

WDCM Training Course for Microbiome Data Sharing

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Personal introduction: I work as a leading researcher in the laboratory of Collection of microorganisms at the Institute of Microbiology of the National Academy of Sciences of Belarus. I am supervises collection of bacteria. My scientific interest is spore-forming bacteria and their bacteriophages. I am responsible executor of the state program: «Creation of a collection of bacteriophages and test-cultures of bacteria as the basis for the creation of biological products» and lead a group of researchers working in this direction. I am the head of the postgraduate studies of our Institute by speciality: Microbiology and Biotechnology including nanobiotechnology.

BELARUSIAN COLLECTION OF NON-PATHOGENIC MICROORGANISMS

Abstract

On the most important results of the work of the Institute of Microbiology of the National Academy of Sciences of Belarus to ensure the preservation and proper functioning of the Belarusian collection of non-pathogenic microorganisms included in the State Register of Scientific Objects that constitute the national treasure.

Key words: Belarusian, collection, non-pathogenic, bacteria, bacteriophages, fungi, biotechnology, microbiome, training course.

1. The Belarusian collection of non-pathogenic microorganisms (BCM), functioning on the basis of the Institute of Microbiology of the National Academy of Sciences of Belarus, was included in the State Register of Scientific Objects, which constitute the national treasure, at number 5, by the Resolution of the Council of Ministers of the Republic of Belarus of 11.06.2002. The BCM numbers over 2100 strains of microorganisms various taxonomic groups - bacteria, bacteriophages, mycelial and yeast fungi. On the basis of the collection, the Bank for industrial-value microorganisms, the Bank of DNA of cultures of industrially valuable microorganisms, the 3 specialized collections of micromycetes-agents of biodeterioration of building materials, phytopathogenic micro-organisms-are the foundations for the creation and effective use of biological control agents and microorganisms for xenobiotic destructors. In 2016, within the framework of State Enterprise "High technology and engineering", scientific research works were started to create two new specialized collections: bacteriophages and indicator cultures of bacteria as the basis for the development and effective use of biological control agents; genetic structures, necessary for obtaining strains-overproducers of practically important compounds. All strains stored in the BCM are registered in the Institute of Microbiology of the National Academy of Sciences of Belarus.

The collection carries out international cooperation with the world's leading collections of cultures, together with foreign colleagues, carries out research aimed at developing collection funds and developing modern software tools for the effective functioning of national collections of microorganisms in Belarus, Russia (All-Russian Collection of Microorganisms (VKM), All-Russian Collection of Industrial Microorganisms (VKPM)), Latvia, Ukraine, Moldova, Kazakhstan, Sweden, Poland.

BCM is registered in the World Federation of Collections of Cultures (2007: WDCM, acronym BIM, collection number 909) and is a significant collection of CIS and world countries. The 6th edition of the WDCM Handbook (2013) provides information for the first time about the Belarusian collection of non-

pathogenic microorganisms. In 2014 - 2016 years. The WDCM initiative on the unification of collection databases and the taxonomic revision of micro-organisms of various taxonomic groups "Microbial Resources Information Management and Utilization for Developing Countries" provides the Federation with the English version of the BCM electronic catalog (WDCM-BIM 909). A taxonomic description of the collection of the BKM collection for the 7th edition of the Directory of the World Federation of Cultures of Microorganisms (2016-2017), World Directory of Culture Collections (Seventh Version, 2016-2017, <http://www.wfcc.info/ccinfo/>).

The staff of the collection carry out fundamental scientific research aimed at further development, preservation and operation of BCM: isolation, screening, selection and certification of biotechnologically valuable cultures of microorganisms; isolation and characterization of genomic DNA samples of industrially valuable microorganisms; characteristics of the physiological and biochemical properties of the collections of the collection fund for use as objects of new biotechnologies; oriented fundamental research related to phenotypic and molecular genetic identification of microorganisms, as well as applied scientific research including long-term storage of cultures by lyophilization and cryopreservation methods, implementation of the procedure for national patent deposition of industrial producer strains. Since 2015, within the framework of the state program of biotechnology, BCM employees are carrying out research work on microbiological analysis and conservation of microorganisms collected in the coastal areas of East Antarctica. Morphological and physiological-biochemical properties, including enzyme-forming activity, are described, 46 cultures of Antarctic bacteria of interest for biotechnology applications.

