

Short-range forecast of permeate flux in detergent wastewater ultrafiltration

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ABSTRACT

Wastewater purification is very crucial nowadays and new techniques like low-pressure driven membrane processes are developed to obtain the sufficient productivity and high efficiency of cleaning. However, selection of membrane requires long-lasting tests. The new methods like artificial neural networks (ANN) are essential to avoid time consuming laboratory measurements. In the article the permeate flow rate of detergent waste water was forecasted using ANN. In order to predict the flow rate, the network used short-range time series regression. During two days of continuous measurements (every 5 min) the following parameters were measured: temperature of wastewater, recirculation flow rate, inlet pressure and outlet pressure. Those parameters were considered as inputs to the network while permeate flow rate as output value. The best created network (with the highest value of Pearson correlation coefficient and the lowest value of training error) was characterised by the following parameters: hyperbolic tangent and sine function of activation, quasi-Newton method of learning, 4 input neurons, 8 hidden neurons and 1 output neuron.

Keywords: Flow rate; Detergent wastewater; Ultrafiltration; Short-range forecast; Time series; Artificial neural network

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