

(Sponsored by the Exhibition Society) Affiliated to Osmania University, Approved by PCI-New Delhi NBA Accredited B.Pharmacy Course, Accredited A+ grade by NAAC

Report of Guest Lecture on ''NMR Advancements and Its Applications'' Organized by Department of Pharmaceutical Analysis

On 17th April 2025, Sarojini Naidu Vanita Pharmacy Maha Vidyalaya proudly organized an inspiring guest lecture on the theme ''**NMR Advancements and Its Applications**''

The seminar on "NMR Advancements and Its Applications" was organized under the institution's initiative to promote advanced analytical techniques in pharmaceutical analysis. The event aimed to enrich students' understanding of cutting-edge tools used in structural elucidation and quality assessment of pharmaceutical compounds.

The session saw **enthusiastic participation from both students and faculty**, reflecting a strong interest in applying modern analytical approaches in research and industry. The program was commenced at 2:00 PM in the SNVPMV Auditorium. The event was hosted by M. Pharmacy 2nd year students of Pharmaceutical Analysis department Ms. S. Deepthi and Ms. B. Anjali. They set the tone for the day by gracefully inviting the dignitaries onto the dais Dr. N Srinivas (Director), Dr. T. Mamatha (Principal), Dr. B. Haarika (Vice Principal), and Dr. P. Vivek Sagar (HOD, Pharmaceutical Analysis) & the Guest Speaker, Dr. Nagula Shankaraiah Associate Professor, Department of Chemical Sciences, National Institute of Pharmaceutical Education and Research (NIPER), Hyderabad

Program Highlights:

- **Prayer Song:** A prayer song was presented by Mahathi Jyothirmayee and team students of M. Pharmacy 2nd Year.
- Welcome Address: Following the formal welcome, Dr. N. Srinivas, Director of Sarojini Naidu Vanita Pharmacy Maha Vidyalaya, delivered the welcome address. He
- expressed his gratitude to all dignitaries, appreciated the efforts of the organizing committee, and highlighted the importance of such knowledge-sharing platforms in enhancing students' career perspectives.

(Sponsored by the Exhibition Society) Affiliated to Osmania University, Approved by PCI-New Delhi NBA Accredited B.Pharmacy Course, Accredited A+ grade by NAAC

- **Eco-Greetings:** K. Manisha of M. Pharmacy 1st Year presented Eco-Greetings to the guest speaker, Dr. Nagula Shankaraiah.
- **Principal's Message:** Dr. T. Mamatha, Principal of SNVPMV, shared her message, emphasizing the importance of the topic for the students and faculty.
- Introduction of the Speaker: M. Pharmacy 2nd year student Battu. Anjali introduced the guest speaker, Dr. Nagula Shankaraiah, providing his background and expertise.
- Guest Lecture: Dr. Nagula Shankaraiah delivered an insightful lecture on "NMR Advancements and Its Applications." The lecture covered the latest developments in NMR technology and its diverse applications in pharmaceutical research and other fields.
- Key Insights from the Lecture: He Made the Seminar informative covering the following aspects on "NMR Advancements and Its Applications" and made it engaging:

Introduction to NMR Spectroscopy

- NMR = Nuclear Magnetic Resonance.
- Non-destructive technique used to determine molecular structure.
- Based on absorption of radiofrequency radiation by nuclei in a magnetic field.

Basic Principle

- Certain nuclei (like ¹H, ¹³C, ¹⁵N, ³¹P) possess spin.
- When placed in an external magnetic field, they align with or against the field.
- Radiofrequency pulse flips the spins \rightarrow resonance occurs \rightarrow signal is detected.
- Frequency of resonance depends on chemical environment (chemical shift).

Key Concepts

- Chemical Shift (δ): Position of signal; reveals the chemical environment.
- **Spin-Spin Coupling (J-coupling):** Splitting of signals due to neighboring nuclei.
- Integration: Area under the peak; tells you the number of nuclei (like protons).
- Multiplicity: Singlet, doublet, triplet, etc., depending on neighboring spins.

