Biosorption of nickel (II) and copper (II) ions from aqueous solution using novel biomass derived from Nannorrhops ritchiana (Mazri Palm)

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\textbf{ABSTRACT}

In the present research work, Nannorrhops ritchiana (Mazri Palm) was used as an effective biosorbent for removal of Cu\textsuperscript{2+} and Ni\textsuperscript{2+} ions from aqueous solution. Nannorrhops ritchiana (Mazri Palm), a dead biomass powder, was used as a low-cost adsorbent without any chemical treatment. In order to estimate the equilibrium parameters, the equilibrium adsorption data were analyzed using Freundlich, Langmuir, and Temkin isotherms. Freundlich isotherms indicated that the sorption capacities on the biomass surfaces increased with increasing initial concentrations of both metals. The adsorption isotherms were correlated with a comparison of linear and non-linear regression analysis. The squares of the errors (SSE) and chi-square test ($\chi^2$) along with the coefficient of determination ($R^2$) were used to determine the best fit isotherm. Langmuir type I was found the best fitting isotherm for adsorption of both Cu\textsuperscript{2+} and Ni\textsuperscript{2+} ions as compared to the other three Langmuir linear isotherms on the basis of the values for $R^2$ and other error functions like SSE and $\chi^2$ obtained from Langmuir-type I linear equation. The present study revealed that Nannorrhops ritchiana proved to be an effective, inexpensive, alternative, and environmentally friendly biosorbent for the removal of Cu\textsuperscript{2+} and Ni\textsuperscript{2+} ions from aqueous solution.

\textbf{Keywords:} Nannorrhops ritchiana; Biosorption; Cu and Ni; Adsorption isotherm

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