

Biosorptional Analysis of Cr (VI) by ZeaMays Cob Powder

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Abstract: The present research work describes bio-sorption of Cr(VI) ions by Zea mays cob powder. Zea mays, corn or maize, is a annual grass in the family, said as Poaceae is also found in Central America. Here we used batch absorption technique. In this study, an attempt has been made for biosorption of Cr (VI) from aqueous solution by Zeamays cob powder using batch absorption technique. Zea mays are basically found in the sub-humid region and Aravali hills region of the Rajasthan. Effect of contact time, pH and metal ion concentration on bio-sorption has been studied with the help of Langmuir and Freundlich adsorption isotherms. Removal efficiency of Cr (VI) by Zea mays cob powder has been found 85.5% at pH 4. **Keywords:** Hexavalent chromium ions, bio-sorption, Zea maize cob powder, removal efficiency, adsorption kinetics.

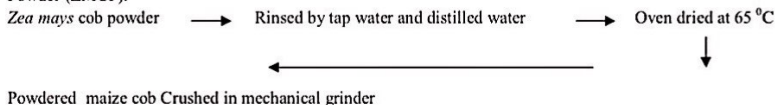
I. INTRODUCTION

Worldwide water pollution is a major problem. Here we are mainly concerned about heavy metal pollution cause by indiscriminate disposal of waste water. Different water bodies are like rivers, lakes, wetlands and underground aquifers but these sources are polluted by different chemical discharged from industries. [1]- [2] Leather tanning industries use chromium compounds for their product formation and discharge waste chemicals into the environment without proper standard treatment. Chromium is a transition metal which occurs in nine different forms of oxidation states, but the two common valences are trivalent and hexavalent chromium forms. Hexavalent chromium has mutagenic and carcinogenic properties. It is hazardous substances for both human and aquatic life. Current techniques: - Physicochemical approaches i.e. Adjusting pH, Membrane filtration, Ion- exchange, Adsorption, Flocculation concentration of ions is low, these techniques are not much effective. Biological approaches:- When naturally occurring processes are used for removal of heavy metals, it is called biological approach. Here we are using Zea mays cob powder for the removal of the hexavalent chromium ion. This is a biopolymer which can be applied for biosorption of Cr (VI) from aqueous solution by Zea mays cob powder using batch absorption technique.

II. MATERIALS AND METHODS

A. Preparation of Adsorbent

The maize cob of Zea Mays were collected from CAZARI (Central Arid Zone of Agriculture and Research Institute) Jodhpur. Each of the cobs were rinsed thoroughly with tap water and then with distilled water and dried in sun light and then in oven for 42 hours at 65 °C. These were crushed in a mechanical grinder and sieved at different mesh sieves (100-300 µm) to obtain Zea Mays Cob Powder (ZMCP).



B. Preparation of Cr (VI) solution

A stock solution of Cr (VI) was prepared by dissolving 2.828 g of 99.00% of $K_2Cr_2O_7$ in 1L double distilled water to obtain 1000 mg L^{-1} stock solution. Further, 50-300 mg L^{-1} strength of Cr (VI) was prepared with the help of stock solution. The pH of solutions was adjusted with the help of 0.1 N H_2SO_4 and 0.1N NaOH solutions as per the requirements, pH were measured by pH meter. Three parameters i.e. effect of concentration of Cr(VI), effect of Ph and effect of contact time were studied as shown in Table

Table 1. Experimental conditions