

Studies on Separation of Heavy Metals from Aqueous Solutions Using Biosorbents

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Man is blessed with an abundance of nature. But in the name of development, the nature is being continuously destroyed by man. As a result, nature is polluted beyond the measure because of an indiscriminate release of heavy metals into the environment. Industrialization and urbanization pose a significant problem to the biosphere. Heavy metal ions do not degrade but harm human body, flora, fauna, and the environment. Biosorption is one of the most effective techniques to remove heavy metals from industrial effluents. The low cost-natural products and waste substances are found to be very effective in the removal of heavy metals from industrial wastewaters. The objective of the present study is to develop inexpensive, eco-friendly and useful metal ion adsorbents that are available in large quantity. As an alternative to existing commercial adsorbents for the removal of different heavy metal ions like chromium, lead and cadmium from synthetic aqueous solutions. In the present work different low cost natural adsorbents such as coconut shell, *tamarindus indica*, *Mangifera indica*, *Moringa oleifera* and waste products such as pineapple peel and soap nut seeds (The Drupe of sapindus plants, containing saponins which are natural surfactants) were used to determine adsorption efficiency in removing chromium, lead and cadmium. All these adsorbents were used without any pre-treatment. The influence of contact time, pH, temperature, adsorbent dose and initial metal ion concentration on the selectivity and sensitivity of the removal process was investigated. The removal of these metal ions from aqueous solutions/industrial effluents was studied using the batch method. It was observed that the rate of adsorption increased with the increase in adsorbent dose. The maximum time for higher adsorption rates was found between 120 to 150 min. The optimum pH for the separation observed was 2. Finally, based on the results obtained, the researcher would like to conclude that the use of low-cost adsorbents for metal ion removal which is feasible and eco-friendly. The results are presented and tabulated.

Key words: Metal ions; biosorption; natural adsorbents; industrial effluents