

Green Synthesis of Silver Nanoparticles, Their Toxicity and Biomedical Applications

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Abstract : Nanoparticles, due to their different sizes and morphologies, are employed in various fields such as the medical field, cosmetics, pharmaceutical, textile industry as well as in paints, adhesives, and electronics. Metal nanoparticles exhibit excellent antimicrobial activity, dye degradation and can be used as anti-cancerous drug loading agents. In this study, silver nanoparticles (Ag-NPs) were synthesized employing doxycycline (antibiotic) as a reducing and capping agent (biological/green synthesis). Produced Ag-NPs were characterized using UV/VIS spectrophotometry, XRD, SEM, and FTIR. Surface plasmon resonance (SPR) of silver nanoparticles was observed at 411nm with 90nm size with homogenized spherical shape. These particles revealed good inhibition zones for Fungi such as *Candida albicans* and *Candida tropicalis*. In this study, toxic properties of Ag-NPs were monitored by allowing them to penetrate in the cell, causing an abrupt increase in oxidative stress, which resulted ultimately in cell death. Histopathological analysis of mice organs was performed by administering definite concentrations of silver nanoparticles orally to mice for 14 days. Toxic properties were determined, and it was revealed that the toxicity of silver nanoparticles mainly depends on the size. Silver nanoparticles of this work presented mild toxicity for different organs (liver, kidney, spleen, heart, and stomach) of mice.

Keywords : metal nanoparticles, green/biological methods, toxicity, *Candida albicans*, *Candida tropicalis*

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