



Chowgule Education Society's  
Parvatibai Chowgule College of Arts and Science  
(Autonomous)


Accredited by NAAC with Grade 'A+'  
Best Affiliated College-Goa University Silver Jubilee Year Award

# CATALYST

NOVEMBER 2024

Chemistry Newsletter

Volume: 08; Issue: 01

CONTENTS	<u>TEACHERS ACTIVITIES</u>
Teachers Activities	<p><b>Dr. Mayuri Naik</b> attended “Green Goa Summit 2024: Accelerating ESG’s/SDG’s in Goa” on 31<sup>st</sup> August 2024 organised by Goa State Pollution Control Board at Durbar Hall, Raj Bhavan, Dona-Paula, Goa.</p>  <p><b>Dr. Mayuri Naik at Durbar Hall, Raj Bhavan</b></p>
Teachers Achievements	
Students Achievements	
RDC Activities (RIS & CJC)	
Nobel Prizes in Chemistry 2024	
Heterocyclic Chemistry Poem	

**Dr. Mayuri Naik** oriented First year BA/BSc students about the two MDC courses offered by the department of Chemistry in the orientation programme held on 02/07/2024.



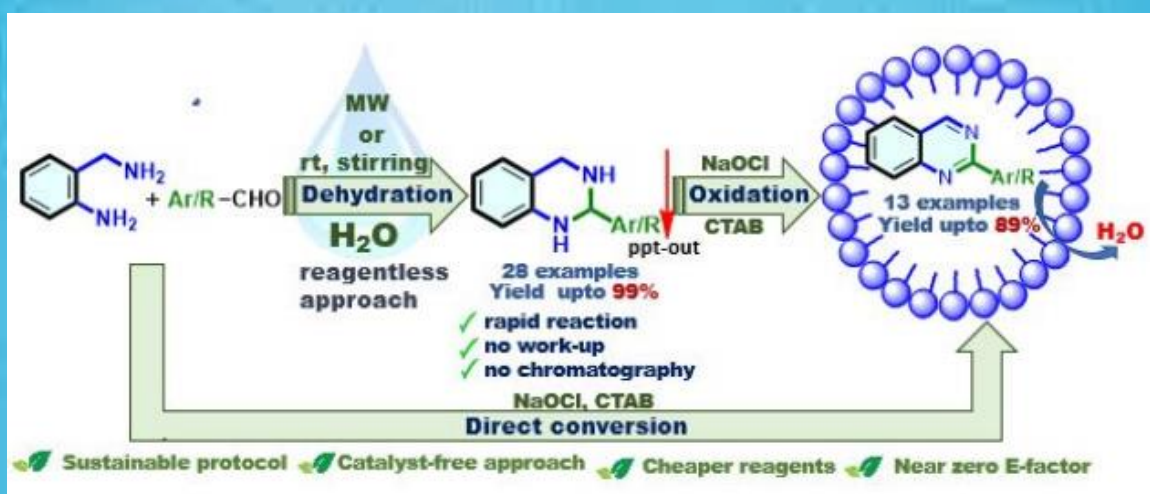
**Dr. Mayuri Naik orienting  
First year BA/BSc students**

**Dr. Roopa Belurkar** and **Dr. Mayuri Naik** had participated in the First Follow-up Meeting of Capacity Building Workshop on "Leveraging Generative AI for Pedagogical Excellence in Higher Education" for Science cluster organized by the Directorate of Higher Education, Govt. of Goa on 23<sup>rd</sup> September 2024.

## TEACHERS ACHIEVEMENTS

**Mrs. Padmini Raikar** in collaboration with her PhD supervisor Prof. Mainak Banerjee and her colleagues from the GCMS lab of K. K. Birla BITS Pilani Goa campus has published a research article in a scopus and web of science indexed journal on 15<sup>th</sup> July 2024 with an impact factor of 3.019.

