Microbial Type Culture Collection and Gene Bank (MTCC)
CSIR-Institute of Microbial Technology (IMTECH)
Sector 39-A, Chandigarh-160036 INDIA

Suresh Korpole, PhD
Head, MTCC

Web Address: http://mtccindia.res.in
MTCC objectives

- *Ex-situ conservation* of microbial resources of India
- To provide *authentic microbial cultures* to research organizations, academic institutes and industries
- To act as a *depository of patent cultures (WIPO-IDA)*
- To provide *microbial related services* to scientific community
MTCC recognized as International Depository Authority on 4th October, 2002

Member of WFCC & Registered with WDCM

Contact information

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Visit us at http://mtccindia.res.in/
Administrative organization of MTCC

Director
CSIR-IMTECH

Head
MTCC

MTCC General Deposit
Service Sections
- Actinomycetes
- Bacteria
- Cyanobacteria
- Extremophiles
  - Fungi
  - Plasmid
  - Yeasts

Safe Deposit

International Depositary Authority
- Actinomycetes
- Bacteria
- Bacteria with plasmid
- Fungi
- Yeast
- Yeast with plasmid
- Bacteriophages
MTCC

National Facility

Repository

Services

Supply of microbes

Sponsored Activities

- Antimicrobial testing
- Microbial load analysis of products and raw materials
- Microbial contaminant testing
- Water quality analysis for microbes
- Air quality analysis for microbes

Total microbial strains ~14000

Repository:
- Actinomycetes 9%
- Bacteria 35%
- Fungi 43%
- Yeast 12%
- Plasmids 1%

Sponsored Activities:
- Antimicrobial testing
- Microbial load analysis of products and raw materials
- Microbial contaminant testing
- Water quality analysis for microbes
- Air quality analysis for microbes
Steps Followed in Strain Deposition

- **Strain receipt @ MTCC**
- **Microbiology service**
- **Service lyophilization**
- **Service Genotypic**
- **Restrict supply**
- **Reference strain**
- **IDA/Patent**
- **General**
- **Deposition upon confirmation**
- **Purity check**

**Anaerobic bacteria**

**Chromobacterium sp.**

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Microorganism types accepted as IDA deposits

➢ MTCC accepts bacteria, bacteria-containing plasmids, fungi, yeasts, bacteriophages

➢ Plasmids in hosts and/or as isolated DNA preparations belonging to the Hazardous Group 1 and 2 as per classification of Indian authority.

➢ Genetically manipulated microorganisms and isolated DNA will be accepted if they can be processed in BSL1 or BSL2 facility or confirm to Group 1 or 2 organisms.
Steps Followed in IDA Deposition

- Purity and viability of culture tested on receipt of the culture
- MTCC assigns an accession number
- Preservation (in -70 °C freezer, liquid nitrogen or freeze-drying or both depending on the type of organism)
- Statement of receipt (BP4) and viability (BP9) are sent to the depositor as per the guidelines
- Safe storage of microbes under scientifically controlled conditions
- Furnishing of samples according to regulations
Cryopreservation

Conventional slow freezing (SF)

- Slow freezing
  - Cells incubated in low concentration of cryoprotectant media
  - Some damaged cells, extracellular ice formation

Rapid freezing method

Vitrification (Vit)

- Vitrification
  - Cells incubated in high concentration of cryoprotectant media
  - More intact cells in glassy form avoiding ice crystallisation
Processing of Freeze Drying Ampules

- Preparation of ~2000 vials per month
- Removal of failed ampules and Processing new deposits
ISO 9001:2015 Certification of MTCC activities: High-end lyophilization unit for freeze dried ampule production and storage

Vision and Mission of MTCC

Vision

To be a premier microbial resource center providing state-of-the-art facilities to microbiology and microbial sciences research.

Mission

To conserve and harness the potential of microbial resources and provide superior services through scientific and industrial research community to supplying authentic microbial cultures, microbial characterization and diagnostics.

