



## SYNTHESIS, CHARACTERIZATION OF ZnO NANOPARTICLES FROM *THESPESIA POPULNEA*

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**ABSTRACT** *Thespesia populnea*, usually known as the *Portia Tree* is a small tree or plant and it belongs to mallow family, Malvaceae. It grows in the wide range of soil types that may be present in coastal environments, counting soils derived from, limestone, quartz and basalt and favors neutral soils (pH of 6-7.4). The green synthesis of metal nanoparticles is an exciting subject of nanoscience. Moreover, of latest concern is the biosynthesis of metal nanoparticles using plants for the large-scale biosynthesis. Nanoparticles formed by plants are more stable and more diverse in shape and size in comparison with those produced by further organisms. Out of all other Metal nanoparticles zinc oxide nanoparticles are most important, as these are used in biomedical, gas sensors, Biosensors, cosmetics, agriculture and drug-delivery etc. Zinc acetate as used to synthesis the zinc Nanoparticles by using leaf extract of *Thespesia populnea*. The optical characterization was carried out using UV – Vis and FT – IR analysis.

**KEYWORDS :** *Thespesia populnea*, ZnO nano particle, NaOH

### INTRODUCTION

Indian Ayurvedic system is one of the significant systems of conventional medicine practice that uses mostly certain plants for the treatments of ailments in both man and other animals. While the popularity of herbal medicine recorded a sharp refuse after the introduction of allopathic chemical drugs, herbal medicines are gaining, growing interest because of their cost-effective, eco-friendly attributes, and true relieve from disease condition. The destructive side effects and high cost of the other forms of treatment and their non accessibility to the poor populations, who live in isolated areas, are also the reasons for the exact for herbal medicine. *Thespesia populnea* is very popular as a medicinal plant as mentioned in the antique text of tribal medicine. This plant is isolated mainly along the coastal regions throughout India, often planted as avenue tree. The leaves of this tree are made into a paste and applied as a bandage over inflammations and the Paste of flowers is useful over skin diseases like pruritis and scabies. The oil synthesized by the leaves and castor oil is applied over the painful areas and inflammations and the milky secretion of the fruit is practical over skin diseases. The paste of the bark is applied externally over leucoderma and other skin infections and The decoction prepared by the bark is given on the inside for toxic conditions, as cures and inflammations [1-5]. Fruits are globose or oblong brown capsules covered with minute peltate scales, pubescent, channeled along the back. Nanotechnology offers enormously inclusive latent applications in optical communications, smart materials and electronics in biological systems. Lot of interest has been unfocused to the green synthesis of metal nanoparticle using biological material as the reducing and stabilizing agents and due to the tradition of ecofriendly. Particles of controlled size with at least one dimensions less than 100 nm are measured as nanoparticles [6-9]. It is showed fully new or enhanced properties and have applications in a variety of fields, such as a magnetic devices, sensors, optoelectronics and drug delivery systems. Nanoparticle can be made a huge range of materials like silver, gold, zinc, carbon and silicon in various chemical and physical methods [10-13]. Among these, zinc nanoparticles are widely used in many field, and the major applications include their use as catalysts, as optical sensors of zeptomole concentration, in textile engineering, in electronics, in optics and most importantly in the medical field as a bactericidal, and as a therapeutic agent and also exhibit a potent cytoprotective activity towards HIV infected cells [14-16]. ZnO nanoparticle have gathered the growing interest of the scientific and industrial community due to varied application in solar energy conversion, cosmetics, paints, drug-delivery, fibers, antibacterial and luminescence properties.

In this present work we have used environmentally benign plant leaf extracts of *Thespesia populnea* which have exceptional therapeutic

properties. The structural, optical, properties of the ZnO NPs have been evaluated.

### MATERIALS AND METHODS

Zinc acetate dihydrate (Merck), sodium hydroxide pellets (Merck.), distilled water were used in the nanoparticle synthesis with the extracts. *Thespesia populnea* leaves were collected from the Botanical garden.

#### Preparation of leaf extracts

*Thespesia populnea* leaf (50 g) were thoroughly washed, dried and then boiled in 50 ml of deionised water for half an hour. The resulting extract was cooled and used as the extract solutions.



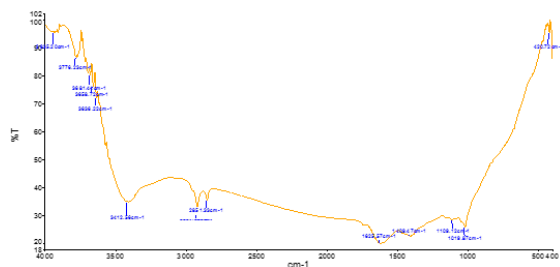
#### Synthesis of ZnO nanoparticles

In this method, 0.25 g of zinc acetate was dissolved in 50 ml water. 4 ml of the extract of *Thespesia populnea* was added dropwise and the resulting mixture was stirred for 10 minutes using a magnetic stirrer. In order to adjust the pH of the solution to pH 12, NaOH (2 M) was added drop-wise while stirring. A white crystalline precipitate of zinc oxide was obtained, which is washed repeatedly with water, filtered and dried in an oven at 60°C to obtain the ZnO nanoparticles.

#### Result and Discussion

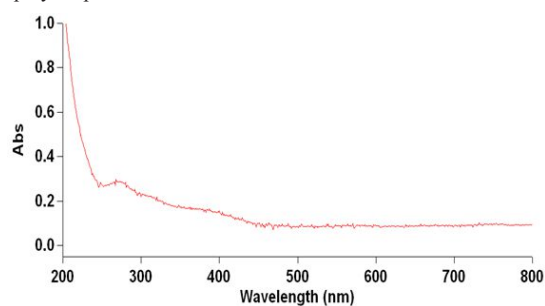
FT – IR spectrum of zinc nanoparticles of *Thespesia populnea* leaf extract and synthesized are shown in Fig 1 The peak located at 1080 cm<sup>-1</sup> could be assigned to the C – O stretching vibration. Peak at 1623 cm<sup>-1</sup>, 3412 cm<sup>-1</sup> corresponds to C=O stretching and O–H stretching Organic

compound. The FTIR analysis of Zinc nanoparticles suggested that they might surround by the any of these organic molecule.



**Fig:1 FTIR Spectrum of Zinc nanoparticle**

Formation and stability of Zinc nanoparticles in aqueous colloidal solution were confirmed using UV-Vis spectral analysis. The UV-Vis spectrum of colloidal solutions of Zinc nano particle synthesized from leaf of *Thespesia populnea* have the characteristic absorbance peaks at 295nm (Fig-2); and the broadening of peak indicated that the particles are poly-dispersed.



**Fig.2 UV Spectrum of zinc nanoparticle**

## CONCLUSION

The Plants have been used in the synthesis of metallic nanoparticles since they are more ecofriendly. These plant extracts also permit a proscribed synthesis. Organic chemical solvents are toxic and absorb intense conditions during nanoparticle synthesis. Plant extracts function as stabilizing, capping or hydrolytic agents. The ZnO nanoparticles are of significant interest as they give many practical applications worldwide.

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