

Abstract

Use of nanoparticles for various industrial and biomedical applications has emerged in recent years rapidly, whereas, their accumulation in the environment has raised concerns for their ecotoxicological profile. Going forward, instead of halting their use, there is a need to develop safer nanoparticles. Recently, use of plants has been introduced for the synthesis of nanoparticles, termed as green synthesis. The current study has been designed to synthesize silver nanoparticles (AgNPs) using *Ocimum tenuiflorum* plant and to test their toxicity using a mammalian model.

Characterization of the green synthesized Ag-NPs was performed; UV-visible confirmed the optical absorption peak at 425nm and SEM imaging confirmed the spherical shaped AgNPs and size 35-47.5nm, FTIR confirmed that alkane and aromatic compounds played an important role as capping and reducing agent for Ag ions.

Male albino mice were used as model animal to test the acute toxicity. In total, 4 groups (1 control and 3- experimental) of albino mice were administered varying concentrations of green AgNPs via IV (intravenous) route. Each group comprised of batches (B 1-3) which were injected for 7, 14, and 21 days respectively; each batch was run in triplicate. At the end of each experiment, blood samples were collected from mice and then the mice were sacrificed to obtain liver tissue.

In the samples from both the sources, catalase and GST decreased, whereas SOD level increased in response to increasing dose of AgNPs; this was a clear indication of the oxidative stress in response to green AgNPs; however, these values were lower than reported values from chemically synthesized AgNPs. This fact indicated that green synthesized AgNPs were less toxic than the chemically synthesized ones. Additionally micrographs of liver (cell distortion, necrosis, apoptosis, hepatocytes detachment and other signs of fibrosis) also strengthened our hypothesis that green synthesized particles are relatively safer.

Keywords: AgNPs, acute toxicity, oxidative stress, albino mice