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REMOVAL OF TURBIDITY AND HUMIC ACIDS USING CHITOSAN AS A COAGULANT AID: MODELING WITH ARTIFICIAL NEURAL NETWORK

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Abstract

In the present study, the effect of chitosan as an eco-friendly coagulant aid was investigated for removing turbidity (bentonite) and humic acid (HA) in the coagulation process. The effects of various operational parameters such as initial pH of the solution (4-9), dosage of chitosan (1-4.5 mg/L), dosage of alum (10-40 mg/L) and initial turbidity (10-150 NTU) were investigated. An artificial neural network (ANN) model was used to predict the performance of turbidity removal efficiencies by coagulation with alum and chitosan based on experimental data obtained in a jar test set up. The experimental results showed that the optimal turbidity removal rate was obtained at pH 7-7.5 (43%) for alum at dosage of 15 mg/L and pH 7 (82%) for combined alum and chitosan (CAC) at the dosages of 15 and 2.5 mg/L, respectively. The alum and chitosan dosages were found to be very important factors that significantly affected turbidity removal. The results showed that the turbidity removal efficiency was improved from 53 to 92% as initial turbidity increased from 10 to 150 NTU. The HA removal efficiency was 37 and 62% for alum alone (60 mg/L) and CAC (40 mg/L of alum and 5mg/L of chitosan), respectively. A comparison between the model results and laboratory experimental data gave a high degree of correlation that indicated the model was able to describe the turbidity removal efficiency with high accuracy.

Key words: alum, artificial neural network, chitosan, humic acid, turbidity

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