Short communication

Different silver nanostructures and growing inhibition of clinical candida albicans isolates

Mohammad Khalili [1] , Farzaneh Haji Esmaeil Hajjar [2]

1 PhD Student of Medical Technology, Department of Nanotechnology, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
2 M.SC. of Medical Mycology,Pars Hospital Lab,Tehran,Iran.

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* Corresponding Author's E-mail: far_pars_1371@yahoo.com

Abstract

The Silver nanoparticle is effective on different microorganisms and lead to cell apoptosis and death by destruction of cell membrane, proteins and DNAs. Silver ions can be reduced differently and made different nanostructures depend on chemical agents and reaction condition. nano wires, nanoplates, nanocubes, nano rods, nanodots are examples of silver nanostructures. The amount effectiveness of all nanostructures on candida albicans are unclear. The aim of this research was the evaluation of different silver nanostructures on growing inhibition of clinical candida isolates. Thirty clinical candida albicans isolated from candidiasis patients at different origin. Colony isolation was carried out on sc and scc medium and germ tube test was done for each isolate. For assessment of grow inhibition of different silver nanostructures, disk diffusion method was done on muler-hinton medium.Nanodots,nanocubes and nanowires of silver were synthesized by reduction reaction and confirmed by scanning electron microscopy and 10 microliters of each nanostructure was added to watman paper(1*1 cm) and dried at room temperature.Disk were hold on muler-hinton medium and incubated at 37 degree centigrade for 48 hours and finally inhibition zone diameter of each isolate was recorded for three nanostructures. The mean of inhibition zone diameter of silverNanodots. silvernanocubes and silvernanowires was 19.7mm ,20.8 mm,17.9 mm respectively. This means silvernanocubes are better grow inhibitors than nanodots and nanowires.This research showed different silver nanostructures had been different growing inhibition of clinical candida albicans isolates, and silver nanocubes are the better inhibitors.

Keywords: silver nanostructures-nanotechnology- candida albicans

Introduction:

The preparation of uniform nanosized drug particles with specific requirements in terms of size, shape, and physical and chemical properties is of great interest in the formulation of new pharmaceutical products [1,2]. Resistance of bacteria to bactericides and antibiotics has increased in recent years due to the development of resistant strains. Some antimicrobial agents are extremely irritant and toxic and there is much interest in finding ways to formulate new types of safe and cost-effective biocidal materials. Previous studies have shown that antimicrobial formulations in the form of nanoparticles could be used as effective bactericidal materials [3,4]. Recently, Klabunde and co-workers demonstrated that highly reactive metal oxide nanoparticles exhibit excellent biocidal action against Gram-positive and Gram-negative bacteria [5]. Thus, the preparation, characterization, surface modification, and functionalization of nanosized inorganic particles opens the possibility of formulation of a new generation of bactericidal materials. It is well known that silver ions and silver-based compounds are highly toxic to microorganisms [6,7] showing strong biocidal effects on as many as 16 species of bacteria including E. coli [8]. Thus, silver ions, as an antibacterial component, have been used in the formulation of dental

resin composites [9–11] and ion exchange fibers [12] and in coatings of medical devices [13–16]. Recently, Tiller and co-workers showed that hybrids of silver nanoparticles with amphiphilic hyperbranched macromolecules exhibit effective antimicrobial surface coatings [17]. studies have shown that stable and highly concentrated aqueous dispersions of silver nanoparticles of narrow size distribution can be simply prepared byreducing silver ions [18]. Silver ions can be reduced differently and made different nanostructures depend on chemical agents and reaction condition. nano wires, nanoplates, nanocubes, nano rods, nanodots are examples of silver nanostructures. The amount effectiveness of all nanostructures on candida albicans are unclear.

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The aim of this research was the evaluation of different silver nanostructures on growing inhibition of clinical candida isolates.

Materials and Methods:

Organism and medium

Thirty clinical candida albicans isolated from candidiasis patients at different origin.Colony isolation was carried out on Saboraud dextrose agar and germ tube test was done for each isolate.

