GREEN SYNTHESIS OF SILVER NANOPARTICLES BY USING ALYSICARPUS MONILIFER PLANT EXTRACT; CHARACTERIZATION OF THE PARTICLES AND STUDY OF ANTIBACTERIAL ACTIVITY

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ABSTRACT *The discipline of nanotechnology is swiftly evolving as an interdisciplinary science, interfacing chemical, medical, environmental and physical sciences not leaving behind diverse engineering fields, with myriad of applications in the development of biosensors and biomedical devices, alternative energy generation and environmental restoration The principal objectives of this research work are Synthesis of silver nanoparticles from silver salts using biological route Characterization of these synthesized silver nanoparticles. Determination of the size and shape of silver nanoparticles study of its antimicrobial activity against a few common bacteria. In the rapid biological synthesis of silver nanoparticles using Alysicarpus monilifer extract provides a stable, environmental friendly, simple and efficient route for synthesis of nanoparticles. These obtained silver nanoparticles have potential applications in the biomedical field and this simple procedure has several advantages such as cost effectiveness compatility for medical and pharmaceutical applications as well as large scale commercial production. In the present study the extract was analyzed with help of UV, SEM and antimicrobial activity.*

Keywords: *Plant Extract , Silver Nanoparticles ,UV, SEM and antimicrobial activity.*

1. INTRODUCTION

Nanotechnology is an important field of modern research dealing with synthesis, strategy and manipulation of particle's structure ranging from approximately 1 to 100 nm in size.With in this size range all the properties (chemical, physical and biological) changes in fundamental ways of both individual atoms/molecules and their corresponding bulk. Novel applications of nanoparticles and nanomaterials are growing rapidly on various fronts due to their completely new or enhanced properties based on size, their distribution and morphology. In the present study, we are focusing on the various methods involved in the green synthesis of Nanoparticles using specific bio-molecules present in plant extracts as precursors with emphasis on the antimicrobial activity of NPs. The limitations of green nanotechnology in development of green silver nanoparticles and its antimicrobial activity along with the strategies to improve the production of green antimicrobial drugs have also been discussed.

2. SCOPE AND OBJECTIVES

The principal objectives of this research work are Synthesis of silver nanoparticles from silver salts using biological route Characterization of these synthesized silver nanoparticles and to determination of the size and shape of silver nanoparticles and study of its antimicrobial activity against a few common bacteria.

3. MATERIALS AND METHODS

The fresh whole plant of Alysicarpus monilifer were collected from Anumantharayan kottai village in Dindigul District. Silver Nitrate Purchased from local chemical suppliers and Nutrient Agar Powder also Purchased from chemical suppliers. The authenticated fresh whole plant were dried under shade and used for the preparation of extract. This whole plant were dried under shade and used for the preparation of extract. This whole plant was coarsely powdered with the help of mechanical grinder and passed through sieve no 60. The powder was stored in an airtight container for further use. This plant powder was soaked in 250 ml deionized water for 48 hours and then filtered with whatmann no filter paper the extract was collected in a container. The extract was preserved inside a refrigerator for future use Preparation of silver nitrate solution of 0.05 mol concentrations. Addition of the 5ml plant extract to the silver nitrate solutions. Boiling the mixed solution to allow nanoparticles formation.

4. RESULTS AND DISCUSSION

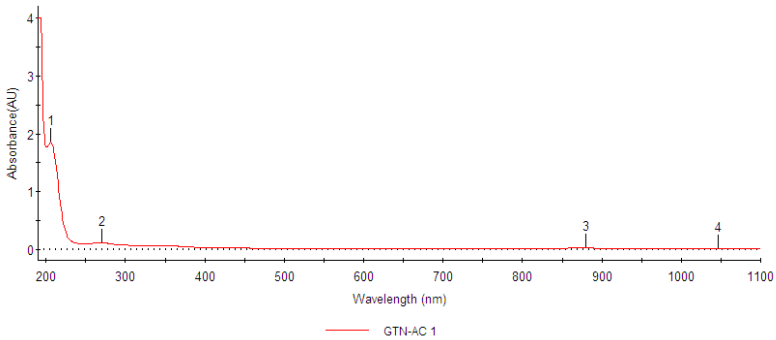
PHYTOCHEMICAL SCREENING OF AQUEOUS EXTRACT OF ALYSICARPUS MONILIFER

S.NO	Phytochemical	Aqueous extract
1	Carbohydrate	+
2	Fixed & fats	+
3	Phenolic compound	+
4	Proteins	-
5	Saponins	+
6	Coumuering	+
7	Quinnones	+
8	Tannis	-
9	Flavonoids	+
10	Phytosterols	-
11	Anthocyanins	-
12	Leucoanthocyanins turns	-

