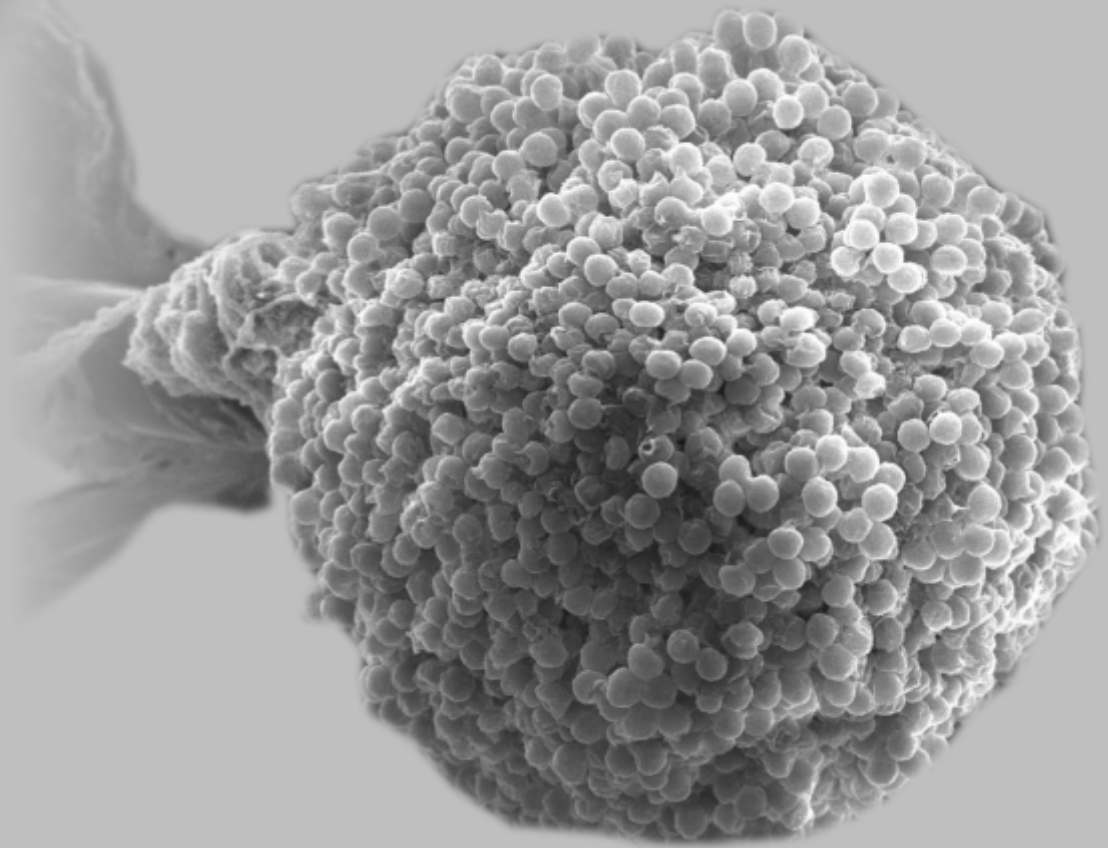




राष्ट्रीय कृषि उपयोगी सूक्ष्मजीव कल्चर संग्रह (रा.कृ.उ.सू.क.स)

National Agriculturally Important Microbial Culture Collection (NAIMCC)



