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NALIN SIDTITOON: REMOVAL OF MERCURY, CADMIUM AND LEAD BY THE USE OF SELECTED MICROALGAL STRAINS. THESIS ADVISORS: DUANGRAT INTHORN, Ph.D. AMARET BHUMIRATANA, Ph.D. SUTHEP SILAPANUNTAKUL, Ph.D.
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Thirty-five strains of microalgae were screened on plates with various concentration of heavy metal in order to determine the high Mercury (Hg), Cadmium (Cd) and Lead (Pb) tolerance. Heavy metals removal in aqueous solution showed that *Scenedesmus acutus* had the highest Hg removal capacity at 85.18 %, T5 had the highest Cd removal capacity at 93.85 % whereas *Calothrix parietina* had the highest Pb removal capacity at 90.59 %. The results showed that 14 strains exhibited a high tolerance and the relative toxicity in increasing order was Hg > Cd > Pb. *Scenedesmus acutus* had highest concentration factor at 3412, 4591 and 4078 for Hg, Cd and Pb, respectively. Additionally, the adsorption experiment revealed that *Tolypothrix tenuis* and *Calothrix parietina* could remove Hg, Cd and Pb rapidly within 5-10 min and become equilibrium while *Chlorella vulgaris*, *Chlorella vulgaris* (CCAP 211/11B) and *Scenedesmus acutus* could remove Hg, Cd and Pb rapidly within 10 mins and could remove these metals slowly afterwards. The adsorption capacity values of Hg were 15.60-26.86 mg Hg/g dry wt. and *Tolypothrix tenuis* had the highest maximum adsorption capacity of 26.86 mg Hg/g dry wt. at a minimum concentration of 1.04 ppm. The adsorption capacity values of Cd were 61.68-109.57 mg Cd/g dry wt. *Scenedesmus acutus* had the highest maximum adsorption capacity of 109.57 mg Cd/g dry wt. at a minimum concentration of 109 ppm. The adsorption capacity values of Pb were 31.48-126.66 mg Pb/g dry wt. and *Chlorella vulgaris* had the highest maximum adsorption capacity of 126.66 mg Pb/g dry wt. at a minimum concentration of 129.5 ppm.

The results of this study suggests that filamentous cyanobacteria, *Tolypothrix tenuis* and *Calothrix parietina* have feasibility to apply to be used in real wastewater treatment system because of high removal capacity, high growth rate and easy separation of the biomass from treated wastewater by simple filtration method.