(+) Present (-) Absent

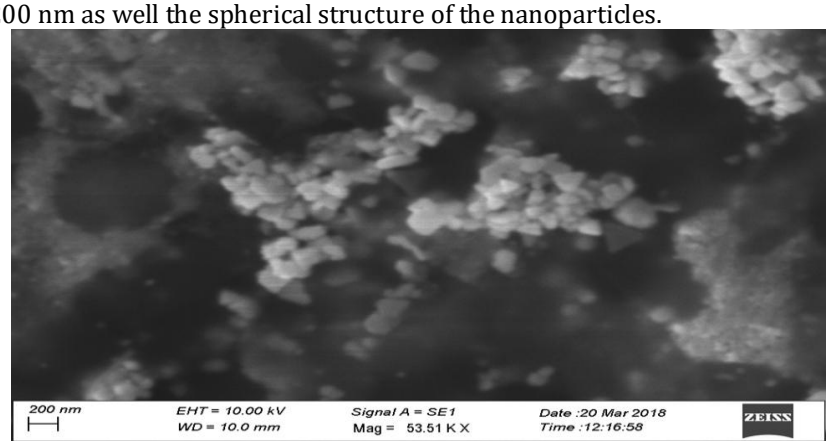
UV ABSORPTION SPECTROMETER

The Ag nanoparticals were primary characterized by UV-visible spectroscopy,which proved to be a very use full technique for the analysis of nanoparticles Fig shows the UV-visible specter of reaction medium recorded as a function of reaction time using silver nitrate and Alysicarpus monilifer plant sample. It is observed that the maximum absorbance of Ag nanoparticals occurs at 205.75nm, 269.95nm. This range suggests to convert the Ag nanoparticles.



SEM ANALYSIS

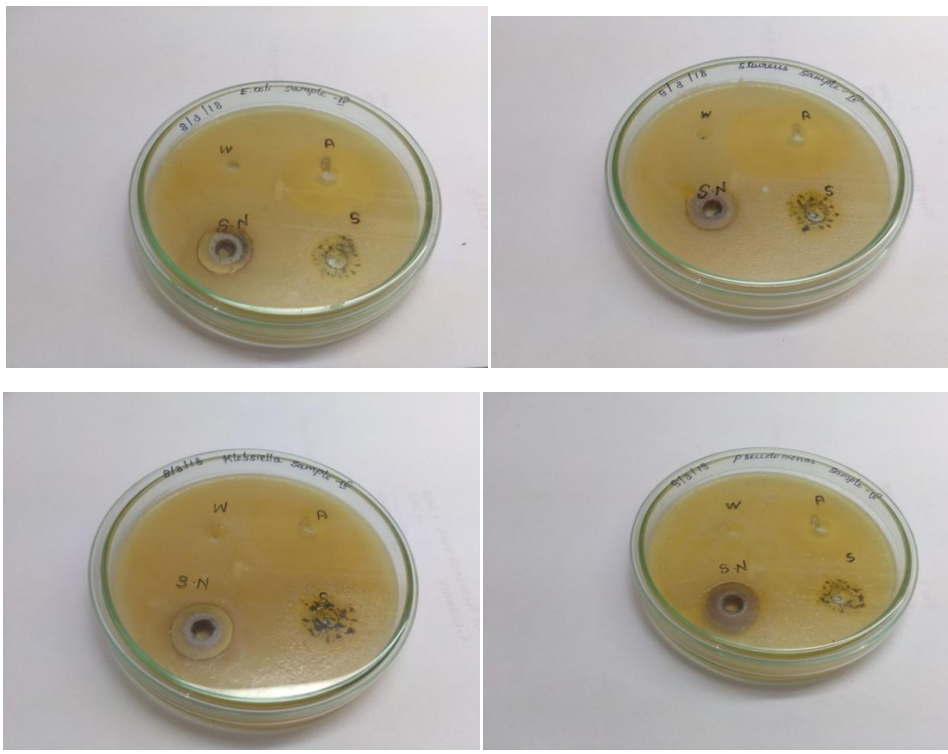
SEM analysis was carried out to understand the topology and the size of the Ag-NPs, which showed the synthesis of higher density polydispersed spherical Ag-NPs of various sizes. The SEM analysis showed the particle size 200 nm as well the spherical structure of the nanoparticles.



ANTIBACTERIAL ACTIVITY

Antibacterial Activity Of Silver Nanoparticles Against Various Bacteria

Pathogens	Concentration of extracts µg/Well / Zone of inhibition in mm			
	Positive control	Negative control	SAMPLE 4 AC	SN
Staph aureus	27	-	12	9
E.coli	22	-	12	9
Klebsiella pneumonia	19	-	10	9
Pseudomonas aeruginosa	20	-	11	8



5.CONCLUSION

In conclusion the rapid biological synthesis of silver nanoparticles using Alysicarpus monilifer extract provides a stable, environmental friendly, simple and efficient route for synthesis of nanoparticles. These obtained silver nanoparticles have potential applications in the biomedical field and this simple procedure has several advantages such as cost effectiveness compatility for medical and pharmaceutical applications as well as large scale commercial production. In the present study the extract was analyzed and identify the various phytochemicals Alkaloids, Sterols, Glycosides, Phenolic compound, Tannins, Flavonoids, Carbohydrate & Saponins. The silver nanoparticles exhibited dark brown colour in aqueous solution. This characteristic colour variation is due to the excitation of the surface plasmon resonance in the metal nanoparticles.The frequency and width of the surface Plasmon absorption depends on the size & shape of the metal nanoparticles as well as on the surrounding medium. It is generally recognized that UV_Visble spectros copy could be used to examine size & shape controlled nanoparticles is aqueous solution. The nanoparticles further conformed with help of the SEM analysis. The applications of silver nanoparticles as an antibacterial agent was investigated and exhibited better antibacterial activity against Gram positive and

Gram negative bacteria. The silver nanoparticles showed good inhibition activity against staph. aureus , E.coli & pseudomonas as well.

6. REFERENCES

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