



LEAVES OF *Rosa* SPECIES – GREEN SYNTHESIS OF SILVER NANOPARTICLES AND THEIR ANTIOXIDANT AND ANTIMICROBIAL PROPERTIES

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ABSTRACT

Metallic nanoparticles are promising as they are known to have astounding antimicrobial properties due to their large surface area to volume ratio. The green synthesis of nanoparticles is an eco-friendly, inexpensive and non-hazardous technique utilised in the synthesis of nanoparticles and there have been several plants used for the successful synthesis of nanoparticles such as copper, platinum, zinc oxide, silver and gold. This research focuses on the green synthesis of silver nanoparticles from five different varieties of *Rosa* leaf extracts and determining their antimicrobial and antioxidant properties in comparison to their water extracts. Assays incorporated to determine the antioxidant properties of both the water extracts and nanoparticles in this research were total phenolic content assay, total antioxidant capacity assay, ferric reducing antioxidant power assay, total flavonoid content assay, 2,2'-Azino-bis (ABTS) and 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay. The antimicrobial properties were determined by well diffusion against *Staphylococcus aureus* (MRSA) and *Escherichia coli* (ATCC 10798). Mueller-Hinton agar was used as a medium where gentamycin was used as a positive control and distilled water as a negative control. After incubation, the zone of inhibition was measured. The results showed that nanoparticles have high total antioxidant capacity, total phenolic content and total flavonoid content in comparison to the water extracts. Considering the radical scavenging activity assays ABTS and DPPH water extracts showed a higher scavenging activity in comparison to silver nanoparticles however, in the FRAP assay nanoparticles showed a higher scavenging activity. The well diffusion results show that overall nanoparticles have a higher antibacterial activity against *Staphylococcus aureus* and *Escherichia coli*. The results from this study prove that silver nanoparticles could be incorporated in various industries such as pharmaceutical or nutraceutical industries.

Keywords: Green Synthesis, silver nanoparticles, water extracts, rosa leaves, antioxidant