Bioactive Nanoparticles and Their Impacts on Human Health

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Abstract: *- The bioactivities of nanoparticles have been found to depend upon the property of the changes into the ratio of the surface to the volume of the nanoparticles. Therefore, it may be presumed that the change in surface to volume ratio may be the basis causing the changes in physical and chemical characteristics of the active materials[1-4]. Therefore, this study is focused to reduce the health hazards owing to the impacts of nanoparticles on living bodies including the animals and the plants coming in contact of the nanoparticles and the nanomaterial. The discussions about the positivity of the nanoparticles and materials on the surface effects of the living bodies in the society with applications to silver and other identicall new nanoparticles used on acrylic fiber have been made to reduce the intense health issue like cancer for the end user and worker of the industry.*

Keywords*: Hydrophobic, Bio-synthetic, Polymer, N9-Silver coating, Absorption capacity,AgNPs.*

Introduction: -*Since the nanoparticles are always surrounded by the electric or magnetic fields produced by the electrons moving in their orbits. Thus the nanoparticles also produce the phonon and the plasmons in their neighborhoods. Thus the bioactivity of nanoparticles may be related to the change in their shape or size due to the fields pervading in their neighborhood. When the size of the nanoparticles are allowed to reduce the surface to volume ratio of the particles go on increasing. This causes the variation in the bioactivity of nanoparticle resulting changes in their characteristics such as chemical reactivity, hardness and magnetic properties, antimicrobial properties that lead to change in biological activity of the nanoparticles. There are several equivalent approaches for the synthesis of nanoparticles of different active materials has been taken under this research. But the biological synthesis approaches have become very preferred methods because they are green, cost effective,*

ecofriendly, clean and safe. This biological approach may provide nanoparticles of better-defined size and morphology for the reduction of health hazards.In this research, the characteristics of silver nanoparticles have been analyzed and study has been made to find the conditions reduce the cancerous effect of acrylic fiber either for the end users and workers of the industry whereas barium titanate cannot be used for it.

The technology development work in the last decade in acrylic fibre manufacturing process in the areas such as increasing polymerization capacity and spinning speeds, simplification and substitution of complicated process steps, reducing raw material and energy consumption, reduction of waste, improving safety and reducing pollution and development of new and improved quality products such as Hi-bulk and Pile, Antipeel fibres, Trilobal and Pentalobal fibres, Fire retardant fibres, gel dyed fibres etc.have occurred very fastly[5-7]. The steps, reducing raw material and energy consumption, reduction of waste, improving safety and reducing pollution and development of new and improved quality products such as Hi-bulk and Pile, Antipeel fibres, Trilobal and Pentalobal fibres, Fire retardant fibres, gel dyed fibres etc. have occurred very fastly. Research institutions have done very satisfactory works in the field of dyeing areas, substitute for processing chemicals, study of process parameters; and other effect on fibre properties. They have made attempts to develop indigenous know-how for poly-condensation, spinning and post spinning operations is still to be made with key equipments like reactors, spinning lines, spinneretles, autoclave etc.Since the acrylic fabric is highly flammable, therefore, it must be treated with toxic flame retardants to avoid the possibility of grievously injuring the wearer [6-7].The types of flame retardants used are called organophosphates, and these toxic compounds gradually accumulate in the body.The United States Environmental Protection Agency (EPA) has long been concerned that residual monomers in acrylic fabric could cause cancer. After that the US Centres for Disease Control and Prevention have since confirmed that every time our skin comes into contact with acrylic fibres and have chances of acquiring cancer. Next problem that EPA has found is that inhalation ofpolyacrylonitrile into the living bodies causes symptoms similar to cyanide poisoning in diseased human.In fact, when our body is exposed to polyacrylonitrile, it converts chemicals into cyanide. This metabolism can occur after contact with the skin such as ingestion, or in contact with chemicals by inhalation. The acrylic fabric itself is very flammable which makes problem in treating with acrylic fibre in summer season and the hot regions. So, it should be treated with a toxic flame retardant to avoid the possibility of serious injury to the wearer. The type of flame retardant which is

called organic phosphate, and these toxic compounds gradually accumulate in the body which make cancerous. Exposure to synthetic fibres in general during the production process increases breast cancer rates in postmenopausal women. Synthetic fibres like acrylonitrile also serve as breeding grounds for bacteria, which could cause skin problems and general discomfort[2-4].

***Methods and Materials**:*

The novelty of this research is to do some medicinal implementation in the modification of Acrylic Fibres so that the side effects of this process may be modified towards the welfare of the people and also for the climate.

