RAMAIAH
College of Arts, Science & Commerce

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M S Ramaiah College of Arts, Science and Commerce
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Approved by Government of Karnataka, Approved by AICTE, New Delhi
Recognized by UGC under 2f & 12B of UGC act 1956

Department of Biochemistry
MSRCASC

Value-added program on

"Hands-on training in Basic Molecular Biology Techniques: Enhancing Research Skills"
in collaboration with
Medauxin, Bengaluru
(An IQAC initiative)

Ref. No: Chem/BC/PG-2024-01 **Date: 02/01/2024**

Circular

Department of Biochemistry is organizing a VAP on "Hands-on training in Basic Molecular Biology Techniques: Enhancing Research Skills" in collaboration with Medauxin, Bengaluru from Jan 4th -7th 2024 for M.Sc. 2nd year Biochemistry students and from 25th- 28th, 2024 for M.Sc. 1st year Biochemistry students at Medauxin.

Dr. Suveditha S.
Assistant Professor &
Convenor
MSRCASC

Dr. Surendra A. S. (HoD)
Head of the Department
Department of Chemistry
and Biochemistry
MSRCASC

CHEMISTRY / BIO-CHEMISTRY
M S Ramaiah College of Arts,
Science & Commerce
Bangalore - 560 ...

Dr. Pushpa H.
Vice Principal
MSRCASC

Dr. Vatsala G
Principal
MSRCASC

M S Ramaiah Nagar
MSRIT Post
Bangalore 560 054
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+91 80 2360 6905
F +91 80 2360 6215
E principal.msrcasc@gmail.com
W www.msrcasc.edu.in

RAMAIAH
College of Arts, Science & Commerce

MEDAUXIN

HANDS-ON TRAINING ON

"BASIC MOLECULAR BIOLOGY TECHNIQUES: ENHANCING RESEARCH SKILLS"

Value-added program

organized by

Department of Chemistry & Biochemistry

M. S. Ramaiah College of Arts, Science and Commerce

In collaboration with

Medauxin, Bengaluru

(An IQAC initiative)

DATE: 4/01/2024 to 7/01/2024

VENUE: MSRCASC and MEDAUXIN

COURSE OUTLINE:

- Laboratory safety procedures & good laboratory practices
- The use & proper handling of molecular biology lab equipments
- Sample collection & storage
- Nucleic acid extraction: DNA from various samples
- Nucleic acid quantification
- Polymerase chain reaction (PCR) amplification
- Agarose gel electrophoresis and elution (PCR product purification)
- Data interpretation and troubleshooting
- Basics of primer designing
- DNA sequencing & introduction to bioinformatics tools

Convenors

Dr. Suveditha S.	Ms. Kavya Lakshmikanth	Mr. Ajay Babu Nekkanti
Asst. Professor, Dept. of Biochemistry	Molecular Biologist	Chief Executive Officer
M.S.R.C.A.S.C	Medauxin	Medauxin

Student Coordinators

Mr. Sulthan Pasha | Ms. Dhamini C.N | Ms. Sandhya J. | Ms. Jalaja B.S.

Advisory Committee

HOD of Chemistry & Biochemistry	Vice Principal	Principal
Dr. Surendra A. S.	Dr. Pushpa H.	Dr. Vatsala G.

RAMAIAH
College of Arts, Science & Commerce

MEDAUXIN

Hands-On Training On "Basic Molecular Biology Techniques: Enhancing Research Skills"

A VALUE-ADDED PROGRAM,
ORGANIZED BY

Department of Chemistry and Biochemistry,
M. S. Ramaiah College of Arts, Science and Commerce
In Collaboration With
Medauxin, Bengaluru
(An IQAC Initiative)

DATE: 01/02/2024 TO 04/02/2024 VENUE: MSRCASC AND MEDAUXIN

COURSE OUTLINE:

Laboratory Safety Procedures and Good Laboratory Practices
The Use and Proper Handling of Molecular Biology Lab Equipment
Sample Collection and Storage
Nucleic Acid Extraction: DNA from Various Samples
Nucleic Acid Quantification
Polymerase Chain Reaction (PCR) Amplification
Agarose Gel Electrophoresis and Elution (PCR Product Purification)
Data Interpretation and Troubleshooting
Basics Of Primer Designing
DNA Sequencing and Introduction to Bioinformatics Tools

CONVENORS

Dr. Suveditha S
Asst. Professor, Dept of Biochemistry
M.S.R.C.A.S.C

Ms. KAVYA Lakshmikanth
Medauxin

Mr. Ajay Babu Nekkanti
CEO, Medauxin

STUDENT CO-ORDINATORS

Mr. Sulthan Pasha **Ms. Dhamini C.N.** **Ms. Sandhya J.** **Ms. Jalaja B. S.**

ADVISORY COMMITTEE

Hod Of Biochemistry
Dr. Surendra. A. S

Vice Principal
Dr. Pushpa H.

