

Ruadeerat Boonsanit 2012: Screening and Isolation of Heavy Metals Resistant-Biopolymer Producing *Bacillus* Strains Using as A Heavy Metal Biosorbent.

Master of Science (Bioproduct Science), Major Field: Bioproduct Science, Division of Science. Thesis Advisor: Orawan Chunhachart, Ph.D. 104 pages.

Heavy metals resistant-biopolymer producing bacteria were screened and isolated from fermented soybean, soil and sludge. Examination of these isolates for heavy metals tolerance was carried out in term of growth and survival in medium containing Pb(II) and Cd(II). The isolated bacteria were characterized and identified as genus *Bacillus* based on morphology and biochemical test. *Bacillus* sp. CR002 is able to tolerate high concentration of Pb(II) (700 mg/L) in minimal salt medium. *B. subtilis* MS104 is the most resistance to Cd(II) among all isolates (20 mg/L). Whereas, the amount of biopolymer produced by *B. subtilis* NT147 is the highest among all isolates. Characterized of the biopolymer produced from isolate NT147 revealed that glutamic acid was a main component of the biopolymer consisting of D- and L- glutamic acid ratio of 61:39. Biomass of CR002, MS104 and biopolymer produced from the isolate NT147 were selected for further studies. Biosorption of Pb(II) and Cd(II) by γ -PGA produced from NT 147 and biomass of CR002 and MS104 were investigated and effects of pH, temperature, initial metal concentration and biomass concentration were also studied. The maximum Pb(II) and Cd(II) sorption were found at pH 5. The removal efficiency of Pb(II) by biopolymer from NT147 and biomass of CR002 were 85 and 84 %, respectively. In addition, Cd(II) adsorption onto biomass of MS104 and biopolymer from NT 147 had the maximum adsorption capacity at 29 and 88% Cd(II) removal, respectively. The results indicate that temperature does not affect on adsorption capacity over temperature range of this study. Whereas, the highest percentage removal for lead and cadmium by biomass cell were obtained from 1.0 g dried biomass/L. The adsorption data results similarly fit with empirical models adsorption isotherm of Langmuir.

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Thesis Advisor's signature

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