

Report of WDCM Training Course for Developing Countries on Microbial Resources Information Management and Utilization

Personal Introduction:

I am, Ashraf Esmailizad, graduated (*M.Sc*) in Microbiology from Azad University of Karaj, Iran (*GPA 18.28*). I'm currently pursuing doctoral degree in microbiology in Azad University of Iran. Currently, I am working in soil as a supervisor in microbiology laboratory. My research is focused on beneficial aspects of Mycorrhizal fungi and PGPRs (Plant Growth Promoting Rhizobacteria) in agriculture. Apart from this I have been given the responsibility of a co-curator of our microbial culture collection.

I have more than 13 years of research experience in soil microbiology and plant tissue culture. Within this time frame I have published more than 9 research papers and also presented 7 papers in national and international conferences. I have also been involved in the in-house publications which include more than 28 final reports.

Email: noblesse55@gmail.com

CCSM (Culture Collection for Soil Microorganisms)

WFCC registration number 891



Soil & Water Research Institute, Department of Soil Biology

Imam Khomeini Blvd., Meshkin Dasht Road, Standard Square, Karaj, Iran

Telephone: +98 2636213852, +98 9122349023, Fax: +98 2636210121

Abstract

CCSM is a biological resource center for microorganisms isolated from soil. CCSM is also bound to supply authentic microbial cultures and also provide services to the scientific community working in research institutions, universities and industries. Training by WDCM is a step forward to make culture collection more visible. Training course is well designed and covers areas like basic bacterial and fungal taxonomy to modern techniques like 16S rRNA gene sequence based analysis, database management, preservation methods, MLST and genomics. CCSM would like to actively participate with WDCM and cooperate in future.

Key Words: WDCM, CCSM, Database.

Brief introduction of our Culture Collection

CCSM is the only culture collections of soil microorganism in Iran which is a national facility dedicated to isolation, preservation, distribution of authentic cultures and identification of agriculture industrially important microorganisms, in Soil Biology department, in Soil and Water Research Institute (SWRI).

SWRI is a governmental research institute focusing on the different aspects of soils of Iran. It founded in 1952, in Tehran, IRAN.

Soil Biology department, the youngest department of 8 departments in SWRI, Started researching on Rhizobia, in 1995 and more than 300 isolates of Rhizobia were collected. In 1998 it started researching on Mycorrhizal fungi and in 2003 research on PGPR, Azotobacter, Azospirillum, Pseudomonas, Bacillus was established. Each project commonly leads us to some strains with definite properties important from agronomic point of view. For Example, we have more than 300 strains of Rhizobial isolated from root nodules of common beans, peas, faba beans, soybeans, alfalfa and clover.

So with the aim of maintaining and protecting these agricultural valuable strains, the head of soil biology department, Dr. Hadi Asadi-Rahmani attended in a training course in Philippines regarding Microbial Culture Collections, in 2004. Training course on the Establishment, Operation and Management of a Microbial Culture Collection Laboratory was held in national Institute of Molecular Biology and Biotechnology (BIOTECH), in University of the Philippines, Los Banos College, Laguna (UPLB) and then in 2006 our collection was registered to WFCC-MIRCEN World Data Centre for Microorganisms (WDCM) with the registration number 891.

We have also some reference strains received from international collections

(ATCC, DSMZ) or scientists from other countries in our collection.

Every year we have some governmental and industrial projects, so these strains deposited for further studies, research projects or use by university students.

Actually we support the needs of research community, requirements of teaching and industry. As our culture collection is basically for agronomic important microorganisms we have taken up various government supported and industry supported projects e.g.

Some strains shows very good results and have potential to be use as biofertilizers. The strain was first patented and then used for biofertilizer mass production in the industry.

We had recently finished a project and introduced a *Microbacterium* sp. that can increase growth and yield of the wheat by 15% compare to blank un-inoculated plants.

So, we are maintaining very important microbial cultures for the country.

some species and subspecies on CCSM

Genus_Name	Species_Epithet and Subspecies_Name
<i>Achromobacter</i>	<i>marplatensis, xylooxidans</i> , sp
<i>Acinetobacter</i>	sp
<i>Agrobacterium</i>	sp
<i>Arthrobacter</i>	<i>agilis</i> , sp
<i>Azorhizobium</i>	<i>caulinodans</i>
<i>Azosprillum</i>	<i>brasilense, lipoferum</i> , sp
<i>Azotobacter</i>	<i>chroococcum</i> , sp
<i>Bacillus</i>	<i>subtilis, aerophilus, methylotrophicus, sonorensis</i> , <i>safensis, tequilensis, humi, firmus, stenotrophomonas, pumilus, fordii, thuringiensis</i>
<i>Bradyrhizobium</i>	<i>japonicum</i> , sp

