

OP 11

Green synthesis of silver nanoparticles using different bacteria: Do the synthesized nanoparticles differ in their antimicrobial activity?

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Objectives: Biosynthesis and characterization of silver nanoparticles (AgNPs) from *Escherichia coli*, *Acinetobacter baumannii* and *Staphylococcus aureus* and determination of antimicrobial activity against selected pathogens.

Methods: *E. coli* (ATCC 25922), *A. baumannii* (clinical strain), *S. aureus* (ATCC 25923) were cultured in nutrient broth medium and used for biosynthesis of AgNPs. AgNO₃ concentration, pH, incubation time and temperature were optimized for AgNP biosynthesis. Antimicrobial activity of the synthesized AgNPs was studied using the well diffusion assay.

Results: All the selected bacteria produced silver nanoparticles at alkaline pH when the concentration of AgNO₃ was greater than 0.3 g/L. The optimum reaction temperature was 60°C. UV-Visible spectroscopy with a maximum absorbance of approximately 420 - 430 nm confirmed the presence of AgNPs. AgNPs produced by *S. aureus* resulted in larger zone of inhibition (ZOI) against the selected pathogens where AgNPs produced by *E. coli* showed comparatively smaller ZOI. Gram negative bacteria (*E. coli*, *P. aeruginosa*) were more sensitive to AgNPs compared to gram positive bacteria (Methicillin Resistant *S. aureus*, *S. aureus*) and fungal species (*Candida albicans*).

Conclusion: AgNPs produced by *S. aureus* are the most effective among the tested AgNPs while *E. coli* produced the least effective AgNPs.