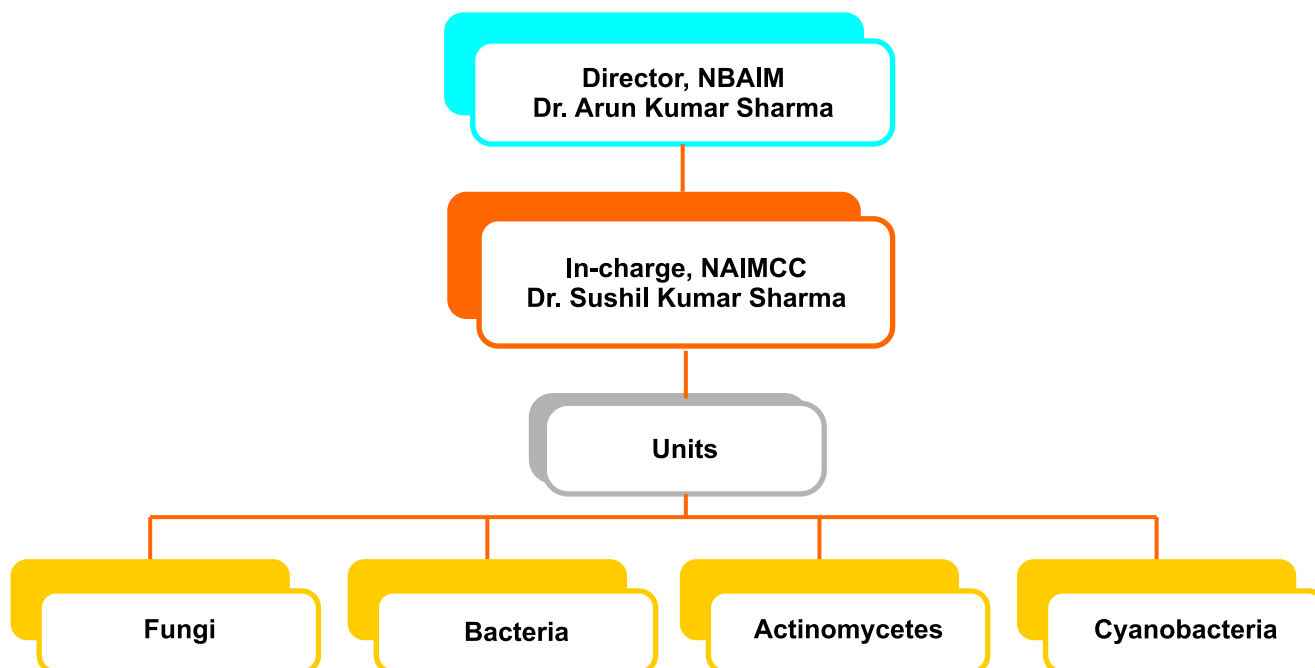
भा.कृ.अनु.प.-राष्ट्रीय कृषि उपयोगी सूक्ष्मजीव ब्यूरो
ICAR-National Bureau of Agriculturally Important Microorganisms

भारतीय कृषि अनुसंधान परिषद

Indian Council of Agricultural Research

(An ISO 9001:2008 Certified Institution)

Organizational Chart of NAIMCC



Curators :

Dr. Sushil K. Sharma (Bacteria & Actinomycetes)

Dr. Pawan K. Sharma (Fungi)

Dr. D.P. Singh (Cyanobacteria)

Dr. Prem Lal Kashyap (Fungi)

Dr. Hillol Chakdar (Bacteria & Cyanobacteria)

Mr. Karthikeyan Nanjappan (Bacteria & Archaea)

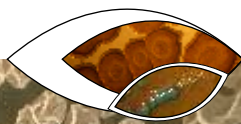
Dr. Pandiyan Kuppusamy (Bacteria & Fungi)

Technical Staff
Mr. Manish Roy
Mr. Alok Upadhyay

The picture on cover page is a scanning electron micrograph of *Aspergillus niger* NAIMCC-F-00292

Incharge, NAIMCC

E-mail : sks_micro@rediffmail.com; Phone : 0547-2530156





भारतीय कृषि अनुसंधान परिषद
Indian Council of Agricultural Research



राष्ट्रीय कृषि उपयोगी सूक्ष्मजीव ब्यूरो

NATIONAL BUREAU OF AGRICULTURALLY IMPORTANT MICROORGANISMS

Understanding and Conserving our National Heritage of Agriculturally Important Microorganisms