CSIR-IMTECH
cGMP facility at CSIR-IMTECH

Production of cGMP cell lines

Storage of cGMP cell lines

Financial support NBM-BIRAC
Year-wise Number of IDA Deposits
MTCC and stakeholders

Microbial Strains For General Supply
IPC Reference Strains

Stakeholders across the country

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Evolution of Traditional Microbiology: IDA deposits

Microbes to Metagenomes

Conventional Microbiology

Molecular Microbiology

Genome Sequence Seqcode

Synthetic Biology
IDA: Microbial Exploitation for Technologies

- Probiotics
- Bioactive agents & Antimicrobials
- Enzymes & Amino acids
- Organic acids & Solvents
- Plant growth Promoting Microbes & Substances
- Bioremediation
Evaluation of genetic and phenotypic consistency of *Bacillus coagulans* MTCC 5856: a commercial probiotic strain

Muhammed Majeed1,2 · Kalyanam Nagabhushanam2 · Sankaran Natarajan1 · Arumugam Sivakumar1 · Talitha Eshuis-de Ruiter3 · Janine Booij-Verink3 · Ynte P. de Vries2 · Furqan Ali3

Probiotic *Bacillus coagulans* MTCC 5856 spores exhibit excellent *in-vitro* functional efficacy in simulated gastric survival, mucosal adhesion and immunomodulation

Tanvi Shindea, b, Ravichandra Venuri, Madhur D. Shastrib, Agampodi Promoda Pereraa, Stephen Tristamba, Roger Stanleya, Rajaraman Eri b
Process optimization for butanol production from developed rice straw hydrolysate using Clostridium acetobutylicum MTCC 481 strain

Amrita Ranjan, Rahul Mayank & Vijayanand S. Moholkar
Trichoderma harzianum MTCC 5179: Biocontrol agent

Trichoderma Harzianum MTCC 5179, A Biocontrol Agent Against Phytophthora Foot Rot-Talc Formulation

Product Background

ICAR-Indian Institute of Spices Research, Kozhikode has successfully developed, field-tested Trichoderma harzianum MTCC 5179 in the talc form. This biopesticide can effectively manage Phytophthora foot rot and slow decline disease in black pepper.

Description

The production of black pepper is hampered by Phytophthora foot root caused by Phytophthora spp. in all black pepper growing countries. Talc formulation of T. harzianum MTCC 5179 can be used to successfully manage Phytophthora. This technology can be effectively used integrated pest management and in organic farming system.
Advances in single-cell biology
Led to methods for preserving individual cells or small cell populations
Microfluidic devices and specialized storage solutions cater to single-cell sample requirements.

Smart Freezers and Refrigerators
They are equipped with temperature and humidity monitoring, as well as alarms for deviations.
Provide real-time data and remote access to ensure sample integrity and safety.

Automated Sample Storage Systems
Robotic freezers and liquid nitrogen tanks, optimize sample storage and retrieval and minimize manual handling and reduce the risk of contamination or sample degradation.
Latest Technologies: Receiving and Storing Biological Material

Automated Sample Receipt Systems
Use robotics to handle, record incoming samples, reducing human error and improving efficiency

Barcode labels or Radio-Frequency Identification
Allows quick and accurate identification of samples, while RFID provides real-time monitoring and location tracking

Biobanking Solutions
Modern biobanks employ sophisticated tracking systems, high-capacity storage solutions, and state-of-the-art security measures
MTCC Scientific Outreach

NATIONAL SKILL DEVELOPMENT MISSION
राष्ट्रीय कौशल विकास मिशन

NSDC
National Skill Development

Signing of MoU between
COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH (CSIR)
& KENDRIYA VIDYALAYA SANGATHAN
for
Jigyasa

in the gracious presence of

Narendra Modi
Prime Minister

Dr. Harsh Vardhan
Union Minister for
Science & Technology and Earth Sciences

Prakash Javadekar
Union Minister of
Human Resource Development

Models of Engagement
- Student Apprenticeship Program
- Learning at Home
- Science and Maths Club
- Scientists as Teachers and Teachers as Scientists
- Teachers’ Workshop
- Student Residential Program
- Publication of student articles in CSIR Journals
- Summer vacation Program

Date: 16th July 2017 | Time: 14:00 hours
Venue: Hotel Ashir
Chandigarh, New Delhi

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Points to be Discussed

1) Procedure for the addition of new biological resources to IDA deposits

2) Procedure to modify/change/add or completely replace the name of the depositor in a situation where original depositor is not traceable (any specific requirement!)

3) How to revise the fee structure! Details of permission required from WIPO (Storage under Rule 12.1(a)(I) and Conversion of a deposit)

4) Does WIPO approval required for any change in the lab information management system (data loggers) or infrastructure

5) Training for the staff in member culture collections with or without financial support by WIPO to upgrade their technical skill

6) Forum created for the member culture collection of Budapest treaty