

# **Preparation, characterization and removal performance of biochar-based nanocomposite for removal of plastic nanoparticles from water**

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Micro- and nanoparticles of common plastic materials are considered as emerging pollutants worldwide. This is a widespread problem in a modern-day that poses major environmental risks. New approaches to the identification and elimination of plastic nanoparticles from the environment are required to reduce the danger of these contaminants. Numerous strategies, including biological, chemical, and physical techniques, can effectively eliminate micro(nano)plastics. Biochar is a low-cost adsorbent that is regarded as an efficient material that is produced by pyrolyzing biomass. Apart from being low in toxicity, environmentally friendly, and inexpensive, biochar also possesses the desirable benefits of a well-developed mesoporous structure and a large number of surface functional groups. They have special physicochemical qualities that make them appealing for use in a variety of environmental applications, including photocatalysis. Its application is ecologically effective for remediation of organic and inorganic contaminants. This study discusses a simple and effective approach for removing polyvinyl chloride (PVC) nanoparticles from spiked water samples using corncob biochar/N-TiO<sub>2</sub> composite. The prepared composite material corncob biochar/N-TiO<sub>2</sub> was characterized by FT-IR (Fourier transform infrared spectroscopy), XRD (X-ray diffraction), SEM (Scanning electron microscopy), EDS (Electron dispersive spectroscopy), XPS (X-ray photoelectron spectroscopy) and BET (Brunauer–Emmett–Teller). The optical band gaps are studied using Tauc's approach. High removal efficiency and nearly quantitative (>98%) removal of PVC nanoparticles were achieved in 3 hours. This work is relevant for planning future applications of the removal of contaminants of various chemical nature.