



Mangifera indica LEAVES AS A BIOSORBENT TO TREAT MUNICIPAL WASTEWATER IN VAVUNIYA DISTRICT

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Abstract: The rapid urbanization in Vavuniya town resulted in high volumes of urban drainage which collectively entered into Vavuniya tank located in the heart of Vavuniya town area. The existing treatment system for urban drainage is not efficient as such there is a need to incorporate an additional treatment step to improve the quality of the treated water prior to discharge into Vavuniya tank. Use of biosorbents is one of the cost-effective techniques which can be incorporated with the existing treatment system to improve its performance. Therefore, this study assesses the feasibility to use a biosorbent derived from *Mangifera indica* leaves in removing the contaminants such as total dissolved solids (TDS), turbidity, chemical oxygen demand (COD) and nitrate from municipal wastewater. Batch experiments namely isotherm and kinetics were conducted to study the effect of dosage and contact time of biosorbents in terms of removing above mentioned contaminants. The varying doses of adsorbents (0.25-6 g/L, particle size >1mm) and varying contact time (15- 300min) were studied to determine the optimum dosage and contact time respectively. *Mangifera indica* leaf powder is found to remove TDS, turbidity, COD effectively at 23%, 21.6%, 56.3%, and 87.55% respectively at the dose of 4 g/L in 180 minutes of contact time. But in the case of nitrate the removal efficiency decreases with increasing dosages. Student t-test confirms that the biosorbent derived from *Mangifera indica* leaves significantly removes the above parameters from the wastewater (p-value < 0.05). This study suggests to incorporate adsorption treatment system (using *Mangifera indica*) as an additional step with the traditional treatment system to ensure sustainable and ecological friendly method of wastewater treatment.

Keywords: Adsorption, Biosorbent, Isotherm, Kinetic, Wastewater