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Topic of Research**:** **Bio-Polymer Based Designing of Integrated System for the Removal of Antibiotics From Wastewater**

Keywords: Bio-Polymers, Chitosan, Antibiotics, Wastewater, Adsorption

Findings

This thesis detailed the fabrication of various bio-polymer based composites such as Chitosan/PVP/Iron oxide composite, PVP/Chitosan/$ZnFe_2O_4$ composite, Chitosan/PVA/$ZnFe_2O_4$ adsorbent films and activated Biochars prepared from Coconut Husk and Wheat Straw using hydrothermal carbonization. These synthesized composites were exploited as adsorbents for different antibiotics like Amoxicillin trihydrate, Tetracycline and Trimethoprim. Moreover, the last chapter of the thesis describes designing of bio-polymer based integrated system for the removal of antibiotics in fixed-bed studies. The synthesised composites were characterized by different spectroscopic techniques like Fourier Transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), Transmission electron microscopy (TEM), scanning electron microscopy (SEM), Vibrating Sample Magnetometer (VSM) and energy dispersive X-ray spectroscopy (EDX). The linear isotherm and kinetic modeling were employed to appraise the equilibrium data. Different Kinetic models (Pseudo First order, Pseudo-second order, Intraparticle diffusion etc) were also utilised to adsorption data to determine the mechanism of the adsorption process. The Reusability of the adsorbent was also studied which demonstrated that these adsorbents can be used for practical purposes. The adsorption of antibiotics onto the synthesized composite occurs via different mechanisms that include weak Vanderwaal forces, Electrostatic interactions, Hydrogen bonding, and π-π interactions.