

## **Penicillium chrysogenum-Derived Silver Nanoparticles: Exploration of Their Antibacterial and Biofilm Inhibitory Activity Against the Standard and Pathogenic *Acinetobacter baumannii* Compared to Tetracycline**

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**Abstract:** This study was aimed to evaluate the antibacterial and biofilm inhibitory activity of *Penicillium chrysogenum*-derived silver nanoparticles (AgNPs) against the standard and pathogenic *Acinetobacter baumannii* using a 96-well microtiterplate-based method. The AgNPs were characterized by using UV–Vis, TEM, AFM, XRD, DLS, Zeta potential, and FT-IR. The nanoparticles (NPs) were fabricated with a spherical shape and an average hydrodynamic diameter of 48.2 nm. The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) of AgNPs were found to be 4 and 32 lg/mL respectively, whereas the MIC and MBC of tetracycline were found to be 1024 and 8192 lg/mL against *A. baumannii* (ATCC 19606). The AgNPs and tetracycline represented considerable biofilm inhibitory activity against both the standard and pathogenic *A. baumannii* at the studied concentrations. However, the AgNPs depicted higher potency to inhibit the process of biofilm formation of some pathogenic *A. baumannii* species compared to tetracycline. The AgNPs at the concentration of 0.5\*MIC (2 lg/mL) inhibited above 90% biofilm inhibition, whereas tetracycline reached 90% biofilm inhibition at the concentration of 4\*MIC (4096 lg/mL) against *A. baumannii* (ATCC 19606). However, further studies are required to evaluate the biofilm inhibitory efficacy of biogenic AgNPs *in vivo*.

**Keywords:** Silver nanoparticles, Biosynthesis, Antibacterial activity, Biofilm inhibitory activity