

Biochemical Synthesis Of Silver Nanoprticles Using Filamentous Fungi *Penicillium Decumbens* (MTCC-2494) And Its Efficacy Against A-549 Lung Cancer Cell Line

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Abstract

Biosynthesis of silver and other metallic nanoparticles is one of the emerging research area in the field of science and technology due to their potentiality, especially in the field of nanobiotechnology and biomedical sciences in order to develop nanomedicine. In our present study, *Penicillium decumbens* (MTCC-2494) was brought from Institute of Microbial Technology (IMTECH) Chandigarh and employed for extracellular biological synthesis of silver nanoparticles. Ag-NPs formation was appeared with a dark brown color inside the conical flask. Characterization of Ag-NPs were done by UV-Spectrophotometric analysis which showed absorption peak at 430 nm determines the presence of nanoparticles, Fourier transform infrared (FT-IR) spectroscopic analysis, showed amines and amides are the possible proteins involved in the stabilization of nanoparticles as capping agent. Atomic force Microscopy (AFM) confirmed the particle are spherical, size was around 30 to 60 nm and also the roughness of nanoparticles. Field emission scanning electron microscopy (FE-SEM) showed the topology of the nanoparticles and were spherical in shape. The biosynthesis process was found fast, ecofriendly and cost effective. Nano-silver particle was found to have a broad antimicrobial activity and also it showed good enhancement of antimicrobial activity of Carbenicillin, Piperacillin, Cefixime, Amoxicillin, Ofloxacin and Sparfloxacin in a synergistic mode. These Ag-NPs showed good anti-cancer activity at 80 $\mu\text{g}\cdot\text{mL}^{-1}$ upon 24 hours of incubation and toxicity increases upon 48 hours of incubation against A-549 human lung cancer cell line and the synergistic formulation of the antibiotic with the synthesized nanoparticles was found more effective against the pathogenic bacteria studied.

Keyword : Anti-cancer; Antibacterial; *Penicillium decumbens* (MTCC-2494); Silver nanoparticles

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