

In Vivo Assessment of Biogenically Synthesized Silver Nanoparticles

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Abstract : Silver nanoparticles (AgNPs) have wider biomedical applications due to their intensive antimicrobial activities. However, toxicity and side effects of nanomaterials like AgNPs is a subject of great controversy towards the further studies in this direction. In this study, biogenically synthesized AgNPs, previously characterized via ultraviolet (UV) visible spectroscopy, scanning electron microscopy (SEM), X-ray diffraction (XRD) and fourier transform infrared spectroscopy (FTIR), were subjected to toxicity evaluation using mice model. Albino male mice (BALB/c) were administered with 50 mgkg⁻¹, 100 mgkg⁻¹ and 150 mgkg⁻¹ of AgNPs, respectively, except for control for 30 days. Log-probit regression analysis was used to measure the dosage response to determine the median lethal dose (LD50). Exposure to AgNPs caused significant changes in the levels of serum AST ($P < 0.05$) at the 100mgkg⁻¹ and 150mgkg⁻¹ of AgNPs exposure, while ALT and serum creatinine ($P > 0.05$) levels remained normal. Histopathology of male albino mice liver and kidney was studied after 30 days experimental period. Results revealed that mice exposed to heavy dose (150 mgkg⁻¹) of AgNPs showed cell distortion, necrosis and detachment of hepatocytes in the liver. Regarding kidney, at lower concentration, normal renal structure with normal glomeruli was observed. However, at higher concentration (150 mgkg⁻¹), kidneys showed smooth surface and dark red colour with proliferation of podocytes. It can be concluded from present study that biologically synthesized AgNPs are small to be eliminated easily by kidney and therefore the liver and kidney did not show toxicity at low concentrations.

Keywords : silver nanoparticles, pseudomonas aeruginosa, male albino mice, toxicity assessment

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