



THE ADSORPTION EFFICACY OF ACTIVATED CARBON FROM RICE HUSKS (*Oryza sativa* L.) AND SABA BANANA (*Musa acuminata x balbisiana*) PEELINGS FOR THE REMOVAL OF CHROMIUM FROM LABORATORY WASTEWATER

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ABSTRACT – One main issue in industrialization nowadays is the management of wastewater that causes negative impacts on both the environment and people. The Sustainable Development Goals states the importance of clean water and sanitation. This paper acts on the goal by finding a way on how to remove chromium (Cr^{2+}) found in laboratory wastewater using activated carbon from agricultural wastes, specifically banana peelings and rice husk. Varying ratios of activated carbon from rice husk (RHAC) and banana peelings (BPAC) were used for the adsorption experiments. Data from scanning electron microscope (SEM) showed that the activation of rice husk was more favorable than the activation of banana peelings due to the presence of more prominent adsorption sites on the surface of the RHAC than on BPAC. Results from Frontier-transform infrared - attenuated total reflection (FTIR-ATR) spectroscopy showed that there was a decrease in H_2O in BPAC; meanwhile there was complete loss of H_2O in RHAC. Atomic adsorption spectroscopy (AAS) showed that pure BPAC removed the lowest amount of Cr^{2+} at only 21 % while pure RHAC removed 61 %. The optimum dosage of activated carbon was determined to have a ratio of 6.67g BPAC:3.33g RHAC with 64 % of Cr^{2+} removed; exhibiting a synergistic effect of BPAC and RHAC. It was interpreted that this was due to the interaction of the $\text{C}=\text{O}$ and $\text{O}-\text{H}$ bonds between RHAC and BPAC which increased the surface area of RHAC for Cr^{2+} attachment. The findings of this study present a safe, clean, and low cost means of wastewater management in a laboratory environment.

Keywords: banana peeling and rice husk activated carbon, laboratory wastewater, removal of chromium



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