

RESEARCH PAPER

Green Synthesis of Zinc Oxide Nanoparticles Using Garlic Skin Extract and Its Characterization

Shreya Modi ¹ and M. H. Fulekar ^{2*}

¹ School of Nano Sciences, Central University of Gujarat, Gandhinagar, India

² Centre of Research for development, Parul University, Gujarat, India

ARTICLE INFO

Article History:

Received 18 August 2019

Accepted 05 October 2019

Published 01 January 2020

Keywords:

Eco-friendly

Garlic skin

Green synthesis

Zinc oxide Nanoparticles

ABSTRACT

Plant-mediated synthesis of metal oxide nanoparticles is a promising alternative to the traditional method of physical and chemical synthesis. In this paper, we report the synthesis of Zinc Oxide nanoparticles (ZnO NPs) by a biological method. During the study, ZnO nanoparticles were synthesized by *Allium sativum* skin (garlic skin) extract. Formation of ZnO nanoparticles has been confirmed by UV-visible spectroscopy, UV diffuse reflectance spectroscopy (UV-DRS), X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), Scanning Electron Microscope (SEM) with Energy dispersive X-ray studies (EDX) and transmission electron microscope (TEM), Atomic Force Microscopy (AFM), Brunauer-Emmet-Teller (BET), Thermogravimetric analysis (TGA). UV-vis spectroscopy confirms the synthesis of ZnO nanoparticles and showed the characteristic of the absorption peak at 370 nm. The scanning electron microscope (SEM) and Transmission electron microscope (TEM) confirms the formation of the rod and hexagonal shaped nanoparticles having an average size of 7.77 nm. Use of waste garlic peel extract for the reduction of zinc chloride to Zinc oxide is the novelty of work. Energy dispersive X-ray analysis (EDX) states the formation of highly pure ZnO nanoparticles. The ZnO nanoparticles synthesized using garlic skin are expected to have applications in biotechnology, biomedical, catalysis, coatings, sensors, and water remediation. Therefore, the study reveals an efficient, cheap, simple, novel, eco-friendly, safe and convenient method for the green synthesis of multifunctional ZnO NPs. [For Full Article Click Here](#)