

Adsorption of Pb(II) ions on Spirulina biomass: An eco-friendly process

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Abstract- Heavy metals pose a serious threat as toxic pollutants in the environment. Lead poisoning has been reported to affect several human organs including heart, kidneys, bones, intestines and nervous system. Conventional methods employed to remove toxic heavy metals from environments are very expensive and cause many environmental problems. The use of non-living biomass of many microorganisms have been recognized to be very effective in biological removal of toxic substances. In this investigation, we report on the biosorption of Pb(II) ions from aqueous solutions by the nonliving biomass of the cyanobacterium *Spirulina platensis*. Propagation of the cyanobacterium was carried out in outside oblong raceway ponds. The biomass was cleaned, dried and used for the investigation. The effect of adsorbent dose, pH, temperature, initial concentration of Pb(II) and contact time by the dry biomass were studied. The experiments were carried out in triplicate in 250 ml conical flasks using an orbital incubator at 150 oscillation/minute. Concentrations of the metal were measured using Atomic Absorption Spectrophotometer. Very high levels of removal (~ 91%) were obtained and the optimum conditions for maximal adsorption of Pb(II) by *S. platensis* were found to be 2 g of adsorbent dose; pH 3; incubation at 26°C; 200 mg/L of Pb(II) as initial concentration and 60 minutes of contact time; for the equilibrium condition. The equilibrium data was described using Langmuir and Freundlich isotherm models. Langmuir isotherm model fitted the equilibrium data better than the Freundlich isotherm model. Results indicated scope for utilization of *S. platensis* dry biomass for removal of heavy metals from aqueous solutions.

Keywords- Biosorption, lead ions, aqueous solutions, *Spirulina*.

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