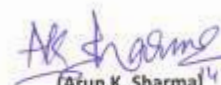
डॉ. अरुण कुमार शर्मा
निदेशक

Dr. Arun Kumar Sharma
Director

Foreword

Microorganisms are vital to human life and the environment we live in. They are backbone of ecosystems and almost 90% of their diversity is still unexplored and uncultured. They are potential source of many useful products and provide many solutions to healthcare, food security and industrial problems. The advances in molecular biology have resulted in the continued discovery of novel microbial taxa that are necessary to be preserved so as to make available to other users for research, teaching and biotechnological exploitation. These microbes have been source of marvelous discoveries for many bioactive molecules of agricultural, industrial and pharmaceutical importance. There are more than 2.4 million microorganisms stored in 678 culture collections which are registered in World Data Centre for Microorganisms (WDCM). Microbial Culture Collections, also known as Microbial Resource Centres, play a crucial role in collection, maintenance, conservation and distribution of quality assured living microbial strains. The ICAR-National Bureau of Agriculturally Important Microorganisms (ICAR-NBAIM) which came into existence in 2001, established the National Agriculturally Important Microbial Culture Collection (NAIMCC). The culture collection of ICAR-NBAIM has been recognized as a National Repository for Agriculturally Important Microorganisms (AIMs) by the National Biodiversity Authority (NBA), Ministry of Environment and Forests, Government of India. Currently, NAIMCC is an affiliate member of World Federation of Culture Collections (WFCC) and is registered with WDCM with registration number 1060. The current microbial holdings of NAIMCC include bacteria, fungi, actinomycetes and cyanobacteria collected from diverse niches of the country. The Bureau is also maintaining a duplicate set of microbial cultures at Culture Storage Facility developed in NBPGR, New Delhi to save this microbial wealth from unforeseen natural calamities.

I extend my best wishes and appreciation to Dr Sushil K. Sharma, Principal Scientist (Agricultural Microbiology) & In-charge, NAIMCC, Dr Pawan K. Sharma, Principal Scientist (Plant Pathology) and other associated staff of the Bureau for their contribution in the field of microbial resources management. The profile of the NAIMCC has been prepared to give an idea into the objectives, facilities, activities, services and the nature of microbial cultures available in the collection and their potential use in the service of the farmers in agriculture and allied sectors.


(Arun K. Sharma) 14.01.15
Director-NBAIM

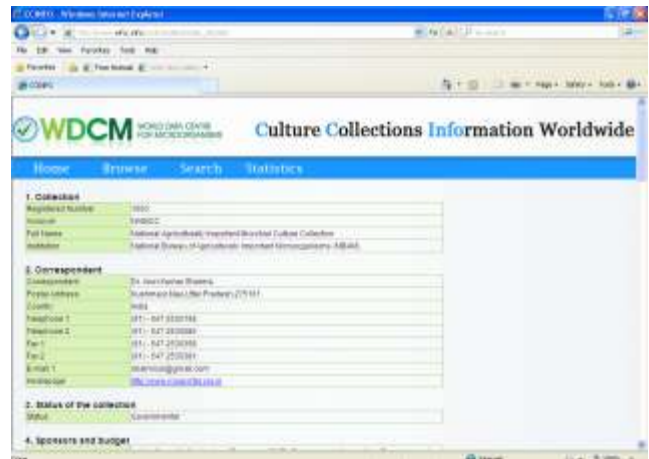
रा.कृ.उ.सू. ब्यूरो – कुसमौर, मऊनाथ भंजन – 275 101, उत्तर प्रदेश, भारत
NBAIM - Kusmaur, Mau Nath Bhanjan - 275 101 Uttar Pradesh, India
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>> www.nbaim.org.in

National Agriculturally Important Microbial Culture Collection (NAIMCC)

