



# **Greensynthesis And Characterization Of Silver Nanoparticles By Using Medical Plant *Melia Dubia***

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## *Abstract*

Nano structured Nobel method have unusual physicochemical properties and biological activities compared to their bulk parent materials. Thus in recent years a number of physical, chemical and biological techniques were applied for the development of metal nano particles (NPs). Here we have synthesized silver nano particles (AgNPs) using *Melia Dubia* extract. Mosquitoes transmit serious diseases causing millions of human health every year. Silver nanoparticles were synthesized in a rapid and eco -friendly method simple agitation. The medical plants of *Melia Dubia* extract in the present paper. It is simple process of recent interest for obtain silver nano particle. The colour change was observed during the reaction period due to the formation of silver nanoparticles. Preparation of stable uniform silver nano particles for the reduction of silver iron. The prepared samples have been characterized by UV, FTIR and EDAX analysis, which reveal of the nature of the particle. The formation of the nano particles were analyzed and conformed by UV-Visible spectroscopy. The presence of vibration modes and functional groups was analysis through a FTIR analysis. The elementary compositions of the sample are analyzed by using EDX spectra. The new technology is ecological, simple, cheap and very fast.

**Key Words:** *Melia Dubia* dye, UV-Visible, PL, AgNPs and FT-IR.

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## **1. INTRODUCTION**

Synthesis and characterization of nanoparticles is an important area of research as selection of size and shape of nanoparticles provide an efficient control over many of the physical and chemical properties. Biological materials like plant leaf extract, bacteria, fungi and enzymes are used for the green synthesis of

silver nanoparticles. Nanocrystalline silver particles have found tremendous applications in the field of high sensitivity bio-molecular detection and diagnostics, antimicrobials and therapeutics catalysis and micro-electronics. However, there is still need for economic, commercially viable as well environmentally clean synthesis route to synthesize silver nanoparticles. Green synthesis is cost effective, environment friendly, easily

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scaled up for large scale synthesis and in this method there is no need to use high pressure, energy, temperature and toxic chemicals as in case of chemical and physical method. Green synthesis provides advancement over chemical and physical method as it is cost effective, environment friendly, easily scaled up for large scale synthesis and in this method there is no need to use high pressure, energy, temperature and toxic chemicals. The most important application of silver and silver nanoparticles is in medical industry to prevent infection against burn and open wounds. Here we report the synthesis of silver nanoparticles by reducing aqueous silver nitrate solution by using of *Melia dubia* extract. It was observe that *Melia dubia* extract has potential for the synthesis of silver nanoparticles. The silver nanoparticles were characterized using UV-Visible, FTIR, FE-SEM, PL and EDAX analysis

### 3. MATERIALS AND METHODS

*Melia dubia* (Malai Vembu in Tamil) is a promising tree highly suitable for farm forestry and agro forestry for generating higher income in the semi-arid regions. Agro-forestry is a sustainable land management system which increases the overall yield of the lands; combine the trees and shrubs with agricultural crops and or livestock on the same unit of land, either simultaneously or sequentially. One of the main problems that farmers face today is decreasing income from an acre per year against sudden increase in the value of agricultural lands. Planting certain tree varieties such *Melia dubia* which fetch a handsome price in the market, assured buyback, and require low maintenance expenditure may help in this regard. In addition, the trees also aid the planet by preventing temperature rise and checking gas emission into the atmosphere. *Melia dubia* is the fastest growing tree and the wood from this tree is used in Plywood Industry. *Melia* is a money spinning tree of short duration. Since there is a total mismatch between demand and supply for wood, block planting of 300 to 400 trees per acre can ensure a minimum profit of rupees one lakh per year from an acre.

## 2. SYNTHESIS OF SILVERNANOPARTICLES

### 2.1 Green synthesis of silver nanoparticles

Homogenate was prepared by weighing 50 grams of fresh *Melia Dubia* collected from Dharmapuri.

Washed thoroughly (thrice) in distilled water and homogenized using a mortar and pestle. Preparation of Extracts *Melia Dubia* leaves were separated and dried under shade and powdered. The powdered leaves were extracted water for three days we get stock solution. The leaf extracts were filtered through whatman No.1 filter paper. The filtrate was further filtered through 0.5 $\mu$ m sized filters yielding 50 ml of broth. The filtrate green colour solution was stored. In order to synthesize silver nanoparticles (SNPs), 10 ml of the leaf extract was mixed with 90 ml of 1 mM silver nitrate solution and heated in a water bath, set at 80 °C for 10 min. A color change from Green to brown designates the formation of colloidal SNPs.

## 3. RESULTS AND DISCUSSION

The pure and silver nanoparticles synthesized of *Melia Dubia* leaves are characterized by UV-Visible spectroscopic, FTIR, PL, SEM and EDAX techniques are discussed below

### 3.1 UV-Visible spectral studies

The UV-Vis spectral analysis of pure and silver nanoparticles synthesized of *Melia Dubia* leaves as shown in figure 3.1 and table 3.1 corresponding to samples A & B respectively. The absorption spectra of pure and silver nanoparticles exhibit a well-defined absorbed peak at 337.5 nm and 487.5 nm respectively. It is observed that the Surface Plasmon Resonance (SPR) band is centered at about 487.5 nm and the reduction of silver ions. The silver nanoparticles were characterized by UV-Vis spectroscopy, one of the most widely used techniques for structural characterization of silver nanoparticles. The absorption spectra of *Melia Dubia* indicate the Violet-Blue silver nanoparticles solution prepared with the proposed method due to the Surface Plasmon Resonance (SPR) absorption band with a maximum of 470 nm, indicating the presence of spherical Ag nanoparticles. The weak absorption peak at 337.5 nm (not shown here) indicates the presence of several organic compounds which are known to interact with silver ions into solution and suggests a possible mechanism for the reduction of the metal ions presented in the solution.