Cooperative Research Centre for Contamination Assessment and Remediation of the Environment

Novel Phytosynthesis of Nanoparticles using Indigenous Australian Plants

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Introduction

Nanoparticles are being viewed as fundamental building blocks of nanotechnology. The reduction of a material's dimension results in significant variations in the physical and chemical properties as compared to the corresponding bulk material. Nanoparticles can be synthesized through different methods. Chemical methods are the most popular in the synthesis of nanoparticles. However, in some chemical methods toxic chemicals were used in the synthesis protocol which restricted the use of such nanoparticles for biological applications. Therefore, there is a need to establish an enviro-friendly green process for nanoparticle synthesis. Plant extracts have emerged as a simple alternative to chemical and physical synthesis methods. Biosynthesis of nanoparticles by plant extracts is currently under exploitation.

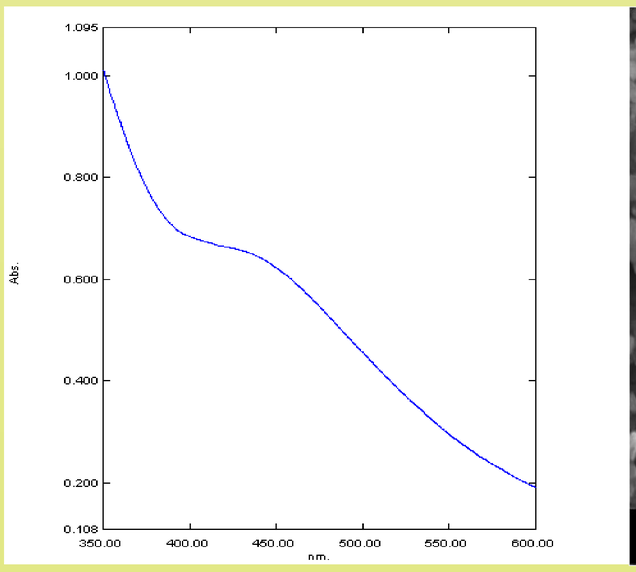
Objectives

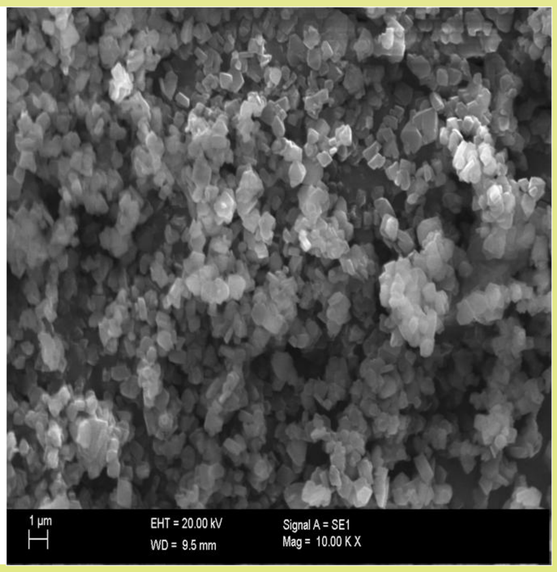
1. To identify the Indigenous Australian plant resources and marine algae for the synthesis of nanoparticles.
2. To demonstrate the phyto-reduction of metal ions to nanosize.
3. To establish enviro-friendly and cost-effective synthetic route for the production of non-toxic nanoparticles.

Methods

Aqueous solution of metal nitrate (mM) is treated with plant extract at ambient temperature and filtered. The supernatant is heated between 50-85^{o}C leading to the formation of nanoparticles. The change in the colour is monitored through UV-VIS spectrophotometer.

