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Green synthesis and characterization of silver nanoparticle from Butea Monosperma Lutea (Yellow Palas) found in kharga Lormi Chhattisgarh.

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Abstract: *Eco friendly or Green synthesis of metal nanoparticles has become an important branch of nanotechnology Butea monosprama lutea is an increasing commercial demand for nanoparticles due to their wide applications. In the present study, an eco-friendly and economical way for the synthesis of silver nanoparticles using flower extract Butea monosparma lutea. Butea monosprama lutea known as 'Palas' belongs to the family Fabaceae For the synthesis of silver nanoparticles (SNPs) using the leaf extract of Butea monosparma lutea. as a reducing agent from 1 mm silver nitrate($AgNO_3$) has been investigated. The Characterization SNPs Prepared carried out using UV-vis, TEM [Mathur abhishek et al (2014)]. Silver nanoparticles were synthesized within 24 hours of incubation period and synthesized SNPs showed an absorption peak at around 400 nm in the UV-visible spectrum. The morphological study of Silver nanoparticles using TEM suggests that the nanoparticles are spherical in shape with a diameter around 50 nm. This route is rapid, simple without any hazardous chemicals as reducing or stabilizing agents and economical to synthesized SNPs.*

Key words: *Silver nanoparticles, UV-Vis, TEM. Butea monosparma lutea, Green synthesis,*

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I. Introduction

Biological synthesis process provides a wide range of biologically synthesized silver nanoparticles has many applications includes catalysts in chemical reactions .Microbial source to produce the silver nanoparticles shows the great interest towards the precipitation of nanoparticles due to its metabolic activity. Of course the precipitation of nanoparticles in external environment of cell, it shows the extracellular activity of organism. Extracellular synthesis of nanoparticles using cell filtrate could be beneficial over intracellular synthesis, the fungi being extremely good candidates for extracellular process and also environmental friendly. There are few reports published in literature on the biosynthesis of silver nanoparticles Nanotechnology, and alongside nano structured materials, play an ever increasing role in science, research and development as well as also in every days life, as more and more products based on nano structured materials are introduced to the market. The advance and very applicable technology is nanotechnology and it was derived from the term of nano it is the billionth of meter or 10^{-} m. The Nano come ultimately from the Greek word for dwarf ,and is also related to the Spanish word Nino. The synthesis of silver nano materials or nanoparticles extensively studied by using chemical and physical methods, but the development of reliable technology to produce nanoparticles is an important aspect of nanotechnology.[Chandan Singh, Ritesh K et al (2012)]

II. Materials And Methods

Material Silver nitrate used for the synthesis of silver nanoparticles was procured from E. Merck.. *Butea monosprama lutea* used in this work were collected from the village kharga and Nutrient agar media used for bacterial growth study were the products of E. Merck.[Kushwaha akhilesh et al.(2014)]

Preparation of the flower extract

Indian medicinal plant A *Butea monosparma* was selected from Kharga lormi, on the basis of cost effectiveness, ease of availability and medicinal property. Fresh and healthy leaves were collected locally and rinsed properly first with tap water followed by distilled water to remove all the dust and unwanted visible particles, cut into small pieces and dried at room temperature. About 5 g of leaves were weighed separately and transferred into 100 ml beakers containing 50 ml distilled water and boiled for about 10 min. The extracts were

then filtered thrice through Whatman No.1 filter paper to remove particulate matter and to get clear solutions which were then refrigerated(4°C) in 100 ml conical flasks for further experiments.

Figure- Flower of butea monosparma lutea.

Figure- Flower and fruits of butea monosparma lutea

Synthesis of silver nanoparticles

For the synthesis of silver nanoparticles, 1 mM silver nitrate and leaf extract were taken. For the reduction of Ag+ Ions 5 ml of leaf extract was added drop wise to 5 ml of 1 mM silver nitrate solution. A distinct colour change was observed after 24 hrs as the solution turned into brown from yellow solution at room temperature suggesting formation of silver nanoparticles. The colour became brown and turned into dark brown after 48 hrs. The reduction of Ag+ was confirmed from the UV–Vis spectrum of the solution. The nanoparticles were separated out from the mixture by ultracentrifugation (at 10000 rpm for 4 hrs [Kushwaha akhilesh et al.(2014)]

