Antimicrobial and larvicidal activity of eco-friendly silver nanoparticles synthesized from endophytic fungi *Phomopsis liquidambaris*

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Abstract

In the quest for developing a biological-based nanomaterial for therapeutic applications, here we report a novel benign method of silver nanoparticles synthesized using the endophytic fungi *Phomopsis liquidambaris* strain SA1 (SAAgNPs). A viable method was developed to generate silver nanoparticles by reacting with silver nitrate and an extracellular filtrate of *P.liquidambaris* as a reducing and stabilizing agent. After formation of brown color, synthesized SAAgNPs was measured for its Surface Plasmon Resonance (SPR) which produces an intense absorption spectrum at 430nm. Fourier Transform Infrared Spectroscopy (FTIR) revealed the functional group moieties involved as a capping and reducing agent in SAAgNPs synthesis. Stable, spherical and polydispersed nanoparticles with an average size of 18.7nm were affirmed by Transmission Electron Microscope (TEM). X-ray Diffraction study showed the diffraction peaks corresponds to (111), (200), (220) and (311) planes resembling cubic crystalline in nature. Energy dispersive analysis (EDAX) identifies the silver as a major compositional element. Moreover, SAAgNPs performed better growth inhibitory activity against the tested pathogens. Further, SAAgNPs arrest the growth of IInd and IVth instar larvae of *Aedes aegypti* and *Culex quinquefasciatus* in a dose-dependent method. Finally, SAAgNPs exhibited very low hemolytic activity; suggesting the biocompatibility and feasibility of SAAgNPs as a therapeutic agent. Thus, the study bestowed the isolation of endophytic fungi *Phomopsis liquidambaris* and its mediated synthesis of silver nanoparticles. Further, SAAgNPs proved its efficacy as an effective antimicrobial and mosquitocidal agent.

Keywords: Endophytic fungi**;** *Phomopsis liquidambars;* silver nanoparticles; Bactericidal; larvicidal; Hemolysis

Introduction