



ABSTRACT

The present study was conducted to synthesise silver nanoparticles by chemical and microbial means. The nanoparticles synthesised by these methods were characterised using UV-Vis spectroscopy, X-ray diffraction, Fourier Transform Infrared and Scanning Electron Microscope analysis. The bacteriogenic nanoparticles showed a surface plasmon resonance peak at 410 nm, they were spherical in shape with 60 nm average particle size which was smallest as compared to the other nanoparticles. These nanoparticles had crystalline nature and were surrounded by capping agents. The antibacterial activity of bacteriogenic silver nanoparticles was maximum in comparison with other nanoparticles. The activity against *Staphylococcus aureus* was 19 mm \pm 0.8, 18 \pm 0.4 *Streptococcus pyogenes*, 16 mm \pm 0.6 *Pseudomonas aeruginosa* and 17 \pm 0.9 *Escherichia coli*. The Minimum Inhibitory Concentration and Minimum Bactericidal Concentration (MIC&MBC) values of bacteriogenic nanoparticles as determined against each bacterium were; *S. aureus*: 6&11 μ g/ml, *S. pyogenes*: 7&11 μ g/ml, *P. aeruginosa*: 13&25 μ g/ml and *E. coli*: 11&23 μ g/ml respectively. These nanoparticles showed synergism when combined with ampicillin, tetracycline, kanamycin and streptomycin against antibiotic sensitive *E. coli* (10%, 3.44%, 7.69% and 4.54%, respectively) and *S. aureus* (35%, 8.69%, 9.52% and 5%, respectively). To enhance their production various parameters were optimised. Bacteriogenic nanoparticles showed enhanced production (1.01×10^{-5} M) using Nitrate broth, 50 mg bacterial biomass at 50 °C, pH 9, 8 mM silver nitrate concentration for 72 hours.