Panjikar, P.C.; Pinheiro, A.B.; Saha, S.; Chatterjee, A.; Banerjee, M. (2024) Dehydration in Water: A Reagentless and Straightforward Synthesis of Tetrahydroquinazolines under Microwave Irradiation or by Stirring at Room Temperature, and Their Subsequent Conversion into Quinazolines in a Micellar Medium. *Synthesis*, 10.1055/a-2348-5564.



### ABSTRACT:

In a reagent-free, catalyst-free approach, a series of 2-substituted-1,2,3,4-tetrahydroquinazolines were synthesized by cyclocondensation between various aldehydes and 2-aminobenzylamines via dehydration reaction in water. The reactions took just 2 min under microwave irradiation and proceeded well under stirring at room temperature affording tetrahydroquinazolines in high to excellent yields. The products were water-insoluble and isolated by simple filtration avoiding a conventional work-up step and offering an organic solventfree process. Furthermore, tetrahydroquinazolines were efficiently oxidized to

quinazolines in cetyltrimethylammonium bromide (CTAB) derived micellar media with cheap commercial bleaching solution (4% NaOCl in water) in high yields. This sustainable protocol has near zero E-factor.

The Department of Chemistry has received the grant of financial assistance for conducting the workshop entitled "**Fascinating World of Chemical Sciences**" for school students from Goa State Research Foundation applied under the GSRF Summer/Winter School Scheme (2024-25). Dr. Mayuri Naik, Assistant Professor in Chemistry will coordinate and Dr. Manjita Porob, Associate Professor in Chemistry will be the deputy coordinator.

### **STUDENTS ACHIEVEMENTS**



**Mr. Nehal Fadte Dessai**

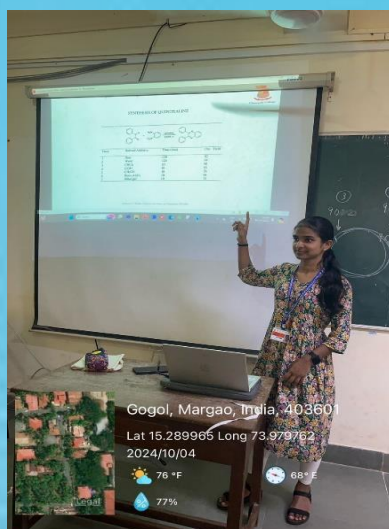
**Mr. Nehal Fadte Dessai**, a third year B. Sc. (Chemistry) student attended the following NCC camps and competition:

- 1) Annual/Combined Annual Training Camp held at Jadhav Nagar, Belgavi from 10<sup>th</sup> June to 19<sup>th</sup> June 2024.
- 2) Annual/Combined Annual Training Camp held at Jadhav Nagar, Belgavi from 24<sup>th</sup> June to 3<sup>rd</sup> July 2024.
- 3) Annual/Combined Annual Training Camp held at Jadhav Nagar, Belgavi from 22<sup>nd</sup> July to 31<sup>st</sup> July 2024.
- 4) Inter Group Competition 2024, Mysore conducted by 14 Karnataka BN NCC Mysuru held from 1<sup>st</sup> August to 10<sup>th</sup> August 2024 at Karnataka State Open University (KSOU), Mysore.

## RDC - RIS ACTIVITIES

Chemistry department initiated “**RESEARCH INTERACTION SERIES**” under the banner of college Research and Development Cell.

1) **Ms. Saloni Rajesh Sail**, a third year B.Sc. (Chemistry) student along with her other project group members delivered a presentation on the research Project entitled “Synthesis of Nitrogen Containing Heterocycles via Manual Grinding” under the guidance of Ms. Padmini C. Raiker on 4<sup>th</sup> October 2024. A total of 3 faculty and 29 students attended this presentation. Through this presentation, 8 students showcased the synthesis of quinoxalines through hand grinding. They demonstrated the method's simplicity, environmental friendliness, and effectiveness, highlighting its potential for green chemistry applications. The students presented the reaction mechanisms, discussed yields, and explored the scalability and sustainability of the technique.



