

UNIVERSITI TEKNOLOGI MARA

**COMPARISON ON BANANA PEELS,
SUGARCANE BAGASSE AND THEIR
COMBINATION AS BIOSORBENT
FOR NICKEL, COPPER AND
CADMIUM IN WATER SAMPLES AT
TASIK IHLAM UITM PERLIS**

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Thesis submitted in fulfilment of the requirements for
the degree of
Bachelor of Science (Honours) Biology

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Undergraduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

The massive amount of biomass byproduct will turn into lignocellulosic biomass and harm the environment. In this study, the potential of biomass byproduct to absorb heavy metal ions in Tasik Ihlam is studied. This study area was chosen due to lots of students activity had been carried out from some streams flowing into the lake through a drain. Three potential biosorbents which are banana peels, sugarcane bagasse and their combination were evaluated using ICP-OES and FTIR. The adsorbents were soaked in water samples within 1 to 2 hours and their concentration of metal ions were recorded before and after the adsorption process. For TI 1, TI 2 and TI 3 while using combination as adsorbent showed the amount concentration of Cu^{2+} before treatment are 1.8, 0.055, and 0.195 g/ml respectively. After adsorbent was applied the concentration of Cu^{2+} has decrease to 0.131, 0.0093, and 0.0205 g/ml respectively. From FTIR result, shows that spectra bands in banana peels assigned to phenol, xyloglucan, pectin and cellulose that lies at 1430, 1078, 1014, and 900 cm^{-1} respectively. While, the spectra for sugarcane the bands were observed for phenolic ring, arabinose, pectin and cellulose at 1630, 975, 1014 and 1060 cm^{-1} respectively. All these functional group has high ability in adsorbed metal ions. The result shows that combination is the most effective adsorbent due to high surface of active sites was evaluated using percentage of removal efficiency and paired T-test. However for the monolayer adsorption banana peels is the most effective compare to sugarcane bagasse and combination was evaluated using Langmuir and Freundlich isotherm. This study would provide greater benefits for the community and government to solve the accumulation of heavy metals pollutant and biomass through cheaper and environmental friendly biosorption process.

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