

## Enhanced Biosorption of Copper Ions by *Luffa Cylindrica*: Biosorbent Characterization and Batch Experiments

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**Abstract :** The adsorption ability of a powdered activated carbons (PAC) derived from *Luffa cylindrica* investigated in an attempt to produce more economic and effective sorbents for the control of Cu(II) ion from industrial liquid streams. Carbonaceous sorbents derived from local *luffa cylindrica*, were prepared by chemical activation methods using ZnCl<sub>2</sub> as activating reagents. Adsorption of Cu (II) from aqueous solutions was investigated. The effects of pH, initial adsorbent concentration, the effect of particle size, initial metal ion concentration and temperature were studied in batch experiments. The maximum adsorption capacity of copper onto grafted *Luffa cylindrica* fiber was found to be 14.23 mg/g with best fit for Langmuir adsorption isotherm. The values of thermodynamic parameters such as enthalpy change,  $\Delta H$  (-0.823 kJ/mol), entropy change,  $\Delta S$  (-9.35 J/molK) and free energy change,  $\Delta G$  (-1.56 kJ/mol) were also calculated. Adsorption process was found spontaneous and exothermic in nature. Finally, the *luffa cylindrica* has been evaluated by FTIR, MO and x-ray diffraction in order to determine if the biosorption process modifies its chemical structure and morphology, respectively. *Luffa cylindrica* has been proven to be an efficient biomaterial useful for heavy metal separation purposes that is not altered by the process.

**Keywords :** adsorption, cadmium, isotherms, thermodynamic, *luffa* sponge

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