

Abstract No: 19

WASTE-DERIVED BIOSORBENTS TO REMOVE ORGANICS FROM RICE MILL WASTEWATER

U.D.T.M. Uduwarage^{*} and S. Devaisy

Department of Bio-science, Faculty of Applied Science, Vavuniya Campus of the University of Jaffna, Vavuniya 43000, Sri Lanka.

^{}thamali.uduwarage12@gmail.com*

The objective of this study was to compare the performance of natural biosorbents (rice hull and peanut hull) in removing organic pollutants from rice mill wastewater. The biosorbents were prepared through the processes of washing, drying, grinding and sieving to obtain particle size of less than 1 mm. Batch adsorption experiments were conducted for rice hull and peanut hull separately for varying doses (0 - 6 g/L) and contact times (0 - 300 min) under similar conditions to determine the optimum dosage and optimum contact time at pH 8.0 ± 0.25 and at temperature 28 ± 2 °C, respectively. The dose of 0 g/L was considered as the control of the experiments. The performance efficiencies of the biosorbents were tested based on the reduction of Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) from wastewater using three replicates for each test. Results revealed that the optimum doses of rice hull and peanut hull were found to be 3 g/L and 4 g/L respectively in reducing organics. At the optimum doses of rice hull and peanut hull, BOD reductions were observed to be 73% and 65%, whilst COD reductions were 73% and 70%, respectively, at a contact time of 4.0 hours. Considering the optimum contact time at the respective doses, the rice hull achieved optimum removal at 120 mins, whilst the peanut hull achieved at 180 mins at the shaking of 150 rpm. Based on a two-way t-test, the rice hull and the peanut hull significantly remove organics from the ricemill wastewater (p-value < 0.05). The findings showed that the rice hull is more efficient in the removal of organics than peanut hull as rice hull requires lesser dose and contact time. Furthermore, it was noticed that the rice hull is capable of adsorbing organics to its binding sites are faster compared to the peanut hull. Therefore, considering the cost-effectiveness and promoting waste to resource concept, the waste-derived biosorbents, such as rice hull and peanut hull, can be used as potential biosorbents to remove organics from ricemill wastewater.

Keywords: Biosorbents, Organics, Peanut hull, Rice hull, Wastewater.