

Abstract

Silver nanoparticles of various shapes are being used for biomedical applications but they induce toxicity and oxidative when administered in a biological system. Current study has designed to synthesize silver nanoparticles of novel triangular shape via chemical reduction method and different amino acids as their capping agents. Both uncapped and capped nanoprisms exhibited three prominent peaks at 330 nm, 420 nm and 660 nm. FTIR results showed the reduction and development of new peaks in FTIR spectra of AgNPrs conjugated with different amino acids. In-vitro antioxidant activity was evaluated by performing DPPH (2,2-diphenyl-1-picrylhydrazil) activity, Ferric reducing power assay and H₂O₂ scavenging activity. Six groups of albino mice were treated with cadmium, silver nanoprisms and their conjugates with a dose of 20mg/kg for 28 days. After 28 days, they were dissected and blood and organs were collected for further analysis. Uncapped AgNPrs were found to induce the toxicity; elevated levels SOD were registered whereas CAT and GST decreased by the exposure of subject particles.

Among all the conjugates, L-cystine and L-tyrosine capped nanoprisms exhibited good antioxidant activity and L-glycine capped nanoprisms showed very less antioxidant activity. Histopathological studies also exhibited damage in case of the animals treated with uncapped AgNPrs and L-glycine capped AgNPrs while those treated with L-cystine and L-tyrosine exhibited normal texture of the tissues. From this study, it is concluded that toxicity of nanomaterials can be reduced after conjugating them various biological molecules and they can be used for various biomedical applications.