

# ***GEOBACILLUS SPP.* INDUCED BIOSYNTHESIS OF SILVER NANOPARTICLES AND THEIR ANTIFUNGAL PROPERTIES**

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The growing number of yeast caused skin diseases and resistance to the antifungal therapy are the key problems that boost the research for the new antifungal materials. The antimicrobial effect of silver has long been known, thus nowadays antimicrobial properties of silver nanoparticles (AgNPs) are receiving more interest. The biological synthesis of nanoparticles is effective and environmentally friendly method compared to chemical or physical synthesis of this nanomaterial.

The present study reports the extracellular biosynthesis of AgNPs using secretomes of *Geobacillus spp.* strains 18, 25, 95 and 612 and 2 mM AgNO<sub>3</sub>. Ag<sup>+</sup> reduction and formation of AgNPs in all *Geobacillus spp.* secretomes were confirmed by UV-Visible (UV-vis) Spectroscopy and Scanning Electron Microscopy (SEM). Obtained AgNPs were tested for their antimicrobial activities against pathogenic yeast (*Candida lusitanae*, *Candida guilliermondii*). The antifungal activity of the AgNPs was evaluated by growth inhibition (100 µg/ml concentration of each AgNPs for 2 days). Also, the synergistic effect of the AgNPs and electroporation was examined (concentration of AgNPs was 5 µg/ml, parameters of electroporation were single 100 µs impulse, 2,5; 5; 7,5; 10; 12,5; 15 kV/cm electric field). The results show that all tested AgNPs have antifungal effect against *Candida* yeast (the most effective results were obtained with *Geobacillus spp.* strain 25 AgNPs). Furthermore, the synergistic effect of AgNPs and electroporation was established.

The results obtained in this study suggests that *Geobacillus spp.* strains 18, 25, 95 and 612 are appreciable tool for preparation of AgNPs. Moreover, due to their antifungal activities, AgNPs have a potential to be used as biocontrol agents against pathogenic yeast.