

# Application of Leaf, Stem and Root of Mangrove (*Avicennia marina*) Collected from Nayband Bay in Bushehr Province for Biosynthesis of Silver Nanoparticles

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## Abstract

In present research, the biosynthesis possibility of silver nanoparticles (AgNPs) was investigated using the aqueous extract of leaf, stem and root of native mangrove plant *Avicennia marina*, collected from Nayband bay in Bushehr province. Silver nanoparticles were synthesized through reduction of silver ions by secondary metabolites from the extract of *Avicennia marina*. Among the different plant parts, the leaf extract showed the maximum spectral absorption and synthesis yield of AgNPs. Absorption spectra in 420 nm confirmed the synthesis of AgNPs. The crystalline nature of AgNPs was confirmed based on the XRD pattern. TEM images showed that the size of nanoparticles was in the range of 1 to 75 nm. The distribution size histogram revealed that most of the particles were in the range of 10-15 nm and the mean size of nanoparticles was 17.3 nm. FE-SEM analysis showed the size ranges of the nanoparticles between 15 to 43 nm. EDS spectrum confirmed the presence of elements like silver, carbon, chlorine, nitrogen and oxygen in the synthesized nanoparticles and silver had the maximum percentage of 51.6 %. FTIR spectrum indicated the presence of different functional groups like amines, alcohol, aromatic loops, alkanes, phenolic groups and alkyl halides in the synthesis process. The results of this research revealed that silver nanoparticles could be synthesized by eco-friendly biological procedures without mediating harmful chemical using reductant components of extracts of plants such as mangroves.

Keywords: *Nanotechnology, Silver ion, Biosynthesis, Avicennia marina.*

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