Summary Report from Microbial Culture Collection, National Centre for Cell Science.

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Research Interests

1. Microbial diversity and taxonomy
2. Microbial identification and phylogenetics
3. Metagenomics

I am working as a bioinformatics scientist in Microbial culture collection, National Centre for Cell Science, Pune, India from 2009. By training I have done my Masters in Bioinformatics and Ph.D. in Biotechnology. In MCC, I am mostly associated with data management and phylogenetic analysis of bacteria and fungi. I have an experience in working on bacterial genomics and metagenomics with various next generation

sequencing platforms like illumina, Ion torrent, 454 and PacBio.

Microbial Culture Collection, National Centre for Cell Science, Pune

ABSTRACT

The main objectives of MCC are to act as a national depository, to supply authentic microbial cultures and to provide related services to the scientific community working in research institutions, universities and industries. The training course is good platform for different culture collections to get together and learn different things on microbial taxonomy and systematics. Training course is well designed and covers areas like basic bacterial and fungal taxonomy to modern techniques like 16S rRNA gene sequence based analysis, MLST and genomics. MCC would like to actively participate in the activities of WDCM and cooperate in future.

Key words: MCC, India, NCCS

1. Brief introduction of your Culture Collection.

About us

The Microbial Culture Collection (MCC), is a national facility funded by the Department of Biotechnology (DBT), Government of India. MCC is affiliated to National Centre for Cell Science, Pune, India and is an affiliate member of the World Federation for Culture Collections (WFCC) and is registered with the World Data Centre for Microorganisms (WDCM, registration number 930). The main objectives of MCC are to act as a national depository, to supply authentic microbial cultures and to provide related services to the scientific community working in research institutions, universities and industries.

MCC was recognized by the World Intellectual Property Organization (WIPO), Geneva, Switzerland as an International Depository Authority (IDA) on April, 2011. The deposit of microorganisms under the Budapest Treaty is recognized to fulfill the requirement of patent procedure in 55 member countries.

Ministry of Environment and Forests, Govt. of India has designated MCC as a National Repository for microorganisms under the Biological Diversity Act 2002 vide its Order No. 26-15/2007-CSC dated 8th July 2013. MCC scientists are actively involved in research programs in microbial diversity, metagenomics, ecology and taxonomy using both classical and molecular approaches.

Mission and Goals

1. As a frontline Research and Development Centre
2. The center focuses on basic research in the areas of microbial diversity, microbial taxonomy, microbial genomics and proteomics etc.
3. As a National Microbial Culture Collection Facility
4. Isolation and Identification of microorganisms from various environmental niches.
5. Preservation of microbial biodiversity from niche areas as metagenomic libraries.
6. Development of new strategies for isolation of "uncultivable" microbes.
7. To provide consultation services for patent deposits, preservation, propagation, biodeterioration, Industrial problems, biosystematics and microbial biodiversity issues etc.
8. To serve as National facility for microbial culture collection, deposit and the supply of authentic microbial cultures.
9. To serve as an International Depositary Authority (IDA).
10. As a focal point of Human Resources Development
11. To establish and conduct workshops, seminars, symposia and training programs in the area of microbial identification, preservation and advanced areas of microbial taxonomy/phylogeny.

Services offered at 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

Deposit of Microorganisms

MCC welcomes deposit of microorganisms which are important for scientific and educational purposes as well as to fulfill mandatory deposit requirement for patent procedures. At present MCC accepts bacteria, fungi and plasmids belonging to HAZARD GROUP 1 and 2 only. After checking purity, viability and identity, each culture is preserved by methods known to be good for long term preservation. MCC has four types of deposit service: General Deposit, Safe Deposit, Patent Deposit

and IDA Deposit under the Budapest Treaty.

1. General deposit (public access)
2. Deposit for patent procedures (national)
3. Deposit under the Budapest Treaty (IDA)

Supply of Cultures:

Cultures listed in MCC catalogue (hard copy/electronic) are available for teaching and research purposes.

MCC supplies cultures bearing its own accession numbers. It does not supply cultures having acronym and accession numbers of other culture collection(s). However, MCC may have equivalent cultures (prepared from cultures received from other culture collections and that have been given MCC accession numbers). Equivalent cultures may not be identical to the original ones because genetic drift may occur.

