# Characterization of Ag-doped ZnO Nanoparticles of *Cymbopogon citratus* L. (Lemon grass) Field

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## ABSTRACT

Ag-doped zinc oxide nanoparticles were synthesized by using refluxed chemical method. The nanoparticles were characterized by using an ultraviolet-visible spectrophotometer. The antifungal properties of Ag-doped zinc oxide nanoparticles were investigated on Aspergillus fumigatus. The antibacterial properties of nanoparticles were investigated on E. Coli along with other standard antibiotics (ampicillin). This research was conducted to analyze the phytochemicals of lemon grass and milkweed plants and spectrophotometry of soil and water samples collected from Korangi industrial area.

**Keywords:** Ag-doped ZnO, Antifungal Activity, Cymbopogon citratus L, Nanoparticles, Standard Antibiotics.

## INTRODUCTION

The Ag-doped ZnO nanoparticles are classified as grey or dust-grey because they are composed of considerably smaller particles that are small enough to scatter visible light (Ullah, 2022). The contamination of surface water from industrial effluents has become a significant concern for environmentalists (Obasohan, *et. al*.,2007).

The availability of quality water necessary for maintaining normal biological functions is decreasing (Udeagbara, 2019). Protecting the aquatic environment and related resources is essential, there is a goal to reduce by half the proportion of people without sustainable access to safe drinking water. Indeed, water scarcity has been recognized as one of the major challenges facing the modern world (Jaime, 2003). Phytochemicals found in plant extracts are crucial for the reduction of metal ions into nanoscale materials (Sabouri, et al., 2023). Green biosynthesis utilizing biopolymers is emerging as an environmentally friendly alternative to traditional, less sustainable methods (Aouadi, *et al*., 2024).

## OBJECTIVE

To synthesis and characterize Ag-doped zinc oxide nanoparticles and to perform uv-vis spectrophotometric analysis of lemon grass and milk weed plant.

## METHODOLOGY

This study was analysed by using the reflux chemical method for the synthesis of silver-doped zinc oxide nanoparticles. The antibacterial and antifungal properties were examined by using agar disc diffusion method. UV-VIS spectrophotometer was used to examine it's optical property. The soil, water and plant samples were collected from field near korangi industrial area were examined under UV-VIS spectrophotometer 1800.

## RESULT AND CONCLUSION

The characterization of these nanoparticles revealed a characteristic peak at 792.5 nm, and the band gap obtained was 2.508× 10−28 eV. The antifungal activity of these nanoparticles was 73.68%. The antibacterial activity of these nanoparticles revealed that they possess antibacterial properties but could not reach the effectiveness of the standard antibiotics. Spectrophotometry of the soil sample revealed the presence of chromium (VI) and vanadium. Spectrophotometry of a water sample revealed the presence of nickel, cadmium, lead, and chromium (VI). The spectra of lemon grass revealed the maximum absorbance at 669.5nm and milkweed revealed the maximum absorbance at 777.5nm.

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