To make the bio synthetic fibre which will be bio-degradable, eco-friendly, less pollution producing and manufactured by the most commonly used vegetable wastage such as from the cover of sugarcane plant oil and fungus nano-particles. So, the main aspects of this produced acrylic fibres which will be less harmful not only for the environment but also the skin of the human body. By the use of advanced technique in which the produced bio degradable fibres become more useful in comparison to Rayon, polyester and nylon fabric. The silver nano-particles have also found diverse applications in the form of wound dressing, coating for medical devices, silver nano-particles impregnated textile fabrics. Coating is a common technique used to apply nano-particles onto textiles. The coating compositions that can modify the surface of textiles are usually composed of nano-particles, a surfactant, ingredients and a carrier medium. The nano-particles are attached to the fabrics with the use of a padder adjusted to suitable pressure and speed, followed by drying and curing.The properties imparted to textiles using nanotechnology include water repellence, soil resistance, wrinkle resistance, anti-bacteria, antistatic and UV-protection, flame retardation, improvement of dyeability. Acrylic fibers are considered the most suitable precursor for making high performance carbon fibers. A study is aimed to understand the role played by acrylic fibre modification treatment in order to improve its bio-degradable property so that it become adjustable with environment as well as with human beings.

Result and discussion:

In vitro characterization method is used to characterize the biologically synthesized silver nanoparticles and analyse the antimicrobial properties. The size and shape of silver nanoparticles are reduced by the interaction between proteins with metal oxide. Finally, the

antibacterial activity of nanoparticles treated acrylic fiber is evaluated against Gram positive and negative bacteria.

