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BENJAPORN BOONYAPOOKANA: TOXICITY AND BIOSORPTION OF CHROMIUM AND CADMIUM BY USING DUCKWEED *WOLFFIA GLOBOSA* HARTOG & PLAS. THESIS ADVISORS: SUCHART UPATHAM, Ph.D., MALEEYA KRUATRACHUE, Ph.D., PRAYAD POKETHITIYOOK, Ph.D., 193 p. ISBN 974-663-776-2

The aquatic plant *Wolffia globosa* Hartog & Plas, abundant in nature, is a rootless duckweed, was used for toxicity test and biosorption of cadmium (II) and chromium (VI) in synthetic solutions. *Wolffia globosa* were cultured in 3% Hoagland's nutrient medium which was supplemented with 1, 2, 4 and 8 mg/L of cadmium (II) and chromium (VI) and were separately harvested after 3, 6, 9 and 12 days. The effects of cadmium (II) and chromium (VI) on the biomass productivity and the chlorophyll content in *W. globosa* indicated that there were significant decreases ($P<0.05$) in the biomass productivity and the chlorophyll content when the exposure times to and concentrations of cadmium (II) and chromium (VI) were increased. The accumulation of the above heavy metals in the plant showed that there were significant increases ($P<0.05$) in toxicity level in the plant tissue when the exposure times and concentrations were increased. *Wolffia globosa* exhibited a higher accumulation (higher in BCF) of cadmium (II) than that of chromium (VI), suggesting that this plant species has more a greater propensity to absorb cadmium (II).

The biosorptions of cadmium (II) and chromium (VI) by using dried *Wolffia globosa* biomass were investigated using batch technique. The effects of concentration and pH solution on the adsorption isotherm were measured by determining the adsorption isotherm at initial cadmium (II) and chromium (VI) concentrations from 10 to 400 mg/L and pH values between 1.5 and 6 for chromium (VI) and between 4 and 7 for cadmium (II). The adsorption equilibria were found to follow Langmuir models. The maximum adsorption capacity (X_m) at pH 7 in *W. globosa*-Cd (II) system was estimated to be 80.65 mg/g, while the removal achieved at pH4, pH 5, and pH 6 were lower (35.09, 48.78, and 65.39 mg/g). In *W. globosa*-Cr (VI) system, the maximum adsorption capacity (X_m) at pH 1.5 was estimated to be 73.53 mg/g, while the removal achieved at pH 3, pH 5, and pH 6 were lower (47.39, 33.11, and 12.85 mg/g). The effects of contact times to cadmium (II) and chromium (VI) sorption indicated that cadmium (II) and chromium (VI) were absorbed rapidly and more efficiently at lower concentrations.