



## Biosorption of Cu(II) from Aqueous Solution by Gokarna Leaves Powder as a Low Cost Adsorbent

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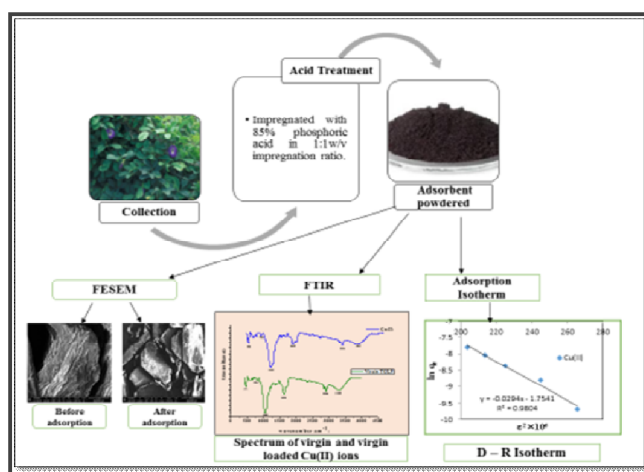
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### ABSTRACT

Adsorption capacity of Cu(II) ions onto acid treated gokarna leaves powder was investigated using batch adsorption method by optimizing various parameters like pH, contact time, adsorbent dosage, particle size, concentration and temperature. The biosorbent was characterized before and after adsorption by SEM, EDX, FTIR, DLS, CHNS and BET. Thermodynamic studies revealed that the adsorption process has been found to be exothermic in nature. The Langmuir, Freundlich, Temkin, D-R and Jovanoic isotherms were used to describe the adsorption equilibrium studies of acid treated gokarna leaves powder at different concentrations. D-R isotherm shows better fit than Langmuir, Freundlich, Temkin and Jovanoic isotherm in the concentration range studied. Experimental data were analyzed in terms of three kinetic models such as pseudo 1<sup>st</sup> order, pseudo 2<sup>nd</sup> order and intraparticle diffusion model and the result showed that the biosorption process of Cu (II) followed well pseudo 2<sup>nd</sup> order kinetics. Desorption studies show Treated gokarna leaves powder (TGLP) possesses an excellent reusability.

### Graphical Abstract



### Highlights:

- Maximum removal (95.52%) of copper ions (0.01M) was observed at pH 5, contact time 90 min, adsorbent dosage 0.5g and particle size 105  $\mu\text{m}$ .

- SEM, EDX and FTIR studies clearly indicated adsorption on Cu(II) ions on ATGLP
- Adsorption kinetics followed pseudo 2<sup>nd</sup> order rate equation.
- Adsorption of Cu(II) ions follows D – R and Freundlich isotherm
- Adsorption process was found to be spontaneous and thermodynamically favorable
- The acid treated gokarna leaves powder have been easily recovered

**Keywords:** Adsorption, Desorption, Gokarna leaves, Isotherms, Kinetics, Thermodynamics.

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