



Saline brine desalination: application of sweeping gas membrane distillation (SGMD)

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ABSTRACT

In this work, desalination of saline brines using the sweeping gas membrane distillation (SGMD) process is investigated. The Taguchi method was applied for optimization of the operating parameters. An L_9 orthogonal array was used to investigate the influence of pertinent variables, including feed temperature (T_f : 45°C, 55°C and 65°C), feed flow rate (Q_f : 200, 400 and 600 mL/min), feed concentration (C_f : 10, 25 and 50 g/L) and sweeping gas flow rate (Q_s : 4, 10, and 16 SCFH) on the distillate flux. Results of the experiments showed that maximum distillate flux, which was about 10 L/m² h, obtained at 65°C feed temperature, 16 SCFH sweeping gas flow rate and brackish water with 10 g/L salt concentration were used. Feed temperature with a contribution of 52.8% had the major effect on the distillate flux. Moreover, the sweeping gas flow rate was found to be more effective compared with the feed flow rate, indicating the significance of the distillate side role in the SGMD process when it is used for brine desalination.

Keywords: Desalination; Saline brine; Sweeping gas membrane distillation; SGMD; Distillate flux

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