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# OPTIMIZATION OF REDUCTION OF COPPER USING *Stenotrophomonas maltophilia* PD2 BIOMASS AND ARTIFICIAL NEURAL NETWORK MODELING

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## Abstract

Copper resistant bacteria, *Stenotrophomonas* species was isolated from a soil from Dhapa, a solid waste disposal site at Kolkata, India. This copper-resistant bacteria *Stenotrophomonas maltophilia* strain PD2 which can reduce copper from aqueous solution, was isolated and reported for the first time. Dead bacterial biomass prepared and used to remove Cu (II) from aqueous solution was investigated using batch techniques. The influence of different parameters on copper uptake by dried biomass, such as initial copper concentration and initial pH of the solution was studied at different intervals of time. A maximum of 83% copper removal efficiency was obtained using 0.5g biomass and 50 mg $L^{-1}$ copper concentration. Optimization of process parameters was performed using Response Surface Methodology (RSM). The multiple corelation coefficient ($R^2$) was found to be 0.9990. The deviation between theoretical and experimental results was 0.016%. Computational simulated artificial neural network (ANN) was developed to get a good correlation between the input variables responsible for copper removal and the output parameter (% removal) of the process. The correlation coefficient (R) of ANN is 0.958. The optimization procedure of biosorption showed a close interaction between the experimental and simulated values of copper removal.

*Key words:* Artificial Neural Network (ANN), biosorption, Copper (II) resistant bacteria, optimization, Response Surface Methodology (RSM)

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