



ORIGINAL ARTICLE

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Assessment of the Antimicrobial Nanoparticles Iman Dendrimers Polypropylene fibrous Medical products

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ABSTRACT

Cotton products that are used in clothing and hospital expenses are susceptible to attack by pathogens and microbial bodies are. According to the characteristics and the presence of cationic amino groups present in polypropylene Iman dendrimer nanoparticles, the nanoparticles may have antimicrobial properties. This study examines the effect of dendrimer nanoparticles Iman on antimicrobial polypropylene cotton products deals.

Keywords: dendrimer nanoparticles polypropylene Iman, antimicrobials, *Pseudomonas aeruginosa*, *Candida albicans*, *Staphylococcus aureus*, *Escherichia coli*.

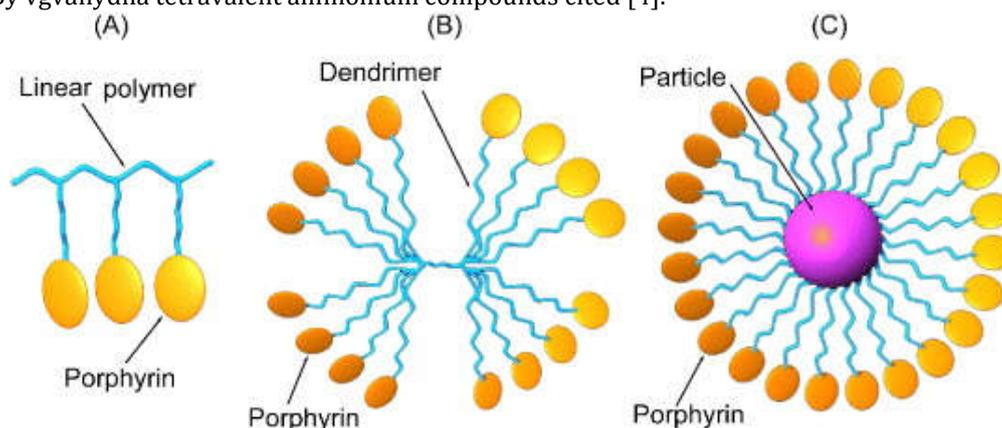
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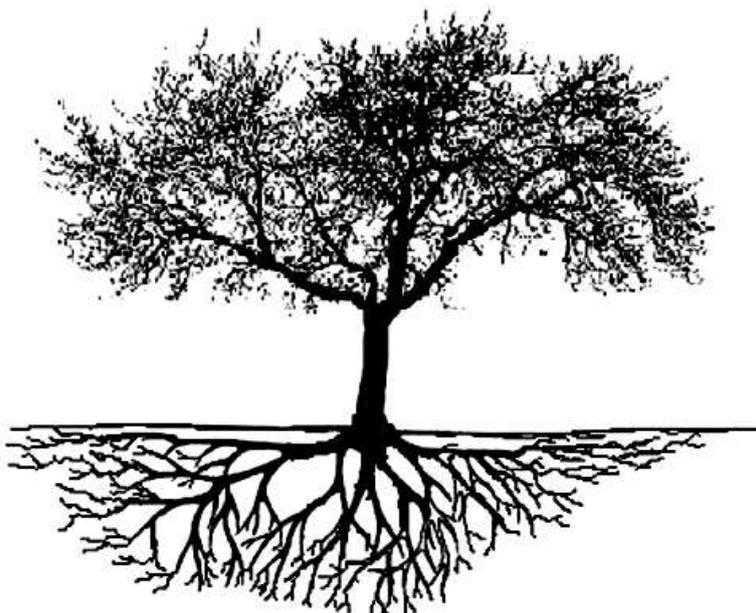
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INTRODUCTION

Due to the unique properties of cotton fiber such as moisture absorption, high strength and abrasion resistance, a natural fiber textiles, apparel and clothing, medical and health are commonly used ¹. On the other hand, cotton products, can provide a suitable environment for the growth of bacteria and fungi, including their disadvantages [2]. Today, due to the growth of fungi and bacteria in the body protection, antimicrobial cotton crop is of particular importance [3]. Antimicrobial agents are known Organic compounds such as Triclosan, Chlorophenol, base metals, inorganic compounds (metal salts Cadmium, silver, copper, mercury, zinc, chromium), natural biopolymers (chitosan), N - Halamynha bridge By vgvanydha tetravalent ammonium compounds cited [4].

