

## Batch and fixed bed column studies for bio-sorption of Lead Pb(+2) from an aqueous solution using *Gracilaria Corticata*

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### Abstract

Batch and fixed bed column bio-sorption studies were conducted for the removal of lead from aqueous solution using *Gracilaria corticata* algae powder as bio-sorbent. The effects of agitation time, size and dosage of adsorbent, pH, initial concentration of lead and temperature of aqueous solution are studied in this work. The maximum bio-sorption of lead is attained at an equilibrium time of 60 min. The optimum dosage and pH are 20 g/L and 6 respectively at an initial concentration of 20 mg/L at 303.0 K. The monolayer uptake capacity is 5.291 mg/g. The statistical analysis of bio-sorption using Response Surface Methodology (RSM) was studied. The quadratic model for Central Composite Design (CCD) has fitted well to the experimental data. The optimum bio-sorption conditions (CCD) are initial pH = 6.096, initial lead ion concentration = 19.76 mg/L, bio-sorbent dosage = 19.93 g/L and temperature = 303.86 K. The experimental data are well explained by Langmuir, Freundlich and Redlich-Peterson isotherm models. The bio-sorption data follows second order kinetics and the process is feasible, irreversible and endothermic. An up-flow packed bed column is employed to investigate lead bio-sorption as a function of flow rate of aqueous solution, initial lead concentration and bio-sorbent bed height and the bed is formed with *Gracilaria corticata* powder. The experimental results and application of various models are studied. The performance of packed bed column is finally analyzed using breakthrough curves.

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### Biography: