Extracellular synthesis of stable silver nanoparticles by biosurfactant produced from *Pseudomonas aeruginosa* PU1 with antioxidant activities

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Abstract: Nanoparticles (≤ 100 nm) are usually produced using two approaches; in one approach bulk materials are gradually broken down to nanosized particles known as top-down approach and in the second approach, molecules are assembled to particles in the nanosized range, which is known as bottom up approach [1]. Owing to their high surface-to-volume ratio, spatial confinement, surface energy and reduced imperfections, metal Nanoparticles have unique physico-chemical properties including optical, electronic, mechanical, magnetic, thermal, dielectric, and catalytic properties as opposed to bulk materials [2].

Silver Nanoparticles (AgNPs) have been found to possess different applications such as optical receptors, intercalation materials for electrical batteries, catalysts in chemical and biochemical reactions, sensors and biosensors, bio-labeling materials, signal enhancers in SERS-based enzyme immunoassay and antimicrobial agents. Due to recent advancements in the nanotechnology, AgNPs have been employed successfully for the treatment of tuberculosis, diabetes, inflammation, cardiovascular diseases, autoimmune disorders (Rheumatoid arthritis) neurodegenerative disorders (Parkinson's and Alzheimer's). AgNPs have been reported to play a key role in the cancer therapy, drug delivery and bio-imaging.

The prokaryotes have the capability of biosorbing and bioreducing toxic and insoluble metal ions to non-toxic and soluble metal salts. This property of prokaryotes has been exploited for the synthesis of metal Nanoparticles using metal ions. In the present study, we report the synthesis of AgNPs using *Pseudomonas aeruginosa* PU1. The synthesized AgNPs will be characterized using different spectroscopic techniques like ultraviolet-visible (UV-Vis) spectroscopy, Fourier transform infrared (FT-IR) spectroscopy, X-ray diffraction (XRD), Transmission electron microscopy (TEM), and Dynamic light scattering (DLS) techniques. Further, these AgNPs has been evaluated for their antioxidant and anticancer properties.

References:

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