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BIOSORPTION BEHAVIOR OF IMMOBILIZED *Phanerochaete chrysosporium* FOR HEAVY METALS REMOVAL

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Abstract

Heavy metals are quite persistent with adverse health and environmental effects. In our study, self-synthesized iron oxide magnetic nanoparticles were encapsulated in the *Phanerochaete chrysosporium* (*P. chrysosporium*) hyphae. The prepared biosorbents possessed high efficiency for Pb(II) from single and binary metal systems. The maximum biosorption capacity was found to be 50.05 mg g^{-1} at pH 5.0. Environmental scanning electron microscope accompanied with energy disperse spectroscopy (ESEM-EDS) characterization showed Pb(II) ions were partially enriched via extracellular complexation and surface biosorption. MR analysis, defined as the ratio of heavy metals removed to H^+ released, confirmed the ion-exchange, surface complexation and extracellular chelation behavior of the biosorbents. Moreover, distinct increase in the interior of Pb(II) contents in the immobilized *P. chrysosporium* suggested that iron oxide magnetic nanoparticles promoted biosorption process. The proposed immobilized biosorbents, showing high efficiency and strong feasibility, exhibited the potential application in Pb-containing industrial wastewater treatment.

Key words: biosorption, heavy metal, immobilized *Phanerochaete chrysosporium*, wastewater treatment

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