

Optimization Studies on Biosorption of Ni(II) and Cd(II) from Wastewater Using *Pseudomonas putida* in a Packed Bed Bioreactor

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Abstract : The objective of this present study is the optimization of process parameters in biosorption of Ni(II) and Cd(II) ions by *Pseudomonas putida* using Response Surface Methodology in a Packed bed bioreactor. The experimental data were also tested with theoretical models to find the best fit model. The present paper elucidates RSM as an efficient approach for predictive model building and optimization of Ni(II) and Cd(II) ions using *Pseudomonas putida*. In packed bed biosorption studies, comparison of the breakthrough curves of Ni(II) and Cd(II) for Agar immobilized and PAA immobilized *Pseudomonas putida* at optimum conditions of flow rate of 300 mL/h, initial metal ion concentration of 100 mg/L and bed height of 20 cm with weight of biosorbent of 12 g, it was found that the Agar immobilized *Pseudomonas putida* showed maximum percent biosorption and bed saturation occurred at 20 minutes. Optimization results of Ni(II) and Cd(II) by *Pseudomonas putida* from the Design Expert software were obtained as bed height of 19.93 cm, initial metal ion concentration of 103.85 mg/L, and flow rate of 310.57 mL/h. The percent biosorption of Ni(II) and Cd(II) is 87.2% and 88.2% respectively. The predicted optimized parameters are in agreement with the experimental results.

Keywords : packed bed bioreactor, response surface methodology, *pseudomonas putida*, biosorption, waste water

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