Cadmium Ion Removal from an Aqueous Solution by Dried Water Hyacinth Biomass-Kinetic Studies: Effect Of pH, Time, Hyacinth Dosage, and Cadmium Concentration on Adsorption

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The purpose of this project was to test the effectiveness of dried Water Hyacinth biomass on the adsorbance of Cadmium within an aquatic medium. Based on popular research it was hypothesized that the plants would have a higher absorbance at pH of around 5, hyacinth biomass concentration of around 5gm/l, cadmium concentrations of 100mg/l and a contact time of 60 minutes. Water hyacinths were separated into two main groups, roots and shoots, which were then separated into each level of independent variable. There were 4 large IV groups, plant biomass concentration, Cadmium concentration, pH of the cadmium concentrate, and the contact time between the biomass and cadmium ions. The pH group had hyacinth biomass in solutions that ranged from 1 to 5 pH; in the next group hyacinth dosage was changed from 1, 3, 5, 8, and 10 grams per liter of cadmium solution; the cadmium concentrate group had cadmium solutions that ranged 100 ppm to 400 ppm and, the contact time group: 15, 30, 60, 90, 120 min. Results from the test supported the hypothesis, plant samples did show an increase in absorbance based on the predicted outcome. Some outliers in the data included rather low absorbance from some of the root samples, which can be attributed a lack of biomass interactions caused by plant material sticking to the wall of the beakers. Using a linear regression t-test, the null hypothesis that there was no significant relation between the levels of IV and absorbance was rejected.

Awards Won:

Third Award of $1,000