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BIOSORPTION OF ZINC (II) FROM AQUEOUS SOLUTIONS BY NONLIVING LICHEN BIOMASS OF *Xanthoria parietina* (L.) Th. Fr.

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Abstract

In this study, the biosorption of zinc(II) ions from the aqueous solutions by the lichen biomass of *Xanthoria parietina* (L.) Th. Fr. was studied as a function of contact time, initial pH of metal solution, biosorbent concentration, initial metal ion concentration and stirring speed in a batch system. The optimum pH value for maximum zinc biosorption was found to be 5.5. Concentration intervals from 50 mg/L to 250 mg/L were tested and it was observed that the biosorption efficiency depends on the ratio of the zinc ion concentration to the biomass concentration. The Langmuir and Freundlich models were used to describe the adsorption equilibrium of zinc on the lichen biomass of *Xanthoria parietina* (L.) Th. Fr. The experimental adsorption data were fitted to the Langmuir adsorption model better than the Freundlich adsorption model. The adsorption capacity (Q_{max}) calculated from Langmuir isotherm was 33.78 mg Zn(II)/g. In addition the experimental data were analyzed using the first and second-order kinetic models and the second-order kinetic model possess high correlation coefficient values of 0.93–0.99 for the lichen biomass. The FTIR technique was used in identifying the chemical groups involved in the sorption of zinc ions. The results showed that the lichen biomass of *Xanthoria parietina* is an effective biosorbent for removing zinc(II) ions from aqueous solutions.

Key words: biosorption, equilibrium, kinetics, lichen, zinc (II) ions

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