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Polyaniline based hybrid bionanocomposites with enhanced visible light photocatalytic activity and antifungal activity

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Polyaniline based bionanocomposites grafted on to biopolymer chains have been synthesized via *in situ* polymerization of aniline and hydrothermally prepared metal nanoparticles. The as prepared bionanocomposites were characterized by XRD (X-ray Diffraction analysis), Fourier Transform Infrared Spectroscopy (FT-IR), Ultraviolet-Visible (UV-Vis) spectroscopy, Scanning Electron Microscopy (SEM), Energy Dispersive Spectroscopy (EDS) and Transmission Electron Microscopy (TEM). Cyclic voltammetry was used to examine the electrochemical properties of the sample while fluorescence spectroscopy was to study the recombination behavior of electron-hole pair under UV irradiation. Moreover, the anti-fungal nature of the bionanocomposite was also examined against 3 pathogenic fungal strains; *Rhizoctonia solani, Fusarium oxysporum* and *Alternaria alternata*. SEM images reveal that synthesized nanocomposites contain spherical metal nanoparticles scattered uniformly within biocomposites matrix. The as prepared materials exhibited significant degradation of reactive orange-16 (RO 16) dye under visible light. Incorporation of spherical metal nanoparticles into the polymer matrix causes strong absorption in case of PANI/Ni as compared to that of PANI/C/Ni. The photo degradation of RO-16 is due to electron-hole pair separation and formation of reactive species i.e. OH- and H by trapping of photo generated electron from the surface of photo catalyst.

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