All-Russian Collection of Microorganisms (VKM)
Institute of Biochemistry and Physiology of Microorganisms,
Russian Academy of Sciences

Catalogue of Microbial Cultures

2005

Bacteria
Filamentous fungi
Yeasts
Genetically marked strains

Pushchino 2005

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Genetically Marked strains

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TO THE READERS OF THE CATALOGUE

Microbial cultures are at the start of research and development the range of which expands irresistibly year by year. It is difficult or impossible to foresee why a reader of this Catalogue may need a culture - be it in connection with his/her work in the field of biotechnology, protection of the environment, university lectures or construction of new microorganisms in the laboratory.

In every case, however, one should clearly understand that the correct choice of a culture can be the first step towards success in solving a concrete problem. Therefore, it should be taken very seriously; at least, prior to making applications for a culture, one should at least read through the Catalogue.

Collection cultures (strains) of microorganisms are not only samples of natural pheno- and genotypic diversity which bear features (sometimes unique). Most of these cultures have been dealt with by investigators and users. Their opinions on the significance and value of particular strains in their field are reflected in publications, patent literature, catalogues of collections and databanks. The importance of information on collection strains is ever increasing. At the time of choice of a culture, it is vital to consider relevant information available. Culture collections can be of help in this respect.

In accordance with the traditions established in the world literature, the cultures offered in the Catalogue are listed by their binomial Latin names which reflect certain genera and species. The nomenclature used is, wherever possible, in accordance with current taxonomic views. The latter are, however, subject to change in time as any scientific views – and especially fast in the recent years. To assist a person not familiar with the field not to loose track of the culture of interest some entries provide the names under which the culture could be mentioned in the literature or catalogues several years ago. Special attention should, however, be paid to the fact that the specific features of a culture of interest to the reader of the Catalogue can be related most reliably to certain strain(s) distinguished by their numbers and abbreviations. Therefore, the choice of a proper strain is no less (and sometimes even more) important than the choice of a microorganism by its taxonomic affiliation.

Work with microbial cultures requires certain professional skills, equipment, observation of safety rules etc. Prior to starting work and obtaining collection cultures, one should be sure that there are secure guarantees of carrying it on. If one can choose, it is better to start with simpler (with respect to their maintenance and handling) cultures.

IN BRIEF ABOUT VKM

Not any multitude of cultures collected in one place can be called a collection. To the authors who are veterans of the collection business, culture collections are like nuclear reactors - critical mass and time are required for them to begin functioning.

Most strains in the Catalogue are identified by the abbreviation 'VKM'. Thousands of cultures with this tag are annually issued by request, many of them with the same

abbreviation are mentioned in publications, patent literature etc. Annually, hundreds of new cultures are added to the VKM depositary, including the type strains of the newly described taxa of bacteria, filamentous and yeast fungi, deposited cultures, original isolates and cultures supplied on the exchange basis by other collections of many countries throughout the world. The logo 'VKM' indicates in general that this particular strain was dealt with by the VKM staff, is deposited in this collection and can be provided to the interested user. But what is VKM?

The All-Russian Collection of Microorganisms (VKM) at the Institute of Biochemistry and Physiology of Microorganisms, Russian Academy of Sciences (IBPhM RAS) was formed in 1980 as a result of the merger of two collections - of the Institute of Microbiology, Russian Academy of Sciences (INMI RAS) and IBPhM RAS. The basis of INMI Collection was the yeast cultures of Prof. V.I. Kudryavtsev which he began to collect well back in 1930s in connection with the works in the field of systematics and ecology of these organisms. The Collection of IBPhM RAS started to be formed in 1968 as a specialized collection which reflected mainly the interests of the Institute. At present, VKM is one of the largest, constanly expanding collections in this country. The Catalogue includes over 9000 strains (3000 species of 650 genera) of bacteria, actinomycetes, filamentous and yeast fungi. The list of species maintained by VKM was included in the World Directory of Collections of Cultures of Microorganisms of the World Data Centre, where VKM is assigned number 342.

VKM staff has reseach experience in various fields mainly associated with collection activities. Attention is paid to identification and taxonomy of various groups of microorganisms, revision of particular taxa is under way, the microorganisms of naturally occuring and artificially constructed communities are analyzed. VKM investigates the resistance of microoranisms to and their damage by extreme factors; the methods of storage and preservation of various groups of microorganisms are improved. A system of databanks of microbial strains is developed.

The section of the Catalogue on genetically marked strains includes information on the cultures of the Collection at the Institute of Molecular Genetics (IMG RAS). That collection was established in 1968 to support research on molecular genetics of bacteria in some laboratories of IMG RAS. At present, the Collection of IMG RAS includes genetically marked strains *Escherichia coli* and *Saccharomyces cerevisiae*, kits of F'episomes and transducing phages with genes of *E.coli*, kits of wild, vector and recombinant plasmids with various genes as well as specialized collections of mutants with vital genes of *E.coli* and *Sacch.serevisiae* .

The Major Functions of VKM

At present, VKM

- collects, studies and maintains authentic strains of bacteria, actinomycetes, filamentous fungi, yeast fungi, genetically marked strains of interest for microbiology, biotechnology, genetics, general and applied biology and other fields of science; educational and practical purposes, thus providing the maintenance of the microbial genetic pool for the present and future generations;

- provides cultures, maintained by the Collection, to interested persons and organizations both in this country and abroad in accordance with the national and international rules;

- serves as an internationally recognized collection for depositing microorganisms: type strains of newly described taxa, reference strains, strains possessing specific features etc.;

- acts as a depositary of microbial strains deposited for patent procedures; is an International Depository Authority in accordance with the Budapest Treaty on the mutual recognition of deposit in the countries that ratified the Treaty;

- provides consultations on isolation, taxonomy, deposition, preservation of microorganisms, bioinformatics etc.;

- performs service works on the identification of strains using the modern methods of culture diagnostics;

- provides information on the cultures maintained in VKM both by publishing catalogues and on request of users;

- communicates with collections both within country and abroad as well as international organizations in its field.