Request for supply of culture(s) should be sent on the MCC culture order form mentioning the name and MCC accession number of the microorganism(s).

Appropriate fee in the form of a DD in the name of Director, NCCS, payable at Pune must accompany the culture order form.

Students/project assistants/research associates should get their request for cultures endorsed by guide/principal investigator or by Head of the

Department.

For hazardous microorganisms, one needs to provide evidence that the appropriate facility is available to work with such organisms and he/she has the requisite permission from the institute to work on such organisms.

A request for supply of cultures from outside India has to provide an import permit for the procurement. Such a request may need clearance from the appropriate authority in India (HMSC) before cultures can be sent.

The cultures are generally dispatched by registered mail within two weeks after receiving a request.

Identification Services

MCC scientists have considerable experience in characterisation of diverse group of bacteria and fungi using both conventional as well as molecular approaches. They are actively engaged in research on microbial diversity, taxonomy and ecology. With such expertise MCC offers services related to extensive characterization of bacteria and fungi using variety of tools and techniques. These are as follows

1. 16S/18S rRNA gene sequencing (~ 700 bp)
2. 16S/18S rRNA genesequencing (~1200bp)
3. Phylogenetic Tree
4. FAME (fatty acid methyl ester) analysis

5. G+C mol% (Tm)
6. G+C mol% (HPLC)
7. DNA – DNA Hybridization
8. MALDI-TOF
9. Phenotypic characterization (will be available soon)
10. BIOLOG system (oxidation pattern of 95 C substrates) (will be available soon)
11. API NE (will be available soon)
12. API 50CH (will be available soon)
13. API ZYM (will be available soon)
14. API-Vitek (will be available soon)