Principal
Dr. Vatsala G.

RAMAIAH
College of Arts, Science & Commerce

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RAMAIAH
College of Arts, Science & Commerce

MEDAUXIN

"HANDS-ON TRAINING ON BASIC MOLECULAR BIOLOGY TECHNIQUES: ENHANCING RESEARCH SKILLS"

(An IQAC initiative)

Value-added program
organized by
Department of Chemistry & Biochemistry
M. S. RAMAIAH COLLEGE OF ARTS, SCIENCE, AND COMMERCE

In collaboration with

MEDAUXIN, Bengaluru

4^{th}-7^{th} JANUARY 2024 Batch 1

1^{st}-4^{th} FEBRUARY 2024 Batch 2

MSRCASC AND MEDAUXIN

ABOUT MSRCASC

M. S. Ramaiah College of Arts, Science, and Commerce, established in 1994 by the late Dr. M. S. Ramaiah, provides a diverse range of undergraduate and postgraduate degree programs in arts, science, commerce, and management. The institution is affiliated with Bengaluru City University. Authorized by AICTE in New Delhi and recognized by the Government of Karnataka, the college holds accreditation from the UGC under Sections 2(f) and 12(B) of the UGC Act of 1956. Notably, it has received an "A" grade reaccreditation from NAAC, showcasing its commitment to academic excellence. A pioneer in education, continuously striving to incorporate innovative teaching methods to foster the development of students into future professionals.

ABOUT THE DEPARTMENT

Established in 1994, the Department of Chemistry & Biochemistry at M.S Ramaiah College of Arts, Science, and Commerce offers both undergraduate (UG) and postgraduate (PG) programs in Chemistry & Biochemistry. Our highly qualified faculty employs contemporary teaching tools, including ICT-enabled learning and molecular models, to enhance conceptual understanding. Recognized under the DBT-STAR college scheme, our department has a track record of securing university ranks. Research initiatives include projects supported by seed money grants, KSCST, SERB-TARE, and KSTA. Department also has collaboration with Biocon Academy to train postgraduates with job assistance.

ABOUT MEDAUXIN

Medauxin, established in 2015, aims to deliver high-quality services and genomic solutions in the field of biotechnology. Headquartered in Bengaluru, with a network of distributors across the country, Medauxin specializes in genomics R&D services. The company offers genomic sequencing and bioinformatics services to global life sciences, healthcare businesses, academic and government institutions in India. Medauxin is actively involved in marketing, selling, and servicing a diverse range of technological products widely utilized by clinical diagnostics and life sciences organizations. With a strong focus on customer satisfaction, Medauxin is well-positioned to quickly establish leadership in its markets.

ABOUT THE VAP

Department of Chemistry & Biochemistry is organizing a four-day VAP on "Hands-on training on Basic Molecular Biology Techniques: Enhancing Research Skills ". Students will engage in hands-on activities to enhance their skills and understanding of various molecular biology techniques. The VAP aims to equip M.Sc. Biochemistry students of I & III semesters with the necessary knowledge for research endeavours and industry-ready jobs. The program, held in collaboration with Medauxin, underscores a hands-on and practical approach to acquiring vital molecular biology techniques, coupled with industry exposure.

OBJECTIVE

1. Improve students proficiency in fundamental molecular biology techniques through practical, hands-on learning experiences.
2. Provide exposure to real-world applications in the industry.
3. Equip students with the skills necessary for engaging in research activities.

COURSE OUTLINE

1. Laboratory safety procedures and good laboratory practices
2. The use and proper handling of molecular biology lab equipment
3. Sample collection and storage
4. Nucleic acid extraction: DNA from various samples
5. Nucleic acid quantification
6. Polymerase Chain Reaction (PCR) amplification
7. Agarose gel electrophoresis and elution (PCR product purification)
8. Data interpretation and troubleshooting
9. Basics of primer designing
10. DNA sequencing and introduction to bioinformatics tools

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PATRONS

Dr. M.R. JAYARAM
Hon'ble Chairman, GEF

SRI. M.R. JANAKIRAM
Hon'ble Director, GEF

SRI. M.R. KODANDARAM
Hon'ble Director, GEF

SRI. B.S. RAMAPRASAD
Chief Executive, GEF (Eng... & GS)