The Major Functions of the Collection at the Institute of Molecular Genetics, RAS

At present, the IMG Collection

- collects genetically marked strains *E.coli* and *Sacch. cerevisiae* developed at IMG laboratories as well as in other home and foreign laboratories, with the aim to support works in the field of molecular biology, molecular genetics, gene engineering and biotechnology,

- maintains collection cultures in viable and genetically stable state,

- provides cultures of collection strains on request of users.

Services

Supply of Cultures

The cultures listed in this Catalogue are distributed within the territory of this country for payments as per letters of guarantee from the customers. In the letter of guarantee, the customer should specify the collection number of the strain requested or, if the number is

not available, the known designation of the strain as well as the source of information, why the strain is required etc.

For foreign customers the cultures are provided on request for payment or free on exchange basis.

VKM bears no responsibility for possible damage of cultures during their transportation and/or subsequent maintenance.

Activity of the producing strains is not routinely checked in the Collection if not specified otherwise by the customer.

Requests for cultures should be sent to the following addresses:

- VKM, Institute of Biochemistry and Physiology of Microorganisms,
Russian Academy of Sciences,
Pushchino, Moscow Region, 142290, Russia (e-mail: *vkm@ibpm.pushchino.ru*).

- Institute of Molecular Genetics, RAS, Kurchatov Sq., 46,
Moscow, 123182 Russia.

The prices for cultures supplied are subject to change.

Generally, VKM sends the cultures in ampoules in the lyophilized state. The strains that do not withstand lyophilization are supplied on agarized medium in test tubes.

Reactivation of Lyophilized Cultures

Plating of the lyophilized culture from the ampoule is done in the following way.

The sealed end of the ampoule is treated with a cotton swab soaked in ethyl alcohol and heated in the flame of a burner. To form a crack, the heated end of the ampoule is touched by a sterile cotton wool swab soaked in sterile water. Using forceps, a lancet or any other suitable tool, the end of the ampoule is cut along the crack, the sterility being observed. The cotton wool swab inside the ampoule (if any) is removed by forceps and, using a pipette, 0.5 ml of sterile tap water or respective nutrient medium is added into the ampoule. After 20 min of reactivation at room temperature the suspension can be used to inoculate the nutrient medium.

Safery Precautions

Under any circumstances, the first thing to consider when choosing a culture should be the strict observance of safety rules and measures. The user should not only follow the established rules but get acquainted with the publications and instructions in this field where the revision of the established views is to a significant extent based on the precedent and occurs no less frequently than the taxonomic revisions. The user of any living culture of any microorganism should clearly understand that he/she takes much greater responsibility for his/her own health and that of people around him/her than in the case of an ampoule with a chemical reagent all properties of which are known or can be securely predicted and the mass of which can only decrease with use.

When working with microorganisms, one should not only observe the safety measures, corresponding to the category hazard of the culture, accepted at that particular time but also have in mind that any increase of the scale of work can increase the hazard.

The Collection neither accepts nor distributes cultures proven to belong to hazard categories groups recognized by evolving lists published by the Federal Center of Epedemiological Survelliance, Ministry of Public Health, RF.

Deposition of Cultures

The cultures aquired by the Collection and assigned VKM numbers can be distributed both in this country and abroad. (The cultures deposited in VKM for the patent purposes, see below).

Information on a strain to be deposited at VKM is written down in a standard information form. Any additional information on the properties of the culture will be highly appreciated because they enhance interest in the strain.

A culture to be deposited is provided to VKM on a nutrient medium or in the lyophilized state, the latter being preferable. Prior to acceptance, the culture is checked for purity, viability and authenticity. If the requirements are observed, it is assigned a VKM number. The person providing an authentic culture to VKM acquires the right for receiving in exchange any strain listed in the Catalogue free of charge.

Deposition for Patent Purposes

- Within the framework of the national legislation

  Deposition of cultures in VKM for patent purposes is done for payment based on letters of guarantee, supplemented with two copies of the culture identification form. The form is to be signed by all authors and to be authenticated by the organization sending the culture for deposition. If the strain was not identified up to a species level or pathogenic forms are known to exist among the species proposed, the certificate should be enclosed (from competent medical bodies only) on the nonpathogenicity of the culture deposited.

  The application for deposition is considered within 5 days. If the decision is positive, the depositor submits the culture to VKM and specifies the method of its storage. When submitted, the culture is checked for purity, viability and authenticity; if necessary, it is lyophilized (the cost being included into the total payment for deposition).

  Microbial cultures deposited in VKM for patent purposes are issued based on the written permission of all the authors of the invention only after a protection document is published. VKM bears no responsibility for the properties and/or activity of the strain, which are the object of the invention, but only for its viability and purity.

- Within the framework of the requirements and the instruction of the Budapest Treaty on the mutual recognition of the deposit

Deposition of cultures as per the Budapest Treaty is carried out in accordance with its regulations and the Instruction. The deposition rules are available in printed as well asw electronic formats. The status of VKM at IBPhM RAS as an International Depository of microorganisms for patent purposes has been confirmed in the Notifications which also state the order of collecting payments (custom duties) for services in depositing cultures as per the Budapest Treaty. The procedure involves the filling-in of respective forms accepted internationally (from BP/1 to BP/14) (Supplement 2).

VKM has the right to refuse deposition in the following cases:

- if the offered strains are type (neotype) or any other microbial strains, already widely available and represented in other collections both in this coutry and abroad;

- if the cultures offered are non-viable or contaminated;

- if the cultures offered are not on the list of microbial groups accepted for deposit by VKM;

- if, due to special features of a strain (or association of cultures) offered, VKM is unable for technical reasons to maintain them for 30 years.

Services by Contracts and Agreements

VKM provides paid consultations on various aspects of collection work, problems of morphology, physiology, biochemistry, ecology of many groups of microorganisms and takes interested persons for probation.

The service works on the agreement basis carried out in VKM are as follows.

Identification

Bacteria, actinomycetes, filamentous and yeast fungi are identified. The modern methods of diagnostics are used (including the determination of the chemotaxonomic characters - type of cell wall; composition of peptidoglycan; content of menaquinones, phospholipids, fatty acids). Use is made of express immunoassay methods, electrophoresis, analysis of the DNA nucleotide content and DNA-DNA similarity values, numeric analysis.

