

Prediction of brine evaporation rate based on response surface methodology and artificial neural network

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Received 14 March 2021; Accepted 4 June 2021

ABSTRACT

In this study, a Box–Behnken design was carried out to investigate the effects of radiation intensity, environment temperature, relative humidity, brine temperature, wind speed and brine concentration on the brine evaporation rate. The predictive abilities of response surface methodology and artificial neural networks were compared. The results showed that root mean square error for new data by the response surface method and artificial neural network models is 0.265 and 0.125, respectively; whereas the coefficient of determination is 0.773 and 0.940, respectively; and the standard error of prediction is 29.26% and 13.77%, respectively. It indicating that the artificial neural network model has much higher modeling abilities and generalization abilities than the response surface methodology model. Thus, the artificial neural network model is much more stable and accurate to be used in predicting brine evaporation rate in comparison to the response surface methodology model.

Keywords: Response surface methodology; Artificial neural network; Brine evaporation rate; Salt Lake

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