SRI. G. RAMACHANDRA
Chief Executive, GEF (Eng... & GS)

ADVISORY COMMITTEE

Dr. VATSALA G.
Principal
MSRCASC

Dr. PUSHPA H.
Vice Principal
MSRCASC

Dr. SURENDRA A. S.
HoD Biochemistry/Chemistry
MSRCASC

CONVENORS

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Asst. Professor
MSRCASC

Mr. AJAY BABU NEKKANTI
Chief Executive Officer
Medauxin

Ms. KAVYA LAKSHMIKANTH
Molecular Biologist
Medauxin

Ms. VIDHYA GURIKAR
Sr. Molecular Biologist
Medauxin

STUDENT COORDINATORS

Ms. JALAJA B. S.
Ms. SANDHYA J.

Ms. DHAMINI C. N.
Mr. SULTHAN PASHA

Report on Value-Added Program on

"Hands-on training in Basic Molecular Biology Techniques: Enhancing Research Skills"

(An IQAC Initiative)

Title: Hands-on training in basic molecular biology techniques: Enhancing Research Skills"

Resource person: Mr. Ajay Babu Nekkanti, Chief Executive Director, Medauxin

Organizer: Dr. Suveditha, Asst. Professor, MSRCASC

Dr. Surendra A. S, HoD Dept of Biochemistry/Chemistry

Date: 4th - 7th January, 2024 (Batch 1), 1st – 4th February, 20204 (Batch 2)

Venue: MSRCASC and Medauxin, Bengaluru

Participants: M.Sc. Biochemistry I and II-year students, MSRCASC

Objectives:

1. Improve students' proficiency in fundamental molecular biology techniques through practical, hands-on learning experiences.
2. Provide exposure to real-world applications in the industry.
3. Equip students with the skills necessary for engaging in research activities.

Details:

The Department of Chemistry & Biochemistry organized a four-day Value-Added Program (VAP) on "Hands-on Training on Basic Molecular Biology Techniques: Enhancing Research Skills." Students engaged in hands-on activities to enhance their skills and understanding of various molecular biology techniques. The VAP aimed to equip M.Sc. Biochemistry students of I & III semesters with the necessary knowledge for research endeavors and industry-ready jobs. The program, held in collaboration with Medauxin, underscored a hands-on and practical approach to acquiring vital molecular biology techniques, coupled with industry exposure.

Day 1:

The reporting time at Medauxin was 9:30 am, the students gathered at the college by 8:45 am and proceeded to Medauxin. Upon arrival, there was a brief introduction about Medauxin and the services provided, by the Director Mr. Ajay Babu Nekkanti. The trainers for the program, Ms. Kavya Lakshmikanth, a molecular biologist, and Mrs. Vidhya Gurikar, a

senior molecular biologist at Medauxin, were introduced. The participants were divided into two batches under the trainers.

Good laboratory practices (GLP) were explained in detail, including one-way entry to the lab and the proper usage and disposal of gloves. The storage of samples and the laboratory setup were also discussed. Before starting the experiments, the usage of all instruments was explained thoroughly. Gel preparation and the role of reagents used in gel electrophoresis, such as loading dye and EtBr, were detailed. The instrumentation of PCR and setting up the PCR reaction for the bacterial 16s gene were also explained.

The experiment began with buffer preparation, specifically 50X TAE buffer and CTAB buffer, by the two batches. The afternoon session included the DNA extraction from a bacterial culture containing the 16s gene. The use of the Bio Safety Cabinet and the precautions necessary while handling it were explained.

Pipetting skills were tested, and guidance was provided during the DNA extraction steps. Finally, the DNA was precipitated and stored at -20°C to run gel electrophoresis the next day. A question-and-answer session concluded the day, and the group left Medauxin at 6:30 pm, returning to the college.

Day 2:

On the second day, the laboratory was reached at 9:30 am. Upon entering, strict adherence to Good Laboratory Practices (GLP) was maintained. Ms. Kavya conducted a session covering 11 conceptual calculations, including 50X TAE buffer, CTAB, chloroform isoamyl alcohol preparation, and normality problems. Knowledge was imparted regarding different bands of PCR, distinguishing between sheared, intact, and high-concentration bands. Building on the previous day's DNA extraction session, principles and procedures of Polymerase Chain Reaction (PCR) were explored.