In total during the reporting period the collection participated in 80 tasks, contracts, grants, contracts, including 19 assignments in the framework of state programs at various levels; 6 tasks of the EurAsEC interstate target program "Innovative Biotechnologies"; 6 contracts with organizations of the Russian Federation, the

Republic of Lithuania and the People's Republic of China; 8 grants of BRFFR with scientific organizations of the Russian Federation, Ukraine, Poland, Belarus; 3 international projects VISBY-01720 / 2004-2006 (Sweden, Poland); VISBY-01147 / 2007-2009 (Sweden); VISBY- 00474/2010 - 2012 (Sweden); 41 of the economic agreement.

The collection conducts active publishing activity. A Catalog of Microorganism Cultures and a Catalog of Industrially-Valuable Microorganisms have been published. Information databases of BCM are created and constantly updated. By now 408 scientific publications were published, including 138 articles in journals (43 of them abroad), 239 publications in conference proceedings, and 4 chapters in collective monographs; 283 reports were presented at international conferences; received applications for objects of industrial property rights - 17, Know-how - 2. The results of scientific research and development of the collection are assessed on a scale of "world level", which is confirmed by 38 publications in high-rated publications.

BCM employees pay much attention to educational work; the collection actively cooperates with the higher school. 20 students were trained / pre-diploma practice on the basis of the collection. Prepared 7 master of sciences and 1 candidate of sciences.

The main achievements of the Belarusian collection of non-pathogenic microorganisms in the field of formation and development of microbial and genetic resources are presented at more than 90 exhibitions and fairs of both national and international level. In 2016, on the basis of the Institute of Microbiology of the National Academy of Sciences of Belarus, a permanent exhibition exposition of the Belarusian collection of non-pathogenic microorganisms was created, which includes the most important achievements of the BKM from its creation to the present day.

The national collection fund for microbial resources is widely used in the development of competitive biotechnologies and biologics. BKM provides the necessary microbial resources to research and industrial organizations working in the field of biotechnology, provides services for scientific support of production processes. So, only for the period 2011-2016. on the basis of industrial-valuable strains of microorganisms, the Institute of Microbiology of the National Academy of Sciences of Belarus has developed and introduced 36 highly effective technologies for obtaining biologics for various purposes. Among the regular customers of the BKM are more than 30 domestic and foreign (Lithuania, Russian Federation) commercial enterprises and industrial organizations, in particular the Minsk sparkling wine factory, OJSC Yeast Factory, OJSC "Minsk Margarine Plant", etc.

2.3.4. I express my deep gratitude and appreciation for the invitation to visit these courses. I have the unique opportunity to learn a lot about microbial resources not only in China but also worldwide, as these courses were attended by representatives of microbiological collections from 14 countries. And it's a great opportunity for me to visit China with capital Beijing to get acquainted with the traditions of China and visit its numerous sights.

The training course is organized great. Lectures provided to our attention contain new and relevant information for today. Accommodation, meals are great. Grateful to miss Jane Zhang for communication and responding to requests. I and my chief Dr. Galina Novik will be happy long-term cooperation.

5. The WDCM&World Federation for Culture Collections (WFCC) experience in microbiome data sharing are joined to launch the long-term international cooperation with Belarusian collection of non-pathogenic microorganisms (WFCC, WDCM: BIM 909) in selected scientific areas. The key point of the joint projects is to address questions on implementation of the research results of microorganisms in the collection practice. During joint researches by Belarusian and WDCM&WFCC scientists the biodiversity and adaptable potential of bacteria,

bacteriophages, filamentous and yeast - like fungi in various regions of Belarus and foreign countries, influence of various physical and chemical factors on viability and activity of a metabolism of bacteria will be studied. For molecular-genetic identification and characterization of the microorganisms isolated from various regions of Belarus and foreign countries, will be developed and applied high - sensitivity genetic methods. Carrying out of joint researches is caused by necessity of identification of bacteria, bacteriophages, filamentous and yeast-like fungi by various methods and studying of genetic properties of new strains of microorganisms representing diverse taxonomic groups, presentations of results of joint researches, popularizations of joint activity of Belarusian collection of non - pathogenic microorganisms and foreign countries collections of microorganisms on the international symposiums.