

Fabrication and characterization of chitosan based nanocomposite films using titanium oxide nanoparticles

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In this study, eco-friendly nanocomposite films were prepared by using chitosan (CHS), PVA, titanium oxide (TiO₂) nanoparticles, and plasticizers (sorbitol (SO) and citric acid (CA)). The CHS based nanocomposite films was characterized by using X-ray diffraction (XRD), fourier transform IR spectrophotometry (FT-IR), and scanning electronic microscope (SEM). The results of the XRD and FT-IR analysis verified that TiO₂ characteristic peaks existed in the prepared nanocomposite films. In addition, the intensity of TiO₂ characteristic peaks increased with increase of TiO₂ contents. The physical properties such as tensile strength (TS), elongation at break (%E), swelling behavior (SB), and solubility (S) of prepared nanocomposite films were investigated. The results indicated that compared with films without added TiO₂ nanoparticles, the mechanical properties and water resistance were enhanced up to 1.42-1.50 times by the addition of TiO₂ nanoparticles. The photocatalytic degradability of the prepared films containing TiO₂ nanoparticles was evaluated using bisphenol A (BPA) and methyl orange (MO) as photodegradation targets.