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Adsorption of Ni^{2+} and Pb^{2+} by Curry leaves

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Heavy metal pollution causes detrimental health issues for flora and fauna. Numerous methods have been employed to get rid of those metals, but most of them are found to be ineffective and expensive. Biosorption of these metals by microbes or plants has been emerging as an alternative and cost effective method to remove heavy metals in the waste.

In this work curry leaves are used as a new biosorbent for heavy metals. The main objective of this work is fine-tuning the conditions to optimize the biosorption of heavy metals by the curry leaves and employ those conditions to remove heavy metals in food. Back ground experimental results showed that water and fiber content of curry leaves are 68 and 14 % by mass. Methylene blue adsorption experiments revealed that specific surface areas of curry leave powder of particle sizes (250-500) and ≤250 µm are 2.1×10^{6} and 2.7×10^{6} km^2 kg^{-1} respectively. It was also found that curry leaves it self contains 0.03 ppm Ni^{2+} and 0.05 ppm Pb^{2+} and these values are neglected in biosorption efficiency calculations. Atomic Absorption Spectroscopy was used to study biosorption efficiency of curry leaves against dried/raw nature of leaves, pH, particle size, concentration of biosorbent and contact time. The results revealed that at room temperature, 1 g of curry leave powder of particle size less than 250 µm adsorb 3 mg of Ni at equilibrium. This corresponds to 62 % removal percentage of Ni^{2+} present in a 250 mL of 40 ppm solution. The biosorption efficiencies were pH dependent and the optimum pH values for adsorption of Ni^{2+} and Pb^{2+} were 6 and 8 respectively.

Keywords: *Biosorption, curry leaves, heavy metal ions*

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