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Abstracts and Plenary Lectures



Faculty of Science  
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## Synthesis and characterization of bacteria-mediated silver nanoparticles

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Various organisms including plants and microorganisms can produce metal nanoparticles (NPs) intra- or extracellularly. Silver nanoparticles (AgNPs) were synthesized from *Pseudomonas aeruginosa* (ATCC 27853), *Staphylococcus aureus* (ATCC 25923), *Escherichia coli* (ATCC 25922) and *Acinetobacter baumannii* (confirmed clinical isolate) in an eco-friendly and less toxic approach. Bacteria were cultured in nutrient broth medium. After 72 h of incubation, 1M AgNO<sub>3</sub> solution was added into cell free filtrates. The culture conditions (AgNO<sub>3</sub> concentration, pH, temperature, incubation time) were optimized to produce a maximum yield. Biosynthesized AgNPs were purified using ultracentrifugation followed by freeze drying. The characterization of synthesized NPs was performed using UV-Visible Spectroscopy, Fourier Transform-Infra Red Spectroscopy (FT-IR), X-ray Diffraction spectroscopy (XRD) and Transmission Electron Microscopy (TEM). In UV-Visible spectra, characteristic peaks around 425-433 nm were observed in all four biosynthesized AgNPs. This is found to be the first report on AgNP synthesis by *A. baumannii*. All biosynthesized AgNPs were spherical. The average sizes of the NPs were  $11.14 \pm 6.59$  nm (*S. aureus* NPs),  $11.71 \pm 2.73$  nm (*P. aeruginosa* NPs),  $12.87 \pm 2.95$  nm (*E. coli* NPs) and  $12.22 \pm 2.45$  nm (*A. baumannii* NPs). In FT-IR spectra, interaction between AgNPs and media components such as proteins and polymeric compounds was evident (bands at 2924 cm<sup>-1</sup>, 2916 cm<sup>-1</sup> and 1643 cm<sup>-1</sup>, etc). According to XRD patterns of the AgNPs, characteristic diffraction peaks were obtained confirming crystalline structure of AgNPs. These results show that the bacteria mediated AgNP synthesis was successful, producing smaller AgNPs (< 20 nm) with a narrow size distribution.

**Keywords:** Silver nanoparticles, TEM, UV-Visible spectroscopy

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**This certificate is awarded**

to

***Peiris M.M.K.***

for

making an oral presentation

on

**'Synthesis and characterization of bacteria-mediated silver nanoparticles'**

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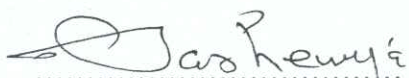
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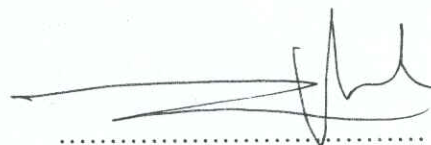
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