



Competitive biosorption of phenol and lead from synthetic wastewater onto live and dead microorganisms

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ABSTRACT

The comparison between the living and dead microorganisms for removing phenol and lead from aqueous solution was examined in a batch system. The working sorption pH, temperature, mixing speed and contact time were fixed at 4, 30°C, 250 rpm and 24 h respectively. Biosorption isotherms were developed for both the single and binary component systems and expressed by four models. Model parameters were estimated by the non-linear regression method using STATISTICA version-6 and EXCEEL-2007 software. The maximum loading capacity (q_m) of the phenol was 30.2018 and 70.0183 mg g⁻¹ and for lead was 36.7888 and 89.8783 mg g⁻¹ onto live and dead microorganisms in single system respectively. However, in binary system the loading capacity decreased because of competition between compounds to binding sites of biosorbents. Desorption efficiency from living microorganisms was 85.974% and 80.096% under 0.1 M of Na₂CO₃ and HCl, while it was 95.352% and 96.632% from dead microorganisms for phenol and lead respectively.

Keywords: Biosorption; Live microorganisms; Dead microorganisms; Phenol; Lead; Biosorption isotherms

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