

BELARUSIAN COLLECTION OF NON-PATHOGENIC MICROORGANISMS - NATIONAL ASSET OF REPUBLIC OF BELARUS. PROBIOTIC BACTERIA

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Development of biotechnology in Belarus depends on application of strains deposited at Belarus collection of microorganisms. Decree of the Council of Ministers has enlisted Belarus collection of microorganisms (collection of type and industrial non-pathogenic microorganisms, Institute of Microbiology, National Academy of Sciences, Belarus) into State Register of scientific objects rated as National asset of the republic. Collection stock has being formed of cultures isolated from natural sources, variants selected by Institute researchers and strains transferred from other depositories.

Valuable industrial microbial strains could be used in manufacturing enzyme preparations, ferments ensiling plant substrates; producing preventive-therapeutic compositions enhancing immune potential in humans and animals; development of biological agents to control plant pathogens; bacterial preparations for degradation of toxic organic substances and bioremediation of natural and industrial media.

Major trends of collection activities are:

- setting up the collection stock of microbial cultures valuable for various areas of microbiology and biotechnology;
- replenishing of the fund with type and reference microbial strains, identification of bacteria, filamentous fungi and yeasts, studies on physiology of microorganisms affiliated to different taxonomic groups;
- maintaining viability of deposited microorganisms by long-term conservation techniques;
- classifying of information on collection stock cultures summed up in the respective data bank, providing expertise on subjects related to identification, depositing of microbial strains in the course of patenting procedure, supplying cultures upon request of the customers.

Currently over 1200 microbial strains are maintained at Belarus collection of non-pathogenic microorganisms. Viability of microorganisms is ensured by transfers into fresh nutrient media. Long-term preservation of collection cultures with minimal risk of genetic changes is guaranteed by freeze-drying and cryopreservation procedures. Basic guidelines for the activities of Belarus collection of non-pathogenic microorganisms are isolation of new microbial strains from natural sources which are potential objects for industrial, agricultural and environmental biotechnologies, compiling data bank characterizing properties of bacteria, filamentous fungi, yeasts and bacteriophages, elaboration of theoretical and practical recommendations for application of industrial strains from collection stock. A promising trend in functioning of the collection is introduction of biochemical methods for detection of phospholipids and glycolipids as chemotaxonomic markers and molecular-genetic methods based on gene sequencing and PCR-fingerprinting for identification of microorganisms.

Project B11PL-003 “Isolation and characterization of probiotic bacteria for functional food production” is aimed on isolation, identification and characterization of probiotic bacteria prospective for application in food industry. In the network of this project we optimized selective media for probiotic bacteria isolation from different sources, particularly, milk and dairy products, biomaterial. Using developed selective media we managed to isolate more than 60 stable cultures of probiotic bacteria from homemade milk, sour clotted milk, curd, sour cream, feces of healthy adults. Primary identification of isolated bacteria cultures on the base of colony and cell morphology allowed us to identify 32 cultures as representatives of *Lactobacillus* genera, 20 cultures – *Lactococcus* genera, 8 cultures – *Bifidobacterium* genera. Nowadays we perform accurate identification of isolated probiotic bacteria using traditional biochemical methods (catalase and oxydase production, nitrate reduction, carbohydrate fermentation) and up-to-date molecular-genetic techniques (phylogenetic gene sequencing, rep- and RAPD-PCR fingerprinting, plasmid profiling). In prospect the isolation of probiotic bacteria from traditional Belarusian and Polish food products

may be combined with technological examination of isolated bacteria for production of several foods of plant and animal origin.

Fermented food has become increasingly popular. Consumers are discovering anew their properties, particularly health promoting and natural form of conservation food.

It was already found that it is possible to produce the food products fermented with selective probiotic bacteria. Regarding the plant food we have produced the carrot juice fermented with *Lactobacillus acidophilus* CH-2, soy beverage and pumpkin sherbet fermented with *Lactobacillus casei* KN291. All the products have gained the consumer acceptance, in some cases better than the basic products. We have also found that the animal origin mediums are suitable for fermentation with probiotic bacteria. Successfully we have added the *Lactobacillus casei* LOCK 0900 and *Lactobacillus paracasei* LOCK 0919 to pork loin, ham and sausages.

In all trials we have obtained sufficient count of probiotic bacteria in the products to be able to name them probiotic foods.