<i>Brevibacillus</i>	<i>parabrevis</i>
<i>Brevibacterium</i>	<i>halotolerans</i>
<i>Burkholderia</i>	<i>sediminicola</i>
<i>Cellulosimicrobium</i>	<i>funkei</i>
<i>Chryseobacterium</i>	<i>lathyri, ginosenosidimutans, taiwanense, piperi</i>
<i>Citrobacter</i>	<i>amalonaticus</i>
<i>Cupriavidus</i>	sp
<i>Enterobacter</i>	<i>hormaechi, xiangfangensis, cloacae, sp</i>
<i>Enterococcus</i>	sp
<i>Kocuriarosea</i>	<i>rosea</i>
<i>Lactobacillus</i>	<i>plantarum, buchneri</i>
<i>Lysinibacillus</i>	<i>fusiformis</i>
<i>Mezorhizobium</i>	sp
<i>Microbacterium</i>	sp
<i>Micrococcus</i>	<i>luteus</i>
<i>Novosphingobium</i>	<i>aromaticivorans</i>
<i>Ochrobacterium</i>	<i>thiophenivorans, anthropi, intermedium</i>
<i>Pantoea</i>	<i>agglomerans, septica, brenneri, ananatis</i>
<i>Pedobacter</i>	<i>duraquae</i>
<i>Penebacillus</i>	<i>ginsengarvi</i>
<i>Pseudomonas</i>	<i>putida, fluorescens, aeruginosa, koreensis, mohnii, helmanticensis, frederiksbergensis, azothoforman, gessardii, chengduensis, granadensis, protegens, brassicacearum, sp</i>
<i>Rahnella</i>	<i>aquaticus</i>
<i>Rhizobium</i>	<i>leguminosarum bv.phaseoli, leguminosarum bv. viciae, pusense, sp</i>
<i>Sinomonas</i>	<i>atrocyanea, sp</i>
<i>Sinorhizobium</i>	<i>meliloti</i>
<i>Sphingomonas</i>	<i>koreensis</i>
<i>Staphylococcus</i>	<i>warneri</i>
<i>Stenotrophomonas</i>	<i>rhizophila</i>

CCSM at the beginning was a specialized research collection totally dependent to the research projects of department of Soil Biology. By the time, CCSM was developed in terms of services and the number of deposits. So, regarding the current status, CCSM is a Major germplasm collection like NifTAL and USDA germplasm. Our Services regarding to CCSM are providing inoculants, live and lyophilized cultures (Bacteria and Fungi), identification of the microorganisms, training course and duplicate storage. There are 5 personnel working in the CCSM with more than 800 culture deposits, 1 Ph.D. (Soil Microbiologist) and 2 M.Sc. (Microbiologist) and 2 B.Sc. (Microbiologist).

These cultures are supplied mostly in freeze dried ampoules. Another storage manner of deposits include preserving in agar slants and glycerol broth method at -70°C. We have following facilities at CCSM 400 m² laboratory; all basic equipments for a microbiology lab. (autoclave, laminar air flow, incubator, freezers, microscope), freeze dryer, ampoules storage facility- equipments for DNA works (PCR, imaging system, ultracentrifuge) and deep freezers (-80°C).

Future programs for CCSM are publishing online and printed catalogue, improving system management (software) , providing taxonomy services, deposit exchange with other culture collection.

Benefit from the training courses

It will be helpful in preparing our catalogue, edit and upload catalogue on GCM with more details on WDCM webpage.

Training has helped me to get familiar with 14 other culture collections and also to China General Microbiological Culture Collection. Interactions with the other participants and staff from CAS involved in the course may led to the future collaborations with our collection. Other benefits from the training are global partnership via joining Global Catalogue of Microorganisms, increasing knowledge on different databases, data management, ABC (Analyzer of Bioresource), Nagoya Protocol (NP) and visibility to our culture collection.

Training has helped me in getting a knowledge in taxonomic studies and get familiar with polyphasic approaches for such studies. Lectures related to genome analysis will be very helpful in developing pipelines for genome annotation at our collection.

Suggestion on WDCM work

Helping culture collection at very frequent intervals to improve the websites or any change related to the WDCM policy and also in improving system management.

Comments or suggestion on the training courses

Training was organized very nicely. I have few suggestions as below:

- More practice compare to lecture would be appropriate.
- Visits to the facilities of the CAS would add expertise within the participants.
- Internet connection was not working for most of the time.

Suggestion on further cooperation between WDCM and your collections

Contribution of WDCM to organize workshop and symposium to educate member of culture collections and help them developing expertise in the field of microbial taxonomy and techniques related to microbial diversity.

CCMC will be looking forward to get help of WDCM to organize training and practical programs for the other culture collection at CCMC on new technologies in taxonomy and the other related Knowledge.