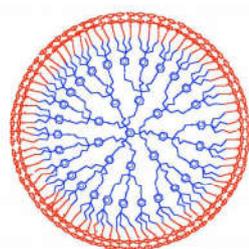


Dendritic structures or dendrimers as a basic pattern in nature, often in places where the need for light, nutrients and energy for growth is found ^[5]. For example, in the ground, branches and leaves to the light or in the soil, the roots to absorb more water and nutrients from a dendritic pattern follow ^[6].

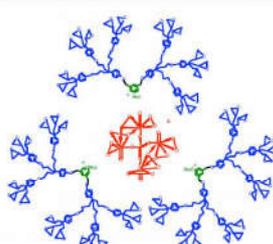


In humans and animals, the evolution process of growth thanks to the development of dendritic network [7]. When air enters the lungs, oxygen molecules in a large network of vessels and bronchi dendritic passes [8]. Dendrimer is a Greek word meaning tree or branch and Dandros and subordinateto the component or components [9].

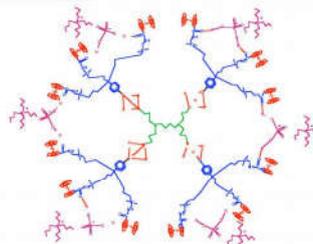
Dendrimer Assembly Modes



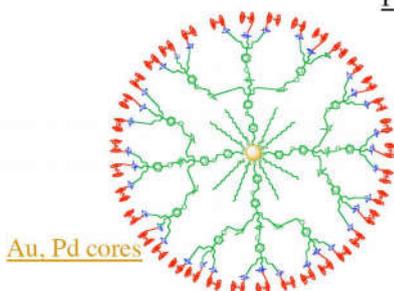
Covalent Assembly



Ionic Assembly
POM-cored

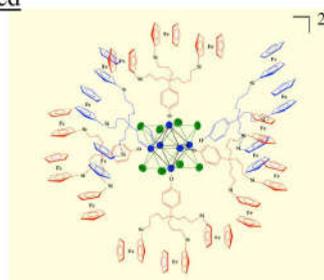


Hydrogen-bonded Assembly



Au, Pd cores

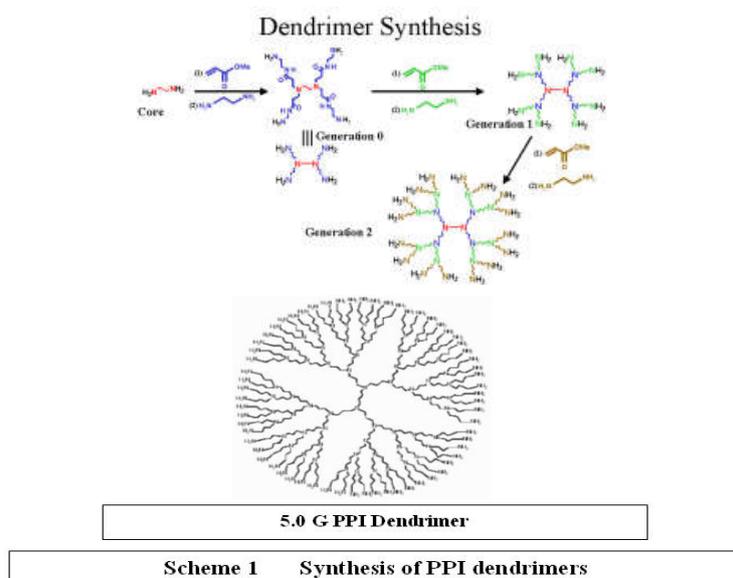
Coordination: Nanoparticle-cored



Mo₆Br₈
core

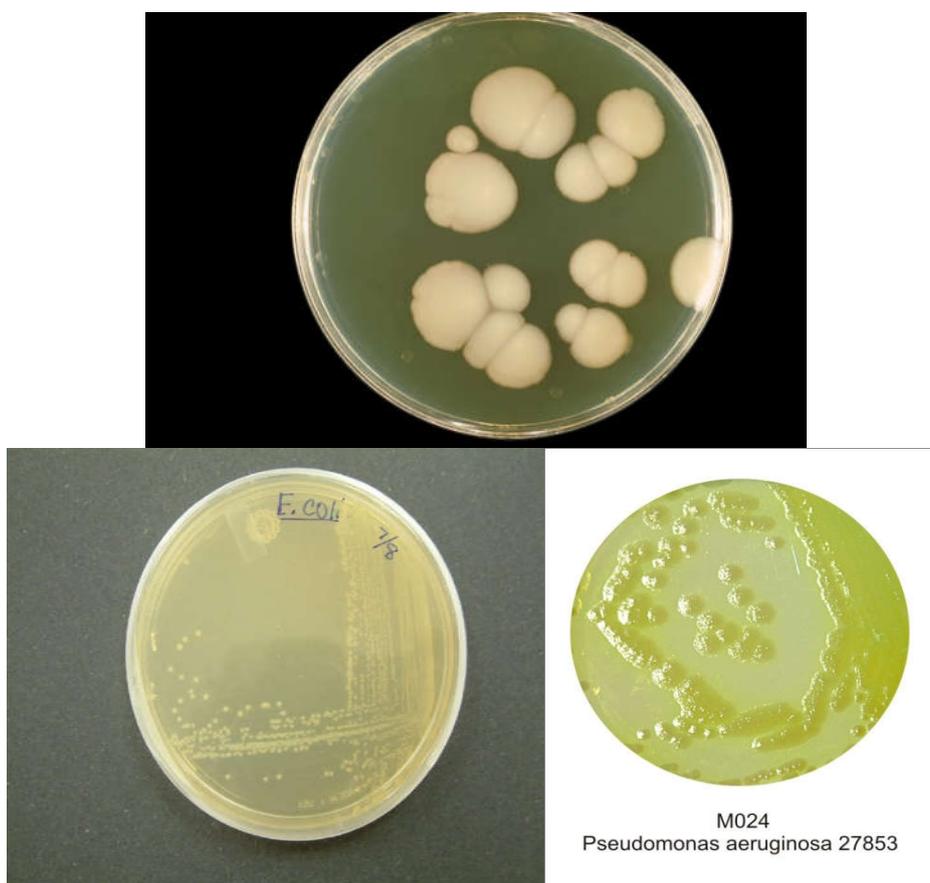
Coordination: Mo₆Br₈ Cluster-cored

In other words, dendrimers subset of dendritic structures that have certain structural order [10]. Dndrymrhay polypropylene Iman oldest dendrimers are synthesized and were introduced first by someone called Vogtel [11]. The core of the dendrimer has an active factors are numerous and the ramifications that the outer core is also said to be branches [12]. That is why in recent years, researchers from the dendritic structures, especially dendrimers in medicine, pharmaceuticals and molecular biology, targeted drug delivery to cancer cells, stem cell growth, treatment of tumors, improved genetic disorders, anti-viral and anti-bacterial applications benefited ¹³.



MATERIALS AND METHODS

In this study, two generations of PPI dendrimers were used without purification. The cotton fabric and chemicals such as Sodium hypophosphite (catalyst), citric acid, and the acid Glutaric (Coupler) were used. Gram-positive and Gram-negative bacteria and fungal microbial bodies used were obtained from the microbiology laboratory database storage. Hinton and BHI culture medium for bacteria was used. To evaluate the anti-microbial properties, fabric samples with a diameter of 5mm at MFG Model 120c ° for 15min with Japan, were sterile. After preparation of the culture, the bacteria into the culture plates were then incubated in the plates were placed at 37c ° and for 24hr.