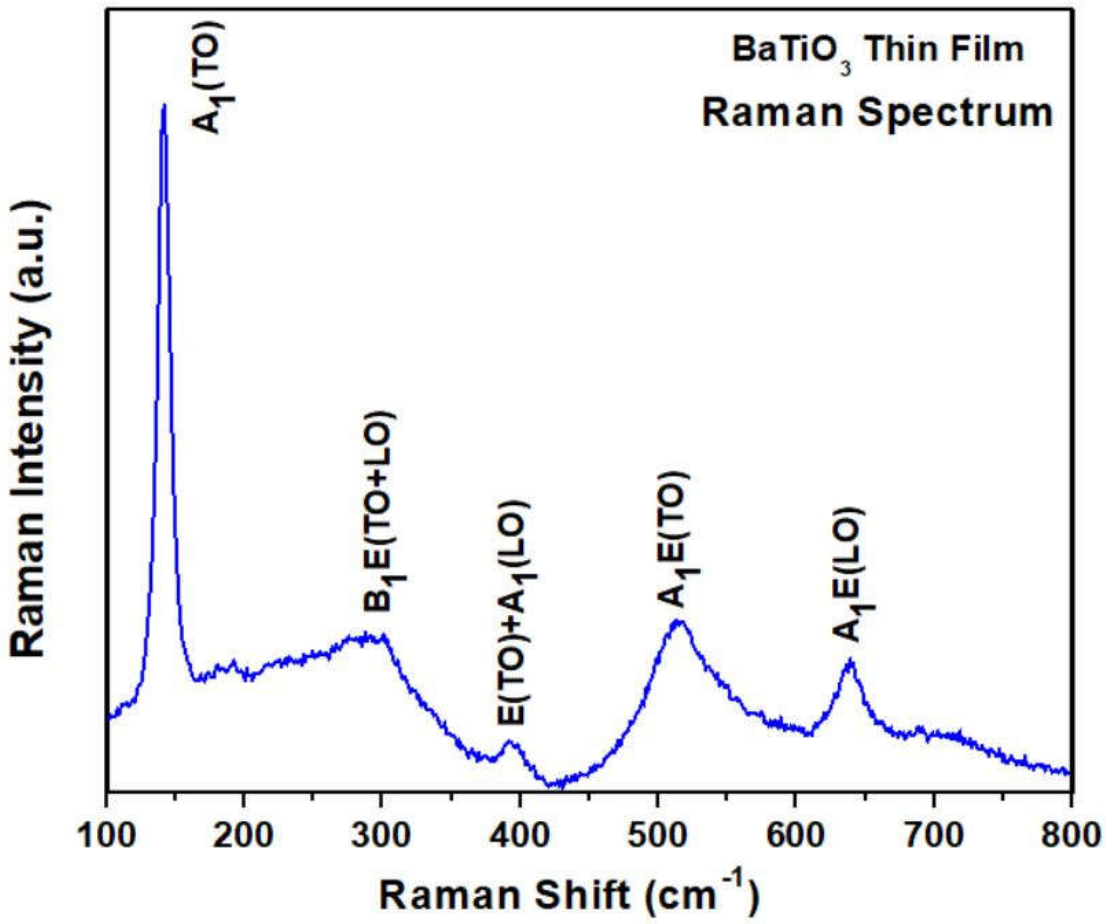

Fig.1 Characterization of thin film of $BaTiO_3$ by Raman spectroscopy

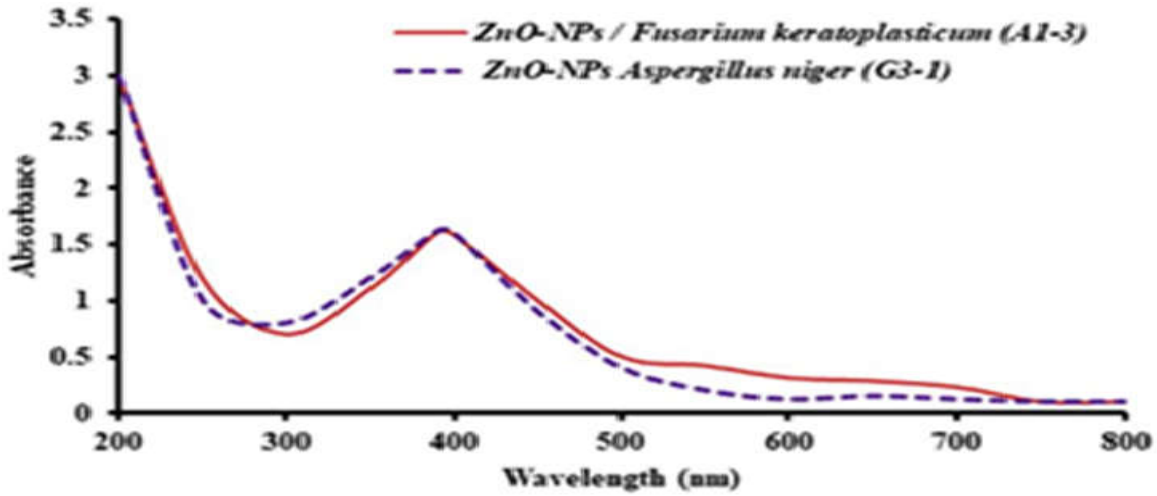

Fig. 2 UV visible spectra of biologically synthesized ZnO-NPs by Fusarium Keratoplasticum(A1-3) and Aspergillus niger strain (G3-1) at different wavelengths[4-7].

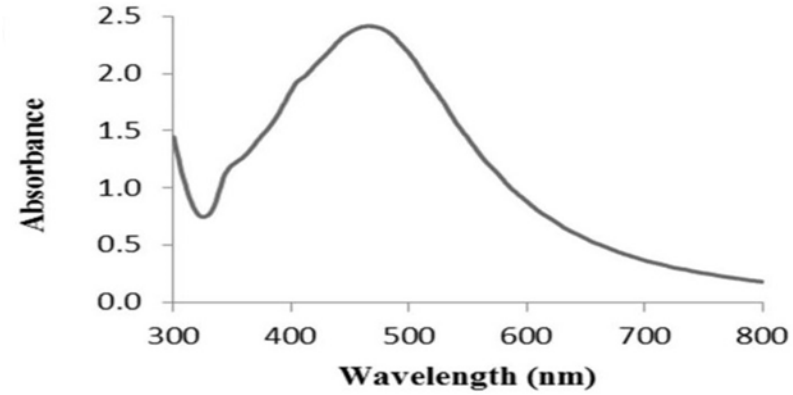

Fig. 3 Characterization of Synthesized AgNPs by UV-VIS spectrophotometer. In UV-VIS absorbance with the strong peak at 466 nm.

Conclusion:

The bacteria-based synthesis of AgNPs is comparatively innocuous, environment-friendly,andfeasible method. In this study, AgNPs can be synthesized by culture super-natant of P. nicotinovorans MAHUQ-43 via an extracellular approach to avoid the draw-backs of chemical methods. The Fourier transform IRspectroscopyindicates that the involvement of differentbiomolecules in between synthesis of AgNPs, as reducing and

capping agents. The synthesized silver nano particles were crystalline in nature and spherical in shape with the size range of 15–26 nmconfirmed by X-Ray diffraction analysis. The synthesis was relatively quicker which must be useful for mass production. The P. nicotinovorans MAHUQ-43-based synthesizedsilver nano particlesindicates potent antibacterial activity in comparison to both P. aeruginosa and B.cereus[9]. The minimum inhibitory and bactericidal concentration for both pathogens were 12.5 µg/mL and 25 µg/mL respectively. Other analysis of treated cells indicates that biosynthesized AgNPs must be damage the cell wall, destroy the membrane integrity, further morechange the actual morphologyof duo pathogens, which leading to cell death. Thus, P. nicotinovorans MAHUQ-43-based environment-friendly treatment could be used for the fast, facile, and non-poisonous synthesis of silver nano particles as anmost practical to conventional methods.

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