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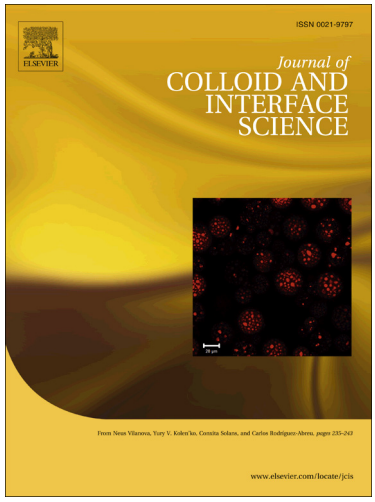

Innate catalytic and free radical scavenging activities of silver nanoparticles synthesized using *Dillenia indica* bark extract

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Innate catalytic and free radical scavenging activities of silver nanoparticles synthesized using *Dillenia indica* bark extract

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Abstract

A green approach was envisaged for the rapid synthesis of stable silver nanoparticles in an aqueous medium using phenolic rich ethanolic bark extract from *D. indica* with marked free radical scavenging and reducing ability. Biosynthesis of silver nanoparticles (AgNPs) was confirmed and characterized by using UV-Visible spectroscopy, particle size analyzer, X-Ray diffractometry (XRD), Transmission Electron Microscopy (TEM) and Fourier Transform Infrared Spectroscopy (FT-IR). Bio-reduction of Ag+ was confirmed with the appearance of golden yellow coloration within 5-10 minutes at 45°C with maximum absorbance at 421 nm. XRD analysis of AgNPs indicated the crystalline nature of metallic Ag. As analyzed by TEM, AgNPs were found to be spherical in shape, well dispersed and size varied from 15-35 nm and dynamic light scaterring (DLS) studies showed the average particle size of 29 nm with polydispersity index (PDI) of 0.280. Synthesized AgNPs were showing surface functionalization as revealed through FTIR studies. These AgNPs were observed to be highly stable at room temperature (28±2°C) for more than 3 months, thereby indicating the ethanolic extract of *D. indica* was a reducing as well as a capping agent for stabilization of AgNPs. Moreover, these green synthesized AgNPs showed enhanced free radical scavenging and excellent catalytic activities when used in the reduction of 4-nitrophenol and methylene blue dye, at room temperature.

Keywords: *Dillenia indica*; silver nanoparticles; free radical scavenging activity; catalytic activity; 4-nitrophenol; methylene blue.

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