

Abstract

In this study, a novel nanocomposite based on chitosan grafted polyaniline/ZnO/montmorillonite has been successfully synthesized. The zinc oxide powder was used to produce zinc oxide nanoparticle using chemical deposition method. montmorillonite, chitosan grafted polyaniline and were used as, the solid support, the natural polymeric stabilizer, respectively. Polyaniline was chemically grafted on chitosan by the use of ammonium peroxydisulphate (APS) initiator . Morphology and particle size of the novel nanocomposite was studied by scanning electron microscopy (SEM), X-ray diffraction (XRD), and Fourier transform infrared (FT-IR) analyses. According to the XRD analysis, the size of nanoparticles was found to be in the range of 32-42 nm. The SEM images showed favored shape of nanoparticles as hexagonally particles which is benign shape for antibacterial analysis. The FT-TR spectrum shows a strong peak around $417-550\text{ cm}^{-1}$ which pertains to Zn-O stretching in zinc oxide nanoparticle. The antibacterial activity of the obtained nanocomposite was also evaluated against bacteria of Gram positive *Staphylococcus aureus* (Staph. aureus) and Gram negative *Escherichia coli* (E. coli) using the paper disc diffusion method. The antibacterial study showed that the MMT/Ch-g-PANI composite did not have a very good antibacterial activity but ZnO/MMT/Ch-g-PANI nanocomposites were found to be effective against two bacteria.

Keywords: Nanocomposite, ZnO nanoparticles, chitosan, polyaniline, montmorillonite, Antibacterial properties



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**Synthesis, characterization and Study of
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based on Chitosan- Grafted-
polyaniline/Montmorillonite/ZnO**

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