

# Summary report of Training Course of Microbial Resources Information Management and Utilization for Developing Countries

## Personal introduction (less than 100word) (Times New Roman, 14)

Myself, Dr. Jayant Khire is Head, NCIM Resource Centre, Pune, India is basically microbiologist working in resource center for last 30 years. My Ph. D. work was on industrial enzyme glucose (xylose) isomerase from actinomycete. I worked as Post doctoral research fellow at University of Pennsylvania, Philadelphia, USA. I visited KRIB, South Korea and RMIT University, Melbourne, Australia for collaborative work. Apart from culture collection work I work in the area of animal feed enzyme, phytase. Our work includes isolation, purification, characterization, strain improvement, up scaling submerged and solid state fermentation from *Aspergillus niger* and its application in animal feed, agriculture and human health. I am also working on phytases from yeast for its application in functional foods and feed. At present 6 students are working under my guidance for their Ph. D. and 5 have already awarded Ph. D. degree in Microbiology/Biotechnology. I am having government aided and industry sponsored projects for important metabolites from microorganisms and published more than 50 papers in international journals along with Indian and US patents.

*Name of your culture collection (Times New Roman,14)*

NCIM Resource Centre (WDCM 3)

## **ABSTRACT**

*(Times New Roman,14)*

The training course started with lecture by Dr. Philippe Desmeth on building trust literally and practically and necessary legal policy for culture collections. Dr. Junica Ma has given introduction regarding WDCM to all participants. Dr. Lyle Glowka given perspective on marine genetic resources while Dr TaeEun Jin discussed regarding management of biological resources in Korea. The importance of Nogoya compliance was elaborated by Dr. Geoff Burton. Dr. Man Cai has taught us how to characterize bacterial strains for taxonomic purpose. Regarding classical taxonomic study of fungi Dr. Youzhi Wang has given through insights. Then we visited with CGMCC. We are very much impressed with the infrastructure facility such as liquid nitrogen and lyophilization of cultures. Prof Hideaki Sugawara taught us regarding annotation and integrated retrieval of microbial genome sequences. Dr. Chen Chen informed us regarding how to carry out microbial genome analysis using SILVA/MLST which was followed by data practice for the same. Dr. Wu Linhuan gave us summary of WFCC Global Catalogue of microorganisms which was very useful for all participants. It was

followed by group discussions by each participant. This was very useful as for the first time we could interact with each other to know their strength of culture collection and specific mandate. Prof. Mamadou Gueye told us regarding biodiversity management and risk assessment. He gave specific example of application of Rhizobium cultures using peat as carrier for nitrogen fixing bacteria for soil inoculation for leguminous plants. We came to know WDCM databases viz. WFCC homepage, CCINFO and reference strain by the informative lecture by Dr. Zhang Jianyuan. She also explained us regarding data standards of microbial resources which was followed by appropriate data practices. We were also taught by Dr. Wu Linhuan regarding WDCM analysis of bio-resources citations. This gives clear cut idea of the performance of your culture collection for carrying out scientific research.

**Key words:(Times New Roman, 14)**

NCIM, culture collection, data base, industrial applications

### **1. Brief introduction of your Culture Collection.**

National Collection of Industrial Microorganisms (NCIM) or NCIM Resource Centre is a national facility dedicated to isolation, preservation, distribution of authentic cultures and identification of industrially important microorganisms. It is one of the oldest culture collections in India which was established in 1951 and

operates as a dedicated Resource Centre in the National Chemical Laboratory (NCL), Pune, India. Starting with just 400 cultures, the NCIM holds more than 4000 cultures today. These cultures are supplied to research organizations and industries within India and abroad. These cultures produce industrially important metabolites such as enzymes, antibiotics, organic acids, pigments etc. We supply around 1000 cultures per month to end users in form of lyophilized ampoules. Our external cash flow (ECF) through supply of cultures is around Rs. 150 lakhs (\$ 2.5 lakhs) per year. These cultures are supplied mostly in lyophilized ampoules. We preserve our biodiversity by regular subculture, soil culture, glycerol broth method and lyophilization. We have total 3 scientists and 5 technical persons to maintain NCIM facility. Additionally we have 8 project assistants working on various government and industrial projects and 10 research fellows doing Ph. D. Thus NCIM is engaged in maintenance and preservation of biodiversity, phenotypic and genotypic identification of microorganisms, supply of cultures and working on government funded and industry sponsored research project.

