



सत्यमेव जयते

Department of Biotechnology
Govt. of India



Microbial Culture Collection, India



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Department of Biotechnology
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Culture Collections all over the world



Source: <http://www.wfcc.info/ccinfo/statistics/>



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Culture collections in India

Total culture collections : 29

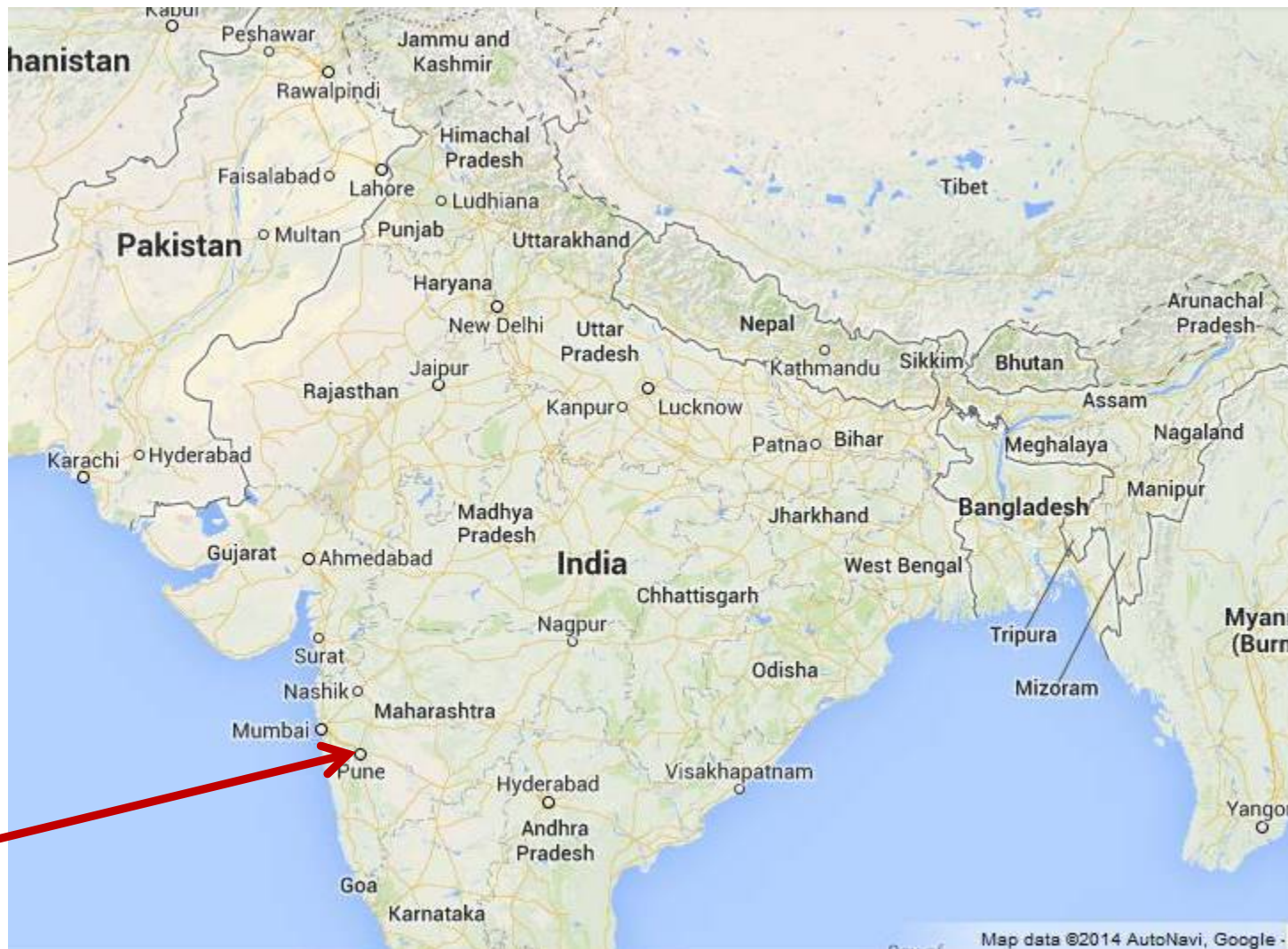
IDAs: 2

MCC, PUNE

**MTCC,
Chandigarh**



Location of MCC



MCC



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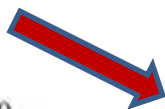


