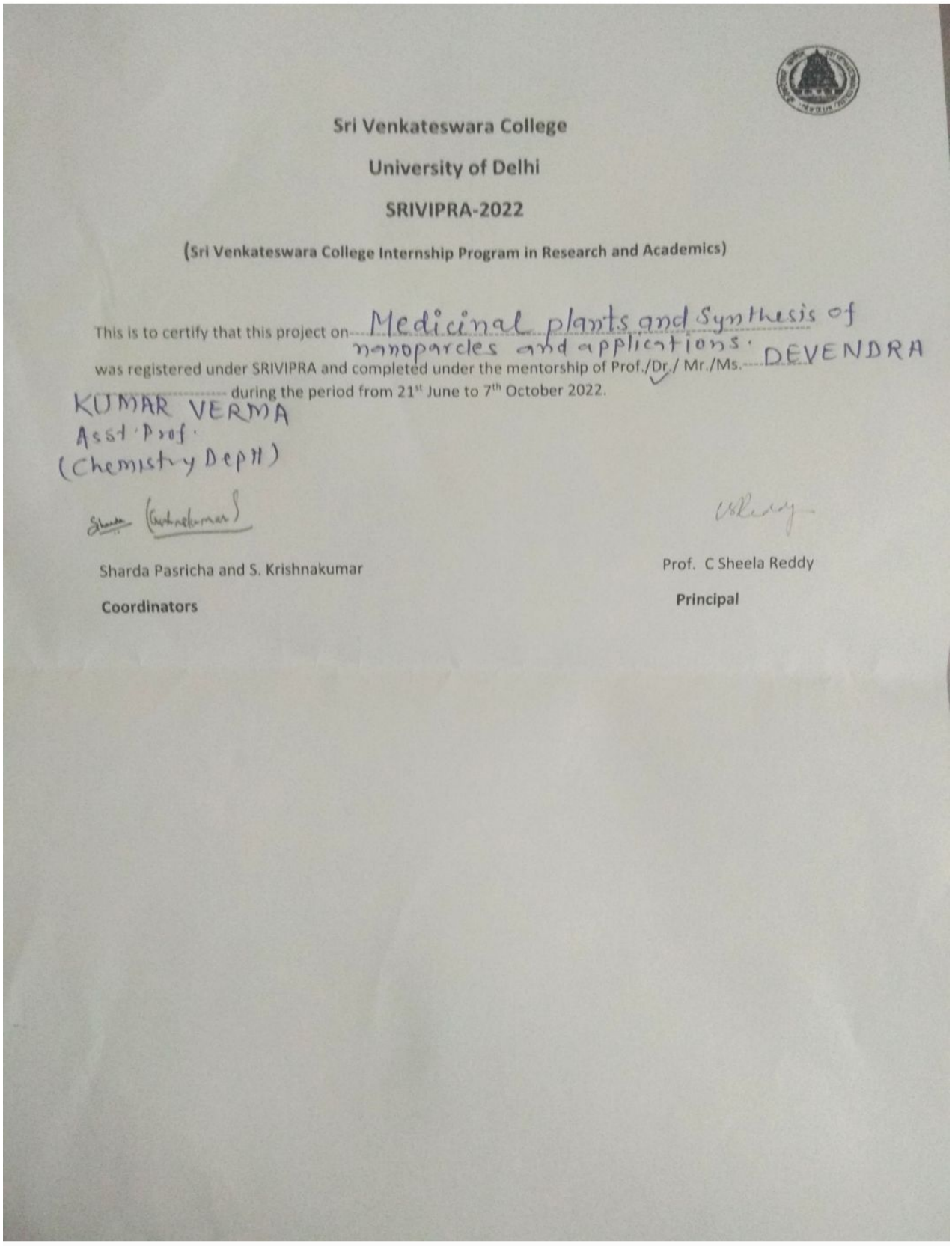

Sri Venkateswara College

University of Delhi

SRIVIPRA-2022

(Sri Venkateswara College Internship Program in Research and Academics)

This is to certify that this project on Medicinal plants and Synthesis of nanoparcles and applications. was registered under SRIVIPRA and completed under the mentorship of Prof./Dr./ Mr./Ms. DEVENDRA KUMAR VERMA Asst. Prof. (Chemistry Deptt) during the period from 21st June to 7th October 2022.