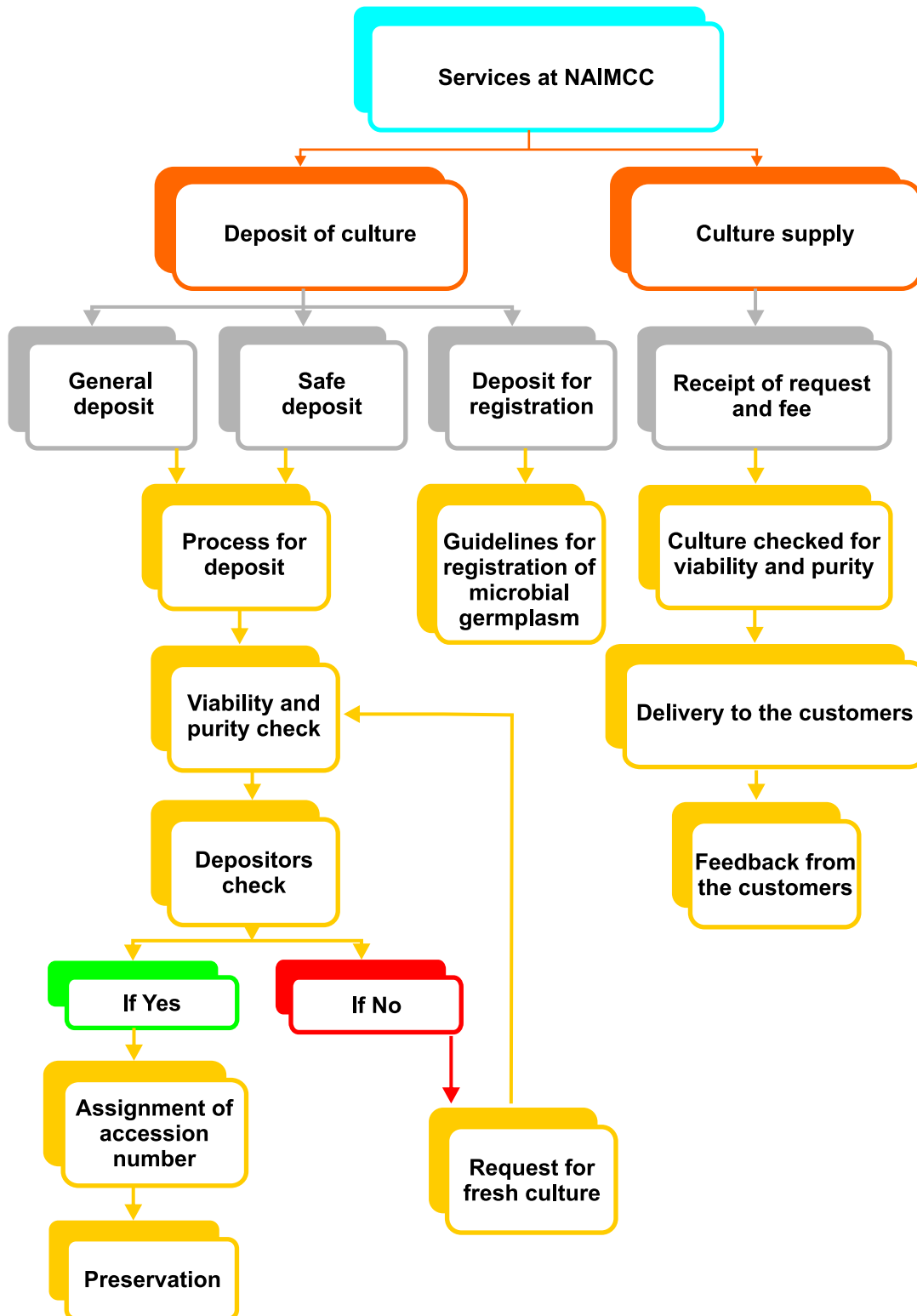
National Agriculturally Important Microbial Culture Collection (NAIMCC) has been established in ICAR-National Bureau of Agriculturally Important Microorganisms (ICAR-NBAIM), Maunath Bhanjan, Uttar Pradesh. The culture collection draws its own guidelines laid on the principles and objectives of the World Federation of Culture Collections (WFCC). It is an affiliate member of WFCC and is registered with World Data Centre for Microorganisms (WDCM) with Reg. No-1060. The NAIMCC is a National Microbial Bio-resource Facility. The NBAIM is recognized as a National Repository by National Biodiversity Authority (NBA), Ministry of Environment and Forests, Govt. of India. The NAIMCC holds four categories of microbial resources namely, bacteria, fungi, cyanobacteria and actinomycetes. Currently, its holding has 5375 microbial strains which include 3200 fungi, 2023 bacteria (including actinomycetes) and 152 cyanobacteria isolated from various ecological niches, like soil, plant, hot water springs, mangroves, forests and insects, etc.