Overview

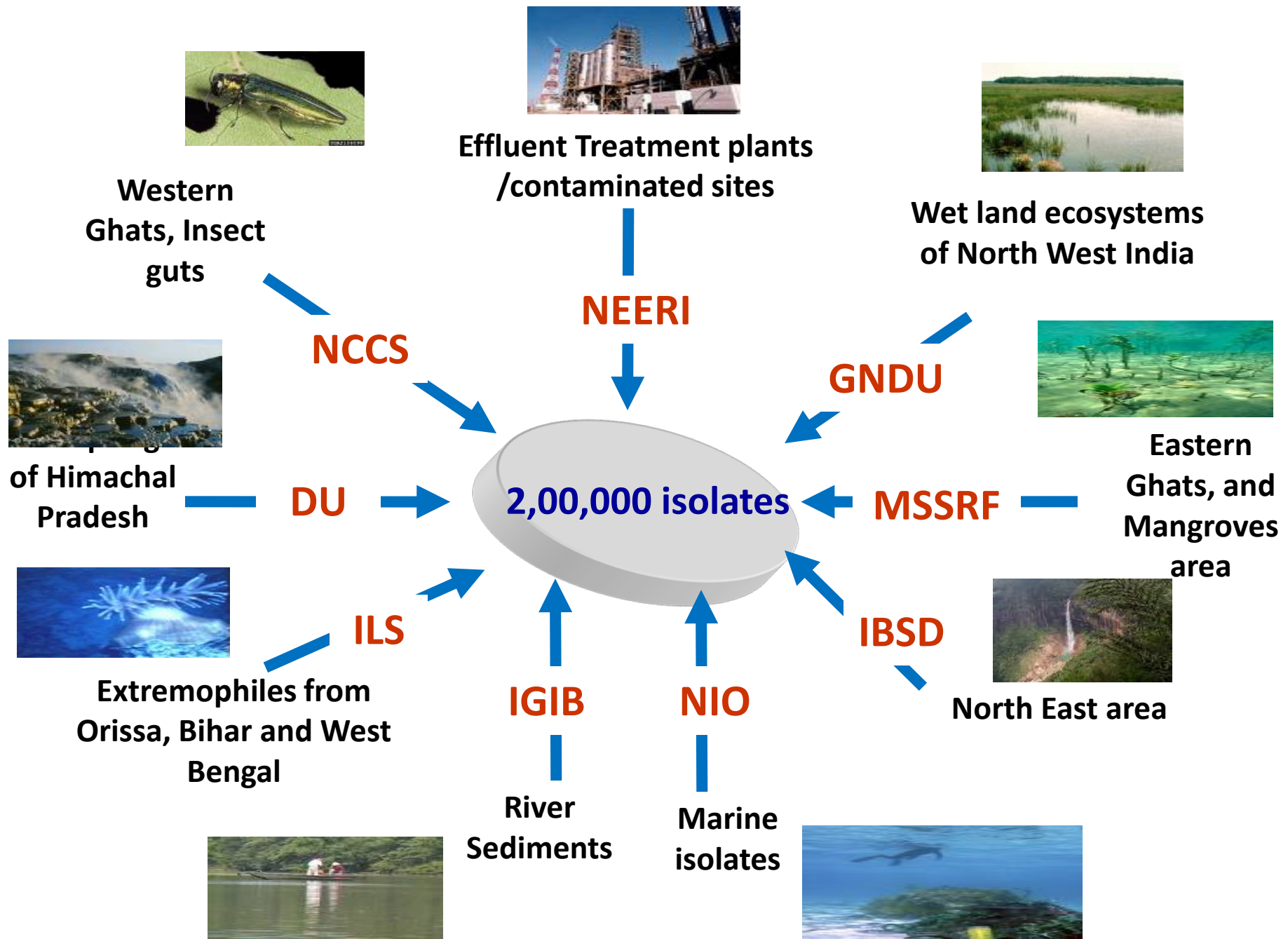
- **Significant progress to achieve a premier culture collection status.**
- Large array of services for systematics of microbial cultures
- Authenticates and preserves microbial cultures for public access
- `
- MCC is presently affiliated with NCCS, Pune. MCC got recognition as IDA by the WIPO, Geneva, Switzerland under Budapest Treaty on 9th April 2011
- Designated as National Repository under the Biological Diversity Act 2002 by Ministry of Environment and Forests, vide its Order No. 26-15/2007-CSC dated 8th July 2013

