DEVELOPMENT OF A NOVEL ACTIVATED CARBON DERIVED FROM LONGAN PEEL FOR REMOVING OF CAFFEINE FROM SYNTHETIC HOSPITAL WASTEWATER

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Abstract - This research investigated the influence of activation temperature on the physicochemical properties of activated carbon produced from longan peel (LPAC). The longan peel was activated using NaOH at temperatures of 600 and 700 °C. The LPAC materials were characterized for their surface and structural properties using X-ray diffraction, N_2 adsorption-desorption analysis, Fourier transform infrared spectroscopy and scanning electron microscopy. The LSAC materials demonstrated an amorphous carbon structure, with a specific surface area ranging from 1,400.8 to 2,156.1 m^2/g, an average pore volume between 0.72 and 1.10 cm^3/g, and an average pore diameter of 9.4 to 10.2 nm. Additionally, they disclosed multiple types of pore structures. The LPAC materials served as an adsorbent for the removal of caffeine (CAF) from wastewater, highlighting the presence of CAF in water resources and the necessity for alternative treatment methods. This study evaluates the performance of LPAC adsorbents in wastewater containing various ions, including synthetic hospital wastewater, in comparison to tap water. The LPAC with high porosity demonstrated an adsorption capacity for CAF exceeding 120 mg/g.

Keywords - Activated Carbon, Longan Peel, Caffeine, Synthetic Hospital Wastewater