

# Nanocomposites and nanomaterials

## Antioxidant and antimicrobial properties of silver nanoparticles green synthesized using *Stevia* leaf extract

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Silver nanoparticles (AgNPs) possess physicochemical and biological activities, thus they have been widely applied in biomedical sciences. The nanoparticles are of great interest for medical applications due to combination of both properties of silver at the nanoscale form and medical benefits of plant. In the present study, the green synthesis of silver nanoparticles has been carried out using *Stevia* leaf extracts. The nanoparticles were characterized by UV-Vis, SEM, and FTIR analysis. The antioxidant activity and antimicrobial properties of synthesized AgNPs were studied.

Silver nanoparticles were synthesized by using three different *Stevia* leaf extracts, viz., *Stevia* leaf grown *ex situ*, *in vitro*, callus. The *Stevia* leaves for analysis were collected from M.M. Gryshko National Botanic Garden of NAS of Ukraine. The absorption spectrum of the yellow silver colloids showed a surface plasmon absorption band with a maximum at 451 nm, indicating the presence of AgNPs. SEM analysis showed that the synthesized AgNPs were of spherical shape with size in the range of 10 – 55 nm. Ability of extracts to reduce silver ions and stabilize silver metal nanoparticles was confirmed by FTIR.

Antioxidant activity of AgNPs in the reactions with stable radicals was the same as the activity of the initial leaf extracts. Green synthesized AgNPs were found to inhibit *Bacillus cereus* growth by more than 80%, while for initial leaf extracts no inhibition of bacterial growth was observed. Thus, synthesized nanoparticles possess both antioxidant and antimicrobial properties and may be used for biomedical applications.