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Macrofilaricidal activity of silver nanoparticle synthesized from a plant *andrographis paniculata*

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Lymphatic filariasis is a neglected tropical disease, causing a major health hazard in the developing world. WHO has ranked the disease as one of the world's leading causes of permanent and long-term disability. The currently available anti-filarial drugs are most effective against microfilaria. Therefore there is urgent need of drug that are macrofilaricidal. Nanoparticles have gained significance in medical fields due to their high surface-area-to-volume ratio. In this study, we synthesize AgNPs from a medicinally important plant *Andrographis paniculata*. The plant have been reported for their antimicrobial, cytotoxicity, anti-protozoan, anti-inflammatory, anti-oxidant, and antiparasitic activities. This nanocomposite was characterized by UV-visible spectroscopy, FT-IR, XRD, SEM, and TEM. Nanocomposite anti-filarial activity was evaluated using motility and viability assay as well as by measuring ROS generation, antioxidant level, and apoptotic markers. The exposure of the nanocomposite to the worms caused a significant decrease in motility and viability leading to their death. Down-regulation of the antioxidant enzymes, as well as alteration in Ca²⁺ signaling, suggested the ER stress-induced mitochondrial-mediated apoptosis. The proteome analysis of treated parasites showed the marked alteration in the protein expression in comparison to the control. In conclusion, the nanocomposite synthesized using plant *A. paniculata* showed strong anti-filarial activity.

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