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College of Arts, Science
& Commerce - Autonomous

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M S Ramaiah College of Arts, Science and Commerce
Re-accredited & by NAAC
Approved by Government of Karnataka
Recognized by UGC under 2f & 12B of UGC Act 1956

Date: 06.01.2025

CIRCULAR

The Department of Biotechnology is organizing a One-Day Workshop on "**Introduction to Bacterial Techniques & Foundations of Microbiology and Biopolymers as Alternatives to Synthetic Polymers**." This workshop will be held on **January 10, 2025**, from 8:30 AM to 5:00 PM at the **Centre for Incubation, Innovation, Research and Consultancy (CIIRC), Jyothi Institute of Technology,** Bengaluru. The workshop aims to provide valuable insights into bacterial techniques and the emerging field of biopolymers, which serve as sustainable alternatives to synthetic polymers. III Semester MSc Biotechnology students are invited to attend this informative and interactive event that promises to enhance their understanding of these critical areas in biotechnology and materials science.

HoD 06/01/2025

Principal 15/1/2025

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One Day Workshop

on

"Introduction to Bacterial Techniques & Foundations of Microbiology and Biopolymers as Alternatives to Synthetic Polymers"

Date: 10 January 2025
Timings: 8:30 AM to 5:00 PM
Venue: Centre for Incubation, Innovation, Research and Consultancy (CIIRC) – Jyothi Institute of Technology

OBJECTIVES

- Introduction to Bacterial Techniques: To provide participants with a comprehensive understanding of bacterial techniques used in microbiology, highlighting their practical applications and significance in research and industry.
- Foundations of Microbiology: To familiarize attendees with the fundamental concepts of microbiology, including the role of microorganisms in various ecological, industrial, and medical contexts.
- Exploring Biopolymers: To introduce the concept of biopolymers as sustainable and eco-friendly alternatives to synthetic polymers, focusing on their properties, production processes, and potential applications.
- Hands-on Learning and Practical Demonstrations: To offer participants the opportunity to engage in hands-on sessions, providing practical experience with bacterial cultures, laboratory techniques, and biopolymer analysis.
- Interdisciplinary Knowledge Sharing: To promote cross-disciplinary knowledge exchange between students, researchers, and professionals in the fields of biotechnology, microbiology, and material science.
- Future of Biotechnology: To highlight the emerging trends in biotechnology, emphasizing the role of biopolymers in addressing environmental concerns and advancing sustainable technologies.

Report on One-Day Workshop on Introduction to Bacterial Techniques & Foundations of Microbiology and Biopolymers as Alternatives to Synthetic Polymers

Centre for Incubation, Innovation, Research and Consultancy (CIIRC) – Jyothi Institute of Technology

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Date of Workshop: 10.01.25
Location: Centre for Incubation, Innovation, Research and Consultancy (CIIRC), Jyothi Institute of Technology
Organized by: Department of Biotechnology, MS Ramaiah College of Arts, Science, and Commerce
Faculty Guide: Dr. Ramesh N
Time: 8:30 AM to 5:00 PM

Introduction

On 10.01.25, the MSc Biotechnology students from MS Ramaiah College of Arts, Science, and Commerce attended a one-day workshop at the Centre for Incubation, Innovation, Research, and Consultancy (CIIRC) at Jyothi Institute of Technology. The primary objective of the workshop was to provide us with hands-on experience and exposure to fundamental techniques in microbiology, biopolymers, and biotechnology. The workshop was divided into two main sessions: one focusing on bacterial techniques and microbiology, and the other on the use of biopolymers as sustainable alternatives to synthetic polymers. The session was conducted under the guidance of Ph.D. students, with overall supervision by Mr. Narendra Reddy, the faculty guide for the second batch.

Program 1: Introduction to Bacterial Techniques & Foundations of Microbiology

The first part of the workshop was dedicated to microbiology and bacterial techniques.

1. **History & Foundations of Microbiology**:
   We began with a brief overview of the history of microbiology, including the contributions of key figures such as **Anton van Leeuwenhoek**, who is considered the father of microbiology. The importance of understanding microbiology in modern biotechnology was emphasized.
2. **Bacterial Streaking Techniques**:
   Several bacterial streaking techniques were introduced, which are fundamental in microbiology for isolating and culturing bacteria:
   - **Quadrant Streaking**: Used to separate bacteria into individual colonies.
   - **Continuous Streaking**: Involves streaking across the plate in one continuous motion.
   - **Zigzag Streaking**: A method to spread the bacterial sample in a zigzag pattern for isolation.

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- **Gradient Streaking**: A more advanced technique to create a concentration gradient for specific bacterial growth studies.

3. **Hands-on Techniques**:
   We were given hands-on experience in two essential staining techniques:
   - **Gram Staining**: This allowed us to differentiate between Gram-positive and Gram-negative bacteria based on their cell wall structure.
   - **Capsule Staining**: We also performed capsule staining, a technique used to visualize bacterial capsules, which play an important role in bacterial virulence.

