

Antibacterial Activity and Cytotoxicity of Silver Nanoparticles Synthesized by Moringa oleifera Extract as Reducing Agent

Authors : Temsiri Suwan, Penpicha Wanachantararak, Sakornrat Khongkhunthian, Siriporn Okonogi

Abstract : In the present study, silver nanoparticles (AgNPs) were synthesized by green synthesis approach using Moringa oleifera aqueous extract (ME) as a reducing agent and silver nitrate as a precursor. The obtained AgNPs were characterized using UV-Vis spectroscopy (UV-Vis), dynamic light scattering (DLS), scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDX), and X-ray diffractometry (XRD). The results from UV-Vis revealed that the maximum absorption of AgNPs was at 430 nm and the EDX spectrum confirmed Ag element. The results from DLS indicated that the amount of ME played an important role in particle size, size distribution, and zeta potential of the obtained AgNPs. The smallest size (62.4 ± 1.8 nm) with narrow distribution (0.18 ± 0.02) of AgNPs was obtained after using 1% w/v of ME. This system gave high negative zeta potential of -36.5 ± 2.8 mV. SEM results indicated that the obtained AgNPs were spherical in shape. Antibacterial activity using dilution method revealed that the minimum inhibitory and minimum bactericidal concentrations of the obtained AgNPs against Streptococcus mutans were 0.025 and 0.1 mg/mL, respectively. Cytotoxicity test of AgNPs on adenocarcinomic human alveolar basal epithelial cells (A549) indicated that the particles impacted against A549 cells. The percentage of cell growth inhibition was 87.5 ± 3.6 % when only 0.1 mg/mL AgNPs was used. These results suggest that ME is the potential reducing agent for green synthesis of AgNPs.

Keywords : antibacterial activity, Moringa oleifera extract, reducing agent, silver nanoparticles

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