Preservation and Storage

Four groups of methods are used for preservation and storage of microorganisms in the VKM depository: subculturing, drying, low-temperature preservations (cryopreservation) and freeze-drying. Each method is realized by concrete techniques which are indicated in the Catalogue for each strain as an alfanumerical index (see Designations of the methods of preservation and storage).

Cryopreservation is carried out in protective media at an optimal rate of cooling, the samples obtained are preserved at a temperatures of -10°– -18°C (laboratory refrigerations), -70°C (deep freezers), -196°C (liquid nitrogen) or about -150°C (nitrogen vapours).

Freeze-drying is carried out on freeze-drying units of the centrifuge type as well as of the shelf type. The freeze-dried cultures are preserved either in refridgerators at 4-12°C or at room temperature in cabinets in the darkness.

During the guarantee period, each strain is preserved by two-three methods.

Genetically marked strains are preserved in IMG RAS under the layer of mineral oil, in glycerol at -70°C and on filters in dried skim milk (*Sacch. cerevisiae*) as well as in the freeze-dried state (*E.coli*).

Paid confidential storage services of cultures without their inclusion into the Catalogue and issue to users are also offered.

Information

Users of VKM are provided with necessary information on the cultures maintained in VKM, including that from the constantly updated computer data bases. The user can obtain information required on the storage and preservation methods, choose the most optimal mode of storage, request data on the use of the cultures, including for the works on the protection of the environment, production of various biologically active compounds etc.

The VKM databank includes, however, not only information on the cultures maintained but also on the depositories of some other collections.

CATALOGUE OF STRAINS

This Catalogue includes information on strains of bacteria, including actinomycetes, filamentous and yeast fungi, genetically marked strains. The Catalogue does not list strains deposited in connection with patent purposes as well as strains kept in the working collections of VKM staff members.

Nomenclature

The scientific names of bacteria, including actinomycetes, listed in this Catalogue are given in accordance with the accepted nomenclature of these organisms. Starting from 1 January 1980, in bacteriology all proposed new names of bacteria should preferably be published in the International Journal of Systematic and Evolutionary Microbiology (IJSEM) (the old name was the International Journal of Systematic Bacteriology). The updated lists of valid bacterial names are constantly published in IJSEM. To validate new names of bacterial taxa published in other journals, their authors should send respective reprints to IJSEM for these names to be included in the published lists of valid names. The date of validation of a new name is the date of publication in IJSEM.

In this Catalogue, the invalid names of bacteria are not excluded but are presented also in a separate list. They are given in inverted commas and are referred to the correct names of strains. If the correct species name is not known, then the strain is referred to as 'sp.' instead of the species name. In both cases, the collection number of the strain in VKM is indicated.

For instance:

"*Bacillus mucilaginosus*" see *Bacillus sp*. B-1574

"*Caulobacter bacteroides* subsp. *modicus*" see
Caulobacter bacteroides B-1562, *Caulobacter leidyi* B-1486,
Caulobacter subvibrioides B-1180.

These records make it possible for the users not very familiar with the changes in bacterial nomenclature readily find strains of interest. New information should be taken into account in the publications.

When preparing the section on bacteria of the Catalogue, besides the lists of approved names, use was also made of current reviews and Manuals.

The nomenclature of the filamentous fungi is based on the International Code of Botanic Nomenclature and the general fundamental works on mycology as well as on the publications in the periodicals.

The nomenclature of filamentous and yeast fungi has been agreed upon with the expert group of mycologists-systematicists (V.A. Komarov Botanic Institute, RAS and VKM IBPM RAS) under the leadership of Dr. V.A. Melnik, DSc, to whom the authors of the Catalogue are sincerely grateful.

How to Use the Catalogue

The cultures listed in the Catalogue are arranged into groups: bacteria including actinomycetes, filamentous fungi, yeast fungi, genetically marked strains. In each group, the names of the taxa are in the alphabetical order, the strains of one species (subspecies) are enumerated by their increasing numbers in VKM. Type strains are indicated as Type or Type Strain. In the section of bacteria the designations are **Ac** = actinomycetes and related forms; **B** = bacteria proper and archebacteria; **F** stands for filamentous fungi; **Y**, for yeasts.

Below are examples of the records on bacterial (actinomycetes) strain, filamentous and yeasts fungi, genetically marked strains with short comments.

Example 1. Bacteria

Alcaligenes ruhlandii [1] (Packer et Vishniac 1955) Aragno et Schlegel 1977[2]

B[3]-1333[4] Type[5] ← INMI, VKM B-1333[6] ← Zavarzin G.A. INMI ← ATCC, ATCC 15749.[7] (ATCC 15749; DSM 653; IAM 12600; ICPB 3983; NCIB 11475; NCIMB 11475; CIP 77.26; LMG 1866, 2909; Davis D.H., 368; Vishniac W. (*Hydrogenomonas ruhlandii*).[8] Received as: *Pseudomonas ruhlandii*.[9] Synonym: *Pseudomonas ruhlandii* Packer et Vishniac 1955[10] Type.[11] Ex: soil[13], USA[14] (Medium 5, 30°C, F-1, F-3, C-1)[15]

Saccharopolyspora rectivirgula[1] (Krassilnikov et Agre 1964) Korn-Wendisch et al. 1989[2]

Ac[3]-810[4] Type[5] ← Agre N.S. IBPhM, INMI 683.[6] (ATCC 33515; DSM 43747; JCM 3057).[8] Received as: *Micropolyspora rectivirgula*.[9] Synonym: *Micropolyspora rectivirgula* (Krassilnikov et Agre 1964) Prauzer et Nomirova 1970 Type[11], *Faenia rectivirgula* (Krassilnikov et Agre 1964) Kurup et Agre 1983 Type[11], *Thermopolyspora rectivirgula* Krassilnikov et Agre 1964[10] Type[11]. Ex: soil[13], Pamir, Tajikistan[14]. (Medium 8, 50°C, F-1, C-1)[15]

Example 2. Filamentous Fungi

Penicillium brevicompactum[1] Dierckx 1901[2]

