Summary Report

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

Personal introduction

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Ever since I was very young, the passion for nature and animals was very strong and it followed me over the years; this has lead me to obtain a bachelor and a master degree in Environmental Sciences – "Ecology and Environmental Protection" (Fac. Biology, 2007) and "Chemical pollution of the environment" (Fac. Chemistry, 2012). I am in the final year of my PhD (Fac. Biotechnology) and my research work is focused on bioprospecting studies, which involve isolation of different microbial strains from various natural biotopes in Romania in order to obtain biological active substances and biomaterials.

Since 2012, I am working as a curator of CMII Culture Collection, responsible for the environmental protection and scientific researcher in the INCDCF-ICCF, Romania.

Collection of Industrial Importance Microorganisms, CMII-ICCF-WFCC 232

ABSTRACT

National Institute for Chemical-Pharmaceutical Research & Development, INCDCF-ICCF, Romania hosts the ***CMII-ICCF-WFCC 232 Culture Collection of Industrial Importance Microorganisms****. Established in* ***1952****, the* ***CMII collection,*** *part from the Pharmaceutical Biotechnologies Department, holds* ***over 400 strains of bacteria, yeasts and fungi*** *as producers of pharmaceuticals and similar ingredients, biopolymers, amino acids, enzymes, single-cell proteins, vitamins, bio-pesticides, and bio-stimulants.*

This report describes a short overview of CMII Culture Collection, WDCM training course and future expectations for further cooperation.

Key words: WFCC 232, CMII, ICCF, microorganisms of industrial importance, Romania

1. Brief introduction of your Culture Collection.

National Institute for Chemical-Pharmaceutical Research & Development, INCDCF-ICCF, Romania hosts the CMII-ICCF-WFCC 232 Culture

Collection. INCDCF - ICCF is organized as 6 main departments involved in R&D projects applicable by technology transfer and innovation. In the field of microbial biotechnology, ICCF has a specialized department since its beginning (1949) and a successful activity of research and development, whose results have meant more than 500 patents for inventions and technologies, out of which a large number was transferred in industry. Only over the last 7 years, ICCF has been coordinating around 17 microbial biotechnology projects in national R&D programs. The biotechnology department has a notable experience regarding processing of agricultural wastes as renewable energy sources and collaborates with the Analysis Department (GLP certified) to perform studies and determinations, checking the conformity to required EU standards. Projects on environment and agriculture, plus the services offered by various studies especially the analytical ones, contribute to a high experience accumulated over time.

About CMII Culture Collection:

Established in **1952**, the **CMII collection,** part from the Pharmaceutical Biotechnologies Department, holds **over 400 strains of bacteria, yeasts and fungi** (**other 102 strains** are pending identification). Since then, CMII as an in house Culture Collection has grown in the frame of projects financed by public authorities and companies.

Since 1981, CMII has been registered at the **World Federation of Culture Collections** (id number **WFCC 232**). In **2014**, CMII joined in a pan-European distributed research infrastructure, **Microbial Resource Research Infrastructure – MIRRI**, as a **collaborating party** and **national node** in Romania. The collection strains are of industrial importance (biohazard groups 1 and 2) as producers of pharmaceuticals and similar ingredients, biochemicals, as well as for veterinary and agrochemical use. A lot of them were obtained through programs of mutagenesis and artificial selection and found industrial applications: biopolymers, amino acids, enzymes, single-cell proteins, vitamins, bio-pesticides, bio-stimulants. 60 strains and procedures are protected by patents.

The CMII-ICCF main directions are focusing on bioactive substances and biomaterials synthesis, R&D upstream and downstream processes, mostly with pharmaceutical applications. They are further developed to medicines or similar health products by pharmaceutical technology, analytical and pharmacological characterization studies in the institute. Therefore, the main function of CMII is to maintain strains of research interest, most of them having potential industrial application in amino acids, enzymes, probiotics, biopolymers SCP, food and fodder additives production, green chemistry.

Some examples of the biosynthesis technologies provided through the research studies, which were mainly conducted in the frame of many national projects are summarized here: obtainment of bacterial xylanase, pullulan (type), curdlan and xanthan polyssacharides, biodegradable biopoliesters, "Bactosan" – product of veterinary use and "Bactobiogen" - product for human use, both to restore normal intestinal flora, microbial ecological products with biostimulation and biofertilization action, biological products used for the control of pathogenic fungi attacking culture plants, probiotics with microorganisms (for veterinary use), chromiated yeast biomass with hypoglycemiant action, yeast biomass bioproduct enriched in chromium and selenium with antioxidant and antidiabetic action, seleniated yeast biopreparate from *Saccharomyces cerevisiae* cultures with antioxidant action etc.

The CMII Culture Collection has an online catalogue (the third edition was developed in accordance with the CABRI instructions Common Access to Biotechnological Resources - Laboratory Procedure for Microorganisms; it contains the descriptions of 250 strains, in their vast majority of biotechnological interest - other 208 strains are currently being characterized and verified, and other 102 are pending identification). The origin of the strains is mainly constituted from natural biotopes, other Service Collections throughout the country and abroad or

exchanges among collections in the country under RDI contracts. The strains are tested and characterized regarding their biotechnological potential and used to obtain derivatives or pharmaceutical products. The techniques applied in CMII - ICCF - WFCC 232 for long-term preservation of microorganisms are slant cultures, lyophilisation and liquid nitrogen storage.