Sharda Pasricha and S. Krishnakumar
**Coordinators**

Prof. C Sheela Reddy
**Principal**

# SRI VIPRA INTERNSHIP 2022

## REPORT
## ON
## Medicinal plants and synthesis of nanoparticle and application.


**Project Mentor:**
Dr. Devendra Kumar Verma
(SVP-2215)

**Members:**
- Kushal Pal Sharma
  B.Sc. Life Science, III year
- Vanshika Vishnoi
  B.Sc. Life Science, III year

**Aim:** To study the controlled synthesis of nanoparticles of different shapes and sizes by medicinal plants

**Introduction:** Medicinal plants are those plants, whose one or more parts contain the substance or chemical structure that is used for therapeutic purposes. Nanoparticles are small particles that range between 1 to 100 nm in size. The plant contains several metabolites and biomolecules like phenols, vitamins, proteins, carbohydrates, and flavonoids which in turn contain different functional groups that react with metal ions and reduce their size into the nano range.
Medicinal plants are now playing a very important role in nanotechnology. Different parts of medicinal plants are being used for the preparation of nanoparticles. These green synthesized nanoparticles are more effective than those which are chemically synthesized.
The general method for green synthesis of nanoparticles involves the reduction of ions with the phytochemicals present in the plant extract. These phytochemicals are further responsible for the stabilization and directing shape and size of nanoparticles.

**Objectives:**

- To Study the plant extract in the synthesis of nanoparticles
- To Investigate the effect of the plant extract on the shape and size of nanoparticles
- To Analyse the factors affecting the characteristics of nanoparticles
- To Study various applications of synthesized nanoparticles

**Chemical structure:** Coenzymes and secondary metabolites etc. are responsible for the reduction of metal ions to form metal nanoparticles. The compounds are ketones, terpenoids, flavones, amides, aldehydes, and carboxylic acids.

**Shape & Size of nanoparticles and factors affecting them:** The size of nanoparticles generally ranges from 1 to 100nm. The size and shape of nanoparticles depend upon the kind of precursor, reducing agent, and stabilizing agent being used. In addition to these, reaction conditions play a major role in deciding the morphology of nanoparticles.

**Effect of shape and size in different applications:** Shape and size play a very important role in determining the properties of nanoparticles. Controlling the shape and size of nanoparticles can result in obtaining the nanoparticle with desired properties. For example- Silver nanoparticles of size 90 nm prepared from the greater celandine plant extract show antioxidant and antimicrobial activity while that of size 10 -15 nm prepared from peanut shell extract showed antifungal activity.

**Methods used:**

- UV–visible (Vis) spectroscopy: To detect the shape and size of the nanoparticles.
- X-ray diffraction (XRD) analysis: For characterization of nanoparticles- shape, defects, etc.
- Fourier transform infrared spectroscopy (FTIR) analysis: To detect the presence of functional groups and other compounds present in the sample
- Transmission electron microscopy (TEM) analysis: This technique uses transmitted electrons to detect the shape and size of nanoparticles.
- Scanning electron microscopy (SEM) analysis: This technique uses reflected electrons used to detect the shape and size of nanoparticles

**Applications:**

Green nanoparticles can be utilized in various fields to eliminate certain diseases. These nanoparticles showed antibacterial, antibiofilm, antidiabetic, antioxidant, antifungal, and anticancer properties. Example-

- Copper nanoparticles derived from *Hagenia abyssinica (Brace) JF. Gmel.* demonstrated antibacterial activity against bacteria- *E. coli, Pseudomonas aeruginosa, Staphylococcus aureus, and Bacillus subtilis.*
- *Ageratina alttissima-derived* titanium dioxide nanoparticles displayed improved photocatalytic activity for the breakdown of dyes in the textile industry.

**Conclusion:**

In this, we investigated the controlled synthesis of green nanoparticles of different shapes and sizes, the chemical structure in medicinal plants responsible for the formation of nanoparticles, the shape and size of nanoparticles, and the factors affecting them.

Green synthesis of metallic nanoparticles is a sustainable approach to harmful conventional processes by being a cost-effective, easy-to-manufacture, and environmentally friendly method against harmful microorganisms.

*•This paper has been presented in*
*National Conference*
*on "Emerging Technologies and Enabling Tools for Eco-friendly*
*management of Diseases in Medicinal & Aromatic plants (MAPs)" (EEEDMAP-2022),*
*29th -30th September, 2022.*

*•This paper has also been prepared for publishing in international Journal of repute.*

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