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Topic of the research: Development of Potentially-abled Biopolymeric Nanocomposites for the Mitigation of Hazardous Environmental Contaminants

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Findings

The thesis entitled **"Development of Potentially-abled Biopolymeric Nanocomposites for the Mitigation of Hazardous Environmental Contaminants"** consists of six chapters. The thesis elucidates the synthesis of various gellan gum-based nanocomposites employing eco-friendly techniques. These green synthesized nanocomposites were effectively utilized for the adsorption of Victoria Blue, Azure Blue, Crystal Violet, Malachite Green, Methylene Blue, Janus Green, and Aniline Blue. Various techniques including X-ray diffraction (XRD), Fourier Transform infrared spectroscopy (FTIR), Brunauer–Emmett– Teller (BET) analysis, Transmission electron microscopy (TEM), Scanning electron microscopy (SEM), Energy dispersive X-ray spectroscopy (EDX), Thermogravimetric analysis (TGA) assisted the physio-chemical characterization of the adsorbents. Isotherm studies were carried out by Langmuir, Freundlich, Temkin, and Dubinin-Radushkevich models. Further, the rate constant of the adsorption reaction was calculated by using pseudo-first-order and pseudo-second-order kinetics. Thermodynamic studies were used to elucidate the spontaneity of the adsorption process by applying Vant' Hoff equation. Desorption studies were carried out for each adsorbent to infer their renewability from an economical perspective. The last chapter is the comparison of the four adsorbents to figure out the best adsorbent based on their Langmuir adsorption capacity, kinetics, thermodynamics, and BET surface area.