F[3]-457[4] ← INMI, VKM F-457[6] ← RIA, RIA 178 ← CBS, CBS 256.31[7]. (ATCC 10111; NRRL 859; CBS 256.31; IFO 5858; IMI 39824; QM 7653)[8]. Received as: *Penicillium stoloniferum* Thom 1910.[9] Synonym: *Penicillium stoloniferum* Thom 1910[10] Type strain[11]. Ex: rotting true mushroom, *Agaricus sp.*[13], USA, Connecticut, Storres[14]. (Medium 11, 25°C, D-4, F-1)[15]

Example 3. Yeast

Cystofilobasidium infirmominiatum[1] (Fell, Hunter et Tallman 1973) Hamamoto, Sugiyama et Komagata 1988[2]

Y[3)]-1265[4)] Type[5)] ← INMI, VKM Y-1265[6)] ← CBS 323[7)]. (VKM Y-1112, 1497)[8)].
Received as: *Rhodotorula infirmominiata* (Okunuki 1931) Hasegawa et Banno 1964[9)]. Synonym: *Rhodosporidium infirmominiatum* Fell, Hunter et Tallman 1973[10)] Type[11)]. mt A1[12)]. Ex: air[13)], Tokyo, Japan[14)]. (Medium 9, 20°C, F-3, S-4)[15)]

Footnotes, brief explanation

1. The names of the genus, species, and subspecies: for bacteria, including actinomycetes, valid according to the lists of approved names in some cases. The Catalogue also gives in inverted commas the names of the organisms invalid by the time of its publication. In the section of bacteria, all valid names are given in medium italics; invalid ones, in italics.
2. The author(s) who described and re-described the (sub) species and the year of publication (for bacteria and actinomycetes the year of validation, according to the lists of approved names).
3. Designation of the microbial group; bacteria, B; actinomycetes, Ac; fungi, F; yeasts Y.
4. Strain number in VKM.
5. The type strain for a given species (subspecies); also indicated are neotype, isotype etc.
6. Collection (its abbreviation is given), person and/or organization from where the strain was obtained, under what number or designation.
7. History of the strain in the chronological order; the transfer of the strain is indicated by the arrow.
8. In brackets, the designations of a given strain in some other collections (taking into consideration the latest catalogues); the names of known investigators can be also given, the designation or name of the strain in their working collections.
9. The name, under which the strain was received in VKM.
10. Synonyms and old names (invalid for bacteria) of a given strain. These names in the alphabetic order are included in the lists, which are given after the main text of the Catalogue and referred to a respective species name. In the section of filamentous fungi: am - anamorph; st. - stage.
11. The given strain was the type strain for the species with the old name.
12. The mating types for filamentous and yeast fungi.
13. The isolation source.
14. The place where the strain was isolated. An attempt was made to take into account the changes in the names of cities, republics, countries which took place by the time this Catalogue was prepared. However, this was possible not in every case and in some cases the names were left which existed by the time the strains were submitted to VKM.
15. Medium and temperature of cultivation which provide good restoration and development of the strain after its submission as well as the methods of storage and preservation enumerated in the list of designations of these methods (see below).

Designations for the Methods of Preservation and Storage

S-1. Aerobic subculturing in liquid medium
S-2. Anaerobic subculturing in liquid medium
S-3. Anaerobic subculturing in semiliquid medium
S-4. Subculturing on agar slants
S-5. Subculturing on agar slants under vaseline oil
S-6. Subculturing in semiliquid medium under vaseline oil
S-7. Anaerobic subculturing in agar blocks
S-8. Subculturing on agar slants under tap water
D-1. Drying of spores on filter paper
D-2. Drying of spores on solid nutrient medium
D-3. Drying of microbial spores in liquid nutrient medium in test tubes
D-4. Drying of spores in soil
C-1. Cryopreservation in glycerol at -196°C at a high cooling rate
C-2. Cryopreservation in sucrose at -196°C at a high cooling rate
C-3. Cryopreservation in sucrose-gelatin agar at -196°C at a high cooling rate
C-4. Cryopreservation on solid medium discs in glycerol at -196°C at a high cooling rate
C-5. Cryopreservation at -196°C at a slow cooling rate
C-6. Cryopreservation at -196°C at a medium cooling rate
C-7. Cryopreservation on silica gel
C-8. Preservation at -70°C
C-9. Preservation at -70°C on filter paper
C-10. Preservation at -10 to -18°C in test tubes
F-1. Freeze-drying in skim milk
F-2. Freeze-drying of cultures from liquid nutrient medium in sucrose-gelatin agar
F-3. Freeze-drying of cultures from dense nutrient medium in sucrose-gelatin agar
F-4. Freeze-drying on dried milk tablets
F-5. Freeze-drying of cultures from solid nutrient medium in horse serum

Abbreviations and Acronyms for Collections and Organizations

ABS "Chashnikovo" - Agrobiostation, Moscow State University, Moscow Region, Russia
ACAM - Australian Collection of Microorganisms, Hobart, Australia
AHU - Laboratory of Culture Collection of Microorganisms, Faculty of Agriculture, Hokkaido University, Sapporo, Japan
AJ - Central Research Laboratories Ajinomoto Co., Inc., Kawasaki, Japan
AMNH - American Museum of Natural History, New York, USA
AMP - Australian Mycological Panal, isolates made in 1944; also previously referred to as "Aust" or "SN" serial no.
ATCC - American Type Culture Collection, USA
AUCM - see VKM

BBS - Biological Station, Moscow State University, Murmansk region, Russia
BIN - Komarov Botanical Institute, Russian Academy of Sciences, 2, Professor Popov Str., St.-Petersburg 197022, Russia (same as LE(BIN))
BiNII StPGU - Biological Research Institute, St.-Petersburg State University, 2, Oranienbaumskoe Ave., Stary Peterhoff, St.-Petersburg 198904, Russia
BNL - Brookhaven National Laboratory, Upton, NY 11973, USA
BPD - Boots Pure Drug Ltd., Nottingham, U.K.
BSI - Biology and Soil Institute, Far-Eastern Branch, Russian Academy of Sciences, 159, Pr.100 let Vladivostoku, Vladivostok, 690022, Russia
BTCC - Bulgarian Type Culture Collection, State Institute for Control of Drugs, Sofia, Bulgaria
BU - see BUCSAV
BUCSAV - Biologisky Ustav Ceskoi Akademii Ved., Prague, Czech Republic
BUN - Brandeis University, Waltham, MA 02254-9110, USA