Objectives

Main objective of NAIMCC is to serve as National repository to conserve microbial germplasm and to provide reliable microbial cultures to research institutions and industry.



Overview of activities at NAIMCC



History of NAIMCC

Microorganisms are prevalent in natural habitats including extreme environments such as glaciers, deep sea vents, hot springs, saline condition, contaminated soil, waste water discharge, etc. India is considered as a hot spot of biodiversity in the world owing to its varied climatic conditions. Microbial diversity analysis is a dynamic area of research as it provides vast data which can be exploited for development of useful products for use in agriculture, industry and pharmaceutical. Still huge microbial diversity remains uncultured, unidentified, uncharacterized and undocumented. Keeping this in view, ICAR established NBAIM in the year 2001 in order to collect, maintain and conserve microbial heritage of India. The Bureau started functioning at old Building of NBPGR, New Delhi and was shifted to Kushmaur, Maunath Bhanjan, UP on June 1st, 2004. The National Agriculturally Important Microbial Culture Collection (NAIMCC) also came into existence in the year 2004 with storage capacity of 10000 AIMS. In addition the Bureau has established a new Culture Storage Facility in the building of National Bureau of Plant Genetic Resources, Pusa Campus, New Delhi, for safe upkeep of the duplicate set of microbial cultures preserved at NBAIM. It was inaugurated by honorable DG ICAR and Secretary, DARE, (GoI), Dr. S. Ayyappan on January 1st, 2013.



Preservation of Microorganisms

NAIMCC follows modern techniques of short-term and long-term preservation of microorganisms. Depending on the type of AIMS, following preservation methods are being used:

1. Short-term storage of active cultures in slants at 4°C for 2 months period.
2. Bacterial and fungal storage in glycerol stock at -80°C (upto 2 years).
3. Mineral oil storage for the preservation of filamentous fungi and yeast for 2-3 years period at low temperature.
4. Long-term storage of microbes by means of lyophilization and cryopreservation (upto 20 years).
5. Cyanobacterial cultures are being maintained in actively growing condition.



