

Heavy metal biosorption by Alginic acid extracted from *Sargassum* sp.

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Water is the driving force for many natural processes on the earth. It is essential to protect the quality of water for the survival of all living beings. However, water pollution has increased significantly during the last few decades with the rapid industrialization processes. This work highlights a development of a low cost, sustainable and efficient water purification sorbent extracted from a seaweed species grown in the coastal areas of in Sri Lanka.

Alginic acid extracted from *Sargassum* sp. collected at the coast of Beruwela has been studied extensively as a candidate material to remove metal ions from natural and waste waters. The extracted alginic acid was characterized using FTIR spectroscopy. Metal absorption capacity, selectivity and the extent of reusability of alginic acid were determined for the metal ions (Pb^{2+} , Cu^{2+} , Zn^{2+} , Co^{2+} , Ca^{2+} , and Mg^{2+}) by using respective metal ion solutions. Alginic acid has shown maximum adsorption towards Pb^{2+} ions with 488.5 mg/g capacity. Adsorption capacity for metal ions Cu^{2+} , Zn^{2+} , Co^{2+} , Mg^{2+} and Ca^{2+} ions were 314.4 mg/g, 287.4 mg/g, 283.8 mg/g, 83.6 mg/g and 74.4 mg/g respectively. It showed more selectivity towards Pb^{2+} ions over the other ions in a metal ion solution. Reusability of the alginic acid for two adsorption-desorption cycles were experimented and determined that the metal ion removal capacity remains fairly constant. Furthermore, alginic acid showed an ability to remove Pb^{2+} ions completely from Pb^{2+} spike natural water sample, which initially contained 5.0 mg/L Pb^{2+} ion concentration. Ca^{2+} and Mg^{2+} ions removal capacities of alginic acid from natural water system were 57.5 mg/g and 36.6 mg/g respectively.

It can be concluded that alginic acid is an economical, sustainable remedy for water purification in Sri Lanka to remove heavy metal ions from waste water.

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