Instrumentation

• Main components: Magnet, RF transmitter/receiver, sample probe.



(Sponsored by the Exhibition Society) Affiliated to Osmania University, Approved by PCI-New Delhi NBA Accredited B.Pharmacy Course, Accredited A+ grade by NAAC

- Superconducting magnets (usually cryogenically cooled).
- Field strengths measured in MHz (e.g., 400 MHz, 600 MHz).

Advantages

- Non-destructive and highly informative.
- Quantitative analysis possible.
- Can study molecules in solution or solid state

Types of NMR

- ¹H NMR: Most common; gives detailed info on hydrogen environment.
- ¹³C NMR: Carbon backbone; less sensitive, often broadband decoupled.

Applications

- Structure elucidation of organic/inorganic/biological molecules.
- Monitoring reaction progress.
- Determining purity of compounds.
- Protein structure analysis (solution-state NMR).
- Metabolomics and drug discovery

Limitations

- Expensive instrumentation and maintenance.
- Requires relatively high sample concentration.
- Data interpretation can be complex.

Recent Advances

- Cryoprobes and higher field magnets = improved sensitivity.
- NMR in metabolomics, material science, and cancer diagnostics.

MRI and Its importance where the principle of NMR applies

• **Q&A Session:** Following the lecture, a Q&A session allowed the audience to interact with the speaker and seek clarification.



(Sponsored by the Exhibition Society) Affiliated to Osmania University, Approved by PCI-New Delhi NBA Accredited B.Pharmacy Course, Accredited A+ grade by NAAC

- **Guest Felicitation** As a token of appreciation, Dr. Nagula Shankaraiah was felicitated by the dignitaries. He was presented with a Shawl and Memento, acknowledging his valuable contribution to the seminar and for enlightening the students with his expertise.
- Vote of Thanks: Dr. B. Haarika, Vice Principal proposed vote of thanks and acknowledged the management, Principal, Director & extended heartfelt gratitude to Dr. Nagula Shankaraiah for his valuable time and insights, and thanked, faculty, and student coordinators for making the event a grand success.
- National Anthem: The program concluded with the singing of the National Anthem.

Conclusion:

The guest lecture on "NMR Advancements and Its Applications" was a successful event that provided valuable knowledge and insights to the participants. The lecture enhanced the understanding of NMR spectroscopy and its applications. The event was well-organized, and the presence of faculty and with student's strength of 85 made it a fruitful experience for all.



(Sponsored by the Exhibition Society) Affiliated to Osmania University, Approved by PCI-New Delhi NBA Accredited B.Pharmacy Course, Accredited A+ grade by NAAC





(Sponsored by the Exhibition Society) Affiliated to Osmania University, Approved by PCI-New Delhi NBA Accredited B.Pharmacy Course, Accredited A+ grade by NAAC



Eco- Greeting to Speaker



Welcome address by Director



(Sponsored by the Exhibition Society) Affiliated to Osmania University, Approved by PCI-New Delhi NBA Accredited B.Pharmacy Course, Accredited A+ grade by NAAC



Principal's Message



Lecture by Speaker



(Sponsored by the Exhibition Society) Affiliated to Osmania University, Approved by PCI-New Delhi NBA Accredited B.Pharmacy Course, Accredited A+ grade by NAAC



Felicitation

Vote of Thanks by Vice Principal

(Sponsored by the Exhibition Society) Affiliated to Osmania University, Approved by PCI-New Delhi NBA Accredited B.Pharmacy Course, Accredited A+ grade by NAAC

Question and Answer Session

(Sponsored by the Exhibition Society) Affiliated to Osmania University, Approved by PCI-New Delhi NBA Accredited B.Pharmacy Course, Accredited A+ grade by NAAC

Group Photo