



### Establishment of Center of Excellence

#### Amity Microbial Culture Center (AMCC)

#### 1. Introduction

The 'Amity Microbial Culture Center' (AMCC) is proposed to be established as Centre of Excellence at the Amity Institute of Microbial Technology (AIMT), Amity University Rajasthan (AUR), with the primary goal of preserving, cataloguing, and maintaining locally isolated microbial cultures along with comprehensive scientific documentation. As the first microbial culture repository of its kind at AUR, AMCC aims to provide a structured platform for conserving valuable microbial resources generated through academic and research activities. AMCC will serve as a central facility for biological science departments at AUR, particularly the Amity Institute of Microbial Technology (AIMT), Amity Institute of Biotechnology (AIB), and Amity Institute of Pharmacy (AIP). The center will facilitate interdisciplinary research, support innovation, strengthen industry-academia partnerships, and promote the sustainable utilization of microbial diversity for scientific, industrial, and entrepreneurial applications.

Initially, AMCC will focus on preserving microbial isolates developed by Amity students and faculty members. Over time, it will expand its activities through collaborations with national repositories such as the Microbial Type Culture Collection (MTCC) and other governmental agencies, while extending its services to other Amity campuses across India.

#### 2. Vision

To become a nationally recognized center of excellence for microbial resource preservation, bioinnovation, and translational research by creating a comprehensive microbial repository that supports scientific discovery, industrial applications, sustainable development, and bioentrepreneurship.

#### 3. Objective

The objective of AMCC is to establish and maintain a scientifically documented microbial culture repository that preserves indigenous microbial diversity, supports research and innovation, facilitates capacity building, and promotes industry-academia collaboration for societal and economic benefit.

The specific objectives of the center are:

- 3.1. **Microbial Resource Preservation:** To collect, authenticate, preserve, and maintain locally isolated microbial cultures generated through teaching, research, and consultancy projects.
- 3.2. **Documentation and Database Development:** To establish a comprehensive digital database containing taxonomic, phenotypic, biochemical, molecular, and application-oriented information of microbial isolates.



- 3.3. **Research and Innovation Support:** To provide microbial resources and technical support for interdisciplinary research in microbiology, biotechnology, pharmacy, agriculture, environmental science, and allied disciplines.
- 3.4. **Capacity Building and Skill Development:** To train students, researchers, faculty members, and technical staff in microbial isolation, preservation, characterization, maintenance, and biosafety practices.
- 3.5. **Industry Linkages and Technology Translation:** To facilitate industrial collaborations, commercialization opportunities, and bioentrepreneurship through microbial resource utilization and translational research.

#### 4. Sustainable Development Goals (SDGs) Linked with AMCC Activities

The AMCC shall align its activities, research endeavors and other practices in alignment with United Nations Sustainable Development Goals (SDGs), such as good-health and well being, Quality education, Clean water and sanitation, Climate action, life on land, and Partnership for the goals (Figure 1).

| SDG                                           | Relevance to AMCC                              |                                                                                                                                |
|-----------------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <br>3 GOOD HEALTH AND WELL-BEING              | SDG 3: Good Health and Well-being              | Supports research on beneficial microorganisms, probiotics, antimicrobial discovery, and healthcare biotechnology.             |
| <br>4 QUALITY EDUCATION                       | SDG 4: Quality Education                       | Provides hands-on training, skill development, internships, and research opportunities for students and faculty.               |
| <br>6 CLEAN WATER AND SANITATION              | SDG 6: Clean Water and Sanitation              | Supports microbial applications in wastewater treatment, bioremediation, and environmental monitoring.                         |
| <br>8 DECENT WORK AND ECONOMIC GROWTH         | SDG 8: Decent Work and Economic Growth         | Promotes bioentrepreneurship, innovation, startup incubation, and industry-oriented microbial technologies.                    |
| <br>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE | SDG 9: Industry, Innovation and Infrastructure | Establishes research infrastructure and facilitates product and process innovation based on microbial resources.               |
| <br>12 RESPONSIBLE CONSUMPTION AND PRODUCTION | SDG 12: Responsible Consumption and Production | Encourages sustainable bioprocesses, biodegradation studies, and circular bioeconomy initiatives.                              |
| <br>13 CLIMATE ACTION                         | SDG 13: Climate Action                         | Supports research on carbon sequestration, biofertilizers, biodegradation, and environmental sustainability.                   |
| <br>15 LIFE ON LAND                           | SDG 15: Life on Land                           | Conserves microbial biodiversity and promotes sustainable utilization of biological resources.                                 |
| <br>17 PARTNERSHIPS FOR THE GOALS             | SDG 17: Partnerships for the Goals             | Encourages collaborations with academic institutions, industries, government agencies, and national repositories such as MTCC. |

Figure 1: Relevance of AMCC with different SDGs.



## **5. Functions of AMCC**

AMCC will perform several functions covering research and development, services to society, capacity building and training, collaborative and translational activities:

### **A. Research and Development (R&D):**

- Establish and maintain a repository of indigenous microbial isolates.
- Encourage stockholders to characterize microorganisms using morphological, biochemical, and molecular techniques.
- Support research in industrial microbiology, environmental microbiology, agricultural microbiology, and medical microbiology.
- Develop microbial applications in biofertilizers, biopesticides, biodegradation, wastewater treatment, probiotics, and bioactive compounds.
- Facilitate publication, patent filing, and innovation-based research.
- Create a microbial diversity database for future scientific exploration.

