MICROWAVE-ASSISTED SYNTHESIS OF SILVER NANOPARTICLES USING *OPUNTIA FICUS-INDICA* CLADODE EXTRACT WITH ITS BIOLOGICAL AND CATALYTIC ACTIVITIES

Neeraj Rani[a]* and Bhagwati Devi[a]

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ABSTRACT

In the current study, silver nanoparticles (AgNPs) were synthesized with silver nitrate and cladode extract of *Opuntia ficus-indica being* used as precursor and phyto-reducing agent, respectively. The reaction combination was irradiated with microwaves (using a domestic microwave oven) for the spontaneous and stable synthesis of AgNPs. AgNPs were also synthesized using chemical methods, to evaluate the difference in microbial activities of AgNPs prepared by two different methods. The AgNPs development was confirmed by UV-Vis spectroscopy. The involvement of phytochemicals of the extract in the reduction of silver nitrate was confirmed by FTIR- spectroscopy. For the determination of the crystal structure of silver nanoparticles, X-ray diffraction examination was performed. Distribution of size and zeta potential of AgNPs was studied by dynamic light scattering (DLS). The dimensions and form of AgNPs were determined using transmission electron microscopy (TEM). The present study confirms activity against *Escherichia coli* and *Micrococcus luteus* and catalytic activity against 4-nitrophenol. The green synthesized silver nanoparticles showed more antibacterial activity than those synthesized by the chemical reducing method.