

SYNTHESIS AND FUNCTIONALISATION OF ZINC NANOPARTICLES FROM

PHYLLANTHUS NIRURI.

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ABSTRACT

The medicinal herb of Phyllanthus Niruri is known as Phyllanthus Niruri in Tamil language. Phyllanthus Niruri is used in Indian medicine for curing various problems in the stomach, liver, kidney. The whole plant is used as medicine, including its roots, leaves, and fruits. The fruits are useful for the treatment of tubercular ulcers, wounds, sores, scabies and ringworm. Phyllanthus Niruri has gained worldwide popularity due to its effect against Hepatitis-B. It is an important plant in Indian medicine, and it has also been used in Brazil and Peru as a herbal remedy for kidney stones. You might have heard the popularity of Phyllanthus Niruri for jaundice treatment. This medicinal herb is specially used in the treatment of jaundice but other than that many other health problems can be solved with the help of this herb's medicinal properties. Siddha and ayurveda found the benefits of Phyllanthus Niruri plant for liver healing treatment. Phyllanthus Niruri is used widely in the treatment of kidney stones, liver and kidney problems, viral infection and bacterial infections also. Phyllanthus Niruri plant is useful to treat diabetes also. It can reduce blood glucose level remarkably. The amazing properties of the plant can prevent glucose absorption and glucose storage in the body. It has been proved that Phyllanthus Niruri plant extracts are loaded with the properties which can work as good as chemotherapy. Nanotechnology is a potentially valuable field with fantastic implications for society, industry and medicine. They are typically prepared from noble metals like Gold, Silver, Platinum, Zinc and Palladium. They find applications in a variety of fields like medicine, electronics, textile, and cosmetics.

The plant mediated synthesis is hasty, low cost, eco- friendly and for safer human therapeutic uses. The structures, optical properties of these fabricated ZnO nanoparticles from Phyllanthus Niruri were characterized by Ultravioletvisible spectroscopy (UV-vis) and FTIR.analysis were studied.

Keywords: Phyllanthus Niruri plant, Zinc Nan particles

INTRODUCTION

Keezhanelli plantis systematically called as Phyllanthus Niruri. It is also called as wind of the storm, stonebreaker. It is a steamy plant, is frequently establish all over in coastal regions. One can simply grow them at house. Keezhanelli leaves and roots are identified for their medicinal values for treating migraine, liver ailments and jaundice. It extract exhibit lipid lowering activity in cholesterol fed hyperlipmic rats. It may lower blood pressure and profit people with kidney stones. It normalizes prominent urinary calcium stone forming patients. The blend of the root and leaves is a good toxic and diuretic when in use cold repeated dose. The milk juice of the plant is a good remedy to apply on hateful skin sores.It very good therapy against malarial fever. Nanotechnology [1] is enabling machinery that deals with nano-meter sized objects. It is expected that nanotechnology will be developed at several levels: materials, devices and systems. The nanomaterials level is the most sophisticated at in attendance, both in methodical knowledge and in marketable applications. A decade ago, it were considered since of their size-dependent chemical and physical properties [2]. Now they have entered a commercial exploration period. Applications of nano particles in drug_delivery, protein and peptide delivery, cancer, tuberculosis treatment, the clinical application of nanotechnology in operative dentistry, in ophthalmology, in surgery, visualization, antibiotic resistance, tissue engineering, , immune response The production of premium nanomaterials with esteem to chemical clarity, phase selectivity, homogeneity, and crystallinity in particle size with controlled state of agglomeration in a cost-effective procedure is still a challenge to material chemists. Moreover chemical synthesis methods lead to presence of some toxic chemical absorbed on the surface that may have adverse effect in the medical application. Increasing awareness towards green chemistry and other biological processes has led to a desire to develop an eco-friendly approach for the synthesis of nanoparticles.

