

Producing and assessing zinc sulfate nanoparticles using *Nigella sativa* assistance(Article)(Open Access)

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Abstract

In this research paper, our primary objective is centered around the creation, characterization, and evaluation of zinc sulfate (ZnSO_4) nanoparticles through the utilization of *Nigella sativa* as a natural reducing agent. We embraced an environmentally conscious and uncomplicated green synthesis approach to synthesize these ZnSO_4 nanoparticles. For a comprehensive examination of their structural and physical properties, we employed techniques such as x-ray diffraction, Raman spectroscopy, scanning electron microscopy, and dynamic light scattering analysis. Our results unequivocally confirmed the successful production of ZnSO_4 nanoparticles with well-defined crystalline structures, distinct wavelength patterns, prominent peak values, and specific particle sizes. This study underscores the impressive efficacy of Zn nanoparticles in the context of bio-electrolyte power generation systems. In addition, it introduces an economically feasible and environmentally friendly method for their fabrication. The Zn nanoparticles display great potential as a solid basis for advancing bio-electrochemical cells, underscoring the significance of further exploration into their effects on these cells. © 2023 Author(s).

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