# Mangrove-Mediated Green Silver Nanoparticles: Comparative Study of *Avicennia Officinalis, Aegiceras Corniculatum*, and *Sonneratia Apetala* for Antibacterial, Antioxidant, and Antidiabetic Applications

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**Abstract:**
Antimicrobial resistance and type 2 diabetes mellitus aggravated by oxidative stress to prevent them multifunctional therapeutic platforms are required. This study confirms the green synthesis of silver nanoparticles (AgNPs) using leaf extracts of three mangrove species *Avicennia officinalis* (AO-AgNPs), *Aegiceras corniculatum* (AC-AgNPs) and *Sonneratia apetala* (SA-AgNPs) synthesized under identical conditions for direct comparison. Nanoparticle formation was confirmed by UV-Vis surface plasmon resonance (420–460 nm), face-centered cubic crystallinity (XRD) and FTIR bands corresponding to phytochemical capping. FESEM revealed spherical to quasi-spherical morphologies with mean diameters of 26.71 ± 5.13 nm (SA-AgNPs), 27.99 ± 8.78 nm (AO-AgNPs), and 38.19 ± 10.12 nm (AC-AgNPs), while EDX confirmed the highest silver content in SA-AgNPs 83.79%. LC-MS identified distinct phytochemical fingerprints driving reduction and capping across species. SA-AgNPs consistently outperformed the other formulations across all bioactivity assays, exhibiting the strongest DPPH ($IC_{50}$ 124.4 µg/mL) and $H_2O_2$ scavenging activity, highest total antioxidant capacity (259.7 mg AAE/g), superior α-amylase inhibition ($IC_{50}$ 102.51 mg/mL), lowest hemolysis (0.06%) and largest inhibition zones against *Staphylococcus aureus* (16 mm) and *Escherichia coli* (12 mm), approaching standard amoxicillin controls. These findings demonstrate that phytochemical composition, rather than extract source alone, governs nanoparticle size, crystallinity and downstream bioactivity. Among the three species, *S. apetala*-mediated AgNPs emerge as the most promising multifunctional candidate for integrated antibacterial, antioxidant, and antidiabetic biomedical applications, supporting mangrove flora as a sustainable, biocompatible platform for next-generation nanotherapeutics.