### **B. Services:**

- Preservation of 'only non-pathogenic' strains of - bacteria, fungal, yeast, and actinomycete cultures.
- Long-term and short-term microbial culture storage services.
- Culture revival and authentication services.
- Basic microbial characterization and documentation.
- Technical consultation for microbial preservation and maintenance.
- Access to microbial resources for approved academic and research purposes.
- Support for student projects, dissertations, and industrial research.

### **C. Capacity Building and Training:**

- Conduct regular workshops and training programs on microbial culture techniques.
- Train stakeholders in isolation, subculturing, preservation, cryopreservation, and maintenance of cultures.
- Provide hands-on exposure to laboratory quality standards and biosafety practices.
- Develop skilled manpower in microbial resource management.
- Organize faculty development programs and certificate courses in microbial technologies.

### **D. Collaborative and Translational Activities:**

- Serve as a bridge between academia and industry.
- Collaborate with national repositories such as MTCC and other recognized culture collections.
- Facilitate joint research projects with industries and government laboratories.
- Support technology transfer and commercialization activities.
- Encourage multidisciplinary research among AIME, AIB, AIP, and other departments.
- Promote startup development and bioentrepreneurship initiatives based on microbial technologies.



#### **6. Operational Framework of AMCC**

AMCC will function through an integrated and collaborative team (from AIMT, AIB, and AIP), consisting of faculty members, technical staff, research scholars, students, and external experts-collaborators from microbial resource centers. The center coordinator shall be responsible for overall management, strategic planning, and external collaborations. The center emphasizes activities like: Culture preservation protocols, Quality assurance, Database management, and Biosafety compliance.

#### **7. Outreach Activities**

AMCC will undertake the following outreach initiatives:

- Celebration of World Microbiome Day and World Environment Day.
- Awareness lectures on microbial diversity and sustainability.
- School and college outreach programs.
- Open laboratory visits for students and stakeholders.
- Industry interaction sessions and innovation conclaves.
- National workshops, symposia, and conferences.
- Extension activities related to environmental monitoring and microbial applications.
- Publication of newsletters and microbial resource catalogues.
- Promotion of citizen science initiatives related to microbial biodiversity documentation.

#### **8. Infrastructure and Facilities:**

AMCC will utilize already existing modern infrastructure and laboratory facilities at AIMT, AUR to support the center objectives and goals.

#### **9. Outcomes and Expected Impact**

AMCC is expected to significantly contribute academically, in research, to the industry and society, which in turn will positively help institutional impact. The anticipated outcomes include:

##### **Academic Impact:**

- Creation of the first institutional microbial culture repository at AUR.
- Support and improve quality and reproducibility of microbiological research.
- Enhanced interdisciplinary collaborations.
- Increased research publications and student dissertations.

##### **Research Impact:**

- Availability of authenticated microbial strains for future studies.
- Establishment of a unique microbial biodiversity database.
- Increase patentable innovations and technology development.

##### **Industrial Impact:**

- Identification of commercially valuable microbial resources.
- Strengthened academia-industry partnerships.
- Development of microbial products and processes.

**Societal Impact:**

- Conservation of indigenous microbial biodiversity.
- Enhanced awareness regarding the role of microorganisms in sustainability.
- Contributions to environmental protection, agriculture, health, and bioeconomy development.

**Institutional Impact:**

- Enhanced visibility and reputation of AUR as a center for microbial research.
- Attraction of collaborative projects and external funding.
- Establishment of a foundation for future microbial resource center accreditation.

**10. Five-Year Strategic Plan****Year 1: Establishment and Repository Development**

- Create infrastructure and standard operating procedures.
- Collect and preserve microbial isolates from AIMT, AIB, and AIP.
- Develop digital database and accessioning system.
- Conduct initial training programs.
- Organizing workshops, seminars, expert lectures and training programmes.
- Publications in international journals and books.

**Target:** 20-30 microbial cultures preserved.

**Year 2: Expansion and Standardization**

- Strengthen characterization facilities.
- Introducing molecular identification methods.
- Develop quality management systems.
- Initiate institutional collaborations.
- Organizing workshops, seminars, expert lectures and training programmes.
- Publications in international journals and books.

**Target:** 50+ catalogued microbial isolates.

**Year 3: Collaborative Research and Resource Sharing**

- Facilitate access to microbial resources across Amity campuses.
- Organizing workshops, seminars, expert lectures and training programmes.
- Establish collaborations with MTCC and other repositories.
- Launch industry-supported research projects.
- Publications in international journals and books.

**Target:** At least 5 active collaborations and 75+ preserved cultures.

**Year 4: Translational Research and Innovation**

- Promote patenting and technology development.
- Organizing workshops, seminars, expert lectures and training programmes.
- Support startup and bioentrepreneurship initiatives.
- Develop specialized microbial collections for agriculture, environment, and healthcare.
- Publications in international journals and books.

**Target:** Multiple technology disclosures/patent applications and 100+ cultures preserved.



#### Year 5: Recognition and Sustainability

- Seek recognition as a regional microbial resource center.
- Secure external funding from national agencies.
- Publish an institutional microbial culture catalogue.
- Establish a sustainable operational and revenue model.
- Publications in international journals and books.

**Target:** 150+ documented cultures, national collaborations, funded projects, and recognized institutional leadership in microbial resource preservation.

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