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**NEURAL FUZZY MODELIZATION OF COPPER REMOVAL FROM WATER
BY BIOSORTION IN FIXED-BED COLUMNS USING OLIVE STONE
AND PINION SHELL**

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Abstract

Continuous copper biosorption in fixed-bed column by olive stone and pinion shell was studied. The effect of three operational parameters was analyzed: feed flow rate (2-6 ml/min), inlet copper concentration (40-100 mg/L) and bed-height (4.4-13.4 cm). Artificial Neural-Fuzzy Inference System (ANFIS) was used in order to optimize the percentage of copper removal and the retention capacity in the column. The highest percentage of copper retained was achieved at 2 ml/min, 40 mg/L and 4.4 cm. However, the optimum biosorption capacity was obtained at 6 ml/min, 100 mg/L and 13.4 cm. Finally, breakthrough curves were simulated with mathematical traditional models and ANFIS model. The calculated results obtained with each model were compared with experimental data. The best results were given by ANFIS modeling that predicted copper biosorption with high accuracy. Breakthrough curves surfaces, which enable the visualization of the behavior of the system in different process conditions, were represented.

Keywords: *ANFIS; biosorption; copper; heavy metals; simulation; wastewater treatment*

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