Nanoparticles are essentially a varied form of basic elements derived by altering their atomic and molecular properties of elements [3-6]. Nanoparticles are being synthesized globally owing to various exciting and unique properties, which facilitate their exploitation in completely unrelated fields, such as, nanodiagnostics, nanomedicine and antimicrobials [7-10]. Zinc oxide, with its unique physical and chemical properties, such as high chemical stability, high electrochemical coupling coefficient, broad range of radiation absorption and high photostability, is a multifunctional material. Zinc oxide nanoparticles (ZnO NPs), in particular, are environment friendly, offer easy fabrication and are non-toxic, biosafe and biocompatible making them an ideal candidate for biological applications [11-13].

MATERIALS AND METHODS

Zinc acetate dihydrate (Merck), sodium hydroxide pellets (Merck.), distilled water were applying in the nanoparticle preparation with the extracts. *Phyllanthus Niruri* leaves were collected from the Botanical garden.

Synthesis of Zn nanoparticles

Phyllanthus Niruri [40g] were thoroughly washed in the distilled water and grained then boiled in 30ml of distilled water for half an hour. The *Final extract* was cooled and used as the extract solutions. 0.25 g of zinc acetate was dissolved in 30 ml water. 5 ml of the extract of *Luffa acutangula* was added dropwise and the ensuing 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 dropwise while stirring. A white crystalline precipitate is washed repeatedly with water, filtered and dried in an oven at 60°C to obtain the Zn nanoparticles

Preparations of Aqueous Extract from *Phyllanthus Niruri* Leaf

Green leaves of *Phyllanthus Niruri* are composed & washed with distilled water several times for the replacement of dust particles. The leaves were then mashed using mortar and pestle until the leaves are grinded finely. Whatman Filter paper was used to filter the grinded leaves to collect the leaf extract. The extract were collected and kept at the room temperature.

RESULTS AND DISCUSSION

UV-Visible spectra analysis

Zn nanoparticles prepared using the extract obtained from the leaf of *Phyllanthus Niruri* was subjected to record UV-Vis spectroscopy. Fig. No.1 showed the photograph of the UV-Vis spectra of Zn nanoparticles prepared from the extracts of *Phyllanthus Niruri*. The absorption peaks was obtained at the wavelength 286 for Zn nanoparticles prepared from leaf.

