

## Microwave-Assisted Green Synthesis of Silver Nanoparticles using Plant Extracts as Antimicrobial Additives for Biopolymer-Based Wound Dressings

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### ABSTRACT

This project investigates the microwave-assisted green synthesis of silver nanoparticles using plant extracts from dates and turmeric, focusing on their antibacterial properties. The study aims to offer an eco-friendly and sustainable alternative to chemical synthesis by leveraging the bioactive compounds in plant materials as reducing and stabilizing agents. Silver nanoparticles were synthesized by mixing silver nitrate with plant extracts, followed by microwave irradiation. UV Vis spectrophotometry confirmed the successful synthesis, with characteristic absorption peaks at 428nm for dates and 431nm for turmeric, indicating nanoparticle formation. The antimicrobial efficacy was evaluated using the Disk Diffusion Assay against *Escherichia coli* and *Staphylococcus aureus*. Results showed significant zones of inhibition, demonstrating the potential of date and turmeric-synthesized silver nanoparticles as effective antibacterial agents. This green synthesis approach highlights the potential for reducing reliance on hazardous chemicals in nanoparticle production while promoting sustainability. Also, the BC-composites showed same antibacterial effect against *S. aureus* and *E.coli*. We monitored the stability of our samples and the results showed that silver nanoparticles can remain stable for a long time.

