



# ANTIFUNGAL ACTIVITY OF ZNO, CU, AND AG NANOPARTICLE

Swapnil D. Joshi<sup>1</sup>, Prasanna S. Pande<sup>2</sup>, Suprita Rana<sup>3</sup>, Vicky Sahu<sup>4</sup>

Department of Chemistry,  
Shankarlal Khandelwal Arts, Science and Commerce College,  
Akola (M.S.) India

## ABSTRACT :

In this study, we evaluated the effect of silver nanoparticles biosynthesized, the growth of *Fuzarium solani* and *Rhizoctonia bataticola*. Our findings showed that silver nanoparticles inhibited the growth of *Fuzarium solani* and *Rhizoctonia bataticola* to varying degrees. This work aims to study the possibility of using silver nanoparticles as an promising tool to fungicides for controlling their growth.

## INTRODUCTION :

Silver nanoparticles have antifungal activity against *Fuzarium solani* and *Rhizoctonia bataticola* growth. The effectiveness of silver nanoparticle treatment was assessed following a control experiment by measuring the diameters of the fungi colonies. Each treatment was replicated three times. The inhibition rate (%) was calculated by using the following formula<sup>[1] [2]</sup>

$$\text{Inhibition \%} = R - r \times 100$$

R

Where R is the radial growth of fungi in the control plate and r is the radial growth of fungi in silver nanoparticle treated plates. We found all nanoparticles were between 21 and 80 nm in size, with an average of 32 nm. Anti-fungal activity of silver nanoparticles against *Fuzarium solani* and *Rhizoctonia bataticola* was observed.

Silver nanoparticles had a significant inhibitory effect on the growth of *Fuzarium solani* and *Rhizoctonia bataticola*. Our results showed the effect of silver nanoparticles on the growth diameter of fungi. Both *Fuzarium solani* and *Rhizoctonia bataticola* were inhibited to various extents by silver nanoparticles (Fig. 1 & 2). In general, inhibition% ranged from 62 to 88%, & 59 to 79 % with *Fuzarium solani* and *Rhizoctonia bataticola* zones of inhibition showing significant inhibition effectiveness of up to 70% & 73% respectively.

Our results demonstrate that silver nanoparticles have good antifungal activity against *Fuzarium solani* and *Rhizoctonia bataticola* and have particle sizes of 20-80 nm.

## MATERIAL AND METHOD :

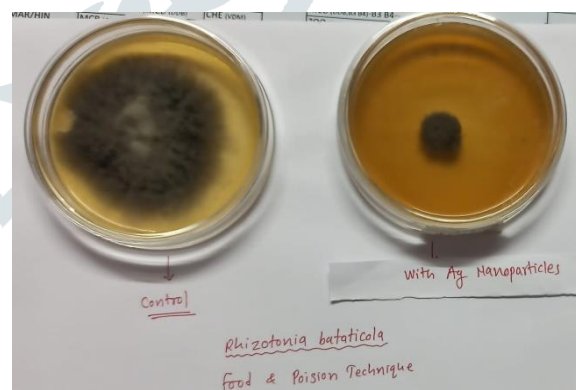
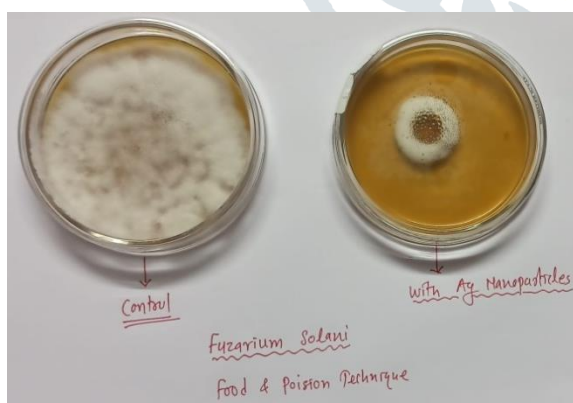
### Nanoparticles – Cu, Zno, and Ag

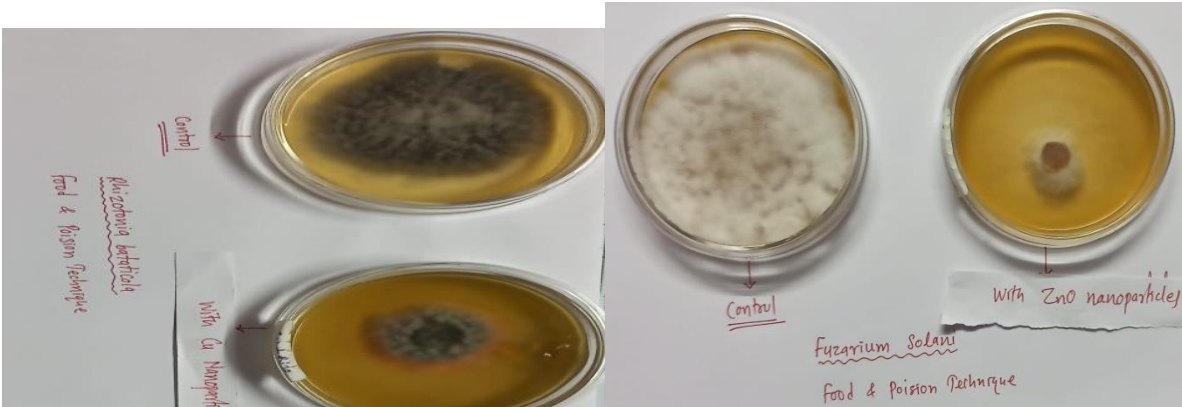
### Method :

Eight plates were made. In four 50-ml conical flasks, 50 ml of PDA was taken. The four conical flasks and petri plates were autoclaved for 15 min at 15 lbs. for sterilization of the equipment. After incubation and cooling, 5 g of nanoparticles were added to three flasks, and in one flask control was added as a control. All the plates were poured under laminar air flow and then allowed to settle for 20 to 30 min. Then, the fungi *Fuzarium solani* and *Rhizotonia bataticola* was added. [3] [5] [6] [7]

Then first fungi plate was taken and then made the disc in the plate with the help of a small test tube. The disc of fungal culture was taken and rotated in such a way that the upper side would contact the media directly by the food poisoning technique<sup>[8] [9]</sup>. This process was repeated for the remaining plates and fungal cultures with Ag, ZnO, and Cu nanoparticles that were poured into plates. Two plates with fungi were taken as a control. The plates were then incubated for 48 h. After 48 hours, the final results were obtained.

## RESULT AND CONCLUSION :





Antifungal activity results

Name of fungi : *Rhizotonia bataticola*

Name of nanoparticle	Growth on 3 <sup>rd</sup> day	Growth on the 5 <sup>th</sup> day
Control	40mm	70mm
Cu nps	36mm	38mm
Zno nps	28mm	30mm
Ag nps	24mm	25mm

Name of fungi : *Fuzarium solani*

Name of nanoparticle	Growth on 3rd day	Growth on the 5th day
Control	Full growth	Full growth
Cu nps	22mm	26mm
Zno nps	19mm	21mm
Ag nps	30mm	32mm

CONCLUSION

It has been observed that Cu, ZnO, and Ag nanoparticles have shown good to moderate Antifungal Activity against the fungi namely *Rhizoctonia Batticaloa* and *Fuzarium solani*.

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