

Rapid Biosynthesis of Silver Nanoparticles Using Trachyspermum Ammi

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Abstract : Plasmonic silver nanoparticles (Ag NPs) was synthesized by chemical reduction method using Trachyspermum Ammi (TA, Ajwain) seeds extract in aqueous medium and AgNO₃ solution at different time interval. Reaction time, and concentration of AgNO₃ and TA could accelerate the reduction rate of Ag⁺ and affect AgNPs size and concentration of NPs. Surface plasmon resonance band centered at 420-430 nm (88.78nm) was recognised as first excitonic peak of UV-Vis absorption spectra of AgNPs that used to calculate the particle size (10-30 nm). FTIR results TA supported AgNPs showed decrease in intensity of peaks at 3394, 1716 and 1618 cm⁻¹ with respect to the plain TA indicating the involvement of O-H, carbonyl group and C=C stretching in formation of TA-AgNPs aggregates. The C-O-C and C-N stretching suggested the presence of many phytochemicals on the surface of the NPs. Impedance study reveals that at low concentration of TA the rate of charge transfer is in TA-AgNPs aggregates, found higher than the higher TA concentration condition that confirms the stability of AgNPs in water. Extract reduce silver ions into silver nanoparticles (NPs) of size 6-50nm. Pronounce effect of the time on Ag NPs concentration and particle size, was exhibited by the system These biogenic Ag NPs are characterized using UV- Vis spectrophotometry (UV-Visible), Fourier transformation infrared (FTIR) and XRD. These studies give us inside view of the most probable mechanism of biosynthesis and optoelectronic properties of the as synthesised Ag NPs.

Keywords : antimicrobial activity, bioreduction, capping agent, silver nanoparticles

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