CBS - Centraalbureau voor Schimmelcultures, Baarn and Delft, The Netherlands
CCEB - Culture Collection of Entomogenous Bacteria, Prague, Czech Republic
CCF - Charles University Prague, Department of Botany Faculty of Natural Sciences, Czechi Republic
CCM - Czech Collection of Microorganisms, I.E.Purkyne University, Brno, Czechia (see MDB)
CCMCU - Culture Collection of Microorganisms, Departamento de Microbiologia, Madrid, Spain
CCRC - Culture Collection and Research Center, Food Industry Research and Development Institute, Taiwan
CCUG - Culture Collection University of Goteborg, Department of Clinical Bacteriology, Goteborg, Sweden
CCY - Slovak Collection of Yeasts, Institute of Chemistry of the Slovak Academy of Sciences, Bratislava, Slovakia
CDA - Canadian Department of Agriculture, Ottawa, Canada
CDC - Centre for Disease Control, United States Public Health Service, Atlanta, Georgia, USA
CECT - Collection Espanola de Cultivos Tipo, Departemento de Microbiologia, Universidad de Valencia, Burjasot, Valencia, Spain
CERIA - Centre d'Enseignement et de Recherces des Industrie Alimentaires et Chimiques, Institute Emile Gryson

CGSC - E.coli Genetic Stock Center, Yale University School of Medicine, New Haven, Connecticut 06510, USA
CIP - Collection de l'Institut Pasteur, Paris, France
CLU - Columbia University, New York, USA
CMI - C.A.B. International Mycological Institute, Kew, Surrey, U.K. (formerly Commonwealth Mycological Institute or IMI)
CN - Burroughs Welcome Research Laboratories, Beckenham, Kent, U.K.
CNCM - Collection Nationale de Cultures de Microorganisms, Paris, France
CRC - Cardiological Research Centre, Russian Academy of Medical Sciences, 15a, 3rd Cherepkovskaya Str., Moscow 121552, Russia
CSG - Collection of Strains, Gatchina, Russia, see PNPI
CSHL - Cold Spring Harbor Laboratory, Cold Spring Harbor, New York 11724, USA
CUB - Actinomycetes Culture Collection, School of Applied Biology, University of Bradford, Yorkshire, U.K.
CUP - Department of Plant Pathology, Cornell University, Ithaca, New York, USA

DG MGU - Department of Genetics and Selection, Moscow State University, Vorobyovy Gory, Moscow 119899, Russia
DLP - Department of Lower Plants, see StPGU
DLP KhGU - see KhGU
DMA MGU - Department of Mycology and Algology, Moscow State University, Vorobyovy Gory, Moscow 119899, Russia
DMUR - Department of Mycology, University of Recife, Brazil
DSB MGU - Department of Soil Biology, Faculty of Soil Sciences, Moscow State University, Vorobyovy Gory, Moscow 119899, Russia
DSM (DSMZ) - Deutsche Sammlung von Mikroorganismen und Zellkulturen, Braunschweig, Germany

EAN - Estacao Agronomica Nacional, Portugal
EFPL - Eastern Forest Laboratory, Ottawa, Canada
EMI - Estonian Forest Research Institute, Tartu, Estonia
ETH - Eidgenosische Technische Hochschule, Institut fur Spezielle Botanik, Zurich, Schwitzerland

FDA - U.S.Food and Drug Administration, Washington, D.C., USA
FERM - Fermentation Research Institute, Agency of Industrial Science and Technology, Ministry of Trade and Industry, Japan
FGSC - Fungal Genetic Stocks Center, Department of Microbio- logy, University of Kansas Medical Center, Kansas City, Kansas, USA
FHCRC - Fred Hutchinson Cancer Research Center, Seattle WA 98104, USA
FRR - Division of Food Research, Commonwealth Scientific and Industrial Research Ogranization, Australia

GI - Gamaleja Institute of Epidemiology and Microbiology, Russian Academy of Medical Sciences, 13, Gamaleei Str., Moscow 123098, Russia
GTU - State Technical University, St.-Petersburg 195251, Russia

HACC - Research Laboratory, Hindustan Antibiotics Ltd., Pimpri, Poona, India
HMGB - see NCAIM
HUC - Harward University, Cambridge, MA 02138, USA
HUT - Department of Fermentation Technology, Faculty of Engineering, Hiroshima University, Japan

