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ANN Modeling for Cadmium Biosorption from Potable Water Using a Packed-Bed Column Process

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Abstract : The recommended limit for cadmium concentration in potable water is less than 0.005 mg/L. A continuous biosorption process using indigenous red seaweed, Gracilaria corticata, was performed to remove cadmium from the potable water. The process was conducted under fixed conditions and the breakthrough curves were achieved for three consecutive sorption-desorption cycles. A modeling based on Artificial Neural Network (ANN) was employed to fit the experimental breakthrough data. In addition, a simplified semi empirical model, Thomas, was employed for this purpose. It was found that ANN well described the experimental data (R2>0.99) while the Thomas prediction were a bit less successful with R2>0.97. The adjusted design parameters using the nonlinear form of Thomas model was in a good agreement with the experimentally obtained ones. The results approve the capability of ANN to predict the cadmium concentration in potable water.

Keywords : ANN, biosorption, cadmium, packed-bed, potable water
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