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A NOVEL APPROACH FOR MODELING Cu^{2+} AND Zn^{2+} ADSORPTION FROM INDUSTRIAL LEACHATE BY PEANUT SHELLS

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Abstract

In this work the adsorption of Cu^{2+} and Zn^{2+} from industrial wastewater by peanut shells without any pretreatment was investigated through optimization techniques such as a feed-forward back-propagation artificial neural network and a simplex algorithm. The Levenberg-Marquardt algorithm was the best back-propagation algorithm, with a minimum mean squared error of 0.000217 for Cu(II) and of 0.000229 for Zn^{2+}. Mean square error on the validation set is used as an estimate for variance. According to the optimization technique, the optimal values of the input quantities were calculated. Furthermore, the effect of each decision variable on the percentage of removal was studied separately to achieve the maximum adsorption of Cu^{2+} and Zn^{2+}. The ability for the removal of Cu^{2+} and Zn^{2+} were assessed by the percentage removed. The maximum percentages removed were calculated as 94.97% and 87.89% for Cu^{2+} and Zn^{2+}, respectively. Moreover, the results are also compared to the ones obtained from statistical analysis.

Key words: artificial neural network, copper, peanut shell, simplex algorithm, zinc

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