STUDY SOME PROPERTIES OF BACTERIAL STARTERS USED IN THE PRODUCTION OF FERMENTED MILK PRODUCTS

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Certain foods or food components may provide health and wellness benefits. These foods, also known as “functional foods”, are thought to provide benefits beyond basic nutrition and may play a role in reducing or minimizing the risk of certain diseases and other health conditions. Examples of these foods include fruits and vegetables, whole grains, fermented milk products, fortified foods and beverages and some dietary supplements.

Functional characteristics of many traditional foods are being discovered and studied, while new food products are being developed to include beneficial components. Fermented milk products based on bacterial starters deserve special attention among the great number of functional food. On the Ukrainian market you can find the starters of such trademarks as “VIVO” (Ukraine), “GoodFood” (Italy), and “GENESIS” (Bulgaria).

The aim of our work is to study the efficiency of domestic bacterial starters, as a functional food. To do this we studied the properties of microorganisms forming the starters; prepared fermented milk products on the basis of these starters according to the manufacturer's instructions; compared the properties of these products according to the normative documents. Our previous work has shown that the application of the fermented milk products based on the bacterial starter cultures is an effective method of prevention and treatment of dysbiosis occurring as an accompanying factor of using antibiotics in the treatment of infectious and inflammatory diseases.

In addition to indicators that are governed by the normative documents we studied the adhesive activity of the starter culture. The given indicator is not included in the standards governing the creation and production of the starters, but it is important to determine the effectiveness of action of fermented milk product on its

basis, because thanks to this property probiotic production strains are able to compete with pathogenic bacteria for receptor binding. Therefore, the criterion for selection of starters, included in the structure of functional food for their effective operation, except for the high antagonistic properties, the adhesion should be assessed.

Adhesive properties were studied with the rapid method for the human blood erythrocytes as a universal model of macro-cell. The starter cultures were grown in liquid nutrient medium 48 h at temperature (37±1) °C and the cells were separated from the culture medium by centrifugation twice at 1000 rpm for 10 minutes. Bacterial cell suspension was prepared by a concentration of $1 \cdot 10^9$ CFU/ml, adding to the draught of buffer solution (pH 7.2-7.3).

The native red blood cells were used in the experiment. The blood was taken from the ulnar vein in tubes with heparin, the blood washed twice with the buffer by centrifugation at 2000 rpm, strands of fibrin beat glass beads. After that the prepared suspension of erythrocytes with concentration $1 \cdot 10^9$ cells/ml. Adhesive properties of cultures was estimated as average adhesion (AA) (average quantity of the microorganisms attached to a single erythrocyte while counting is not less than 25 erythrocytes, taking into account not more than 5 erythrocytes in the same field of view), to the participation rate of erythrocytes in adhesion process (K) (the percentage of erythrocytes, which have adhered microorganisms on its surface) and to the index of adhesiveness of microorganisms (IAM) (average number of microbial cells at one participating in adhesion process, the erythrocyte). IAM is calculated as AA divided by K in %. Adhesiveness is zero when AA - from 0 to 1.0, low - from 1.01 to 2.0, average - from 2.01 to 4.0 and high at the AA above 4.0. The microorganism is non-adhesive when IAM $\leq$ 1.75, low-adhesive - from 1.76 to 2.5, average-adhesive - from 2.51 to 4.0 and high-adhesive when IAM above 4.0.

The study of adhesion of microorganism's cultures of studied starters showed the presence of low- and average-adhesive strains. This fact shows that the producers do not take into account the ability to adhesion of microorganisms in the construction of starter cultures for production of fermented milk products, which allows recommending this criterion, as required in the selection of strains of starter cultures.