Program 2: Biopolymers as Alternatives to Synthetic Polymers

The second half of the workshop focused on the use of **biopolymers** as eco-friendly alternatives to synthetic polymers.

1. **Electrospinning Visualization**:
   We were introduced to **electrospinning**, a technique for creating nanofibers from a polymer solution. This method has wide applications in fields such as tissue engineering, filtration, and drug delivery systems.
2. **Protein Isolation from Peanut Meal**:
   A key hands-on experiment involved isolating proteins from **peanut meal** using **isoelectric focusing**. This technique allowed us to separate proteins based on their isoelectric point, which is crucial in proteomics and biotechnology.
3. **Chitosan Biofilm Production**:
   We used **chitosan** (a biopolymer derived from chitin) to cast biofilms with the help **magnetic stirrer** and casting trays. The biofilms created were then tested for **tensile strength** using a **UTM 18m/ms Universal Testing Machine**, which allowed us to assess the mechanical properties of the biopolymer. These biofilms are potential candidates for sustainable packaging solutions.

Lab Visits and Exposure

The workshop also provided us with valuable exposure to several state-of-the-art laboratories. We were divided into two groups and visited the following labs:

- **Cell Biology Lab**
- **Molecular Biology Lab**
- **Food Biotechnology Lab**
- **Nanotechnology Lab** (including carbon activation by pyrolysis)

These labs provided us with insights into the cutting-edge research taking place in various subfields of biotechnology.

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Tea Break and Interactions

During the tea break, we had the opportunity to interact with the Ph.D. students and faculty members. The welcoming environment fostered collaborative learning and provided us with an opportunity to clarify doubts and engage in discussions about the topics covered during the day.

Sophisticated Instrument Facility (SIF) Visit

The workshop concluded with a visit to the **Sophisticated Instrument Facility (SIF)**, which housed a variety of advanced analytical instruments. We were introduced to the following equipment:

- **Scanning Electron Microscope (SEM)**
- **Fourier Transform Infrared Spectrometer (FTIR)**
- **UV-Vis Spectrophotometer**
- **X-Ray Crystallography**
- **High-Performance Liquid Chromatograph (HPLC)**
- **Gas Chromatograph (GC)**
- **3D Printer**

These instruments are vital for conducting high-level research and are used extensively in fields such as material science, environmental monitoring, and drug discovery.

Conclusion

Attending this workshop has been an enriching experience for all participants. It provided us with an in-depth understanding of key microbiological techniques, biopolymer production, and state-of-the-art laboratory practices. The workshop emphasized the importance of **sustainable practices** in biotechnology, particularly through the exploration of **biopolymers** as alternatives to synthetic polymers. These materials, derived from natural sources like chitosan, offer great potential in developing environmentally friendly solutions for various industries, including packaging, healthcare, and agriculture.

In addition, the exposure to advanced instruments and techniques such as **electrospinning**, **protein isolation**, and the use of sophisticated analytical tools further enhanced our understanding of the practical applications of biotechnology. These insights will undoubtedly benefit our academic and research pursuits, particularly as we explore innovative solutions to pressing global challenges, such as **green energy** and **environmental sustainability**.

The workshop not only provided us with practical knowledge but also inspired us to think critically about how biotechnology can contribute to sustainable development, making it a highly beneficial experience for all participants.

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Snapshots from the Workshop

X-ray crytstallography equipment

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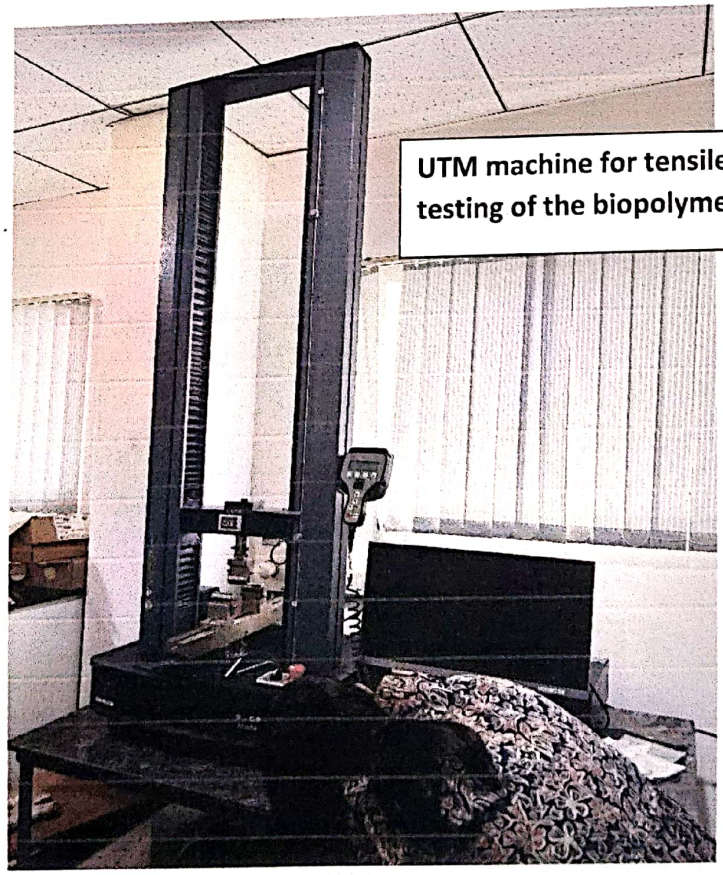