The catalogue can be downloaded through the Institute webpage:

http://cfarm.ncpri.ro/sct_1/page_58/culture_collection_of_industrial_importance_microorganisms_-_cmii.htm

2. Benefit from the training courses.

The major benefits provided by the WDCM training course could be described in terms of both, personal and institutional.

Therefore,

personal achievements could be characterized as follows: above all, as a participant at WDCM training course I am tremendously grateful for this opportunity, which has met some of the most important development needs in terms of my starting career as a scientific researcher, in the field of microbiology. Secondly, truly appreciated was the possibility to broaden my perspective over what does worldwide research work mean. And last but not least, since the beginning of my trip to China until now, I have found a very pleasant feeling about myself, regarding some

particular matters, such as communication and social abilities, as well as adapting to a totally new environment; I have been quite unexpectedly impressed about how significant and continuously extensive these could be, in order to fulfill my curiosity and exploring needs.

On the other side,

from the institutional perspective, as a scientific researcher, main curator of CMII Culture Collection and responsible for environmental issues, I would like to highlight the main benefits provided by WDCM training course:

Foremost,

one of the substantial gains is principally related to the worldwide visibility; the CMII's necessity to be visible at international level has started a long time ago, when the WFCC identification number (232) was given due to the its registration at the World Federation of Culture Collections, in 1981. At the same time, uploading our strains information in the Global Catalogue of Microorganisms (GCM) has been considered a great step forward to promote CMII's research work.

The WDCM training course came as a very well appreciated and helpful winning for our young researchers, who are working hard to maintain, revive and the most important, to reveal the great biotechnological resources of an "old-fashioned" Culture Collection as a real treasure for

economic development, taking into account the actual necessities for green technologies, so mandatory for a clean and healthy environment. Furthermore, the course lead to a "communication network" established between the participants from different countries, which, hopefully, could be considered as a starting "platform" for future collaborations.

WDCM offered an opportunity for small collections to take a closer look on how some of the most prestigious collections in the world and not only, are working together in order to disseminate their knowledge and management practices. Information about their services, preservation and identification methods, research projects, databases, standards and future expectations were also provided. With this occasion, idea of developing a national network in Romania has immediately started to "bloom", as a solution to bring together all our small Culture Collections in order to be more visible for industry.

The main interest of CMII is focused on promoting the industrial importance microorganisms preserved in the collection, beyond national borders and this training course offered useful information about the infrastructure necessities, the efficient management of biological resources, the compliance with Nagoya Protocol and CBD and different ISOs (ISO TC 276 – Biotechnology, especially). Lectures about different resources networks, biotechnology, metagenomics, and newest research

in pathogens taxonomy, bioinformatics or the latest publications in the field were also, greatly appreciated.

It was a real honor to participate at the WDCM 50th anniversary, where some of the most renowned science names in the world presented their latest research results.

3. Suggestion on WDCM work.

The huge efforts made by the WDCM team in order to establish and continuously develop some of the most recognized databases in the world are highly appreciated. It is a major step for Culture Collections, by promoting and supporting them to become more visible for worldwide users. Offering easy access at related information bring together both, scientific community and global industry.

As a beginner user of WDCM databases and a young curator, I have only a few suggestions, although from a personal perspective:

- e.g http://gcm.wfcc.info/cc/ - it would be very useful if you can introduce a short description for each of the following terms: ORDERS, DEPOSITS and MTA, so as all of database users (the beginner ones and those from very small collections, especially) to know what should be uploaded. Also, it will be useful if you can provide some example formats…yes, every Culture Collection is different, but a minimum set of information can be used as a model

to adapt those documents, according to every collection's specific needs, of course.

- ABC database for microorganisms search should be better promoted; I have not seen any reference on WDCM website for this database.
- It would be easier if a special function for "password/user name recovery" will be designed.
- Developing an "Industrial users" section will be a useful tool, so as the worldwide industrial demands and possible "supplies" from different research areas (e.g microorganisms, technologies, bio-products, drugs) easily connect.
- Organizing workshops for worldwide Culture Collections about the following thematic: "Why Standardization is so important nowadays, and how can it be implemented, even for small CCs, with limited financial resources?"; motivation - advantages, how to do it, what is mandatory, etc.

4. Comments or suggestion on the training courses.

First of all, I am very thankful for the opportunity which WDCM offered me; participating at this training course was a real chance to get familiarized with data management, so mandatory for curators.

Besides very informative lectures, WDCM training course offered an

enlarged picture of how could biological resources be managed efficiently. Many examples of databases were provided and the trainees were "updated" with the latest research trends in various research areas. Although, I expected that Microbial Biotechnology will receive a more focused interest, because it is a valuable resource for the industry's sustainable development.

A better Wi-Fi connection would be appreciated in order to easy handle with the data practice tasks.

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

First of all, CMII expects WDCM to continue supporting small Culture Collections to become widely known.

Secondly, as a Culture Collection of Industrial Importance Microorganisms, a further cooperation regarding Biotechnology promotion through WDCM work will be greatly appreciated.

It would be an idea if WDCM will concentrate some efforts in order to develop and implement a strategy to help small CCs to "grow-up" their economic potential. For example, in some developing countries WDCM's workshops could be organized, throughout the industrial users and researchers meet and present their needs and offers, respectively. In this case, WDCM, considered the most representative foundation for

bio-resources worldwide visibility could act as a promoter, encouraging the private sector to take a closer look at microbial resources and their promising biotechnological potential (state of art for some of the most successful implemented technologies using bio-resources).

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