

## Use of chemically modified *Macaranga indica* leaf powder for the removal of methylene blue from aqueous solutions

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One of the common contaminants of industrial wastewater is dye pollutants that come from textile, paper and leather industries. Currently much attention has been paid in utilizing low cost biosorbents for dye removal in wastewater. The feasibility of utilizing *Macaranga indica* (MI) leaf powder as a potential adsorbent for the removal of methylene blue (MB) was investigated in this study. The parameters such as contact time and pH were optimized for the determination of adsorption capacity of MI leaf powder. The surface characterization of the adsorbent was carried out by determining the point of zero charge ( $\text{pH}_{\text{pzc}}$ ) values. Possible enhancement of adsorption capacities was investigated by the chemical modification which is one of the most outstanding and efficient techniques used to enhance the surface properties of biosorbents. NaOH and EDTA were used for chemical modification of MI leaf powder and the maximum adsorption capacities were determined. The maximum adsorption capacities for unmodified MI leaf powder and its NaOH and EDTA modified forms were 12.31, 149.25 and 250.00 mg/g respectively. The extent of the adsorption of MB by the unmodified and modified MI leaf powder was influenced by ionic constituents in the medium and pH. Langmuir and Freundlich models were used to describe the adsorption process. The results revealed that dry powder of MI leaf is a very efficient low cost potential biosorbent for the removal of MB and similar cationic dyes from aqueous solutions such as wastewater.

**Keywords:** Biosorbent, *Macaranga indica*, Chemical modification, Methylene blue

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