**Ms. Saloni** while delivering the presentation to faculty and students

2) **Mr. Vastav Rivonkar**, a third year B.Sc. (Chemistry) student along with his other project group members delivered a presentation on the research Project entitled “Preparation of Chitosan from crustacean waste and its applications” under the guidance of Dr. Manjita Porob on 18<sup>th</sup> October 2024. A total of 3 faculty and 27 students attended this presentation. During this presentation, 7 students exhibited an impressive method for extracting chitin from crustacean waste, subsequently transforming it into chitosan. They kept audience engaged by exploring the extraordinary potential of chitosan, detailing its wide-ranging applications across fields such as biomedicine, agriculture, water treatment, and more. Their presentation highlighted not only the scientific innovation involved but also the promising implications of chitosan for sustainable development and industrial applications.



**Mr. Vastav** while delivering the presentation to faculty and students



**Dr. Manjita Porob** with her Project students

3) **Mr. Nehal Fadte Dessai**, a third year B.Sc. (Chemistry) student along with his other project group members delivered a presentation on the research Project entitled “A study on

the extraction of Caffeine from commonly consumed beverages and various source” under the guidance of Dr. Roopa Belurkar on 18<sup>th</sup> October 2024. A total of 3 faculty and 29 students attended this presentation. Through this presentation, 8 students showcased the extraction of caffeine from tea and coffee. They demonstrated various methods of caffeine extraction, highlighting the effectiveness of each and its potential for green chemistry applications. The students discussed reaction mechanisms, examined yields, and explored the scalability and sustainability of the techniques used.



**Mr. Nehal** while delivering the presentation to faculty and students

### **RDC - CJC ACTIVITY**

Chemistry department initiated “**COLLEGE JOURNAL CLUB**” activity under the banner of college Research and Development Cell. It is a monthly activity and the activity conducted for the month of October 2024 is as follows.

**Ms. Ravisha Shirodker**, a third year B.Sc. (Chemistry) student delivered a presentation on the “Synthesis of Substituted Pyridines with Diverse Functional Groups via the Remodeling of (Aza) Indole/Benzofuran Skeletons” under the guidance of Dr. Mayuri Naik on 19<sup>th</sup>

October 2024. A total of 4 faculty and 12 students attended this presentation. Firstly, Ms. Ravisha introduced about “Pyridine heterocyclic compound” followed by the research methodology reported in the paper, and also discussed its mechanism. The huge substrate scope of the methodology was explained by showing the structures of total 93 5-aminoarylpyridines and 33 5-phenol pyridine compounds. Thus, the selected methods versatility to synthesize diverse derivatives of substituted pyridines was highlighted. Finally, the presentation was concluded with key points of the research article and references.

**Research article referred:** Vaithegi, K.; Yi, S.; Lee, J. H.; Varun, B. V.; Park, S. B. Synthesis of Substituted Pyridines with Diverse Functional Groups via the Remodeling of (Aza) Indole/Benzofuran Skeletons. *Commun. Chem.* 2023, 6 (1), 112.

*This paper will help third year BSc chemistry students to understand the structure and derivatives of Pyridine heterocyclic compound through this new methodology which is studied in Heterocyclic chemistry course of semester V.*



Dr. Mayuri Naik, teacher in-charge briefly introduced the CJC activity to students and faculty



Ms. Ravisha Shirodker presented the research paper to students and faculty

## **NOBEL PRIZES IN CHEMISTRY 2024**

Press Release: 9<sup>th</sup> October 2024



**David Baker**  
University of Washington  
USA



**Demis Hassabis**  
Google DeepMind  
United Kingdom



**John M. Jumper**  
Google DeepMind  
United Kingdom

The Royal Swedish Academy of Sciences announced the Nobel Prizes in Chemistry 2024 on 9<sup>th</sup> October 2024. The Nobel Prizes for 2024 in Chemistry was awarded to **David Baker** for “*Computational protein design*” along with **Demis Hassabis** and **John M. Jumper** for “*Protein structure prediction*”. One half of the prize is awarded to **David Baker**, University of Washington, Seattle, WA, USA, Howard Hughes Medical Institute, USA and the other half jointly to **Demis Hassabis**, Google DeepMind, London, UK and **John M. Jumper**, Google DeepMind, London, UK.