Understanding the components of PCR, such as template DNA, forward and reverse primers, and emerald buffer, was emphasized, along with their function in PCR. Details on programming PCR, from setup to execution, were provided. Insights were gained into the preparation and role of loading dye, as well as the types of primers used in PCR. Ms. Vidya guided everyone individually in performing the PCR reaction.

Further theory covered the aspects like PCR melting temperature gradient steps, primer dilution, and the protocol for gel purification, slated for the next session on Day 3. The day concluded with departure from the lab at 6:30 pm, heading back to college.

Day 3:

On the final day at Medauxin, the lab was reached on time. Upon arrival, Ms. Kavya reviewed the work and topics covered in the previous days. She provided insights into industrial applications and issues faced with customer samples and shared information about research fields that could be pursued after graduation. Several questions were asked and answered accordingly.

After this session, the group returned to the extraction room to begin gel extraction. The gel was purified and the samples were loaded onto the gel for analysis under the guidance of facilitators. Following this, primer-designing using the Primer-Blast tool was learned, along with watching a few YouTube videos on molecular biology techniques. The group was taught how to analyze gel images based on the type of band formed, learned about multiple band formation under certain circumstances, and methods of troubleshooting.

At the end of the program, feedback forms regarding the VAP from Medauxin were handed out, filled in, and submitted. The training concluded in the evening, and everyone headed back to the college.

Day 4:

On the fourth day, the session at MSRCASC facilitated an interactive discussion where students actively participated in discussions about our comprehensive training program, the latest advancements in molecular biology techniques, and the diverse career opportunities available in the field. Insightful questions from students fostered a dynamic exchange of ideas and knowledge.

Following the interactive session at MSRCASC, a valedictory function was organized to mark the culmination of the hands-on training program. The event was attended by the resource person from Medauxin, the principal of MSRCASC, the registrar, the vice principal, HoD of Biochemistry, and other faculty members.

During the function, the principal addressed the gathering, highlighting the significance of the hands-on training program and its impact on the students' learning journey. Certificates of participation were awarded to all student participants, recognizing their commitment and dedication throughout the program.

The valedictory session provided an opportunity for students and faculty to reflect on the knowledge gained and experiences shared during the hands-on training. It concluded on a celebratory note with a high tea, allowing participants to interact informally and discuss their future aspirations in the field of molecular biology.

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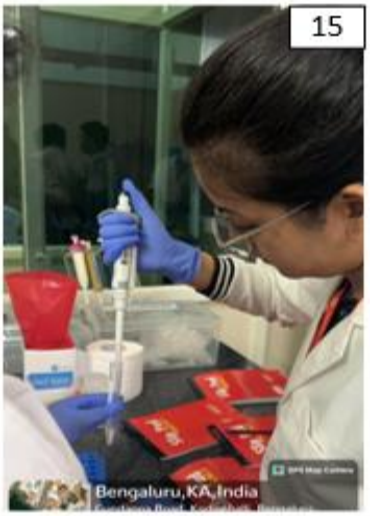
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18


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19


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Lat 13.055915°
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Google

1. Ms. Kavya giving insights on buffer preparation

2. Students working on DNA extraction

3. Ms. Vidhya guiding a student in PCR sample preparation

4. Ms. Vidhya explaining sample loading in gel electrophoresis

5. A student extracting a DNA sample

6, 7, 8, 9, 10. Students working on sample loading in agarose gel electrophoresis

