 Isotherm models for the nickel(II) biosorption using dead fungal biomass of *Aspergillus awamori*: comparison of various error functions

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\textbf{ABSTRACT}

In this research, the equilibrium sorption of nickel(II) by inexpensive dead fungal biomass of *Aspergillus awamori* was explained using the linear and nonlinear regression analysis of Freundlich, Langmuir, Temkin, and Redlich–Peterson isotherms. In the case of nonlinear regression method, the best fitting model was evaluated using six different error functions, namely coefficient of determination ($r^2$), chi-square test ($\chi^2$), hybrid fractional error function (HYBRID), Marquardt’s percent standard deviation (MPSD), average relative error (ARE), and sum of the errors squared (SSE). The $r^2$ function was found to be a better option to minimize the error distribution between the experimental equilibrium data and the predicted two-parameter isotherms. In the case of three-parameter isotherm, HYBRID was found to be the best error function to minimize the error distribution structure between experimental equilibrium data and theoretical isotherms.

\textbf{Keywords}: Biosorption; Nickel(II); Equilibrium isotherm; Error functions; Regression analysis

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