ABSTRACT

ADSORPTION OF CADMIUM ION BY *EICHHORNIA CRASSIPES* (MART.) SOLMS WITH AND WITHOUT *RHIZOBIUM* Sp. BJVr-12 EXOPOLYSACCHARIDES (EPS)

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Cadmium, an extremely toxic metal, has been well documented to pose seriously harmful threat to the environment and public health. Finding the suitable biosorption agent to help restrict the spread of heavy metal contaminants in the environment has long been the objective of environmentalists as they focus on the bioremediation technology. This study investigated the biosorption capacity of *Eichhornia crassipes* (water hyacinth) with and without *Rhizobium* exopolysaccharides (EPS) for cadmium ions in solution. The results showed that the greatest percentage removal value of 88.13%, corresponding to 0.52 ppm cadmium adsorbed, was achieved by *E. crassipes* without *Rhizobium*-EPS; while a lower percentage removal value of 80.77%, corresponding to 0.42 ppm cadmium was adsorbed by *E. crassipes* with *Rhizobium*-EPS. The maximum adsorption of cadmium ions was attained when the cadmium-containing solutions were maintained at pH 3, followed by the value attained when solutions were at near neutral pH of 6.8. The least amount taken up was when solutions were at pH 9. The decreasing ability for cadmium removal from low to high pH levels may be attributed to a reduction in metal ions availability with increase in pH. The high percentage removal value when at pH 3 was most likely due to the solubility as well as the mobility of cadmium in acidic solution. The greatest percentage removal of cadmium ions from the solution generally transpired at the end of the 24_{th} hour of the exposure period, which may have provided the cadmium ions a longer period to interact with the available binding sites on the surfaces of the adsorbent. The isotherm data derived for *E. crassipes* with and without *Rhizobium*-EPS at all pH levels subscribed to the Langmuir model. The highest Q_o = 3.221 mg Cd^{2+}/g of adsorbent$_{(dw)}$ and b = -0.085 mg Cd^{2+}/g of adsorbent$_{(dw)}$ values obtained suggest the presence of available adsorption sites for cadmium ions on the adsorbent and also indicate the ions high affinity to the adsorbent.