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Fungicidal activity of silver nanoparticles synthesized by *Agaricus bisporus* (White Button Mushrooms)

G.Narasimha[1]*, S.Papaiah[1], B.Praveen[1], A.Sridevi[1], K.Mallikarjuna[2], B.Deva Prasad Raju[2]

[1]Department of Virology, Sri Venkateswara University, Tirupati-517502, A.P, (INDIA)

[2]Department of Physics, Sri Venkateswara University, Tirupati-517502, A.P, (INDIA)

E-mail: dr.g.narasimha@gmail.com

ABSTRACT

An invitro study was conducted to investigate the antifungal properties of silver nanoparticles synthesized from edible mushrooms *(Agaricus bisporus)*. The synthesized and characterized silver nanoparticles exhibited an excellent antifungal property on pathogenic fungal strain *Aspergillums niger*, causative agent of Aspergillosis disease.

KEYWORDS

White button Mushroom;
Silver nanoparticls;
Antifungal activity.

INTRODUCTION

Nanotechnology is mainly concerned with synthesis of novel nanoparticles of variable size, shapes, controlled dispersity and their potential uses for human benefits. The most predominantly studied about nanoparticles today are those made from noble metals like, Pt, Au, Pd and Ag. Among the four metal nanoparticles, silver nanoparticles play a significant role in the field of biology and medicine. Now days, resistance to commercially available antimicrobial agents by pathogenic microorganisms has been increasing at an alarming rate and has become a serious problem. Particularly fungal infections are more frequent in patients who are immunocompromised due to cancer chemotherapy[1]. There is need to search for novel antimicrobial and antifungal agents from natural and inorganic substances for drug resistant microorganisms including fungus. The inorganic metallic agent silver has been employed as most antimicrobial agent, since ancient times to fight infections pathogens[2]. The significant feature of silver is its broad spectram antimicrobial property which is due to microbial colonization associated with biomaterial related infections[3]. There are many invitro studies on antibacterial properties of silver nanoparticles. But the reports on antifungal activity of silver nanoparticles were scanty. Hence there is need for much research on antifungal compounds including inorganic, organic and metallic nanoparticles from chemical and biological systems for control of viral diseases in plants, animals, and human beings. In this study, an attempt was made on antifungal properties of silver nanoparticles synthesized from Edible mushrooms *Agaricus bisporus*.

MATERIALS AND METHODS

Collection of silver nanoparticles

The silver nanoparticles used in this study were synthesized from Edible mushrooms (*Agaricus bisporus*) their size and shapes was characterised (3).

Antifungal activity

The antifungal activity of silver nanoparticles was

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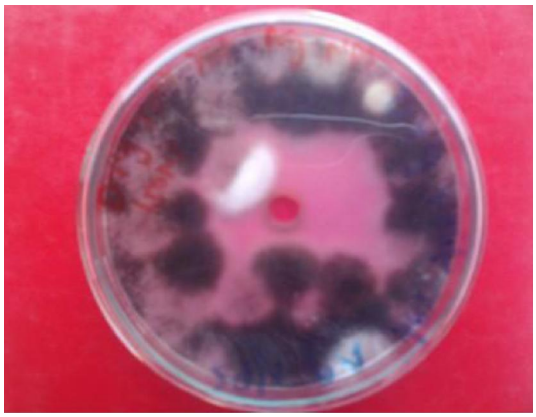
tested by standard method.(4) The potato dextrose agar plates were inoculated with 0.1mL of fungal culture (10 day old) in agar medium and 100 micro liters of colloidal silver nanoparticles is loaded agar wells and the plates were incubated at 26±4 °C for 7days. After incubation formation of a clear zone surrounding the well was observed and measured. The cavities filled with double distilled water served as control.

RESULTS AND DISCUSSIONS

The colloidal silver nanoparticles synthesized from mushroom extracts showed maximum inhibition on growth of pathogenic fungal strain *Aspergillus niger* (Figure 1). Maximum zone of inhibition with diameter with 2.1cm was recorded in present study (Figure 1). Similar work made by others previously on antimicrobial activity of silver and its compounds as antimicrobial agents[5-10]. In this study we reported highest antifungal activity (maximum inhibition zone above 2cm) of silver nanopartles from edible mushroom, *Agaricus bisporus*. Maliszewska and Sadowski[11] reported that silver nanoparticles were preferentially the antifungal activity is due to the formation of insoluble compounds by inactivation of sulfhydryl groups in the fungal cell wall and disruption of membrane bound enzymes and lipids which causes cell lysis.



***Fungicial activity was measured in terms of formation of zone of inhibition in cm surrounding the well containing the colloidal silver nanoparticles.**

Figure 1 : Fungicidal acitivity of silver nanoparticles (inhibition zone)by Agaricus bisphorus.

CONCLUSIONS

The colloidal silver nanoparticles synthesized from White button mushroom (*Agaricus bisporus)* is effectively inhibited the growth of pathogenic fungi *Aspergillus niger*. Formation of maximum inhibition zone surrounding the well containing the colloidal nanoparticles is an indication of antifungal nature of silver nanoparticles, and these metallic nanoparticles could act as effective antifungal agents in nanomedicine for control of various fungal diseases in human and animals.

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