Lead(II) Biosorption Characteristics Onto Waste Biomass Of Phaselius vulgaris L.

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The aim of this research is to investigate the possible use of Phaseolus vulgaris L. waste as an alternative biosorbent material for the removal of lead(II) ions from aqueous solutions. It is abundantly available agricultural material and it was chosen as a biosorbent material due to a lack of information on its biosorption abilities. Biosorption of lead(II) ions onto Phaseolus vulgaris L. waste was investigated with the variation in the parameters of pH, contact time, biosorbent and lead(II) concentrations and temperatures. The maximum biosorption capacity of biosorbent for the removal of lead(II) was obtained at pH 5. The lead(II) biosorption equilibrium was attained within 20 min. The biosorption equilibrium data fitted well to the Langmuir and Dubinin-Radushkevich (D-R) isotherm models. Maximum biosorption capacity (q_{max}) of biosorbent for lead(II) ions was 2.064x10^{-4} mol g^{-1} or 42.77 mg g^{-1} at 20°C. The negative values of ΔG° confirm a favorable biosorption of lead(II) onto P. vulgaris L. waste and the positive value of ΔH° leads to an endothermic nature of biosorption. The nature of the possible biosorbent and metal ion interactions was examined by the FTIR technique.

It may be concluded that P. vulgaris L. waste can be used for elimination of heavy metal pollution from wastewater because it is a low-cost, abundant, waste and locally available biosorbent.

References