

Enriched Antibacterial Activity of Zinc Oxide Nanoparticles Synthesized Using *Opuntia ficus Indica* Fruit Extract

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Abstract

In order to enrich the antibacterial activity, Zinc Oxide (ZnO) nanoparticles were green synthesized by *Opuntia ficus indica* fruit aqueous extract. ZnO is an antimicrobial agent and is effective to inhibit both gram positive and gram negative bacteria. The phytochemicals in the plant extract function as stabilizers and reducing agents. In order to investigate the surface morphology and optical characteristics, SEM and UV-Vis spectroscopy were used. Zinc oxide nanoparticles with a light brown color show an absorption band at 445 nm as a result of surface plasmon resonance. FTIR and EDX results supported the existence of phytochemicals in the produced compounds. The average particle size, according to an XRD examination, was 21.75 nm. The size of nanoparticles was shown to decrease with rising temperature and to be smaller in green synthesis than in chemical synthesis. Aggregated clusters of smaller nanoparticles can be seen in SEM images. The sample has improved antibacterial activity.

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