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"Gheorghe Asachi" Technical University of Iasi, Romania

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

Danlian Huang[1,2,*], Guangming Zeng[1,2,*], Piao Xu[1,2], Meihua Zhao[1,2], Cui Lai[1,2], Ningjie Li[1,2], Chao Huang[1,2], Chen Zhang[1,2], Min Cheng[1,2]

[1]College of Environmental Science and Engineering, Hunan University, Changsha 410082, PR China
[2]Key Laboratory of Environmental Biology and Pollution Control (Hunan University), Ministry of Education, Changsha 410082, PR China

Abstract

Heavy metals are inorganic persistent pollutants 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) biosorption 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: heavy metal, wastewater treatment, biosorption, immobilized *Phanerochaete chrysosporium*

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[*] Author to whom all correspondence should be addressed: zgming@hnu.edu.cn, huangdanlian@hnu.edu.cn; Phone: +86 731 88822754; Fax: +86 731 88823701.