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

Oluwatobi S Oluwafemi
University of Johannesburg, South Africa

We herein report the antibacterial, cytotoxicity and sensing properties of dextrosed reduced starch-capped silver nanoparticles (Ag-NPs). The synthesis involves the use of water, starch, and dextrose which are environmentally benign materials as the solvent, stabilizing, and reducing agent respectively while AgNO3 was used as the silver precursor. The reaction was carried out without the use of any accelerator and the antibacterial activities of the Ag-NPs synthesized at different reaction time were investigated. The as-synthesized 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). Antibacterial study show that, all the as-synthesized Ag-NPs show good antibacterial activities against *E. coli* and two strains of *P. Aeruginosa*, which are antibiotic sensitive and resistant bacteria. In addition, the Ag-NPs produced at longer reaction time (48 h) showed a better antibacterial efficacy than those synthesized at lower reaction time. The cytotoxicity evaluation on Human THP-1 monocyte cell line indicated that the as-synthesized Ag-NPs are less toxic than $AgNO_3$ at lower concentrations. The as-synthesized Ag-NPs are very sensitive towards hydrogen peroxide (H_2O_2) and show a linear response over a wide concentration range upto 10−10 M H_2O_2.

Biography

Oluwatobi S 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 authored and co-authored 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.

Oluwafemi.oluwatob@gmail.com

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