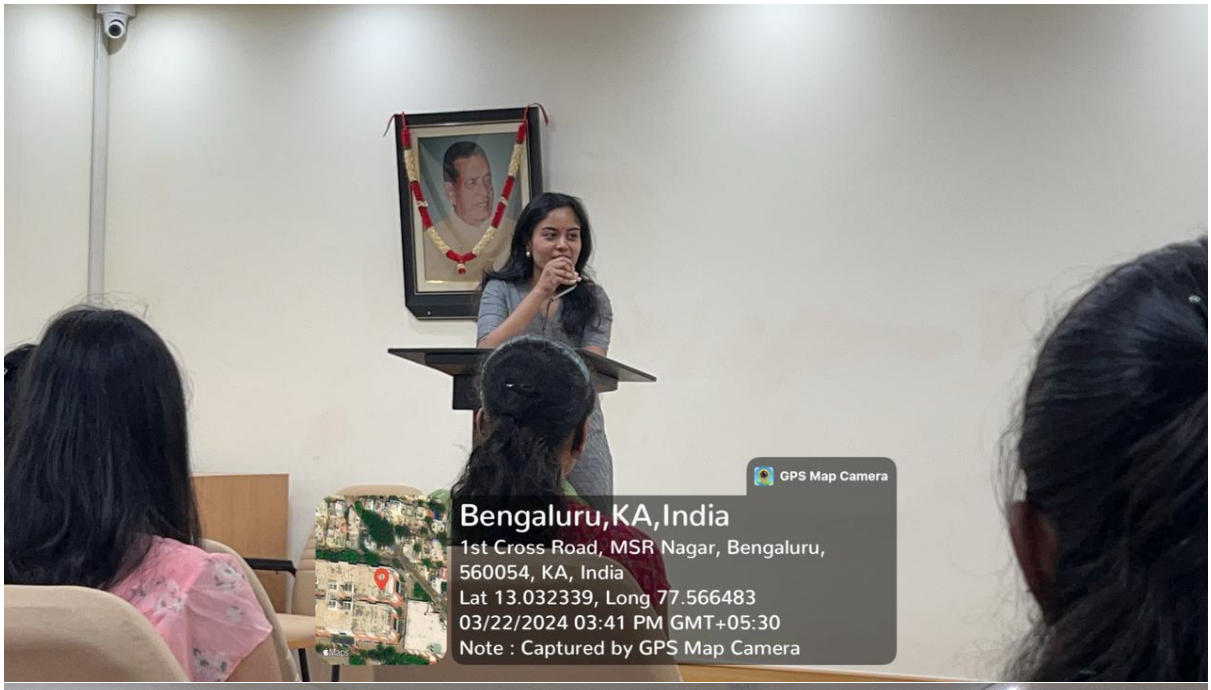
11, 12. Students working in the PCR room

13, 14. Students working on DNA precipitation

15, 16. Students loading DNA samples onto gel electrophoresis.

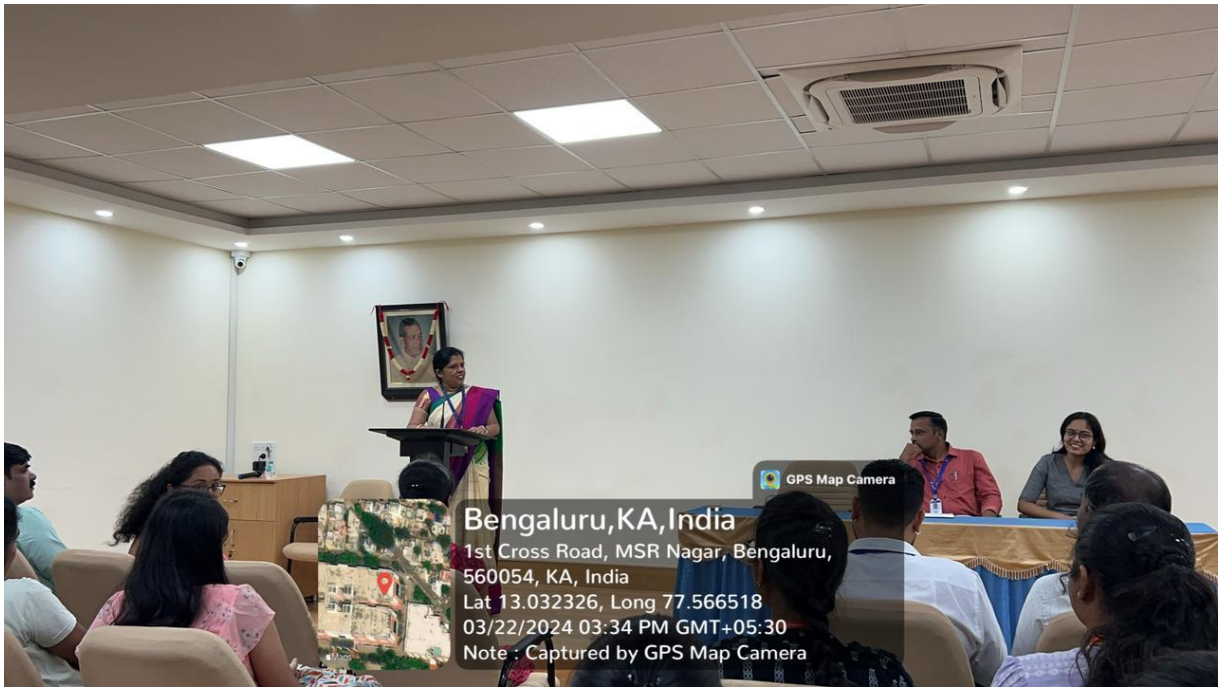
17,18. MSc Biochemistry I year students, faculty with the Medauxin team