Genesis of MCC

Serial numbers	Institutes	Principal Investigators	Responsibilities
1	National Environment Engineering Research Institute, Nagpur	Dr. Hemant J. Purohit	Project Co-ordinator and microbial isolations from effluent treatment plants
2	M.S. Swaminathan Research Foundation, Chennai	Dr. Sudha Nair (Dr. V. K. Prabavathi)	Microbial isolations from mangroves and Eastern Ghats
3	Institute of Genomics and Integrated Biology, Delhi	Dr. V. C. Kalia	Microbial isolations from river sediments
4	Delhi University, Delhi	Prof. Rup Lal	Microbial isolations from hot springs of Himachal Pradesh
5	Guru Nanak Dev University, Amritsar	Prof. B. S. Chadha	Microbial isolations from wet land ecosystems of North West India
6	Institute of Life Sciences, Bhubaneswar	Dr. S. Das	Isolation of extremophiles from Orissa, Bihar and Bengal
7	National Institute of Oceanography, Goa	Dr. N. Ramaiah	Microbial isolations from marine sediments
8	Institute Biodiversity and Sustainable Development, Imphal	Dr. O. N. Tiwari	Microbial isolations from North East
9	National Centre for Cell Science, Pune	Dr. Yogesh Shouche	Microbial isolations from guts of the insects and soil from Western Ghat and preservation of all the isolates generated in the project
10	Piramal Life Sciences Limited	Dr. Arun Balakrishnan Dr. Saji George	Screening for anti infective, anti cancer, anti inflammation and anti diabetic activities



DBT's Microbial Mission Program





Services Offered by MCC

- Supply of Cultures
- General Deposit
- Safe Deposit
- IDA/Patent Deposit
- Identification Services.
 - 16S/18S rRNA gene, ITS region sequencing (~ 700 and ~1200 bp)
 - Phylogenetic Analysis
 - MALDI-TOF typing
 - FAME (fatty acid methyl ester) Analysis
 - G+C mol% (Tm)
 - G+C mol% (HPLC)
 - DNA-DNA Hybridization



Summary: Total Deposits

Culture type	received	accessioned	Under process
Bacteria	600	531	69
Fungi	167	120	47
IDA deposits	30	21	9
Safe deposits	2	2	0

Culture Supply

BSL 2

115 strains



Identification Services

> 16S/18S rRNA gene, ITS region sequencing

- In addition to the sequencing of deposit cultures for authentication, a total of approx. 500 cultures for bacteria and fungi together were sequenced at MCC.



Identification Services

> Phylogenetic Analysis

- Four requests for bacterial identification and phylogenetic analysis.
- Phylogenetic analysis is based on two methods; Neighbor joining and Maximum parsimony.
- Only type strain sequences from databases like RDP and EZTaxon are used.