As our culture collection is basically for industrially important microorganisms we have taken up various government supported and industry supported projects e.g.

- Strain Improvement for citric acid production (Cargill Dow Polymer, USA)

- Strain Improvement for lactic acid production (NMITLY project)
  - Process improvement for ethanol production
  - Strain improvement for bio-ethanol production
  - Bioconversion of fusel oil
  - Microbial Enhanced Oil Recovery (MEOR)
  - Bio-surfactant production from Marine *Acinetobacter*
  - Microbiological conversion of erythromycin to clarithromycin
- Biodiversity & Bio-transformation
- Value added polymeric materials from renewable resources :  
Lactic acid and Lactic acid based polymers (NMITLY project)
  - $\alpha$ -Galactosidase from thermophilic fungus *Humicola* sp
  - $\alpha$ -Galactosidase from thermophilic *Bacillus stearothermophilus*
  - $\beta$ -Galactosidase from *Rhizomucor* sp
  - Bile salt hydrolase from lactic cultures
  - Phytase from yeasts for its application in food and feed
  - Studies on entamopathogenic fungi (*Metarrhizium anisoplea*):  
Solid state fermentation (SIBRI project)
  - Studies on chitinolytic enzymes for production of chitin/chitosan
  - Phytase from *Aspergillus niger*: Strain improvement, up scaling, purification and its application in animal feed, food, agriculture and soil amendment.

Our institute: National Chemical Laboratory, Pune, India



We have following facilities at NCIM Resource Centre

1. Microscopes



2. Fermenters (upto 13 lit capacity, NewBrunswick, USA)



3. HPLC



4. Lyophilizer and ampoules storage facility



## 5. Rotavapour and concentrator



Culture collections play an important role in the area of biotechnology. But their meaningful exploitation is possible only if the properties of cultures are properly documented and the information is easily accessible. We are very happy to inform you that 4<sup>th</sup> edition of NCIM Catalogue of strains is published in 2014 and is now available in form of book and CD. It is also uploaded on NCL website. We have facility for phenotypic identification. Last year we have introduced facility for genotypic identification. So the strains supplied to research organizations and industries are genetically authenticated. We have large scale lyophilization (freeze drying) facility which is made available for our customers. We do take research projects from government organization and industries which helps us to improve our infrastructure facility.



All researchers in the field of microbiology can help in building up the culture collection by depositing cultures that have scientific and industrial value. NCIM is fully geared up to help scientists to exploit the rich biodiversity of this country for the benefit of the common man.

We appeal to everyone to come forward and deposit new cultures in NCIM, thus adding to the wealth that can be shared by a large number of users.

## **2. Benefit from the training courses.**

I am very happy to enumerate following benefits of the present training course

- a. Visibility of NCIM Resource Centre, Pune, India to international scientific community.
- b. Knowledge of the efforts taken by WFCC and WDCM to help culture collections to upload their culture data to get visibility of their novel strains and exchange of data for scientific interactions
- c. To know the recent trends in software management helpful for updating the data of various culture collections
- d. Development of human resources for management of culture collection

## **3. Suggestion on WDCM work.**

- a. More practical work to educate regarding uploading of data of

culture collections

- b. To educate the participants for the financial resources available to participants for up gradation of their culture collection
- c. WDCM web site is very good but few people in developing country may find it little difficult for users friendly

**4. Comments or suggestion on the training courses.**

- a. Experts for training can visit countries like India where number of culture collections are more so many culture collections can get benefit of training in India.
- b. More data practice to solve any problem during uploading of the data base

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

- a. More frequent correspondence for follow up of workshop for uploading the data of the cultures to WDCM.
- b. NCIM Resource Center, Pune, India holds more than 4000 industrially important cultures for which we have published online catalogue along with hard copy and CD. Is it possible for WDCM to convert it to “Excel” format for its inclusion in WDCM catalogue? Dr. Wu Linhuas has kindly agreed for the same.
- c. It will be very helpful for the members of developing country to

know various funding agencies, if available, for their human resource development and technical support.