

**MODIFICATION OF CELLULOSE FROM COTTON BALLS WITH
ETHYLENEDIAMINE (EDA) FOR HEAVY METAL ADSORPTION
FROM WASTEWATER**

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WASTEWATER**

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ABSTRACT

MODIFICATION OF CELLULOSE FROM COTTON BALLS WITH ETHYLENEDIAMINE (EDA) FOR HEAVY METAL ADSORPTION FROM WASTEWATER

This study investigates the modification of cellulose from cotton balls using ethylenediamine (EDA) to enhance its adsorption capacity for copper ions in wastewater treatment. Copper solution samples containing 1, 3, 5, 7, and 9 ppm were prepared for Atomic Absorption Spectroscopy (AAS) to evaluate the adsorptive efficiency of both raw and modified cellulose. The results demonstrate that EDA-modified cellulose exhibits significantly higher copper adsorption across all concentrations compared to raw cellulose. For instance, at a saturation level of 5 ppm Cu, the modified cellulose showed an absorbance of 0.092, indicating greater adsorption compared to 0.030 for raw cellulose. The calculated adsorption capacities for modified cellulose ranged from 0.14 mg/g at 1 ppm to 0.58 mg/g at 9 ppm, consistently outperforming raw cellulose. FTIR characterization confirmed the successful modification of cellulose, as evidenced by peaks at 3400 cm^{-1} and 1638 cm^{-1} , corresponding to the N-H stretching of amine groups and N-H bending or C=N stretching of imine groups, respectively. These functional groups enhance the binding sites and improve adsorption efficiency. The findings of this study conclude that chemical modification of cellulose with EDA significantly increases its copper adsorption capacity. This modified cellulose can serve as an effective and sustainable adsorbent for the pre-treatment of wastewater, contributing to enhanced environmental cleaning processes.

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