

## Turmeric Mediated Synthesis and Characterization of Cerium Oxide Nanoparticles

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**Abstract :** Cerium oxide and turmeric have antioxidant properties, which have gained interest among researchers to study their applications in the field of biomedicine, such as anti-inflammatory, anticancer, and antimicrobial applications. In this study, the turmeric extract was prepared and mixed with cerium nitrate hexahydrate, stirred continuously to obtain a homogeneous solution and then heated on a hot plate to get the supernatant evaporated, then calcinated at 600°C to obtain the cerium oxide nanoparticles. Characterization of synthesized cerium oxide nanoparticles through Scanning Electron Microscopy determined the particle size to be in the range of 70 nm to 250 nm. Energy Dispersive X-Ray Spectroscopy determined the elemental composition of cerium and oxygen. Individual particles were identified through the characterization of cerium oxide nanoparticles using Field Emission Scanning Electron Microscopy, in which the particles were determined to be spherical and in the size of around 70 nm. The presence of cerium oxide was assured by analyzing the spectrum obtained through the characterization of cerium oxide nanoparticles by Fourier Transform Infrared Spectroscopy. The crystal structure of cerium oxide nanoparticles was determined to be face-centered cubic by analyzing the peaks obtained through the X-Ray Diffraction method. The crystal size of cerium oxide nanoparticles was determined to be around 13 nm by using the Debye Scherer equation. This study confirmed the synthesis of cerium oxide nanoparticles using turmeric extract.

**Keywords :** antioxidant, characterization, cerium oxide, synthesis, turmeric

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