Biosorption of cadmium(II) and lead(II) from aqueous solutions by fruiting body waste of fungus *Flammulina velutipes*

Dan Zhang*, Haijiang He*a,b, Wei Li*a, Tingyan Gao*a, Pei Ma*a

*aKey Laboratory of Mountain Environmental Diversity & Control, Institute of Mountain Hazards and Environment, Chinese Academy of Sciences & Ministry of Water Conservancy, Chengdu, 610041, China
Tel. +86 13708008342; Fax +86 28 85255558; email: daniezhang@imde.ac.cn
bGraduate University of Chinese Academy of Sciences, Beijing 100081, China

Received 31 July 2009; Accepted in revised form 3 February 2010

**ABSTRACT**

The biosorption of Cd\(^{2+}\) and Pb\(^{2+}\) by fruiting body wastes of macrofungi *Flammulina velutipes* was studied. The factors affecting absorption including pH, initial metal concentration, biosorbent dosages and mutual competitive biosorption of both metal ions were focused. The sorption of Cd\(^{2+}\) and Pb\(^{2+}\) was increased with pH value from 2 to 6 and maximum biosorption was at pH 6. The quantity of Cd\(^{2+}\) and Pb\(^{2+}\) adsorbed increased with the initial concentration of metal ions and both metals removal gradually increased with the biosorbent dosage. There existed mutual competitive biosorption between Cd\(^{2+}\) and Pb\(^{2+}\) when they were in the same solution. The Langmuir isotherm model fitted both metal ions sorption data well in the experiment and the calculated maximum sorption capacity of Cd\(^{2+}\) and Pb\(^{2+}\) by *F. velutipes* was 8.4317 mg/g dry biomass with \(R^2\) of 0.9228 and 18.3486 mg/g dry biomass with \(R^2\) of 0.9280, respectively. Pseudo-first order equation fitted for adsorption data of Cd\(^{2+}\) with \(R^2\) of 0.9504, while pseudo-second order equation more fitted for adsorption data of Pb\(^{2+}\) with \(R^2\) of 0.9917.

**Keywords:** Biosorption; Cd\(^{2+}\); Pb\(^{2+}\); *Flammulina velutipes*; Langmuir isotherm; Pseudo-first and second-order equation

* Corresponding author.