



Eco-friendly waste water treatment by cow dung powder (Adsorption studies of Cr(III), Cr(VI) and Cd(II) using tracer technique)

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ABSTRACT

This explicit investigation aims to explore a green and clean alternative for the waste water treatment employing a natural biosorbent: Dry cow dung powder (DCP). The potential of DCP to sequester toxic heavy metal ions such as Cr(III), Cr(VI) and Cd(II) has been successfully demonstrated, employing Tracer Technique. We have carried out Batch equilibration method and all the important parameters such as pH, dose of sorbent, metal ion concentration, contact time, agitation speed, temperature and interference of different salts have been studied and optimized. The kinetic studies were carried out employing various models but the best fitting was Lagergren pseudo-second order model with high Correlation coefficient R^2 values approximately of 0.997 for all three metal ions. The adsorption capacity and the pseudo-second order rate constant for Cr(III), Cr(VI) and Cd(II) was obtained by regression analysis. Thus DCP proves to be Eco-friendly resin for the heavy metal removal from aqueous medium and for waste water treatment.

Keywords: Waste water treatment; Heavy metal toxicity; Biosorbent; DCP; Eco-friendly removal; Humic acid

1. Introduction

Water, the basic and indispensable unit of eco-system, is the greenest substance, essential for life and recyclable naturally; hence since ages it has been taken for granted by the human society. A rising quality of life with high rate of resource consumption have an unintended and negative impact on environment, generating waste hulk with far beyond handling capacities of mankind. The threat of water famine looms greatest as our rivers and other water resources are poisoned due to each successive epoch of urbanization and industrialization leading to the water pollution. To combat against water pollution and to find sustainable solution

for the same, globally, we have embraced Green Chemistry approach which is one of the Waste Management and Treatment Strategies. Waste management is the collection, transport, processing, monitoring and recycling or disposal of the waste material. It is based on waste hierarchy of reduce, reuse and recycle coined with rethink [1,2].

Heavy metal toxicity in our aqueous milieu is one of the most menacing situations as heavy metals are non-biodegradable and through the process of bio-magnification, they further accumulate in food chain [3]. Some of the heavy metals, viz. Cadmium, Mercury, Chromium, Lead, Arsenic etc., are among the most harmful of the elemental pollutants and are of particular concern because of their toxicities to human as well as to the biota of environment. Generally, in-vivo

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