Biosorption of toxic acidic dye–Acid Blue 25, by aquatic plants

Masoud Kousha\textsuperscript{a}, Ehsan Daneshvar\textsuperscript{a, *}, Ali Reza Esmaeili\textsuperscript{a}, Hamid Zilouei\textsuperscript{b}, Keikhosro Karimi\textsuperscript{b}

\textsuperscript{a}Department of Fisheries, Faculty of Natural Resources, Isfahan University of Technology, Isfahan 84156, Iran
Tel. +98 917 8391732; email: ehsandaneshvar_iut@yahoo.com
\textsuperscript{b}Department of Chemical Engineering, Isfahan University of Technology, Isfahan 84156, Iran

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\textbf{ABSTRACT}

The adsorption of Acid Blue 25 (AB25) ions by aquatic plants, \textit{Potamogeton pusillus} and \textit{Ceratophyllum demersum} from aqueous solutions was studied. The adsorption was studied as a function of solution pH (2–11), contact time (0–60 min), biomasses dosage (0.1–2.5 g/L), initial dye concentration (30–100 mg AB25/L), biosorbents particle size (53–500 \textmu m), addition of neutral salts (20–100 mg KNO\textsubscript{3}/L and 20–100 mg KH\textsubscript{2}PO\textsubscript{4}/L), and salinity (0.5–40 g NaCl/L). The results of equilibrium adsorption were successfully described through Freundlich and Temkin isotherm for both of the biosorbents. Maximum adsorption capacity of 183.46 and 129.68 mg/g were observed for \textit{P. pusillus} and \textit{C. demersum}, respectively. Different kinetic models including pseudo-first order, pseudo-second order, and intra-particle diffusion were examined, and the pseudo-second order was shown to be the best model to fit the adsorption kinetics data. Thermodynamic parameters demonstrated that adsorption of AB25 ions was spontaneous and endothermic at a temperature range of 10–40\degree C. FTIR analysis confirmed the responsibility of several functional groups on the surface of the biosorbents for the adsorption of AB25 in this process.

\textbf{Keywords:} Biosorption; Aquatic plants; Acid Blue 25 dye; \textit{Potamogeton pusillus}; \textit{Ceratophyllum demersum}

\textsuperscript{*Corresponding author.