

SYNTHESIS, CHARACTERIZATION, *IN VIVO* CYTOTOXICITY AND IMMOBILIZATION OF β - GALACTOSIDASE ON POLY(*O*-TOLUIDINE)- TITANIUM DIOXIDE NANOCOMPOSITE

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ABSTRACT

The nanocomposites of poly(*o*-toluidine)-titanium dioxide (POT/TiO₂) have been synthesized by *in situ* chemical oxidative polymerization of *o*-toluidine (monomer). The POT/TiO₂ nanocomposites are obtained by the addition of TiO₂ nanoparticles (NPs) in the POT. Subsequently, β -Galactosidase (BGAL) has been immobilized on POT/TiO₂. The nanocomposite POT/TiO₂ nanocomposites were characterized by FTIR, SEM and TGA/DTA. The nano size of pure POT and its POT/TiO₂ nanocomposites were confirmed by transmission electron microscopy (TEM) and X-ray diffraction (XRD) studies. The particle size was found to be in the range of ~ 25-40 nm. The characterization results confirmed that there is a strong synergistic interaction among POT and TiO₂ NPs. The results showed that the POT/TiO₂ nanocomposites are thermally more stable as compared to pristine POT. The loading efficiency of POT/TiO₂ nanocomposites is 84.51%. The immobilized POT/TiO₂ nanocomposites enhance its stability, recycling efficiency and residual activity, an ideal candidate for industrial applications. The *in vivo* cytotoxicity studies of POT and POT/TiO₂ have also been estimated against brine shrimp.

Keywords: Thermogravimetric analysis, Composites, transmission electron microscopy, X-ray diffraction.