Storage of Fungal Cultures in Mineral Oil

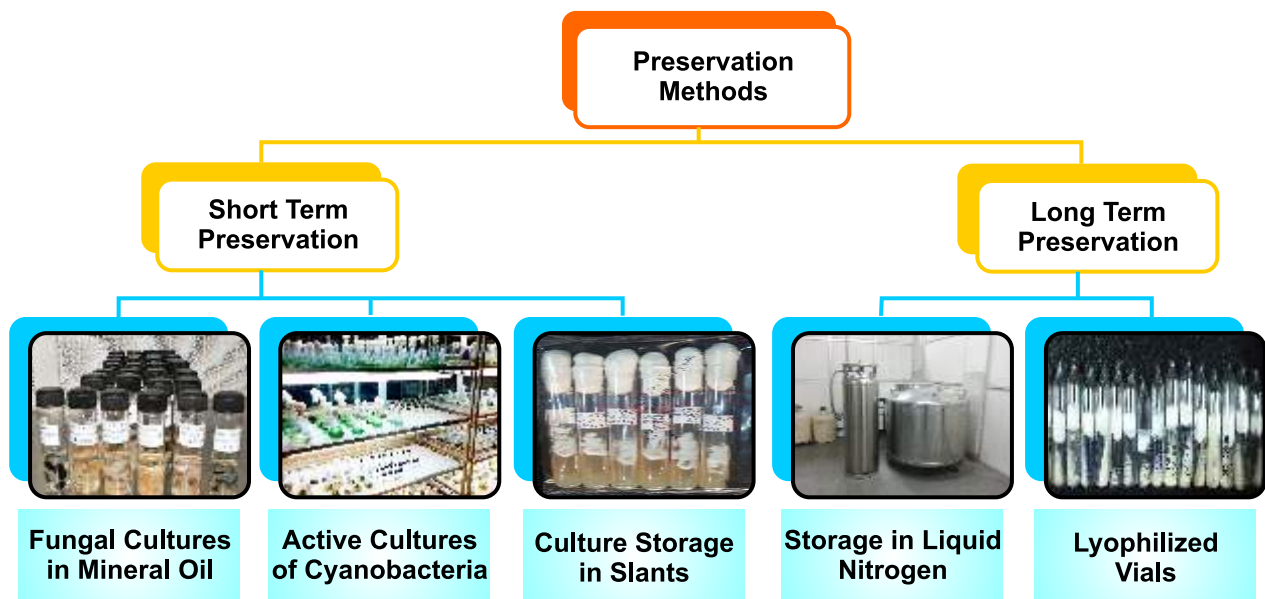


Lyophilized Vial Storage



Live Cyanobacterial Cultures

Overview of Preservation Methods



Facilities at NAIMCC

- Lyophilizers , Scanning electron microscopy, Stereomicroscope, Fluorescent microscopes, FAMEs profiling systems, Cryopreservation system, Deep freezers (-20°C & -80°C) , Growth chambers for cyanobacterial culturing, Cold room facility, Bio-safety cabinet and Gradient temperature reducer



Laminar Air Flow



Microscopy



Scanning Electron Microscopy



Lyophilizer



Cryo Tanks



Gradient Temperature Reducer

- A facility for the supply of microbial cultures is available at NAIMCC. The request for supply of cultures should be addressed to either the Director or I/c NAIMCC, NBAIM, Maunath Bhanjan. The information regarding microbial strains is available in the form of catalogues published in 2011 and its supplement in 2014. This information is also available on websites www.mgrportal.org.in and www.nbaim.org.in. Most of the cultures are being supplied in active form.
- Cultures can be deposited in NAIMCC as general or safe deposit. A complete passport data, along with active pure cultures, are required to be submitted to the NAIMCC for acquiring accession number.
- A registration facility of elite microbial germplasm is offered by NBAIM for the microbes having distinct and unique characteristics.

The image displays the Microbial Culture Collection Database (MCCD) software interface. The main window shows a list of microbial strains with columns for Scientific Name, Culture Type, and Genus. A detailed view of an 'Alternaria solana' entry is shown, including fields for Accession Number (NAIMCCF-00117), Scientific Name, and State (Bengal). Overlaid on the screenshot are images of the 'Catalogue of Microbial Cultures' (2011 and Supplement-2014) and an 'Accession Card'.

Microbial Culture Collection Database (MCCD : a software), accession card, acknowledgement card and catalogues of microorganisms

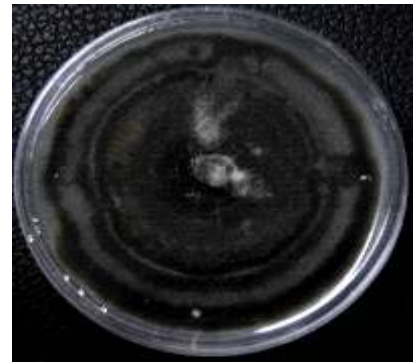
Glimpse of Microbial Diversity at NAIMCC



