosis (RO). However, it is an energy intensive process compared to other water treatment technologies such as nanofiltration (NF). The latter technique is capable of retaining polyvalent ions and could provide the same distributed water quality with much lower energy consumption. In this work, simulations were conducted in order to compare reverse osmosis and nanofiltration performances in brackish water desalination process within arid regions and to determine the best technique for desalting brackish water for lower energy and water consumptions. For a given distributed water quality, specific energy consumption could be reduced by 40% when nanofiltration is used instead of reverse osmosis. Water consumption when NF is applied is reduced as well. The distributed water quality is not significantly affected by applying NF instead of RO. Besides, these environmental aspects, scaling assessment favored NF as well.

Keywords: Brackish Water; Desalination; Reverse Osmosis; Nanofiltration; Simulation; Energy Consumption; Scaling

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