

Silver Nanoparticles and its Synthesis

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EDITORIAL NOTE

Silver nanoparticles are synthesized through green chemistry, which is a completely unique and potential substitute for chemically synthesized nanoparticles. Scientists have discovered that these nanoparticles have a toxic effect on cells. Depending on the concentration and duration of exposure, they can inhibit cell growth, proliferation and cause necrosis. The antibacterial effect of silver nanoparticles is to regulate bacterial growth in one application, including dental work, surgical applications, wound and burn treatment, and biomedical equipment. It is known that silver ions and silver-based compounds are highly toxic to microorganisms. Synthesis of silver nanoparticles 0.1 M is prepared from silver nitrate solution (AgNO_3), which is also used to synthesize silver nanoparticles.

Green synthesis is necessary to avoid unwanted or harmful by-products by establishing reliable, sustainable and environmentally friendly synthesis procedures. The use of ideal solvent systems and natural solvents is critical to achieving this goal. Since the discovery of the major antibiotic penicillin in 1928, the spread of antibiotics and antimicrobial agents has been developed and used in human treatment and industrial applications. However, the excessive and uncontrolled use of antibiotics has led to a substantial increase in the number of drug-resistant pathogens. There is an urgent need for new treatments to replace ineffective antibiotics to overcome the growing resistance of microorganisms to multiple drugs. In recent years, ongoing research has focused on developing nanoscale objects as effective antibacterial therapies. Among many nanoparticles, silver nanoparticles have attracted a lot of attention due to their unique antibacterial properties. However,

concerns about the synthesis of these materials, such as the use of chemical precursors and toxic solvents, and the production of toxic by-products, have led to an alternative approach, namely green synthesis. This environmentally friendly technology uses a combination of biological, plant or microbial preparations as reducing agents and capping agents. Silver nanoparticles synthesized by green chemistry provide a completely unique and potential substitute for chemically synthesized nanoparticles. Generally speaking, green nano-biotechnology refers to the synthesis of nanoparticles or nanomaterials by means of various biotechnology tools, using biological pathways such as microorganisms, plants, and viruses, or biological pathways such as purchased proteins and lipids.

Synthesis of silver nanoparticles

Noble metal nanoparticles, especially silver nanoparticles, are widely used in many scientific fields. Their unique properties can be used in biosensor materials, composite fibers, cosmetics, antibacterial applications, conductive materials, and electronic components, making them an important subject for research in chemistry, biology, health, electronics, and other related branches. These unique characteristics depend on the size and shape of the silver nanoparticles. According to reports, there are different preparation methods for the synthesis of silver nanoparticles, such as electron irradiation, laser ablation, chemical reduction, bio artificial methods, photochemical methods, and microwave treatment. In nanoparticle synthesis, it is very important to measure concentration, size, shape, surface charge, crystal structure, surface chemistry, and surface transformation of the nanosilver.

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Received: August 10, 2021; **Accepted:** August 24, 2021; **Published:** August 31, 2021

Citation: Ilaria M (2021) Silver Nanoparticles and its Synthesis. J Phys Chem Biophys. 11:e297.

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