Staphylococcus Aureus

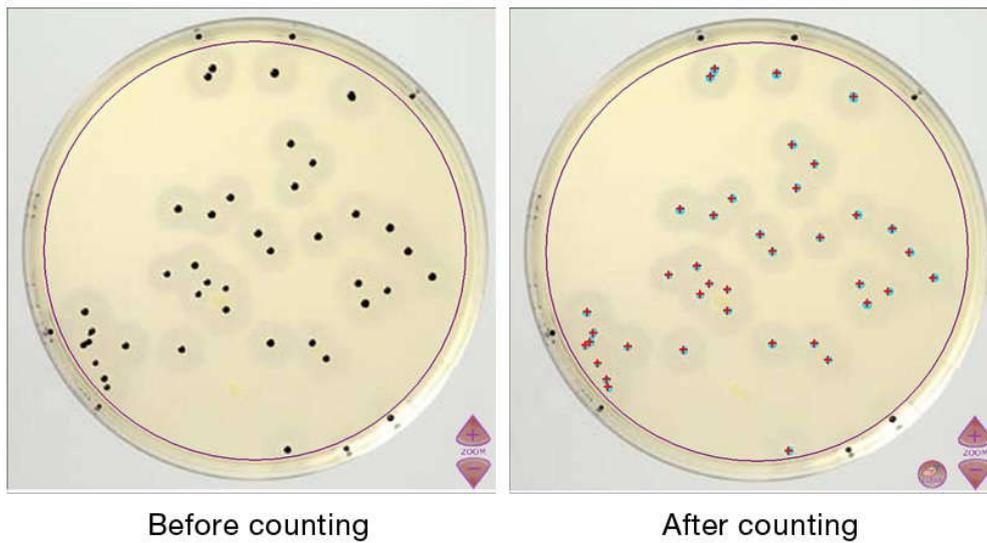


Figure 1: The formation of colonies of Staphylococcus aureus in culture

RESULTS

Figure below shows the dendrimer nanoparticles polypropylene Iman at all concentrations against all bacteria other than *Pseudomonas aeruginosa*, the antimicrobial activity of dendrimer nanoparticles is better than the other, so that the built-in serial concentrations (1.2, 1.4, 1.8) of the initial solution of dendrimer nanotechnology PPI (initial concentrations of 1%) after 24 hours, no colony growth is not observed.

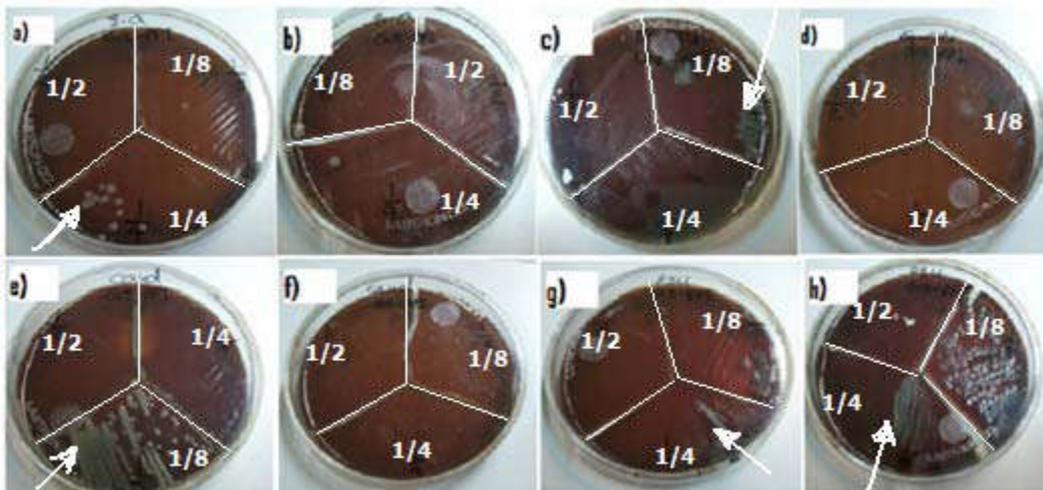
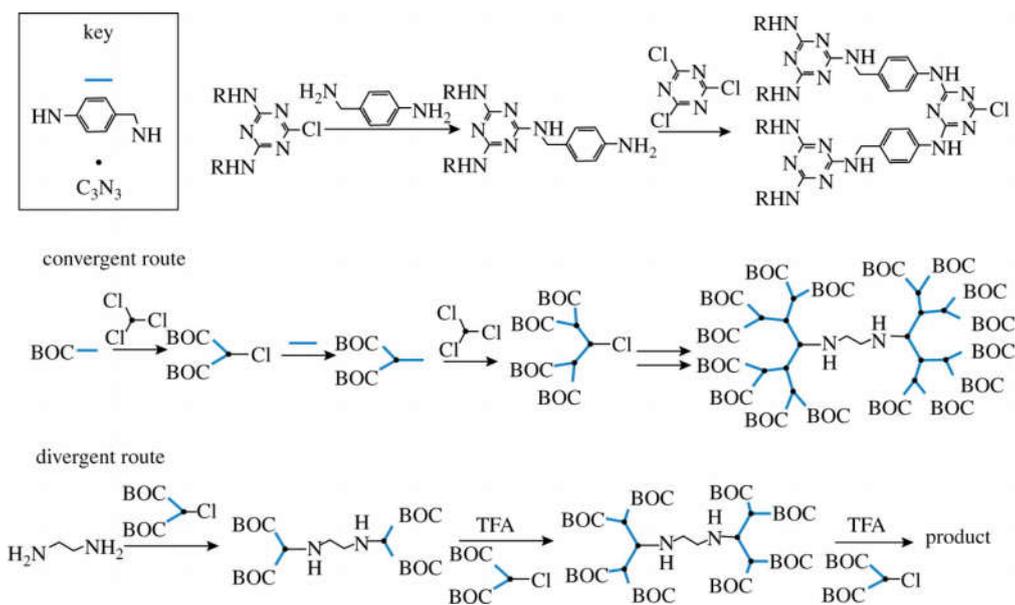


Fig2.