UTM machine for tensile strength testing of the biopolymer

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SCIENTIFIC WORKSHOP ON THE OCCASION OF SUVARNA BHARATHI MAHOTSAVA

THIS CERTIFICATE IS PRESENTED TO

Mohammed Umar Sadiq

from

M.S. RAMAIAH COLLEGE OF ARTS SCIENCE AND COMMERCE

for participating in the workshop on

FOUNDATIONS OF MICROBIOLOGY-A PRACTICAL INTRODUCTION TO BACTERIAL TECHNIQUES

at CIIRC, Bengaluru held on January 10, 2025

Dr. Nagananda G S	Dr. K Chandrasekhar	Dr. Krishna Venkatesh
Programme Head	Programme Co-ordinator	Director

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Engineering Tomorrow's Materials: Exploring Biopolymers as Alternative to Synthetic Polymers at CIIRC, Bengaluru held on January 10, 2025.

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DEPARTMENT OF BIOTECHNOLOGY

III SEMESTER M.Sc. BIOTECHNOLOGY STUDENT LIST

Attendance Sheet –One day workshop at Jyothy Institute of Technology. 10-01-2025

Sl. NO.	Register No.	Name of the Student	Signature of the student	Remarks
1	P18EV23S027001	Jai Shree R	Ab	
2	P18EV23S027002	Sowjanya C	Sowjanya.C	
3	P18EV23S027004	Deekshitha. A	Deekshi	
4	P18EV23S027005	Nithyashree M S	Ab	
5	P18EV23S027006	Yashaswini V	Yashaswini.V	
6	P18EV23S027008	Bipasha Singh	Ab	
7	P18EV23S027009	Bhoomika N	Ab	
8	P18EV23S027010	Perumal Vijaya Shanthi	Ab	
9	P18EV23S027012	Adarsh Tamang	Ab	
10	P18EV23S027013	Kaursika Roy	Ab	
11	P18EV23S027014	Sayata Choudhury	Ab	
12	P18EV23S027015	Hariharan R	Ab	
13	P18EV23S027016	R Varshitha Raju	Varshitha	
14	P18EV23S027017	Keerthana S. N		
15	P18EV23S027019	Likhitha P	Ab	
16	P18EV23S027020	Farheen Farooque	Ab	
17	P18EV23S027021	Ayushma Paul	Ab	
18	P18EV23S027022	Kavyashri B T	B.T.	
19	P18EV23S027023	Ruzaina Fathima	Ab	
20	P18EV23S027024	Vandana S	Vandana	
21	P18EV23S027025	Bindushree C M	Bindu	
22	P18EV23S027026	Mala S	Ab	
23	P18EV23S027027	M S Mahendrababu	mahendrababu	
24	P18EV23S027028	Mithali Mangesh Mavinkurve	Mithali M.M	
25	P18EV23S027029	Sireesha D	Sireesha D	
26	P18EV23S027031	Ranjana C N	Ab	

27	P18EV23S027032	Shilpashree P V	Shilpashree PV.	
28	P18EV23S027033	Prasanna.C	Prasanna.C	
29	P18EV23S027034	Shashanth	Shashanth.K	
30	P18EV23S027035	Keerthi S	Ab	
31	P18EV23S027036	R Thanushree	Thanushree R	
32	P18EV23S027037	Amar	Ab	
33	P18EV23S027038	Bhuvana V	Bhuvana.V.	
34	P18EV23S027039	Mohammed Umar Sadiq	Umar Sadiq	
35	P18EV23S027040	Chaitra S		
36	P18EV23S027041	Prathiksha M	Prathiksha M	
37	P18EV23S027042	N Yashaswini	Yashaswini.N.	
38	P18EV23S027043	Sneha S	Sneha. S	
39	P18EV23S027044	Nandini G	Nandini G	
40	P18EV23S027045	Darshan D	Darshan.D	
41	P18EV23S027046	Prathyusha Chandrasekar Reddy	Prathyusha	
42	P18EV23S027047	Adarsh A C	Adarsh	