Fusarium illudens CABI-256214
NAIMCC-F-00779



Gymnascella dankaliensis CABI-119450
NAIMCC-F-01219



Colletotrichum curcumae CABI-288937
NAIMCC-F-00647



Achaetomium sp. CABI205029
NAIMCC-F-02412



Chaetomium longicolleum CABI-256285
NAIMCC-F-00518



Gliomastix CABI-354106
NAIMCC-F-01170



Bacillus sp. IARIS7
NAIMCC-B-01666



Rhizobium phaseoli FB-2
NAIMCC-B-00434



Bacillus marisflavi IARIS14
NAIMCC-B-01562



Haloarcula quadrata M4(2)
NAIMCC-B-01790



Bacillus megaterium IARI-S-46
NAIMCC-B-01648



Calothrix javanica 449
NAIMCC-C-00095

Exploration and sampling from some of the habitats of microorganisms



**Hokka (*Hyphaene indica*)
Branch Palm in Diu**



**Sea Beach Near
Diu Fort**



**Ice Sample Collection
Leh**



**Umsaw Reserve Forest
Meghalaya**



**Jhoom Cultivation Site
Manipur**



**Vegetation in Marshy Area
of Diu Islands**



**Buxa Tiger Reserve
West Bengal**



**Bhayender Salt Pans
Mumbai**



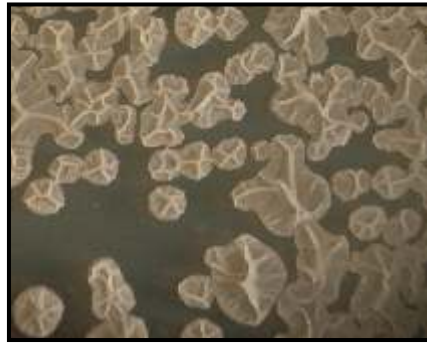
**Pangong Lake
Leh**

Acknowledgements: We acknowledge the contributions made by Dr. Alok K. Srivastava (Senior Scientist), Dr. D. P. Singh (Senior Scientist), Dr. Deepak T. Nagrale (Scientist), Dr. Roshan Kumar (Research Associate), Mr. Manish Roy (Technical Assistant) and Mr. Alok Upadhyay (Senior Technician) in the preparation of NAIMCC profile.

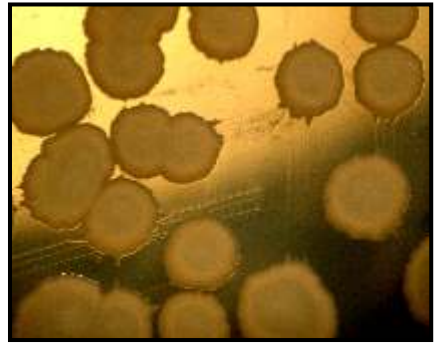
Bacterial colony under stereomicroscope



Bacillus aquimaris SNL18
NAIMCC-B-01609



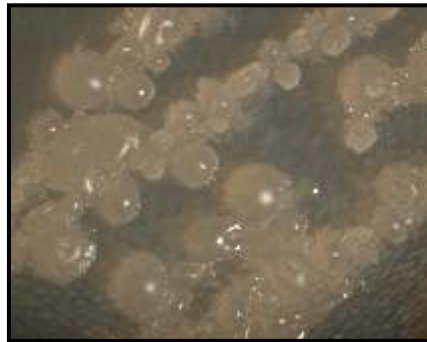
Brevibacterium sp. L11
NAIMCC-B-01134



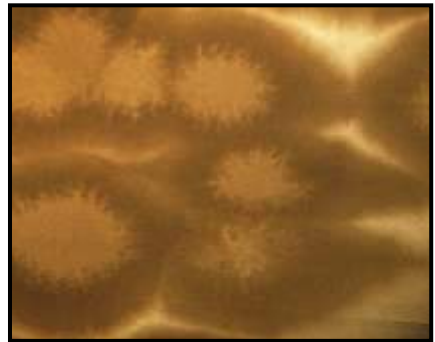
Bacillus aryabhatai MDSR 14
NAIMCC-B-01442