- The 2 generation PPI dendrimers antimicrobial activity against *Staphylococcus aureus*.
- Antimicrobial activity against bacteria *Staphylococcus aureus* 5 generation PPI dendrimers.
- PPI dendrimer 2 generation antimicrobial activity against *E. coli* bacteria.
- PPI dendrimer 5 generation antimicrobial activity against *E. coli* bacteria.
- Activity against the fungus *Candida albicans* antimicrobial 2 generation PPI dendrimers.
- Antimicrobial activity against the fungus *Candida albicans* 5 generation PPI dendrimers.
- PPI dendrimer 2 generation antimicrobial activity against *Pseudomonas aeruginosa*.
- PPI dendrimer 5 generation antimicrobial activity against *Pseudomonas aeruginosa*.



DISCUSSION AND CONCLUSION

With previous research, this study found that the project can be degraded by bacteria commonly antimicrobial agents and the effect of the destruction of the bacterial cell membrane, changing the atmosphere, destroying the bacterial enzymes, damage to and destruction of the walls of the bacterial chromosome done. The present study shows that the dendrimer nanoparticles polypropylene Iman second and fifth generation, Can be used as antimicrobial agents in the completion of antimicrobial products used in cotton clothes to be used in hospital and health.

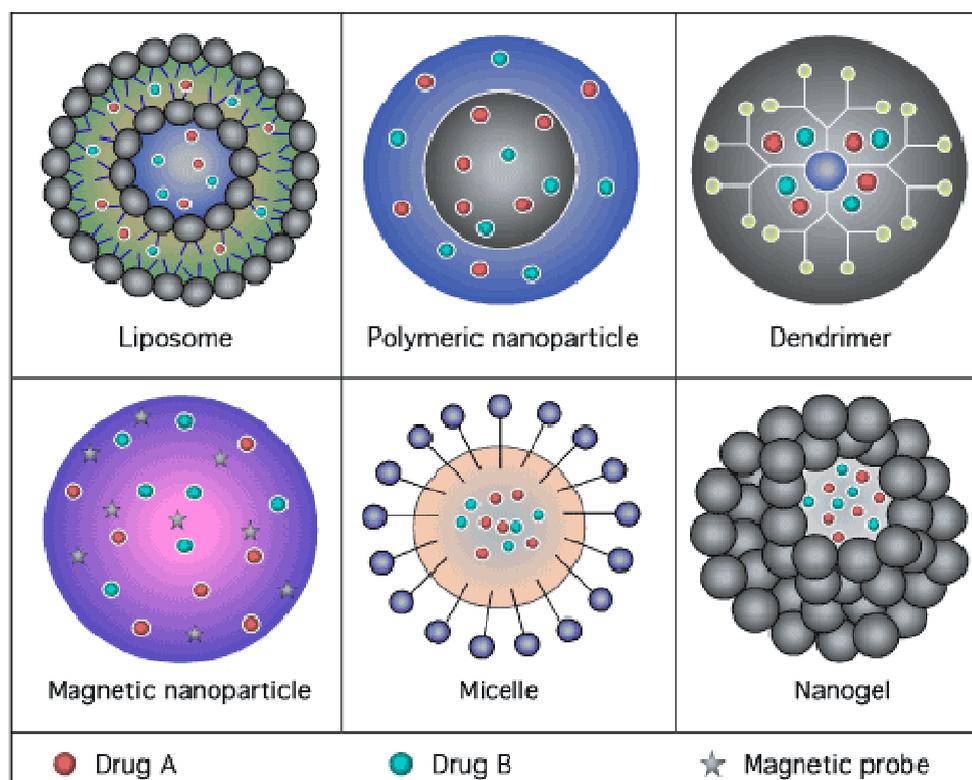


Figure 4 : schematic models of Nanoparticles

This result can be attributed to the presence of amino groups attached to the end of the dendrimers cotton products than that in React with negatively charged membrane and cytoplasm of microorganisms, damage bacterial cell wall and thus the dichotomy to bacterial colonization and replication is disabled.

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