Synthesis of Nanodots,nanocubes and nanowires of silver

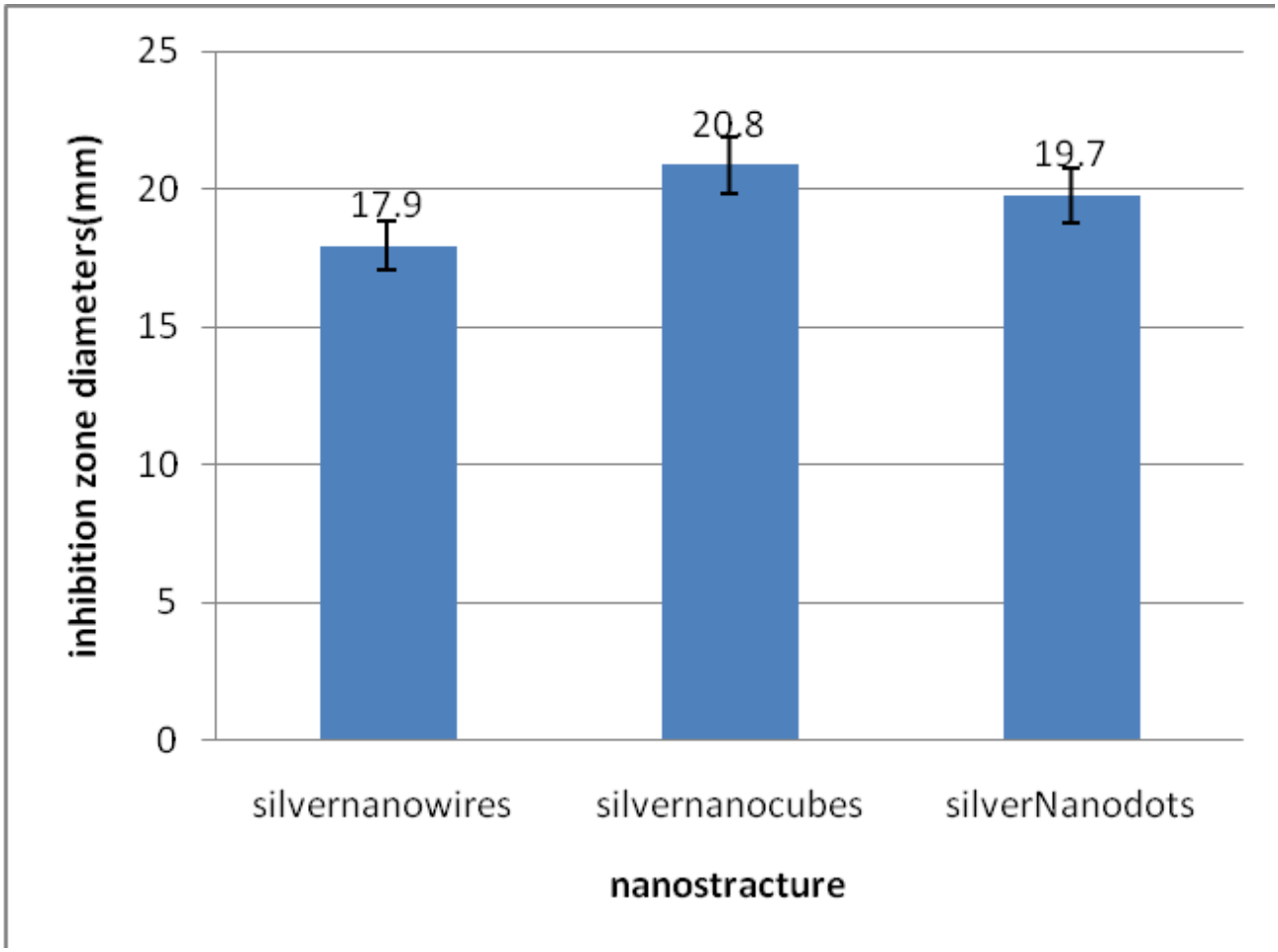
Nanodots,nanocubes and nanowires of silver were synthesized by reduction reaction and confirmed by scanning electron microscopy.

Assessment of grow inhibition

For assessment of grow inhibition of different silver nanostructures, disk diffusion method was done on muler-hinton medium.10 microliters of each nanostructure was added to watman paper(1*1 cm) and dried at room temperature. Disk were hold on muler-hinton medium and incubated at 37 degree centigrade for 48 hours and finally inhibition zone diameter of each isolate was recorded for three nanostructures.

Result and discussion:

The mean of inhibition zone diameter of silverNanodots. silvernanocubes and silvernanowires was 19.7mm ,20.8 mm,17.9 mm respectively(graph1). This means silvernanocubes are better grow inhibitors than nanodots and nanowires.



Graph1. The mean of inhibition zone diameter of silvernanostractures

Conclusion :

This research showed different silver nanostructures had been different growing inhibition of clinical candida albicans isolates, and silver nanocubes are the better inhibitors.

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