IAI - Institute of Aircraft Industry, Moscow, Russia
IAM - Institute of Applied Microbiology, University of Tokyo, Bunkyo-ko, Tokyo, Japan
IB - Institute of Biology, Ural Branch of Russian Academy of Sciences, Cheboksary, Russia
IBCh - Institute of Bioorganic Chemistry, Russian Academy of Sciences, 16/10, Miklykho-Maklay Str., Moscow GSP-7, 117871, Russia
IBK - See IBK Ukr.
IBK Ukr. - Kholodny Institute of Botany (Collection) Ukrainian Academy of Sciences, 2, Repin Str., Kiev GSP-1, 252601, Ukraine
IBMCh - Institute of Biological and Medical Chemistry, Russian Academy of Medical Sciences, 10, Pogodinskaya Str., Moscow 119121, Russia
IBPh - Institute of Biophysics, 46, Zhivopisnaya Str., Moscow 123182, Russia
IBPhM - Institute of Biochemistry and Physiology of Microorganisms, Russian Academy of Sciences, Pushchino, Moscow region 142292, Russia
IBSO - Institute of Biophysics, Siberian Branch, Russian Academy of Sciences, Akademgorodok, Krasnoiyarsk-36 660036, Russia
IC - Institute of Cytology, 4, Tikhoretsky Prospekt, St.- Petersburg 194064, Russia
ICMP - International Collection of Microorganisms from Plants, Plant Diseases Division, DSIR, Auckland, New Zealand
ICPB - International Collection of Phytopathogenic Bacteria, Davis, California, USA
IEAME - Institute for Evolutionary Animal Morphology and Ecology, Russian Academy of Sciences, 33, Lenin Prospekt, Moscow 117071, Russia
IEP - Department of Insect Pathology, Institute of Entomology, Prague, Czech Republic
IF - Institute for Forestry, Karelsky Research Centre, Russian Academy of Sciences, 11, Pushkinskaya Str., Petrozavodsk 185610, Russia
IFM - Institute for Food Microbiology, Chiba University, Chiba, Japan
IFO - Institute for Fermentation, Osaka, Japan
IGC - Centro de Biologia Instituto Gulbbekian de Ciencia, Oeiras, Portugal
IGU - Irkutsk State University, 5, Sukhe-Bator Str., Irkutsk 664000, Russia
IHM - Instituto de Higiene Experimental, Montevideo, Uraguay
IHMC - Institute of High-Molecular Compounds, Russian Academy of Sciences, 31, Bolshoy Prospekt, St.- Petersburg 119004, Russia
IIWB - Institute of Internal Water Biology, Borok p/b 152742, Nekouzskii district, Yaroslavl region, Russia
IJFM - Instituto Jaime Ferran de Microbiologia del Superior de Investigaciones Cientificas, Madrid, Spain
IMB - Institute of Molecular Biology, Russian Academy of Sciences, 32, Vavilov Str, Moscow 117984, Russia
IMCAS - Institute of Microbiology, Czech Academy of Sciences, Prague, Czech Republic
IMET - Nationale Kulturensammlung fur Mikroorganismen, Zentralinstitut fur Mikrobiologie und Experimentelle Therapie, Jena, Germany
IMG - Institute of Molecular Genetics, Russian Academy of Sciences, 46, ak. Kurchatov Square, Moscow 123182, Russia
IMG - Institut für Mikrobiologie, Universitat Gottingen, Gottingen, Germany
IMI - see CMI
IMiV - Institute of Microbiology and Virology, Kazakh Academy of Sciences, 103, Kirov Str., Almaty -100 480100, Kazakhstan
IMP - Marcinovsky Institute of Medical Parasitology and Tropical Medicine, 20, M. Pirogovskaya Str., Moscow 119435, Russia
IMRU - Institute of Microbiology, Rutgers State University, New Brunswick, New Jersey, USA

IMV - Zabolotny Institute of Microbiology and Virology, 154, Zabolotny Str., Kiev-143 252143, Ukraine, (same as Ukr.IM)
IMZh - See IEAME
INA - Institute for New Antibiotics, 11, B.Pirogovskaya Str., Moscow 119867, Russia
INEOS - Nesmeyanov Institute of Organoelement Compounds, 28, Vavilov Str., Moscow GSP-1, 117813, Russia
INMI - Institute of Microbiology, Russian Academy of Sciences, 7, Bldg 2, Prospekt 60-letiya Oktijabriya, Moscow, 117811, Russia
INMIA - Institute of Microbiology, Armenian Academy of Sciences, Arzninskoe Ave., Abovian 378510, Armenia
IOC - Instituto Oswaldo Cruz., Rio de Janeiro, Brazil
IOGEN - Vavilov Institute for General Genetics, Russian Academy of Sciences, 3, Gubkin Str., Moscow 117809, Russia
IPF - Institute Pasteur, Paris, France
IPh - Kirensky Institute of Physics, Siberian Branch, Russian Academy of Sciences, Akademgorodok, Krasnoiyarsk-36 660034, Russia
IPO - Institut voor Planteziektenkundig Onderzock, Wageningen, The Netherlands
IPV - Instituto di Patologia Vegetale, Milano, Italia
ISP - International Streptomyces Project, Ohio Wesleyan University, Delaware, Ohio, 43015, USA
ISSA - Institute of Soil Sciences and Agrochemistry, Azerbaijan Academy of Sciences, 5, Khrebtovaya Str., Baku-122 370122, Azerbaijan
IVRKU - Institute for Virus Research Kyoto University, Kyoto, Japan
IZB - Institute of Zoology and Botany, Estonian Academy of Sciences, 21, Vanemuise Str., Tartu 202400, Estonia (same as TAA)

JCM - Japan Collection of Microorganisms, Institute of Physical and Chemical Research, Saitama, Japan
JHU - Johns Hopkins University, Baltimore, MD 21205, USA

KCC - Culture Collection of Actinomycetes, Kaken Chemical Co. Ltd., Tokyo, Japan (Collection transferred to JCM)

KGU Mold. - Kishinev State University, 65, Pirogov Str., Kishinev 277000, Moldova
KhGU - Kharkov State University, 16, Universitetskaya Str., Kharkov 310000, Ukraine
KhCRI - Khabarovsk Complex Research Institute, 65, Kim U Chen Str., Khabarovsk, Russia
KL - Bacteriological Department of the Karolinska Institute, Stockholm, Sweden
KM MGU - Department of Microbiology, Faculty for Biology, Moscow State University, Vorobyovy Gory, Moscow 119899, Russia
KM StPGU - Department of Microbiology, St.- Petersburg State University, 29, 16-th line of Vasilyevsky Ostrov, St.- Petersburg 199178, Russia
KMUzb. - Institute of Microbiology (Collection), Uzbekistan Academy of Sciences, 7a, A. Kadyri Str., Tashkent 700128, UzbekistanKS - see IMET
KSM - Collection of Genetical Strains of Bacteria, *see GI*
KUSM - Kyushu University School of Medicine, Fukuoka 812, Japan

LBG - Laboratory of Genetic Regulation of Biochemical Processes, see GI
LC - Laboratory of Cryptogamy, National Museum of Natural History, Paris, France
LCP - see LC
LE (BIN) - Komarov Botanical Institute, Collection, Russian Academy of Sciences, Russia, see BIN

LHFI - See PHFI
LIA - Research Institute of Antibiotics and Enzymes, 41, Ogorodnikov Prospect, St.-Petersburg 198020, Russia
LKB - Laboratory of Kodama Brewing Company, Iitagawa machi. Akita Prefecture, Japan
LLB - Lenin Library's Laboratory, 3, Noviy Arbat, Moscow 121019, Russia
LM BiNII StPGU - Biological Research Institute, St.-Petersburg State University, Laboratory of Microbiology, 2, Oranienbaumskoe Ave., Stary Peterhoff 198904, Russia
LMG - Collection Laboratorium voor Microbiologie Gent, Fakulteit Vetenschappen-Rijksuniversiteit, Belgium
LMGE - Laboratory for Molecular Genetics of Episomes, Institute of Epidemiology and Microbiology, see GI
LMGY - Laboratory for Molecular Genetics of Yeasts Institute for Molecular Genetics, Russian Academy of Sciences, see IMG
LSHB - Biochemistry Department, London School of Hygiene and Tropical Medicine, London, U.K.
LWP - Senezh Laboratory for Wood Preservation, Pl. Senezh, Moscow region, 141500, Russia

