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Endophytic fungi *Alternaria* species-1 p-coumaric acid induces anticancer activity on HeLa cancer cell line by initiating mitochondrial-dependent apoptosis pathway

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In the present study, endophytic fungi, *Alternaria alternata* water extract was used to analyze phytochemical by qualitative and GC-MS methods. Synthesized the silver nanoparticles were characterized by UV-Vis spectra, XRD, FTIR, DLS, EDX and SEM to know biophysical properties and evaluated for antioxidant, anticancer and nano-toxicological studies. The endophytic fungal water extract yielded biologically important phytochemicals in qualitative method and the GC-MS yielded five different types of phytochemicals. The color was changed to dark brown when silver nitrate incubated with *Alternaria alternata* water extract. Typical silver nanoparticles formations were confirmed using UV-visible spectra at 420nm and were spherical shaped ranging size 30-40nm. The AaAgNPs showed significant antioxidant activity was compared with ascorbic acid and butylated hydroxytoluene in all the four methods (DPPH, scavenging activity of H₂O₂ and nitric oxide and reducing power). The AaAgNPs significantly reduced the viability of the HeLa cancer cell line and enhanced the caspase-3, 7, 8 and 9 activities at the highest level, assumed to be AaAgNPs induces mitochondrial mediated apoptosis. But, AaAgNPs had not inhibited the growth of green gram and also exhibited anti-hemolysis and heme-biocompatible activity on human blood RBCs. Together of all results, the study provided use of endophytic fungi *Alternaria alternata* in the synthesis of nanoparticles and their significant antioxidant and nano-toxicological studies. The results are strong evidence to develop potential antioxidant and anticancer silver nanoparticles for commercial application.

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