Identification Services

> MALDI-TOF typing

- Since its installation in April 2013, the methods for sample preparation and analysis have been standardized for the Bruker MALDI-TOF MS.
- So far, only internal MCC cultures have been run on the instrument with very high congruence to rRNA gene sequence identification.
- MCC is now ready to provide MALDI analysis as a part of bacterial identification service.
- Till date we have identified around



Identification Services

> FAME Analysis

- FAME analysis as a service started in February 2013.
- Since then, a total of 37 bacterial cultures (17 anaerobic and 20 aerobic bacteria) have been analyzed on the MIDI system.
- The major anaerobic genera identified were *Bacteroides*, *Campylobacter*, *Tissierella*, *Treponema*, *Peptococcus*, *Clostridium*, *Coproccoccus* etc. Among the aerobes, *Sphingomonas*, *Virgibacillus*, *Bacillus*, *Paenibacillus*, *Pseudomonas*, *Rhodococcus*, and *Rhizobium* were identified as common genera.



Identification Services

> DNA-DNA hybridization and GC (mol %)

- DDH and GC content analysis as a service were started in June 2013.
- These services are now being utilized by scientists of MCC and other national institutes for classification and delineation of taxa at species and subspecies level.
- 40 cultures have been analyzed so far.



ISO Certification

- ISO 9001 was implemented in October 2013 for its general and IDA deposit services.
- A set of standard operating procedures (SOP) for various activities performed during processing of cultures for deposit have been devised.
- As per the ISO 9001 requirement, the first audit review for certification is due in early mid 2014.



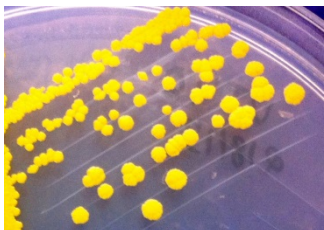
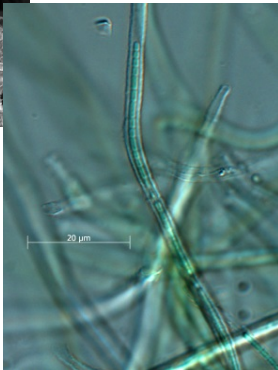
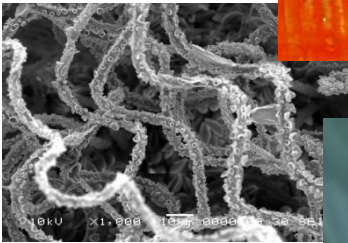
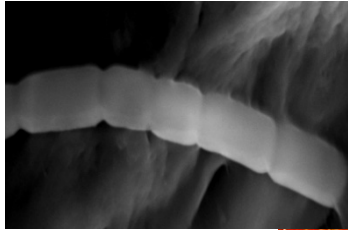
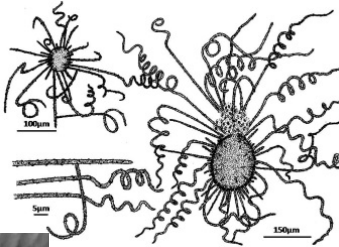
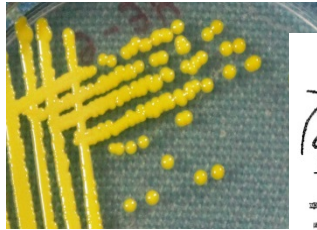


MCC Database Management System

- In order to efficiently perform activities, it was necessary to have a digital catalog of the cultures, and the transactions relating to these cultures.
- MCC got a web based system developed during the past 1 year.

Research:

New Taxa



Nitrincola lonarensis

Lonar lake, Maharashtra

Allonitrincola sp.

