



## Biosorption of Ni(II) from aqueous solutions by *Syzygium cumini* bark powder: Equilibrium and kinetic studies

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### ABSTRACT

The present work deals with the use of *Syzygium cumini* bark powder as a biosorbent for Ni(II) removal from aqueous solution. The biosorption characteristics of Ni(II) onto *S. cumini* bark powder was investigated as a function of pH, contact time, biosorbent dosage, and initial Ni(II) ion concentration. Langmuir and Freundlich isotherms were used to fit the experimental data. The best interpretation for the equilibrium data was given by the Langmuir isotherm. The maximum biosorption capacity was found to be 294.1 mg/g for Ni(II) at pH 5.0 and at room temperature. The biosorbent was characterized by Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy analyses. The equilibrium biosorption data were well fitted with the pseudo-second-order kinetic equation. The chi-square ( $\chi^2$ ) and sum of the square error tests were also carried out to find the best-fit biosorption isotherm and kinetic model. The FTIR results revealed that carboxyl, hydroxyl, and amine groups are responsible for Ni(II) biosorption onto *S. cumini* bark powder.

*Keywords:* Biosorption; Ni(II); *Syzygium cumini* bark powder; Equilibrium modeling

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