19. MSc Biochemistry II year students and faculty with the Medauxin team.



Day 4: Engaging with students about the comprehensive training program, the newest advancements in molecular biology techniques, and potential career paths in the field

Valedictory function

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560054, KA, India
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M.Sc. 2nd Year Biochemistry

Value-added program on "Hands-on training on Basic Molecular Biology Techniques: Enhancing Research Skills"

Jan 4th- 7th 2024

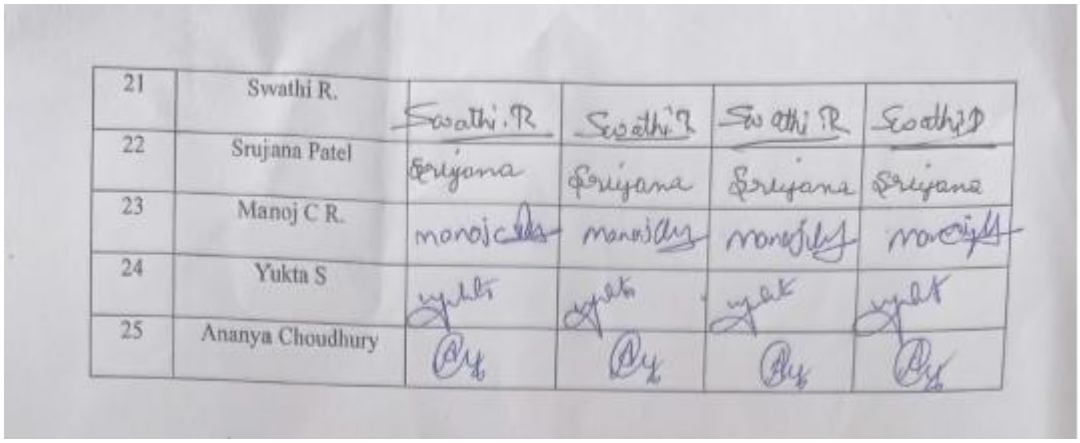
Sl. No.	Students Name	04-01-2024	05-01-2024	06-01-2024	07-01-2024
1.	Chandana A.				
2.	Dhamini C N.				
3.	Sireesha N.				
4.	Sulthan Pasha.				
5.	Keerthana K.				
6.	Vaishnavi N.				
7.	Sumithra V.				
8.	Sharvani Deshpande.				
9.	Amrutha Rangashree.				
10.	Yashaswini K S.				
11.	Sahana L J.				
12.	Payal V.				
13.	Sreelakshmi E V.				
14.	Durga Hyndavi Vakkalanka.				
15.	Monisha P.				

M.Sc. 1st Year Biochemistry

Value-added program on "Hands-on training on Basic Molecular Biology Techniques: Enhancing Research Skills"

Feb 1st - 4th, 2024

Sl. No.	Students Name	01/02/2024	02/02/2024	03/02/2024	04/02/2024
1	Amrutha V.				
2	ReddaiahRohith P.				
3	Logavarshini S.				
4	Varun N M.				
5	Vishwajeet U R.				
6	Sai Charan A.				
7	Aardra R S.				
8	Pooja T.				
9	Arya Anil Kumar				
10	Jyothika A.				
11	JoysriDey				
12	Jalaja B S.				
13	Syed Umar				
14	Sudeep S.				
15	Jayanth H.				
16	Anusha S.				
17	Bhumika S.				
18	Brundha H N.				
19	Sandhya J.				
20	Deekshitha G.				



21	Swathi R.	Swathi.R	Swathi.R	Swathi R	Swathi.R
22	Srujana Patel	Srijana	Srijana	Srijana	Srijana
23	Manoj C R.	manoj	manoj	manoj	manoj
24	Yukta S	yukta	yukta	yukta	yukta
25	Ananya Choudhury				

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MEDAUXIN

CERTIFICATE OF PARTICIPATION

This Certificate is presented to

Sulthan Pasha

of M. S. Ramaiah College of Arts, Science, and Commerce for successfully completing the value-added program on **"Hands-on Training on Basic Molecular Biology Techniques: Enhancing Research Skills"** which was organized by the Department of Chemistry & Biochemistry, M. S. Ramaiah College of Arts, Science and Commerce, Bengaluru in collaboration with Medauxin, Bengaluru from 4th - 7th January 2024.