Lonar lake, Maharashtra

New genus

Lonar lake, Maharashtra

Rufibacter immobilis

Pangong lake, India

New genus

Industrial waste, Pune

New Cyanobacterial genus

Sugarcane Field, Ahmednagar

Chaetomium jatrophae

Endophyte on *Jatropha podagrica*

Arthrinium jatrophae

Endophyte on *Jatropha podagrica*

Alanobotryoshaeria indica

Soil from industrial area

Micrococcus aloeverae

Endophyte from *Aloe vera*

Pelistega indica

Human gut

Reclassification of *Physicola gilvus*

Reclassification of *Microterricola viridarii*

Gordonia sp. VT40

Coal mine drainage

***Domibacillus* sp. SD111**

Marine sediments,
Lakshyadweep islands, India

Bacillus enclensis

Mangrove Sediment

Fictibacillus enclensis

Marine sediment



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Research @ MCC



AMERICAN
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MICROBIOLOGY

genomeAnn

HOM

International Journal of

Indian Journal of Microbiology

September 2013, Volume 53, Issue 3, pp 247-252

Carl Woese: from Biophysics to ionary Microbiology

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Indian J Microbiol

DOI 10.1007/s12088-014-0475-7

IJSEM

International Journal of
Systematic and Evolutionary
Microbiology

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Description of *Domibacillus indicus* sp. nov., isolated from ocean sediments of Lakshadweep and emended description of the genus *Domibacillus*

Avinash Sharma^{1,3}, Sunil Dhar¹, OM Prakash²,
Venkat Raman Vemuluri², Vishal Thite² and Yogesh S Shouche²

This Article

Published online ahead
of print June 6, 2014.
doi:
10.1099/ijs.0.064295-0

IJSEM June 2014
ijs.0.064295-0

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☐ [Classifications](#)

New Taxa – Firmicutes and
Related Organisms

e and pH
C) hot

Scientist Responsibilities

Scientist	Institute	Facility	Taxonomic group
Dr. Amaraja Joshi	DU	-	Firmicutes
Dr. Amit Yadav	NCCS	-	Beta-Proteobacteria, Tenericutes
Dr. Ashish Polkade	IGIB	Lyophilisation, DNA sequencing	Actinomycetes
Dr. Avinash Sharma		IDA	Extremophiles
Dr. Kamlesh Jangid	NEERI	ISO	Verrucomicrobia, Gamma-Proteobacteria, Acidobacteria
Mahesh Chavadar	NIO	-	Alpha-Proteobacteria
Dr. Neetha Joseph	GNDU	FAME	Firmicutes
Dr. Om Prakash	MSSRF	Anaerobes, Quinone	Anaerobes, Gamma-Proteobacteria
Dr. Praveen Rahi	-	MALDI-TOF	Rhizobia
Dr. Rohit Sharma	ILS	Fungal Cultures	Fungi
Dr. Venkata Ramana	-	DDH, G+C content	Anoxygenic Photosynthetic bacteria
Dhiraj Dhotre		Phylogenetic analysis, Database	
Dr. Prashant Singh	IBSD	-	Cyanobacteria



facility





Large Scale storage facility





MIDI and DNA Sequencing Facility





Research Labs



MCC Website

**MCC**

Microbial Culture Collection

Affiliated to National Centre for Cell Science, Dept. of Biotechnology, Govt. of India

NCCS Mail	Home	Identification	Downloads	Services	Staff	Contact us
Carriers@NCCS	About us	Biochemical		Deposit of Cultures	Administrative	
Resources	Mission and Goals	Phenotypic		Supply of Cultures	Scientific	
NCCS Website		FAME		Workshops/Training	Technical	
		BIOLOG			IDA deposit	
News		Molecular	16S rDNA sequencing			
Congratulations ! for the selected candidates for the post of Scientist C and Scientist B ! Welcome to the MCC group !			G+C content			

Microbial Culture Collection

Welcome to Microbial Culture Collection !

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Symposium and Workshops

Two Day Symposium on Microbes: Molecular Ecology and Systematics

September 6 & 7, 2012 | Pune, India

Organised by
MCC-NCCS & AMI Pune Unit



HIMEDIA GENAXY ThermoFisher Scientific Life



Future Plans

- Additional services
 - Supply of DNA from strain available in public database
 - Anaerobic microbes
 - Supply of cultures for prospecting
 - Photoautotrophic
 - Hazard group 3 microbes
 - Phenotypic characterizations
-



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Scientists: 14; Consultants: 02

Technical Staff: 22

Administration and Others: 10



Current Staff at MCC



Acknowledgements

- **Committee members of European Culture Collection Organization 2014**
- **Department of Biotechnology, Government of India for funds.**

- **Thank you**

- “Somewhere, something incredible is waiting to be known.”

— Carl Sagan