MCC website http://www.nccs.res.in/mcc/index.html

Figure 1: MCC homepage

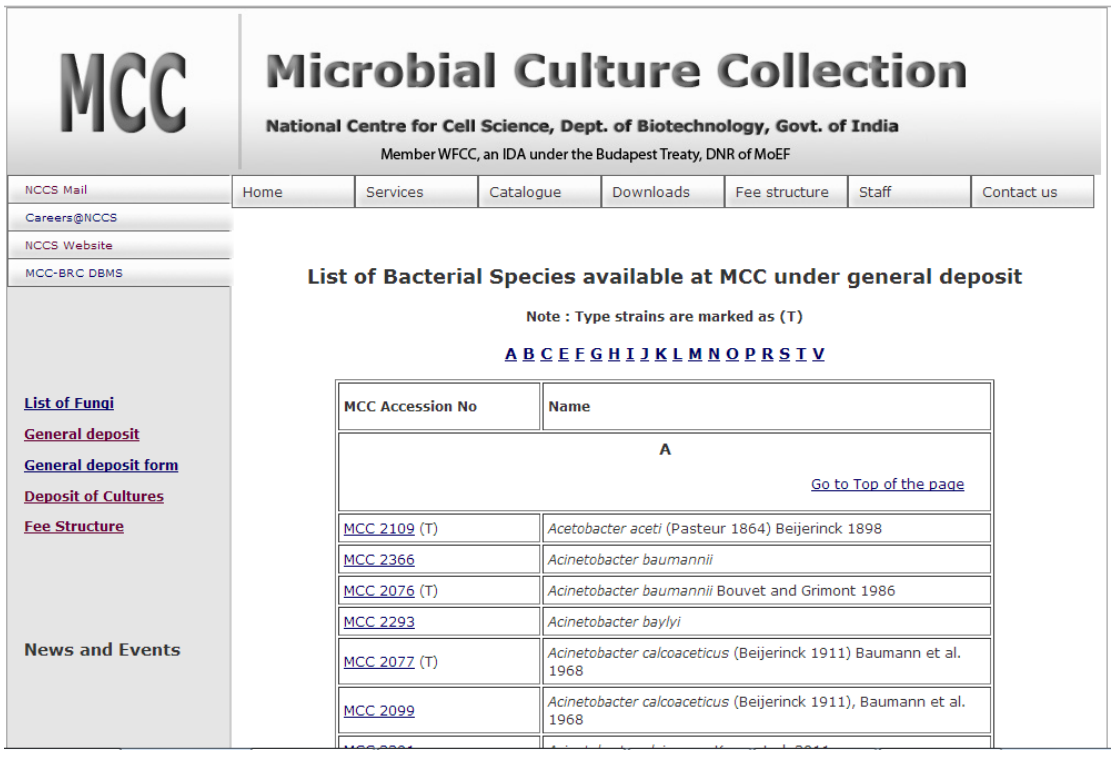

Figure 2: Online catalogue for bacteria

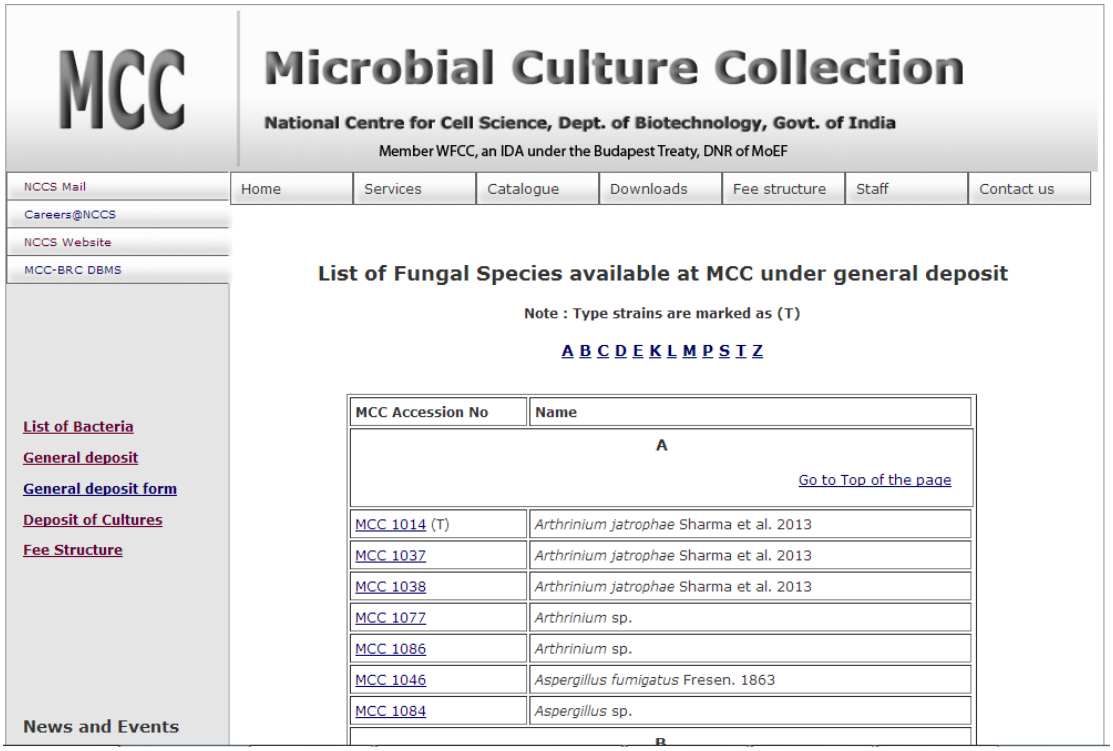

Figure 3: Online catalogue for fungi

2. Benefit from the training courses.

This training course is good platform for different culture collections to get together and learn different things on microbial taxonomy and systematics. Lectures on genomics and taxonomy were useful. This will benefit us by giving us a platform to deposit our strain information on GCM.

3. Suggestion on WDCM work.

WDCM is making a significant contribution towards giving a common stage to cultures collections. The WDCM serves as the data center of the WFCC and provides an important information resource for all microbiological activities. Additionally, the WDCM acts as a coordination center for data activities among WFCC members.

Some of my personal suggestions in order to improve the accessibility are as follows:

1. GCM website should have search box on the home page itself. It will make easier for users to search for cultures.
2. Bulk method for making cultures visible or invisible.
3. CCINFO, GCM can have a single username and password so it becomes easier to manage.

4. Comments or suggestion on the training courses.

Training course is well designed and covers areas like basic bacterial and fungal taxonomy to modern techniques like 16S rRNA gene sequence based analysis, MLST and genomics. I think if the course emphasizes more on data practices it would be really helpful.

5. Suggestion on further cooperation between WDCM and your collections.

MCC would like to actively participate in the activities of WDCM. Being one of the prime institutions of India we may also contribute to the activities which WDCM is conducting. We would be happy to conduct such training courses in India as well.