

## ***Efficiency of Sugarcane Bagasse-Derived Biosorbents to treat Grey Water in terms of Organics Removal***

Y. Suntharalingam<sup>1\*</sup>, S. Devaisy<sup>1</sup>

<sup>1</sup> *Department of Bio-science, Faculty of Applied Science, University of Vavuniya, Sri Lanka*  
*\*yogasubanuja@gmail.com*

Water scarcity is a pressing issue exacerbated by population growth. However, leveraging greywater as a supplementary water source for non-potable purposes. Sugarcane bagasse, a lignocellulosic biomass, generally a low-cost and eco-friendly product, has gained attention as a potential biosorbent for greywater treatment. However, the application of this adsorbent to the grey water treatment in this region is lacking. The porous nature and surface structure of sugarcane bagasse make it a possible biosorbent for treating wastewater. This study emphasizes the use of sugarcane bagasse-derived biosorbent to treat the grey water produced from a student hostel. The sugarcane bagasse was collected from a local market, then it was thoroughly washed and dried under shade. The bagasse was cut into small pieces to enhance the surface area. Batch adsorption experiments were conducted through adsorption isotherms (for varying doses of 1–12 g/L) and kinetics (for contact times of 30 min–24 hours). This was conducted to determine the optimum dosage and the optimum contact time of the biosorbent, respectively, for the removal of COD, EC, and turbidity. Results revealed the 5 g/L dosage of sugarcane bagasse exhibited maximum reduction in COD (63%), turbidity (94%), and EC (37%), at a contact time of 360 mins from raw wastewater (COD 449 mg/L; turbidity 172 NTU; EC 4.16 mS/cm). The adsorption capacity ( $q_e$ ) of bagasse was 64.0 mg/g in terms of COD reduction. Optimum dosage (5 g/L) and optimum contact time (360 mins) were determined based on the adsorption capacity of the adsorbents for the COD removal. The adsorption capacity ( $q_e$ ) of bagasse was 64.0 mg/g in terms of COD reduction. Optimum dosage (5 g/L) and optimum contact time (360 min) were determined based on the adsorption capacity of the adsorbents to the respective dosage and time. The pseudo-second-order kinetic model and Elovich isotherm model explain the experimental data on adsorption equilibrium with  $R^2$  values of 0.995 and 0.764, respectively, for COD removal. According to the models, the removal phenomenon is based on a chemisorption kinematic principle in heterogenous surfaces. The wasted sugarcane bagasse could be potentially incorporated into sand filters, constructed wetlands, or other alternative treatment systems, enhancing their ability to effectively remove, especially organics, from greywater.

**Keywords:** Adsorption, Chemical Oxygen Demand, Greywater, Reuse, Sugarcane Bagasse