Removal of Nickel, Cadmium and Lead from Aqueous Solutions using Combination of Sapodilla (*Manilkara zapota*) and Custard Apple (*Annona squamosa*) Seeds Powder

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ABSTRACT

Heavy metals present in wastewater are recognized as long-term hazardous contaminants because of their non-biodegradable behavior, high toxicity, accumulation and retention in human body and carcinogenic properties. In the present investigation, combination of sapodilla (Manilkara zapota) seeds and custard apple (Annona squamosa) seeds have been identified as potentially low cost and efficient bio-sorbent material for the removal of toxic heavy metals (nickel, cadmium and lead) from aqueous solutions. The influence of pH, contact time, metal concentration, adsorbent dosage on the selectivity and sensitivity of the removal process was investigated. The results showed the removal efficiencies: (90 per cent for nickel at pH 6, 95 per cent for cadmium at pH 5 and 92 per cent for lead at pH 6. The removal efficiencies by differing contact time (96 per cent for nickel at contact time of 90 min, 95 per cent for cadmium and 94 % for lead at a contact time of 120 min). The removal efficiencies by varying adsorbent dosage: (94 % for nickel and, 94 % for lead at a 100 mg of adsorbent dosage and 91 % for cadmium, at 125 mg of adsorbent dosage). The removal efficiencies at various initial metal ion concentrations: (89 % for nickel at 4 µg mL^{-1}, 84 % for cadmium and 89 % for lead at 4 µg mL^{-1}).

Graphical Abstract
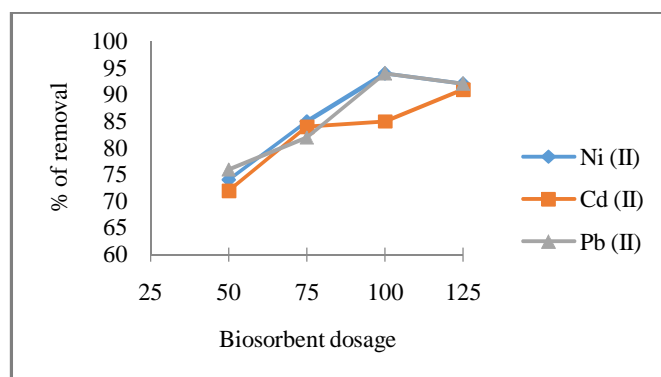
Effect of adsorption dosage on adsorption of Ni ((II), Cd (II) and Pb (II).

Keywords: Nickel, Cadmium, Lead, Sapodilla, Custard Apple.

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