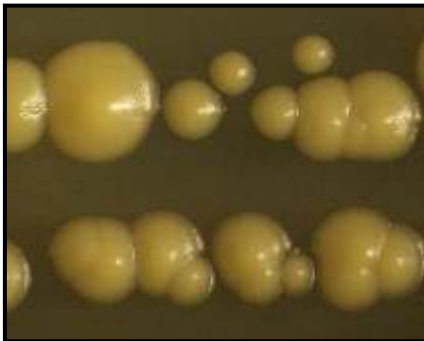
Lactobacillus fermentum 138
NAIMCC-01446



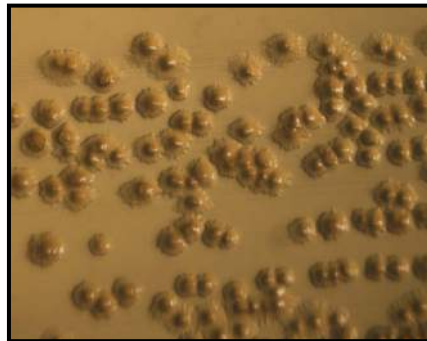
Bacillus licheniformis AMAAS353
NAIMCC-B-00953



Bacillus thuringiensis 18
NAIMCC-B-00953



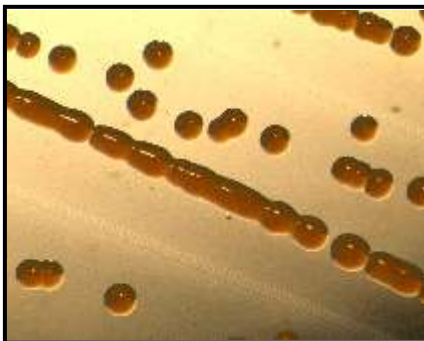
Bacillus circulans NCIM 2107
NAIMCC-B-00081



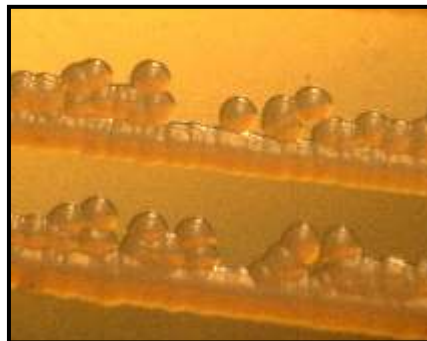
Pseudomonas aeruginosa P17
NAIMCC-B-00931



Jeotgaliococcus halotolerans IARI ABR5
NAIMCC-B-01567



Ralstonia solanacearum RS10257
NAIMCC-B-01626



Pantoea agglomerans KP59
NAIMCC-B-01527



Lysinibacillus sphaericus IARI R11
NAIMCC-B-01581

ICAR-NBAIM

कार्य अधि-पत्र

कृषि की संपोशनीय बढ़त को बनाये रखने और तत्सम्बन्धी अनुसंधान एवं मानव संसाधन विकास कार्यों को पूरा करने के लिए, कृषि हितार्थ देशी एवं विदेशी सूक्ष्मजैविक संसाधनों के अधिग्रहण और प्रबन्धन हेतु राष्ट्रीय और अन्तराष्ट्रीय स्तर पर एक प्रमुख केन्द्र के रूप में कार्य करना।

Mandate

To act as a nodal centre for acquisition and management of indigenous and exotic microbial genetic resources for food and agriculture, and to carry out related research and human resource development for sustainable growth of agriculture



Conceived and Edited by

**Sushil K. Sharma, Pawan K. Sharma, Hillol Chakdar,
Sandeep Saini and Ankita Verma**

Published by

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Director- NBAIM**

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