



# ODESSA NATIONAL ACADEMY OF FOOD TECHNOLOGIES

## BIOTECHNOLOGY OF SELENIUM-CONTAINING PROBIOTICS

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### Purpose and scope

The aim of the work is to develop biotechnologies for selenium-containing probiotics, dietary supplements and food products with their inclusion.

### Main characteristics and the development essence

It is justified to use the culture of *Lactobacillus acidophilus* and *Bifidobacterium bifidum* to produce selenium-containing dietary supplements. It has been established that sodium selenite ( $\text{Na}_2\text{SeO}_3$ ) is the optimal source of inorganic selenium, which addition to the cultivation medium ensures its maximum accumulation and biotransformation. It has been determined that optimal concentrations of  $\text{Na}_2\text{SeO}_3$ , which do not inhibit the growth of biomass of lactic acid bacterium and bifidobacteria, are  $0.5\text{-}5 \mu\text{g} / \text{cm}^3$ . Direct dependence between the content of inorganic  $\text{Na}_2\text{SeO}_3$  in the culture medium and the content of organic selenium in biomass of the studied microorganisms was determined. Based on the results, it was developed selenium-containing dietary supplements "Selenolact" (containing lactobacilli of  $2.0 \times 10^9 \text{ CFU} / \text{cm}^3$  of organic selenium  $195 \pm 1 \mu\text{g} / \text{g}$ ); "Bifisel" (with a content of bifidobacteria of  $4.4 \times 10^8 \text{ KUO} / \text{cm}^3$  of organic selenium  $200 \pm 1 \mu\text{g} / \text{g}$ ); Selenobifilact (with a content of lactobacilli  $1.0 \times 10^9 \text{ CFU} / \text{cm}^3$ , bifidobacterium -  $1.2 \times 10^8 \text{ CFU} / \text{cm}^3$  of organic selenium  $202.5 \pm 1 \mu\text{g} / \text{g}$ ).

### Comparison with the world's analogues, the main development advantages

Selenium that is found in microorganisms, in organic form, is easier to digest, provides high antioxidant, anti-mutagenic properties, as well as helps to remove heavy metal ions from the body. Probiotic cultures of lactic acid bacteria and bifidobacteria, in turn, provide nonspecific resistance to the organism through microbial antagonism, activation of phagocytic and cytostatic activity of macrophages, lymphoid tissue stimulation, as well as the release of antibiotic substances, vitamins.

### The intellectual property protection status

The scientific novelty of the work is confirmed by the declarative patent of Ukraine on utility model No. 111251 "Method of obtaining probiotic selenium supplements". (10.11.2016)

### Demand in the market

Companies of the microbiological industry

### The readiness for development status

The technological, hardware schemes and normative documentation for the production of selenium-containing dietary supplements have been developed.



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