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Brine Reclamation Agriculture Industry Using Forward Osmosis Process

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Abstract

Groundwater is the main source for irrigation water of food crops. The salinity of the ground water exceeds the allowable limit recommended by Food and Agriculture Organization which mandates further treatment before using it for irrigation of food crops. Brackish water reverse osmosis is usually used for the treatment of the ground water due to the ease of use, and small footprint. However, brine reject is produced from the reverse osmosis process, therefore a suitable treatment process must be designed to eliminate the brine discharge to the environment. In this study, we evaluated the performance of element scale forward osmosis process for the reclamation of brine produced by the desalination of brackish ground water. Forward osmosis was used to dilute the reverse osmosis brine reject using treated municipal wastewater as feed solution. The water flux obtained in the forward osmosis process using a hollow fibre membrane module was around 1.5 LMH, while using feed solution flow rate of 2 LPM and draw solution flow rate of 0.3 LPM. The recovery rate achieved in the process was almost 20%, and the water quality of the diluted brine was similar to the brackish ground water.

Keywords: Brine, Forward osmosis, Hollow fiber, Irrigation water, Reverse osmosis