

Abstract:

This study investigates Java seed extract and biochar for their applications in chromium removal from industrial wastewater and latent fingerprint enhancement. Scanning Electron Microscopy (SEM) reveals the porous microstructure of Java seed biochar, highlighting its potential as an efficient chromium adsorbent. The adsorption experiments demonstrate time-dependent kinetics, with chromium removal reaching 79% after one hour and increasing to 83% with 100 mg of biochar. These results underscore the effectiveness of biochar in chromium removal. Additionally, Ultraviolet-Visible Spectroscopy (UV) unveils the optical properties of both materials, suggesting their dual use as sensitizing agents for latent fingerprint enhancement. Biochar stands out for its optical properties, making it a promising candidate for environmental remediation and forensic applications. Fourier-Transform Infrared Spectroscopy (FTIR) provides insights into the chemical composition of Java seed extract and biochar, further enhancing our understanding of their potential roles in heavy metal sequestration and latent fingerprint development.