Characterization of silver nanoparticles

UV-Vis Spectroscopy

The reaction mixture was subjected to UV-Vis Spectrophotometric Measurements (Model UV-1600 PC). According to this technique many molecules absorb ultraviolet or visible light. The percentage of transmittance light radiations determines when light of certain frequency passed through the samples. This spectrophotometer analyses records the intensity of absorbance or optical density (O.D) as a function of wavelength. Absorption is directly proportional to the concentration of the absorbing species (Beer's law).Formation of silver nanoparticles is easily detected by spectroscopy because the coloured nanoparticle solution shows a peak ~400 nm. In this study, spectrophotometer was used to measure the optical density of solutions or suspensions. [Mathur abhishek et al.(2014)]

Figure- Characterization of silver nano particle

The production of silver nanoparticles by reduction of silver ions due to the addition of Butea *monosparma lutea* extract was followed by UV–Vis spectroscopy. The UV-Vis absorption spectrum of 'Green' silver nanoparticles in the presence of leaf extract is shown in .The band in silver nanoparticles solution was found to be close to 400 nm throughout the observation period as the nanoparticles were dispersed in the solution without possibility for aggregation in UV-Vis spectrum. The high OD of the solution suggests a high conversion of Ag^{+} to Ag^{o} as nanoparticle.

III. TEM Analysis

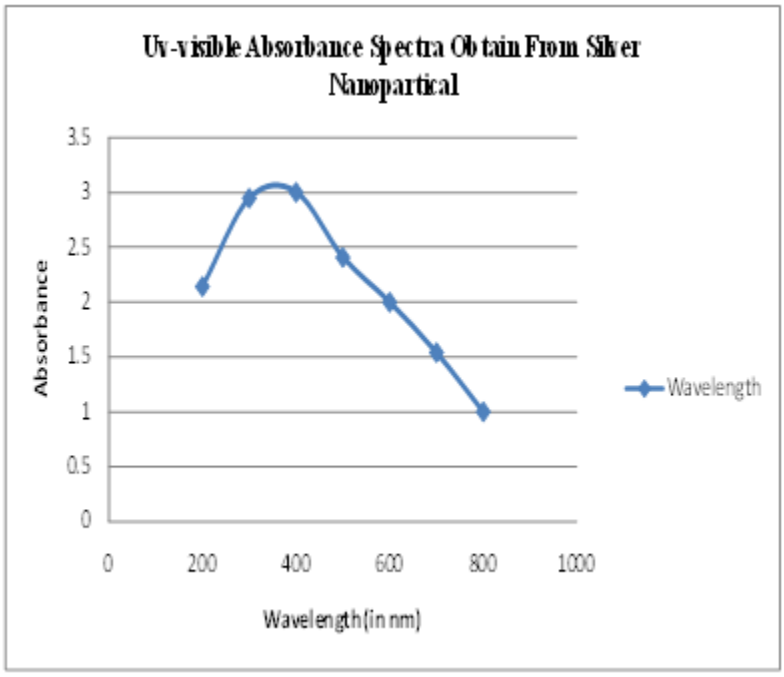
In the present study, TEM has been used for analysing the shape and size of the silver nano triangles synthesized butea monosparma lutea reduced silver nanoparticles. TEM analysis has also been used to visualise the change in the morphology of the silver nano technology. Besides, the transmetallation on the surface of silver nanoparticles has been followed using different concentrations of silver ions by TEM analysis. This particular work has been done by first making a thin film of silver nanoparticles on to the silver TEM grid, which was then exposed to different concentrations of chloroaurate ions for the transmetallation to take place. In another part of the work The TEM measurements were done on a JEOL model 1200EX instrument operated at an accelerating voltage of 80 kV. High resolution transmission electron smicroscopy of the silver nano particles samples prepared on $AgNO_3$ were carried on a G2 F-30 model operated at an accelerating voltage of 300 kv.
There is graph between nm and frequency three different nm and different frequencies.100nm size of silver nano particle graph showing different nm Vs frequencies In graph highest frequencies maximum size of silver nano particle (nm).