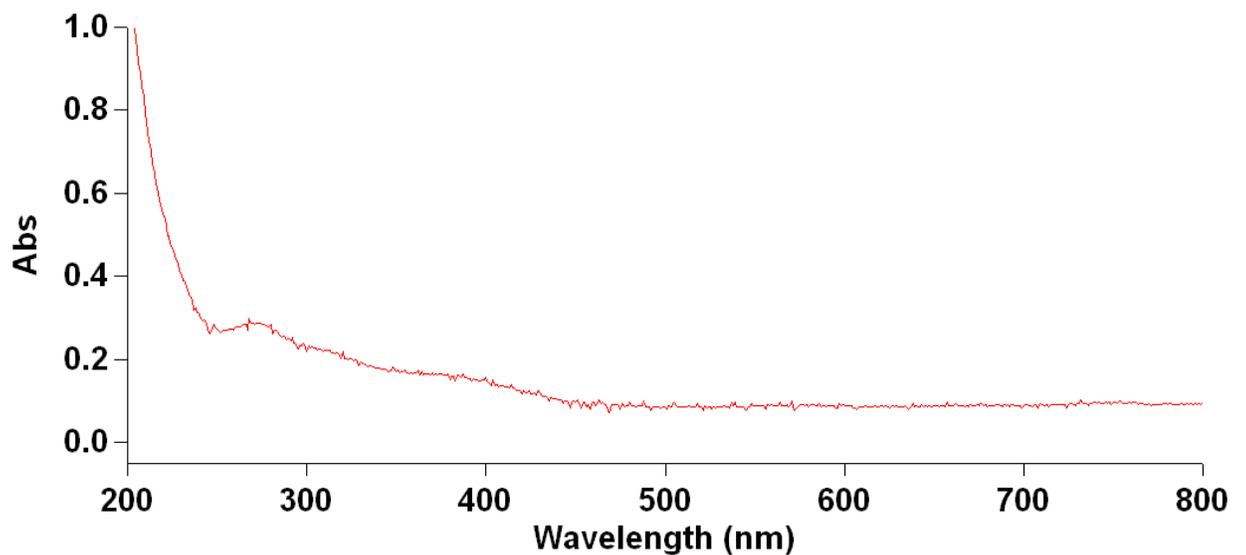


Fig.1: UV Spectrum of zinc nanoparticles from leaf



FTIR spectra analysis

In order to conclude the functional groups on Phyllanthus Niruri leaf extract and identify their role in the prepare of zinc nanoparticles, FT – IR analysis were performed. FT – IR spectrum of Phyllanthus Niruri leaf extract and prepared zinc nanoparticles are given in Fig 2.

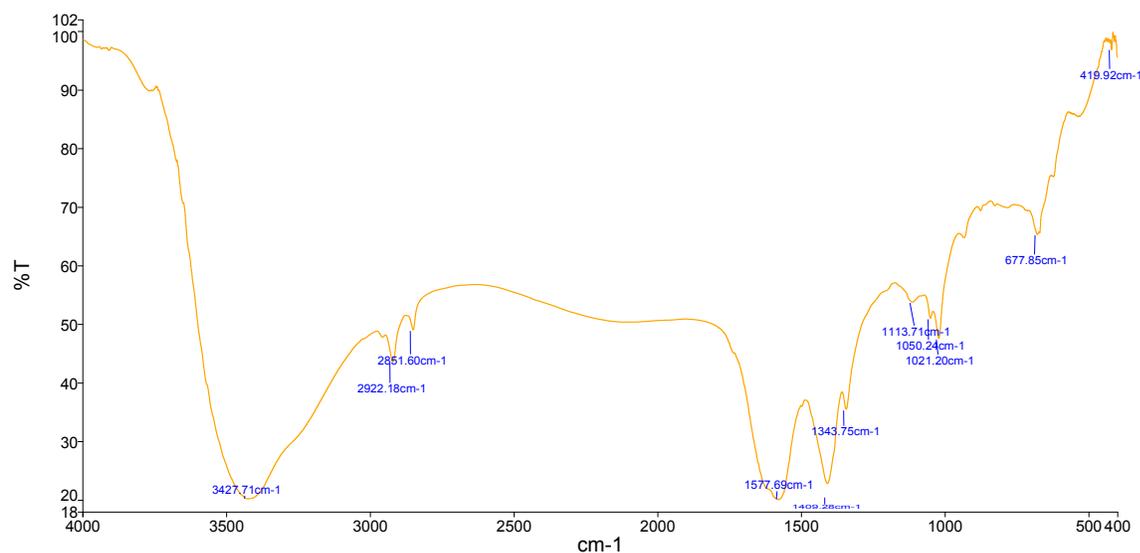


Fig.2 FTIR Spectra of Zn nanoparticle from Phyllanthus Niruri

In the zinc nanoparticles, peak values at Peak at 699 cm^{-1} corresponds to C – H bending. The peak located at 1577 cm^{-1} , could be assigned to the C – O stretching. Peak at 2922 cm^{-1} 3427 cm^{-1} corresponds to C=O stretching of amides and O–H stretching of phenolic compound. The FTIR analysis of Zinc nanoparticles recommended that they strength contain by the any of these organic molecules. The physicochemical properties of Phyllanthus Niruri leaf extract act as capping agent and prevents the nanoparticles formed from aggregation..

CONCLUSION

Zinc nanoparticles using the leaf extract of Niruri was synthesized by green synthesis method. FTIR results confirm the presence of functional group such as carboxylic acid, alcohol group. Synthesis conditions were optimized and resultant nanopowder was characterized using UV-Visible spectroscopy. Zinc oxide (ZnO) nanoparticles (NPs) are a promising platform for use in biomedical research, especially given their anticancer and antimicrobial activities.

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