The Nobel Prize in Chemistry 2024 is about proteins, life’s ingenious chemical tools. David Baker has succeeded with the almost impossible feat of building entirely new kinds of proteins. Demis Hassabis and John Jumper have developed an AI model to solve a 50-year-old problem: predicting proteins’ complex structures. These discoveries hold enormous potential. The diversity of life testifies to proteins’ amazing capacity as chemical tools. They control and drive all the chemical reactions that together are the basis of life. Proteins also function as hormones, signal substances, antibodies and the building blocks of different tissues.

Heiner Linke, Chair of the Nobel Committee for Chemistry said “One of the discoveries being recognised this year concerns the construction of spectacular proteins. The other is about fulfilling a 50-year-old dream: predicting protein structures from their amino acid sequences. Both of these discoveries open up vast possibilities”.

Proteins generally consist of 20 different amino acids, which can be described as life’s building blocks. In 2003, **David Baker** succeeded in using these blocks to **design a new protein** that was unlike any other protein. Since then, his research group has produced one imaginative protein creation after another, including proteins that can be used as pharmaceuticals, vaccines, nanomaterials and tiny sensors.

The second discovery concerns the **prediction of protein structures**. In proteins, amino acids are linked together in long strings that fold up to make a three-dimensional structure, which is decisive for the protein’s function. Since the 1970s, researchers had tried to predict protein structures from amino acid sequences, but this was notoriously difficult. However, four years ago, there was a stunning breakthrough.

In 2020, **Demis Hassabis** and **John Jumper** presented an AI model called **AlphaFold2**. With its help, they have been able to predict the structure of virtually all the 200 million proteins that researchers have identified. Since their breakthrough, AlphaFold2 has been used by more than two million people from 190 countries. Among a myriad of scientific



applications, researchers can now better understand antibiotic resistance and create images of enzymes that can decompose plastic.

Life could not exist without proteins. That we can now predict protein structures and design our own proteins confers the greatest benefit to humankind.

<https://www.nobelprize.org/prizes/chemistry/2024/press-release/>

## **HETEROCYCLIC CHEMISTRY POEM**

### **HETEROCYCLIC CHEMISTRY**

**An important branch of Organic Chemistry**

**Is the interesting Heterocyclic chemistry**

**Very challenging may be sometimes**

**Hence, makes you think critically**

**Heterocyclic compounds structures are cyclic**

**Containing N, O, S heteroatoms in it**

**Which might be one or more in numbers**

**Thus, commonly called as Heterocycles**

**Heterocycles may be aromatic or aliphatic**

**Having one or more rings in it**

**Resonating structures increases stability**

**It's diversified compounds in nature are plenty**

**There are wide uses of heterocycles**

**Making them very important in society**

**Includes Medicinal chemistry and many more fields**

**Thus used to treat several diseases**

**Organic chemists synthesize heterocycles**

**Using variety of synthetic routes available**

**Yields vary from low to moderate to high**

**Still researchers are in continuous methods search**

Difficulty faced by organic chemists  
At every stage of its synthesis  
Still the research goes at a high speed  
Owing to its wide applicative need

**Teaching Heterocyclic chemistry to my TY students  
Is possibly the most difficult task  
As it includes all reactions and full with mechanisms  
Which are considered to be the most difficult part**

Heterocyclic chemistry is easy and may be fun  
If learnt seriously by every student  
Little bit practice is always required  
To understand its full chemistry and higher applications

BY

**Dr. Mayuri Naik**  
**Assistant Professor in Chemistry**  
**(Heterocyclic Chemistry course teacher)**

**Editor: Dr. Mayuri M. Naik, Assistant Professor in Chemistry**

**Disclaimer: The opinion and news appeared herein are those of the contributors and the editor and not necessarily of the Principal or Management.**