

## **7. Biogenic Silver Nanoparticles**

### **Preamble:**

The project entitled “**Mycosynthesis of Silver Nanoparticles for The Development of Novel Antimicrobials**” financially supported by Rajiv Gandhi Science and Technology Commission (RGSTC), Govt. of Maharashtra, Mumbai to aid technology development, was successfully executed at demonstration level by Professor (Dr) M.K. Rai, Department of Biotechnology, SGB Amravati University Amravati, 444 602. The results obtained are of high commercial value because method has been developed for large scale production of silver nanoparticles by optimizing physico-cultural conditions and hypothetical mechanism has been given for the synthesis of silver nanoparticles. The novel antimicrobial agent has been developed for the treatment of patients suffering from multi-drug resistant pathogens and secondary fungal infections. *In vivo* evaluation of formulation containing silver nanoparticles has been done for excision, incision and burn wound healing property. Considering the results of wound healing, silver nanogel formulated by using 0.5 mg/gm of silver nanoparticles demonstrated the best in healing activity. It is low -cost and eco-friendly antimicrobial agent, which is an answer to multidrug resistant bacteria and secondary fungal infections. In addition, the gel showed wound healing property.

### **Objectives of the project:**

- i. Screening of fungi for the mycosynthesis of silver nanoparticles.
- ii. Optimization of conditions for the large scale synthesis of nanoparticles and study on possible mechanism for mycosynthesis of silver nanoparticles.
- iii. Evaluation of antimicrobial activity of silver nanoparticles against the human pathogenic fungi and bacteria.
- iv. Development of silver nanogel and its evaluation for wound healing property.

## **NanoGel: Unique Features:**

- 🌈 It is low-cost and eco-friendly antimicrobial for multidrug resistant bacteria and secondary fungal infections with wounds healing property.
- 🌈 It is the first biogenic silver nanoparticles based wound healing formulation.
- 🌈 Formulated nanogel could be commercialized after its patent. The patent has been filed.
- 🌈 Optimization of nanoparticles synthesis conditions will be helpful in large scale production of silver nanoparticles.

## **Potential Applications:**

The silver nanogel developed under this project is safe to use for humans and animals as the *In vivo* study on *albino wistar* rat showed no toxicity on skin, brain, heart, kidney, lungs and liver.

## **Equipment Required for Plant Setup and Production:**

Fermenter, UV-Visible spectrophotometer, FTIR, Nanoparticle Tracking Analyser, Vacuum evaporator, Biosafety cabinet, Stirrer, Packaging unit, etc.

## **For Details, Contact:**

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## Sample Products developed under this project

Silver nanogel containing silver nanoparticles for wound healing and for the treatment of patients suffering from multi-drug resistant pathogens and secondary fungal infections is our main product. In addition, method for large scale synthesis of silver nanoparticles by optimizing physico-cultural conditions has been developed. Indian Patent (Application no 838/MUM/2014) has been filed to cover the formulation of nanogel.



Control      0.1 mg/ml      0.5 mg/ml      1 mg/ml

**Formulated silver nano gels of different concentrations**