# ASSESSMENT OF THE ANTIFUNGAL POTENTIAL OF BIOGENIC SILVER NANOPARTICLES SYNTHESIZED USING *CURCUMA LONGA* EXTRACT

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INTRODUCTION: Biogenic synthesis of nanoparticles is used in nanotechnology across various fields such as health, food, and the environment, employing sustainable methods and milder synthesis conditions to minimize environmental impact. Biogenic silver metal nanoparticles (AgBNPs) have been synthesized using biomass extracts as a reaction mediator. Generally, these extracts contain polyphenols necessary for reducing and stabilizing biogenic metal nanoparticles. Since different synthesis conditions can affect the properties of the obtained materials, a good strategy is to use experimental design. OBJECTIVES: In this context, this work focuses on the use of CCRD (Central Composite Rotatable Design) to evaluate the influence of reaction time, the concentration of the metal precursor (silver nitrate – $AgNO_3$), and biogenic source (*Curcuma longa* extract) on the obtaining, concentration, morphology, size, and dispersion index of AgBNPs. The AgBNPs were evaluated for their antifungal capacity, and the Fungal Inhibition Concentration (FIC) was determined against three species of fungi (*Aspergillus carbonarius, Penicillium verrucosum,* and *Alternaria alternata*) that produce the mycotoxin Ochratoxin A (OTA) as a secondary metabolite. MATERIALS AND METHODS: The characterization of the nanoparticles was performed using transmission electron microscopy (TEM), Fourier-transform infrared spectroscopy (FTIR), dynamic light scattering (DLS), zeta potential (ZP), and flame atomic absorption spectroscopy (FAAS). RESULTS AND CONCLUSION: AgBNP 5, which was synthesized in 36 minutes using a $AgNO_3$ concentration of 0.56 mmol/L and an extract concentration of 1.22%, showed the best inhibition of fungal growth (*Alternaria alternata* showed 42% inhibition, *Penicillium verrucosum* 52%, and *Aspergillus carbonarius* 38%) as well as the highest inhibition of mycotoxin production (*Aspergillus carbonarius* showed 57% inhibition). An ideal green synthesis method was identified to enhance antifungal activity, utilizing turmeric extract and its beneficial properties.

Keywords: Biogenic synthesis; Turmeric extract; acidic pH; silver metallic nanoparticle; antifungal activity