REMOVAL OF Cu (II) IONS FROM INDUSTRIAL WASTE WATER USING LOW COST BIOSORBENT PREPARED FROM JACKFRUIT (*Artocarpus heterophyllus*) LEAF POWDER

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by

VISSUNDARA MUDIYANSELAGE RAJINDRA SWARNAMALI

Faculty of Science and Technology
Uva Wellassa University of Sri Lanka

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Abstract

The presence of heavy metals in industrial waste water has become a major concern of environmental pollution. In recent years, various technologies for heavy metal removal from industrial wastewater have been developed. In this regard, adsorption of heavy metals on solid surfaces has gained a growing interest. Activated carbon is widely used to adsorb heavy metal ions, but the high cost of activated carbon restricts its use in developing countries. As a result, the process of heavy metal removal by adsorption has diverted to the use of lower cost adsorbents. The main objective of this study is to investigate the efficiency of Cu (II) ion removal from wastewater by using jackfruit leaf powder (JLP) and chemically modified JLP. It is much suitable to use JLP as a biosorbent because of its abundant availability without any commercial value and the ability to be disposed after the use without need for expensive regeneration. Batch adsorption technique was utilized for the removal of Cu (II) ions in aqueous solution by JLP under different experimental conditions. The effect of various process parameters including biosorbent dose, contact time, pH, particle size and various initial copper concentration were investigated and optimized. Maximum sorption for copper was reached at pH 5. The efficiency of adsorbent for copper removal was 98.8% for dilute solutions at 1g/50ml adsorbent dose. Equilibrium data were successfully fitted to the Langmuir model. The maximum adsorption capacity onto JLP was found to be 48.85mg/g for Cu. JLP was treated using HNO_3 acid to chemically modify its surface. The adsorption efficiencies of untreated JLP and HNO_3 treated JLP were compared. Treatment using HNO_3 has slightly increased the Cu ion removal efficiency of the adsorbent. The results confirm that untreated JLP is a promising biosorbent for the removal of Cu (II) due to its high efficiency, economic feasibility and simplicity of preparation.

Keywords: Industrial wastewater, Jackfruit leaf powder, Batch adsorption technique, Adsorption, Biosorbent.