MBG - Main Botanical Garden, Russian Academy of Sciences, 4, Botanicheskaya Str., Moscow 127276, Russia
MDB - Microbiology Department, Faculty of Natural Sciences University, Brno, Slovakia (see CCM)
MGU - Moscow State University, Vorobyovy Gory, Moscow 119899, Russian
MI - Mechnikov Research Institute for Vaccines and Sera, 5a, Mechnikov Str., Moscow 103064, Russia
MIT - Massachusetts Institute of Technology, Cambridge, MA 02139, USA
MITC - Moyne Institute Trinity College, Dublin 2, Ireland
MKD - Laboratory for Molecular Fundamentals of Genetics, Collection of Institute for Molecular Genetics, Russian Academy of Sciences, see IMG
MLH - Martin-Luther-Universitat Halle-Wettenberg, Sektion Biowissenschaften, Halle/S, Germany
MPIMG - Max-Planck-Institut fur Molekulare Genetik, 1000 Berlin, 33 Germany
MR - Institute for Microbial Resources, 9-5-1209 Kudankita 1-Chome, Chiyoda-ku, Tokyo, 102 Japan
MUCL - Mycothegue de l'Universite Catholique de Louvain, Laboratoire de Mycologie Systematique et Appliquee Louvain-la-Neuve, Belgium
MW - Institut für Spezielle Botanik, Jena, Abt. Mycologie, Weimar, Germany

NCA - National Canner's Association, Washington, D.C., USA
NCAIM - National Collection of Agricultural and Industrial Microorganisms, University of Harticulture and Food Industry, Department of Microbiology, Budapest, Hungary
NCDC - see CDCNCDO - National Collection of Dairy Organisms, Reading, U.K.
NCFB - National Collection of Food Bacteria, AFRC Institute of Food Research, Shinfield, Reading RG2 9AT, U.K.
NCIB - National Collection of Industrial Bacteria, Aberdeen, Scotland, U.K.
NCIM - National Collection of Industrial Microorganisms, National Chemical Laboratory, Poona 8, Maharashtra, India
NCIMB - National Collections of Industrial and Marine Bacteria, Ltd., Aberdeen, Scotland, U.K.
NCMB - National Collection of Marine Bacteria, Torry Research Station, Aberdeen, Scotland, U.K.

NCPPB - National Collection of Plant Pathogenic Bacteria, Plant Pathology Laboratory, Harpenden, Hertsfordshire, U.K.
NCTC - National Collection of Type Cultures, Central Public Health Laboratory, London, U.K.
NCYC - National Collection of Yeast Cultures, Food Research Institute, Colney Lane, Norwich, U.K.
NHL - National Institute of Hygiene Sciences, Ministry of Health and Welfare, Kamiyoga 1-Chome, Setagaya-ku, Tokyo, 158 Japan
NI - Nagao Institute, Tokyo, Japan
NIG - National Institute of Genetics, Japan
NIH - National Institutes of Health, Bethesda, Maryland 20014, USA
NILOS - Research Experimental Station for Subtropical Forestry and Park Economy, Sochi, Russia
NPO "Vitaminy" - See RIV
NRC - National Research Council, Ottawa, Ontario, Canada
NRCC - see NRC
NRIC - Nodai Research Insitute Culture Collection, Tokyo University of Agriculture, Japan
NRRL - ARS Culture Collection, Northern Regional Research Laboratory, U.S.Department of Agriculture, Peoria, Illinois, USA
NRS - Collection of the late Dr.N.R.Smith, U.S. Department of Agriculture, Washington, D.C., USA (most strains now at ATCC or NRRL)
NYUSM - New York University School of Medicine, USA

OKI - National Institute for Public Health, Budapest, Hungary
ORNL - Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA
OUT - Osaka University, Faculty of Engineering, Yamadaue, Osaka, Japan

PAF - St.-Petersburg Academy for Foresty, St.-Petersburg, Russia
PCI - Penicillin Control and Immunology Section, Food and Drug Administration, Washington, D.C., USA
PCM - Peterhoff Collection of Microorganisms, 7/9, Universitetskaya Nab., St.-Petersburg 199034, Russia
PHFI - St.-Petersburg Chemico-Pharmaceutical Institute, 14, Professor Popov Str., St.-Petersburg 197022, Russia
PHRI - Public Health Research Institute of the City of New York, Inc
PIBCh - Pacific Institute of Bioorganic Chemistry, Far-Eastern Branch, Russian Academy of Sciences, 159, Prospekt 100 let Vladivostoku, Vladivostok 690022, Russia
PNPI - Konstantinov St.-Petersburg Nuclear Physic Institute, Gatchina 188350, Russia
PRL - Prairie Regional Laboratory, Saskatoon, Canada
PRU - Princeton University, Princeton, NJ 08540, USA
PSA - Progetto Sistematica Actinomiceti, Institute of Microbiology, Milano University, Milano, Italia
PZH - Collection of Cultures, Institute of Hygiene, Warsaw, Poland

QM - Quartermaster Research and Development Centre, U.S. Army Natick Laboratory, Natick, Massachusetts, USA
QMC - Queen's Medical Centre, U.K.

