

A Short Term Course

Microbial Techniques focusing identification of industrially important bacteria

Microbial Biotechnology: A Practical Training Program with Hands-On Experience

Duration: 7 Days

Venue: Department of Biotechnology, The University of Burdwan

Maximum Participants: 25

Program Background

Microbial biotechnology has emerged as essential tools in the industrial sector, revolutionizing the production of bio-based products, pharmaceuticals, and environmental solutions. Industrially important bacteria play a pivotal role in diverse applications, including production of enzyme, antibiotics, bioremediation, probiotics, and the manufacturing of fermented foods. This short-term course is designed to provide participants with hands-on experience and theoretical knowledge of microbial techniques tailored to harness the potential of industrially relevant bacteria. The program will focus on key aspects such as bacterial isolation, cultivation and identification using 16S rRNA gene based analysis. Participants will also be enriched in the knowledge of advancements in microbial biotechnology, gain insights into industrial applications, and learn how to integrate modern bioinformatics tools to enhance bacterial identification. This course is an excellent opportunity for students, researchers, and industry professionals to develop skills that bridge academic research and industrial practices, fostering innovation and sustainability in microbial biotechnology.

Program Objectives

- To train participants with the principles, techniques, and applications of Microbial Biotechnology.

- To provide hands-on experience in key Microbial techniques for isolation of industrially important bacteria such as media preparation, sterilization, serial dilution, spread plate technique, streak plate technique, screening assays, culture inoculation, sub-culturing etc.
- To train participants in the isolation of bacterial genomic DNA, agarose gel electrophoresis, visualization on UV-transilluminator/gel-doc.
- Training for identification of bacterial isolate using 16S rRNA gene based molecular phylogenetic approach.

Course Content

The course will cover the following topics:

- Principles of isolation of α -amylase and cellulase producing bacterial culture
- Sample collection
- Preparation of serial dilution
- Media preparation and sterilization (specific)
- Media pouring (plating), spread plate technique, streak plate technique.
- Aseptic inoculation and incubation
- Screening assays
- Bacterial genomic DNA isolation
- Visualization of DNA
- Demonstration on PCR technique
- 16S rRNA gene sequence analysis on NCBI/EzTaxon/EzBioCloud database (BLAST, retrieval of sequences)
- Multiple sequence alignment
- Construction of phylogenetic tree using MEGA

Programme schedule daywise:

- **Day 1: Lecture session-** Introduction to Microbial biotechnology and its applications, and its application, Principle: α -amylase and cellulase production bacterial culture, industrial applications
- **Practical session-** Sample collection, Preparation of serial dilution, Introduction to various instruments for microbial techniques.

- **Day 2:** Lecture Session- Introduction on microbial media, media preparation: types, composition
Practical session- Media preparation and sterilization (specific), Media pouring (plating), spread plate technique, streak plate technique, Aseptic inoculation and incubation
- **Day 3: Lecture session-**Brief introduction on sample collection, Different microbial techniques for isolation and maintenance of bacterial samples: serial dilution, sterilization, pouring, spread plate, streak plate, inoculation and incubation
Practical session- Isolation of α -amylase and cellulase producing bacterial culture
- **Day 4: Lecture session-**Screening assay: principle of α -amylase and cellulase production, Discussion on bacterial genomic DNA isolation, principle: PCR technique
Practical session- Screening assays, Bacterial genomic DNA isolation, agarose gel electrophoresis, Visualization of DNA
- **Day 5:** Introduction: identification of bacterial culture using 16S rRNA gene based molecular phylogenetic approach
Practical session- Screening assays, Demonstration on PCR technique, Demonstration on HPLC
- **Day 6: Lecture session-** Special lecture on Microbial Biotechnology
Practical session- 16S rRNA gene sequence analysis on NCBI/EzTaxon/EzBioCloud database (BLAST, retrieval of sequences)
- **Day 7 Lecture session-** Special Lecture on Microbial Biotechnology
Practical session- Multiple sequence alignment, Construction of phylogenetic tree using MEGA

Program Organizer

This training program will be conducted by experienced professionals and experts in the field of Microbial biotechnology. These experts have a proven track record in delivering high-quality training and have extensive practical knowledge of the subject matter.

Programme Venue

The training program will be held at the Department of Biotechnology, The University of Burdwan.

Schedule

The training program will run for 7 days, from Monday to Sunday, from 11:00 AM to 4:00 PM,. There will be a break for lunch each day.

	11:00 am- 12:30 pm	12.30 pm - 02:00 pm	02:30 pm- 04:00 pm
Day 1	Lecture	Practical	Practical
Day2	Lecture	Practical	Practical
Day 3	Lecture	Practical	Practical
Day 4	Lecture	Practical	Practical
Day 5	Lecture	Practical	Practical
Day 6	Lecture	Practical	Practical
Day 7	Lecture	Practical	Practical

The schedule is subject to change due to various circumstances.

Course Fee

The application fee for the 7-Days Microbial Biotechnology: A Practical Training Program with Hands-On Experience is Rs. 5,000/-. This fee covers training materials, laboratory supplies, equipment usage, and certificates of completion for the participants.

Mode of Payment

Will be updated soon

Accommodation

Accommodation is not included in the course fee. However, there are a number of hotels and guesthouses located near the Golapbag area, Burdwan.

Evaluation and Feedback

We value feedback and are committed to continuously improving our training program. To this end, we will provide participants with evaluation forms at the end of the program to gather their feedback and suggestions.

Course Syllabus

Theory

- Introduction on Microbial Biotechnology and its application, Principle: α -amylase and cellulase production bacterial culture, industrial applications
- Introduction on microbial media, media preparation: types, composition
- Brief introduction on sample collection, Different microbial techniques for isolation and maintenances of bacterial samples: serial dilution, sterilization, pouring, spread plate, streak plate, inoculation and incubation
- Screening assay: principle of α -amylase and cellulase production
- Discussion on bacterial genomic DNA isolation, principle: PCR technique
- Introduction: identification of bacterial culture using 16S rRNA gene based molecular phylogenetic approach.

Practical

- Isolation of α -amylase and cellulase producing bacterial culture
- Sample collection, Preparation of serial dilution
- Media preparation and sterilization (specific), Media pouring (plating), spread plate technique, streak plate technique, Aseptic inoculation and incubation
- Screening assays
- Bacterial genomic DNA isolation, agarose gel electrophoresis, Visualization of DNA
- Demonstration on PCR technique, 16S rRNA gene sequence analysis on NCBI/EzTaxon/EzBioCloud database (BLAST, retrieval of sequences)
- Multiple sequence alignment, Construction of phylogenetic tree using MEGA

Date of commencement of the course and payment link for admission will be communicated shortly. Please follow the University website regularly