Comparative Study on Acetic Acid Adsorption Using Activated Carbon Derived from Banana and Pineapple Peels

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Abstract:

This study compares the adsorption efficiency of acetic acid using activated carbon from banana peel (BP-AC) and pineapple peel (PP-AC) at different time intervals (5, 10, 15, 30, and 60 minutes). Despite BP-AC having a higher surface area (561 m^2/g) than PP-AC (148 m^2/g), their adsorption efficiencies remained comparable. At 5 minutes, BP-AC (3.5%) outperformed PP-AC (2.5%), but at 10, 15, 30, and 60 minutes, both adsorbents reached similar efficiencies of 4.3–5.5%. SEM confirmed enhanced porosity after KOH activation, while EDX suggested oxygen-containing functional groups aiding adsorption via electrostatic interactions and hydrogen bonding. These findings emphasize that pore accessibility and surface chemistry significantly influence adsorption beyond surface area alone, supporting the use of banana and pineapple peel-derived activated carbon as sustainable adsorbents for wastewater treatment. publishers.

Keywords:

Acetic acid adsorption, Activated carbon, Banana peel, Pineapple peel, Wastewater treatment.