IV. Result

Silver nanoparticles (AgNPs) will be successfully obtained from bio reduction of silver nitrate solutions using leaf extracts. In summary, visual observations, UV–Vis confirmed the formation of silver nanoparticles by leaf extracts. This work indicates that leaf extract had a good valuable potential in the future for production of silver nanoparticles. Hence, due to their benign and stable nature these Silver nanoparticles (AgNPs) may be well utilized in industrial and remedial purposes. However, plant uptake and utilization of Silver nanoparticles (AgNPs) require more detailed research on many issues like uptake potential of various species, process of uptake and translocation and the activities of the AgNPs at the cellular and molecular level.
Double Beam Spectrophotometer 2205(BW 1 nm)

Mode Multiple Wavelength

Sr. No	Cell no-name	Wavelength	Absorption
01	1-4	200.0	2.414
		300.0	2.950
		400.0	3.004
		500.0	300.6
		600.0	3.006
		700.0	2.999
		800.0	2.975



GRAPH- Graph between wavelength and absorption

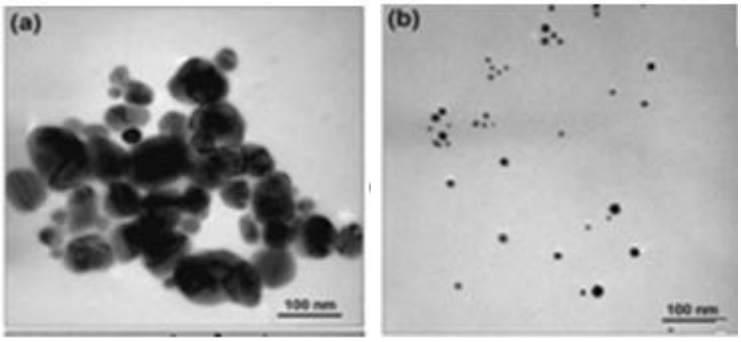


Figure- Particle diameter (nm)

In figure (a) the nano Particle size 100 nm and dencity high
In figure (b) nano particle in clean like spot and particle diameter .

V. Conclusion

Silver their benign and stable nature these Silver nanoparticles (AgNPs) may be well utilized in industrial and remedial purposes. However, plant uptake and utilization of Silver nanoparticles (AgNPs) require more detailed research on many issues like uptake potential of various species, process of uptake and translocation and the activities of the AgNPs at the cellular and molecular levels.

The rapid biological synthesis of silver nanoparticles using Butea monosparma lutea leaves extract provides environmental friendly, simple and efficient route for synthesis of benign nanoparticles.. The size were bigger as the nanoparticles were surrounded by a thin layer of proteins and metabolites such as terpenoids having functional groups of amines, alcohols, ketones, aldehydes, etc., which were found from the characterization using UV-vis spectrophotometer, TEM. All these techniques it was proved that the concentration of plant extract to metal ion ratio plays an important role in the shape determination of the nanoparticles. The higher concentrated nanoparticles had sheet shaped appearance where as the lower concentrations showed spherical shaped. The sizes of the nanoparticles in different concentration were also different which depend on the reduction of metal ions. Plants are treasures of medicine. When the plants sound strong traditional significance they are exploited to study their efficacy. Review works by various authors have documented the uses of B. Monosperma lutea in different systems of medicine. Their study helped to know the detailed chemical constituents of drug part and potency of plants in pharmacological field, with relevant references. The physicochemical parameters, phytochemical constituents, mineral and nutritive value. Some salient features of B. Monosperma lutea flowers studied using pharmacognostic features are discussed in this

work. Humidity in the sample and extract decides the deterioration time. The parameters studied can be utilized in identification of Butea monosperma lutea in crude drug form and can be used as a potential source for useful therapeutics. The resulted data will be beneficial for quantitative and qualitative standardization of genuine drug in herbal preparations. This plants may be a good source of minerals to treat number of diseases that are mainly caused due to the deficiency of those minerals and can be utilized in Ayurvedic system to cure disease. *Palash* one of the important drugs used in the various indigenous medicines and formulations of Ayurveda. The present work focuses phytochemical and flower.

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