Mr. Ajay Babu Nekkanti	Dr. Suveditha S.	Dr. Surendra A. S.	Dr. Vatsala G.
CEO Medauxin	Convenor Assistant Professor M.S.R.C.A.S.C	HOD Biochemistry/Chemistry M.S.R.C.A.S.C	Principal M.S.R.C.A.S.C

RAMAIAH
College of Arts, Science & Commerce

MEDAUXIN

CERTIFICATE OF APPRECIATION

This Certificate is presented to

Sulthan Pasha

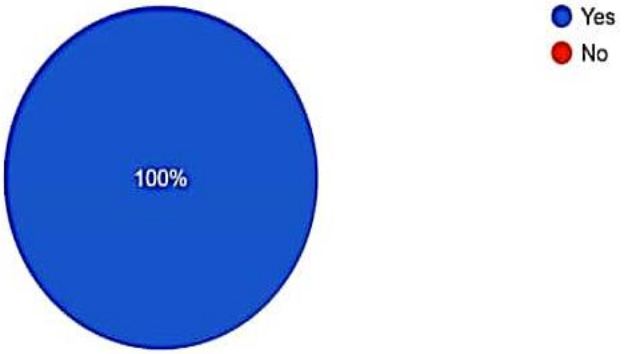
of M. S. Ramaiah College of Arts, Science, and Commerce for your excellent work as a student coordinator during the value-added program on **"Hands-on Training on Basic Molecular Biology Techniques: Enhancing Research Skills"** which was organized by the Department of Chemistry & Biochemistry, M. S. Ramaiah College of Arts, Science and Commerce, Bengaluru in collaboration with Medauxin, Bengaluru from 4th - 7th January 2024.

Mr. Ajay Babu Nekkanti	Dr. Suveditha S.	Dr. Surendra A. S.	Dr. Vatsala G.
CEO Medauxin	Convenor Assistant Professor M.S.R.C.A.S.C	HOD Biochemistry/Chemistry M.S.R.C.A.S.C	Principal M.S.R.C.A.S.C

VAP students feed-back data

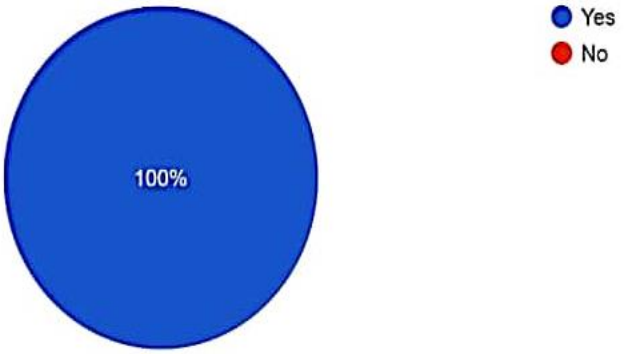
1.Did you find the VAP helpful in understanding the concepts?

39 responses



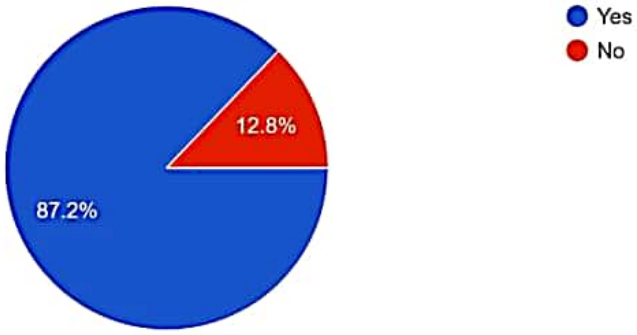
2.Did the VAP provide you with practical skills that you can apply in your research?

39 responses



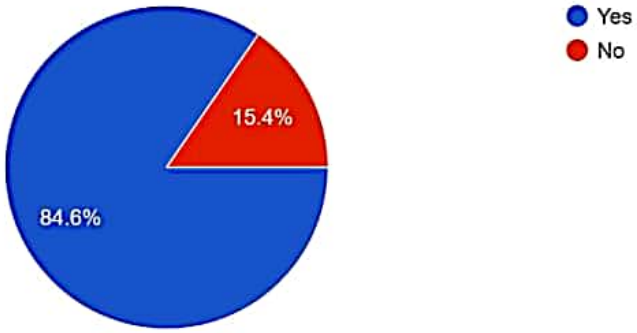
4.Did the VAP offer opportunities for networking with professionals in the field?

