

Synthesis and Characterization of Zinc Oxide Nanoparticles from *Curcuma longa* Extract by Green Synthesis Method

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Abstract

Among the nanobiotechnological approaches with the increase in recent years for the synthesis and characterization of metal nanoparticles is green synthesis methods. Green synthesis approaches are very advantageous besides physical and chemical nanoparticle synthesis because of their low cost, biocompatibility and environmental friendliness. In this study, aqueous extract obtained from the powder form of *Curcuma longa* was used as a reducing agent for green synthesis zinc oxide nanoparticles. Ultraviolet visible (UV-vis) spectroscopy analysis, Fourier Transform Infrared Spectroscopy analysis (FTIR) and scanning electron microcopy (SEM) were used to characterize the synthesized zinc oxide nanoparticles (1). Zinc oxide nanoparticles prepared by *C. longa* gave a peak at 365 nm wavelength and this peak, which was not found in *C. longa* extract in the wavelength scan of the nanoparticle compared to the literature, refers to the ZnO nanoparticle structure according to a study (2). It is seen that the prepared nanoparticle sizes are in the range of 30-60 nm and the morphology is close to spherical. The findings are consistent with the literature (3). When the FTIR spectrum of the nanoparticles was examined, C-O tension band was observed at 1135 cm⁻¹, 1137 cm⁻¹, 1151 cm⁻¹ vibrations, C-H tension band (alkane) was observed at 2136 cm⁻¹ 2926 cm⁻¹ 2921 cm⁻¹ and 2928 cm⁻¹ vibrations, and N-H tension band was observed at 3357 cm⁻¹ and 3383 cm⁻¹ vibrations. However, the Zn-O bond around 575 cm⁻¹ observed in the literature was not observed in the spectra (4).

Keywords: Zinc oxide nanoparticles, green synthesis, *Curcuma longa*, Nanoparticles characterization.

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