UNIVERSITI TEKNOLOGI MARA

# REMOVAL OF CADMIUM (II) FROM AQUEOUS SOLUTION BY USING LEUCAENA LEUCOCEPHALA PODS

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# ABSTRACT

Heavy metals in wastewater is a growing concern whereby industrialization and populace growth were the major factors of many rising heavy metal ions in wastewater. One of the toxic heavy metal ions is Cd (II) ion where it was studied by the adsorption of Cd (II) on pods of Leucaena Leucocephala (LL). Sequestration of heavy metal ions by using adsorption technique utilizing bio adsorbent is developing as a economical potential option. Thermo Gravimetric Analysis (TGA), Fourier Transform Infrared (FTIR) Spectroscopy, Inductively Coupled Plasma (ICP), X-Ray Fluorescence (XRF) and Point Zero Charge were used to characterize the pods of Leucaena Leucocephala (LL). The effect of adsorbent dosage, pH and contact time were investigated through batch experiment in this study. The optimum removal of Cd (II) ion were found at concentration of 50 mg/L, pH 8, 0.25g of adsorbent dosage and a 160 min of contact time. This study revealed that the Leucaena Leucocephala pods are also a viable alternative as it is economical of bio adsorbent for Cd (II) ions removal in wastewater discharged from industry.

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# INTRODUCTION

## 1.1 Research Background

Urbanization and populace growth have prompted the rise of many rising toxins, for example, heavy metals ions. The adsorption of lethal substances coming about because of the gathering of industrial wastes is vital and a standout amongst the most hazardous difficulties confronting the earth. These heavy metals ions contains metal particles that give a critical hazard to environment and human, in light of their high poisonous quality at both low and high concentration in soil and water (Al-Senani & Al-Fawzan, 2018). Agricultural advancement on reasonable premise has prompted an ascent in the production of lignocellulosic biomass in Malaysia that offers tremendous potential to grow high esteem bio-based materials and items. Consistently, Malaysia creates in excess of 160 million tons of biomass which has now been recognized as forthcoming bioenergy asset and a long-haul answer for the country's vitality request (Sohni et al., 2018).

Water eutrophication and overwhelming metal defilement are representing a danger to the current water assets around the world. Cd (II) is the most concerned harmful overwhelming metal that has brought about soil and water contamination because of its high versatility and perseverance (Cui, Hao, Zhang, He, & Yang, 2016). The introduction of Cd (II) into nature has been expanding significantly which is basically ascribed to the mining and refining of zinc and Cd (II) minerals regularly related metallurgical businesses. A few industrial products that are in charge of the raising Cd (II) levels in the earth are the results of metal plating, cadmium-nickel batteries, phosphate manures, shades, stabilizers, pottery, photo, material printing materials (Borah et al., 2018). The extraction of cadmium ions from polluted water is imperative profit by both financial and ecological because of its high poisonous quality to creatures, plants and humans (Al-Qahtani, 2017).

Cadmium is ordinarily separated from modern wastewater by procedure ion exchange, ultra-filtration, RO, chemical precipitation, dissolvable extraction and other electrochemical treatments yet the techniques have a few impediments like high