39 responses



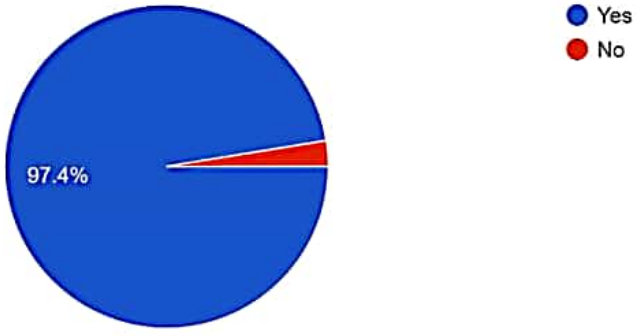
6.Will you be able to detect and troubleshoot an issue that arises from the topic?

39 responses



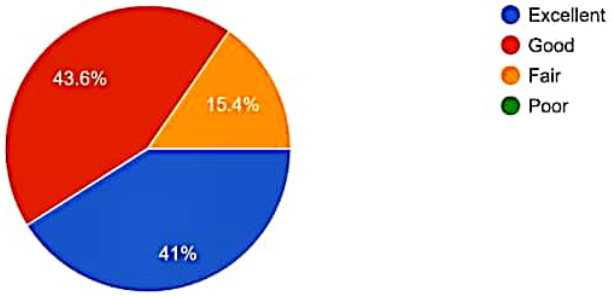
8.Would you be interested in a follow up/advanced VAP in related topics?

39 responses



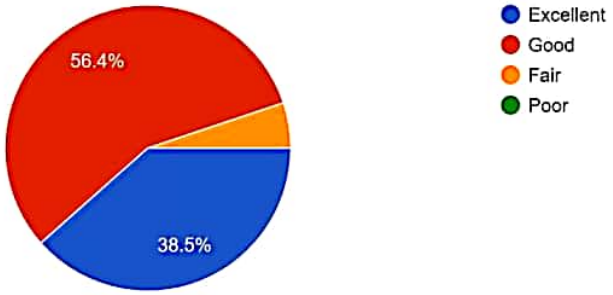
9.How well did the VAP cover the basics of molecular biology?

39 responses



10.Overall how satisfied were you with the VAP experience?

39 responses



11.What was the most valuable part of VAP for you?

Most valuable part of Vap that I learnt was PCR, its troubleshooting and able to see many advanced instruments

Hands on training and deep understanding

Hands on for each and every steps in gel electrophoresis, PCR and buffer preparation etc

Learnt to troubleshoot and also other related skills were improved (pipetting, basics of mol. bio). Completely studied and performed PCR individually along with other processes (DNA extraction, gel electrophoresis, gel documentation, gel purification and data analysis).

The way they thought us

Gel loading

Hands on experience individually with instrumentation was provided.

HANDLING OF THE MICRO PIPETTE AND HANDLING OF PCR INSTRUMENT AND CENTRIFUGES MACHINE

Everything was good

Hands on training on gel electrophoresis

Giving opportunity for everyone to use all equipment

Pipette

Micropipeting

Pcr and dna extraction

Confidently handling micropipette and loading the samples to gel

Also docking the gel to Gel documentation system

This program helped us immensely in experiencing laboratory environment where we learnt things practically which differed a lot from theoretical knowledge. Handling of micro pipettes , extraction of bacterial dna , pcr , setting of gel electrophoresis and docking them further interpretation of results were the core topics covered during the program .This definitely provide the basis of many kinds of research in molecular biology level.

The instructors were very approachable and answered my questions to the best of their ability

12.Is there any improvements you would suggest for future VAPs?

Since the VAP was done in 4 days, we may like to have for a week at least so that we will be still more perfect with whatever we learnt.

Increase days for hands on experience

Addition of days so that we can learn even more and understand.

Maybe a long duration is required so that we can learn more clearly (min. of 5-8 days)

Next time it would be good if it were sent in baches

13.Overall experience.

The VAP was well organised and the facilitators were excellent in training and correcting our mistakes. The venue had required facilities and it was an exposure to professional field.

Worth the time and energy to learn things better.

It was totally a good experience and was enjoying the learning throughout.

Every minute details were explained by the trainers I have learnt a lot and I also got to exposure to company culture.

Since I am not from Bt or MB background, it did help me a lot in learning about the micropipette, PCR and electrophoresis. It was interesting. Thank you and looking forward for more such workshops and VAP
Excellent
It was very helpful to do extraction purification and pcr which is really useful and the pipette handling was assessed and corrected Overall experience was good

Action taken:

1. The primary concern was the duration. Although the event spanned four days, students expressed a desire for an extension to include deep learning topics. Future plans will consider extending the event, taking into account academic schedules.
2. Another concern was the division into batches, which will be reconsidered in light of academic schedules. Although the 40 participants were split into two groups, this approach will be reviewed for future events.