

ADSORPTIVE REMOVAL OF ZINC BY BENTONITE: APPLICATION OF TIME SERIES MODELING METHOD

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Abstract: Zinc (II) removal using low-cost sorbents requires a proper process parametric study to determine its optimal performance characteristics. In this respect, the present study proposes a new modeling and simulation procedure for heavy metal removal system and is carried out to optimize input variables such as initial pH, adsorbent dosage, and contact time for biosorption of Zinc (II) by using bentonite. The proposed experimental system is cost-effective and requires less calculation for determining optimal values, i.e., input variables and their related removal capacity, $R_{em}\%$. To optimize the adsorption process, cubic spline curve fitting and numerical differentiation techniques are used for required calculations. According to the proposed calculations, the removal capacity is calculated as 98.66%, while the optimal values are calculated as initial pH – 6.76, adsorbent dosage – 1.14 g L⁻¹, contact time – 13 minutes. To evaluate the results, full factor experimental design and 3 way ANOVA test are used for comparison.