RIA - Research Institute for Antibiotics, 3a, Nagatinskaya Str., Moscow 113105, Russia
RIAM - Research Institute of Applied Microbiology, Obolensk, Moscow region 142279, Russia

RIBC - Kucherenko Research Institute for Building Constructions, 6, 2nd Institutskaya Str., Moscow 109389, Russia
RIBMI - Research Institute for Butter and Cheese Manufacture Industry, 19, Krasnoarmeisky Prospekt, Uglich, Yaroslavl region 152620, Russia
RIMVS - Research Institute of Medical Veterinary Sciences, 5, Zvenigorodskoe Ave., Moscow 123022, Russia
RIR - Research Institute of Restoration and Preservation of Art Objects, Moscow, Russia
RIV - Research Institute for Vitamins (same as NPO "Vitaminy"), 14a, Nauchny Proezd, Moscow 117820, Russia
RIVE - Collection of the Research Institute of Viticulture and Enology, Bratislawa, Slovakia
RM - Art Restoration Research Center, 34a, B.Ordynka Str., Moscow 109017, Russia
RSA - Rancho Santo Ana Botanic Garden, Claremont, California, 91711, USA

SCC - Schering Corporation, USA
SN - see AMP
SSIC - Collaborating Centre for Reference and Research on Escherichia and Klebsiella (WHO), Statens Serum Institute, Denmark
STG - Stratagene Ltd: Cambridge Innovation Centre, Cambridge CB4 4GF, U.K.
StPGU - St.- Petersburg State University, 7/9, Universitetskaya Nab., St.- Petersburg 199034, Russia
STU - Stanford University, California, USA
SUL - State University of Leiden, Wassenaarseweg 64, Leiden, The Netherlands

TA - Timiriyazev Academy for Agriculture, 51, Timiriyazev Str., Moscow 125008, Russia
TAA - See IZB
TI - Tarassevich State Research Institute for Standardization and Control of Medical Biological Preparations, 41, Sivtsev Vrazhek, Moscow 121002, Russia
TIFI - Moscow Technological Institute for Food Industry, Moscow, Russia
TUB - Budapest Technical University, Budapest, Hungary
TUN - Texas University, Texas 77843, USA

UAMH - University of Alberta Microfungus Collection and Herbarium, University of Alberta Devonian Botanic Garden, Canada
UCB - The University of California, Berkeley, California, 94720, USA
UCLA - University of California, Los Angeles, CA 90024, USA
UCS - Universidad de Cantabria 39011-Santander, Espana
UGA - University of Georgia, Athens, Georgia 30602, USA
UGL - University of Glasgow, Glasgow 611 5JS, Scotland, U.K.
UIC - University of Illinois, Chicago, Illinois 60612, USA
Ukr.IM - See IMV
Ukr.RIFI - Ukraine Research Institute for Food Industry, 368, Klochkovskaya Str., Kharkov GSP 310000, Ukraine
ULDL - University of Liverpool, Donnan Laboratories, Liverpool, L69 3BX, U.K.
UMMS - University of Michigan Medical School, Ann Arbor, Michigan 48109, USA
UNA - University of Arizona, Tucson, Arizona, 85724, USA
UNB - University of Bristol, Bristol BS8 1TD, U.K.
UNC - University of Colorado, Denver, Colorado 80262 USA
UNED - University of Edinburgh, Edinburgh EH9 3JR U.K.
UNF - Universitat Freiburg, 7800 Freiburg, Germany
UNG - Universite de Geneve, CH-1211 Geneve 4, Switzerland
UNL - Universite de Liege, Liege, Belgigue B-4000
UNR - Universitat Regensburg, D-8400, Germany

UPCC - Natural Sciences Research Institute Culture Collection, University of the Philippines, Philippines
UPSC - Uppsala University Culture Collection of Fungi, Sweden
UQM - University of Queensland, Department of Microbilogy, St. Lucia, Queensland, Australia
USDA - United States Department of Agriculture, Washington, D. C., USA
UTIMS - University of Tokyo, Institute of Medical Science, Tokyo, Japan
UTO - University of Toronto, Toronto M5S 1A8, Canada
UWMC - University of Wisconsin Medical Centre, Madison Wisconsin 53706, USA
UWO - University of Western Ontario, Canada

VILAR - Scientific a. Industrial Establishment VILAR - 7a, Grin Str., Moscow, Russia
VIZR - Institute for Plant Protection, 3, Podbelsky Ave., Pushkin-6, St.-Petersburg 189620, Russia
VKM - All Russian Collection of Microorganisms, Institute of Biochemistry and Physiology of Microorganisms, Russian Academy of Sciences, Pushchino, Moscow region 142292, Russia
VKPM - Collection of Industrial Microorganisms, Institute for Genetics and Selection of Industrial Microorganisms, 1, 1st-Dorozhny Proezd, Moscow 113545, Russia
VNIIGenetics - See VKPM
VNIIhydrolysis - Research and Production Association "Gydrolysisprom", 13, Kalinin Str., St-Petersburg 198099, Russia
VNIIKHPLO - Research Institute for Breadbaking Industry, St.-Petersburg Division, 18a, Smolenskay Str., St.-Peters- burg 196084, Russia
VNIIMP - See RIB
VNIISHM - Research Institute of Agricultural Microbiology, 3, Podbelsky Ave., Pushkin-6, St.- Petersburg Region 189620, Russia
VNIISHMM - Research Institute of Agricultural Microbiology, Moscow Department
VNIIsintezbelok - Research Institute for Biosynthesis of Protein Substances, 27, Kommunisticheskaya Str., Moscow 109004, Russia (same as VSB).
VNIISViV Mold. - Research Institute of Horticulture, Viticulture and Winemaking, 14, Fruktovaya Str., Kishinev 277000, Moldova
VNITIAF - Research Institute of Antibiotics and Enzymes, 41, Ogorodnikov Prospekt, St.-Petersburg 198020, Russia (same as LIA)
VPI - Virginia Polytechnical Institute and State University, Blacksburg, VA., USA
VSB - See VNIIsintezbelok
VTT - VTT Collection of Industrial Microorganisms, Technical Research Centre of Finland (VTT), Biotechnical Laboratory, Finland

WB - Bacteriology Department, University of Wisconsin, Madison, Wisconsin, USA
WFPL - Western Forest Products Laboratory, Vancouver, Canada
WIM - see IMRU
WHO - World Health Organization
WUN - Washington University, USA

YGSC - Yeast Genetic Stock Center, University of California, Berkeley, CA 94720, USA
YUSM - Yale University School of Medicine, New Haven, Connecticut, USA

ZBH - Zentrum Biochemie Medizinische Hochschule, D-3000 Hannover 61, Germany
ZIMET - see IMET