Evaluation of new biosorbents prepared from immobilized biomass of *Candida* sp. for the removal of nickel ions

Sajjad Haydar, Muhammad Fayyaz Ahmad*, Ghulam Hussain

Institute of Environmental Engineering and Research (IEER), University of Engineering and Technology (UET), Lahore 54890, Pakistan, Tel. +92 301 4495686; emails: sajjad@uet.edu.pk (S. Haydar), engineerfayyaz@yahoo.com (M.F. Ahmad), ghussain@uet.edu.pk (G. Hussain)

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**ABSTRACT**

Batch biosorption process for nickel removal was evaluated using three newly developed biosorbents. These three biosorbents were prepared by immobilizing the biomass of *Candida lipolytica*, *Candida tropicalis*, and *Candida utilis* with the help of calcium alginate. Optimum conditions for initial pH, biosorbent dose, contact time, temperature, and initial concentration of nickel ions were determined using batch studies. The equilibrium, kinetic and thermodynamic parameters were determined for batch biosorption process. The maximum biosorption capacity (mg g\(^{-1}\)) under optimum experimental conditions and temperature of 45°C was 197.68, 178.06, and 123.43 for immobilized *Candida tropicalis* beads (ICTB), immobilized *Candida utilis* beads, and immobilized *Candida lipolytica* beads, respectively. Hydrochloric acid solution exhibits excellent desorbing efficiency and recovered 98% of adsorbed nickel ions from ICTB. The biosorbent was successfully used for five consecutive biosorption desorption cycles without significant loss in its biosorption capacity. ICTB appeared to be an efficient biosorbent to accumulate and recover nickel ions due to higher biosorption capacity and outstanding regeneration results.

**Keywords:** Biosorption; *Candida* sp.; Equilibrium; Kinetic; Nickel; Thermodynamics

*Corresponding author.

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