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Evaluation of the antimicrobial activity of silver nanoparticles capped with garcinol, extracted from Garcinia quaesita Pierre.

H.N. Fernando,[1] U.R. Kumarasinghe,[1] T.D.C.P. Gunasekara,[2] S.S.N. Fernando,[2]
P.M. Jayaweera,[1] and S.P. Rajapaksha[1*]

[1] *Department of Chemistry, Faculty of Applied Sciences, University of Sri Jayewardenepura, Nugegoda.*
[2]*Department of Microbiology, Faculty of Medical Sciences, University of Sri Jayewardenepura, Nugegoda.*

Nanotechnology deals with the substances having dimensions in the nano scale. Recent studies have shown the potential applications of nanoparticles in healthcare, especially with regard to antimicrobial activity. The stability and biological activity of nanoparticles can be increased by modifying the surface of the nanoparticles with different molecules. *Garcinia quaesita* Pierre, commonly known as "rath goraka" bears a red to orange colour fruit, which contains numerous secondary metabolites. Garcinol is one of the biologically active and structurally complex polyisoprenylated benzophenone derivatives found in genera Garcinia and Clusia. Though garcinol is a biologically active compound, its clinical applications are narrow due to its extreme insolubility in water. In this study, garcinol was used as the reducing and capping agent in the synthesis of aqueous silver nanoparticles (AgNPs) in order to investigate the anti-microbial activity. Garcinol was isolated from the dried fruit rinds of *G.quaesita* and characterized by UV-Visible, Proton Nuclear Magnetic Resonance (^{1}HNMR), and Fourier Transform Infrared (FTIR) spectroscopy, while garcinol capped silver nanoparticles (G-AgNPs) were characterized by UV-Visible spectroscopy, Transmission Electron Microscopy (TEM), and FTIR spectroscopy. The antimicrobial activity was tested against seven microbial species including *Staphylococcus aureus* (ATCC 25623), *Pseudomonas aeruginosa* (ATCC 27853), *Escherichia coli* (ATCC 25922), *Candida albicans* (ATCC 10231) and clinical isolates of methicillin resistant *Staphylococcus aureus* (MRSA), *Acinetobacter baumannii*, and *Klebsiella pneumoniae,* using well diffusion assay. UV-Vis spectrum of G-AgNPs indicates a sharp surface plasmon absorption band near 418 nm, which assures the reduction of Ag^+ to Ag in the aqueous phase. The TEM images evidenced the existence of spherical shaped G-AgNPs with diameter range of 7-20 nm. FTIR measurements indicated the capping of AgNPs with garcinol. G-AgNPs had mean zones of inhibition against *S. aureus* (15.5 mm), MRSA (14 mm), *P. aeruginosa* (11 mm) and *C.albicans* (15.3 mm). The results suggest that garcinol is a suitable reducing and stabilizing agent to synthesize AgNPs, which has significant antimicrobial effect on Gram positive bacteria and Candida species, compared to Gram negative bacteria.

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E-mail: suneth@sjp.ac.lk