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Synthesis, antibacterial, cytotoxicity and sensing properties of biopolymer -capped silver nanoparticles

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In this study we report the antibacterial, cytotoxicity and sensing properties of sugar reduced biopolymer-capped silver nanoparticles (Ag-NPs) synthesised via a completely green method. The synthesis involved the use of water, starch and gelatin, and maltose and dextrose as the solvent, stabilizing, and reducing agents respectively while AgNO3 was used as the silver precursor without the use of any accelerator. The as-synthesised Ag-NPs were characterized using UV-vis absorption spectroscopy, Fourier transform infra-red spectroscopy (FTIR), Raman spectroscopy, X-Ray diffraction analysis (XRD) and High resolution transmission electron Microscopy (HR-TEM). All the as-synthesised Ag-NPs had good antibacterial activities against E coli and two strains of P. aeruginosa, which are antibiotic sensitive and resistant bacteria. The study also indicated that, the time of reaction did not have any significant effect on the antibacterial activity of the Ag-NPs synthesized in this present study, though they are of different particle size. The cytotoxicity evaluation on Human THP-1 monocyte cell line indicated that the as-synthesised Ag-NPs are less toxic than AgNO3 at lower concentrations (2 µg/ml). Furthermore, the as-synthesised Ag-NPs was found to be very useful for colorimetric detection of hydrogen peroxide (H2O2) an environmental pollutant at lower concentration upto 10−10 M with a linear regression coefficient value of 0.88223.

Biography

SO Oluwafemi is a National Research Foundation (NRF), South Africa rated researcher at the department of Applied Chemistry, University of Johannesburg. His research is in the broad area of nanotechnology and include green synthesis of semiconductor and metal nanomaterials for different applications which include but not limited to biological (Imaging, labeling, therapeutic), optical, environmental and water treatment. He has author and co-author many journal publications, book chapter and books. He is a reviewer for many international journals in the field of nanotechnology and has won many accolades both local and international.

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