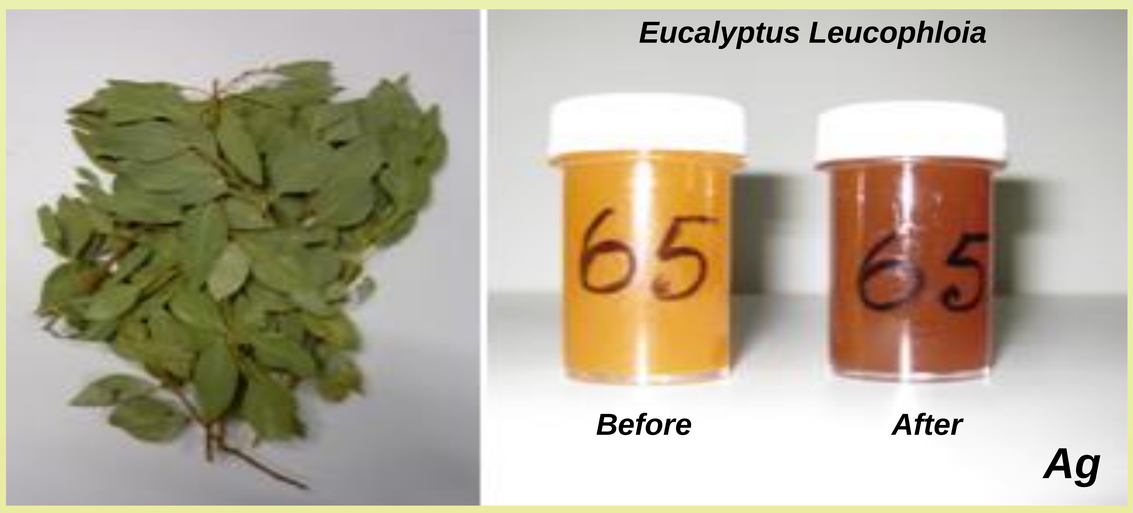
SEM, EDAX measurements are performed to estimate size, shape and the quantity of the nanoparticles.

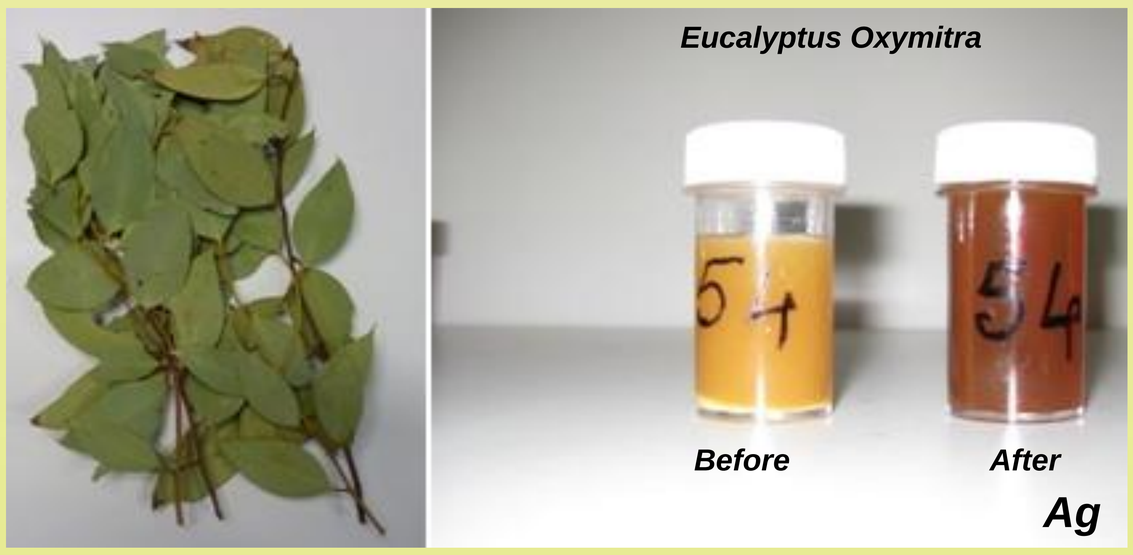




Results

A controlled and up-scalable phytosynthetic route to nanosilver particles with well-defined morphology using Indigenous Australian plants is being reported for the first time. The formed silver nanoparticles are cubical in shape with an average particle size of 50nm. The obtained nanoparticles are highly stable and promising for application as antimicrobial agents and therapeutics.





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