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INNOVATIVE PROVISION OF BIOLOGIZATION OF AGRICULTURE IN UKRAINE

KHODORCHUK V.
Engineering and Technological Institute "Biotechnica" National Academy of Agrarian Sciences of Ukraine
https://orcid.org/0000-0001-6542-0290 ,
e-mail: khodor.od@gmail.com

Summary. The article is devoted to the issue of innovative provision for the biologicalization of agriculture in Ukraine, which is directly related to the development by scientists of the Engineering and Technological Institute "Biotechnica" of the National Academy of Agrarian Sciences of Ukraine of engineering-technological and agrobiological provision for the production and use of means of biologicalization of agriculture. Modern directions of research on ensuring biologization of agriculture are presented. The results of research conducted by scientists of the institute in the first half of 2023 under the program of scientific research of the National Academy of Sciences of Ukraine No. 11 "Biological methods of plant protection under the conditions of environmentalization of agriculture" ("Biocontrol") (2023-2025) are highlighted.

Keywords: *innovative provision, biologicalization of agriculture, research results*

Introduction. Taking into account the global challenges and recognized approaches to their solution, the greening of production becomes the main direction of sustainable development of agriculture. Its implementation is carried out mainly through the development of alternative farming systems and through the use of elements of these systems in traditional farming. The necessary mechanism for the transition to alternative systems is the complex biologization of agriculture, which is based on biological methods of protection and nutrition of plants and involves the process of replacing agrochemicals in crop production technologies with biological means of natural origin. The innovative nature and effectiveness of biologicalization is largely determined by the state of its final stages, namely the production and use of biological agents. This requires the development of engineering-technological and agrobiological

support for production and the use of means of biologicalization of agriculture.

The purpose of the work was to highlight the results of the research of the Engineering and Technological Institute "Biotechnica" of the National Academy of Agrarian Sciences of Ukraine in the first half of 2023 regarding the development of innovative provision for production and the use of means of biologicalization of agriculture.

Materials and methods. Modern research on ensuring biologization of agriculture concerns:

– the use of microbiological and growth regulating drugs of biological origin in crop production [1];

– application of biological preparations based on fungi of the genus *Trichoderma* by the method of pre-sowing treatment of seeds on soybean, wheat, corn crops [2];

– the use of microbial preparations to increase the productivity of seed buckwheat [3];

– development of a technological complex for the industrial production of *Chrysoperla carnea* Steph. [4];

– the impact of organic fertilizers of different origins on the microbiological properties of the soil during the cultivation of hazelnuts [5];

– development of technology for mass breeding of agents for biological control of pests of agricultural crops [6];

– system design of information and control complexes for biotechnologies, in particular, ensuring the production processes of entomophages of guaranteed quality [7];

– development of engineering methodology for assessing the energy efficiency of technological processes of industrial production of microbiological preparations for plant protection [8].

The materials of the work were the results of fundamental and applied scientific research of the Engineering and Technological Institute "Biotechnica" of the National Academy of Agrarian Sciences of Ukraine in 2023 under the scientific research program No. 11 "Biological methods of plant protection under the conditions of environmentalization of agriculture" ("Biocontrol") (2023-2025). Taking into account the history and current state of the biological method in Ukraine, the program mainly considers innovative processes related to biological means, which are intended for the protection, nutrition, growth stimulation of plants and ensuring soil fertility, and are products of artificial

breeding of biological organisms of natural origin. In Ukraine, microbiological preparations of bacterial and fungal origin, as well as insects and ticks, are mainly used from this group.

Results and discussions. In 2023, scientists of the institute:

– a thermodynamic model of the air conditioning system for entomological production was developed;

– the main regularities of the functioning of agricultural bioengineering complexes are determined;

– a methodology for modeling currents formed in bioreactors during mixing of the fermentation medium for the production of microbiological plant protection products was developed; installation scheme for modeling currents in bioreactors;

– the concept of applying methods of quality control of insect cultures at different stages of ontogenesis is proposed;

– the influence of the temperature regime on the development of eggs and larvae was investigated *Perillus bioculatus*;

– a study was conducted to determine the optimal substrate for the development of *Perillus bioculatus* at the larval stage;

– the effect of the modified recipe composition of nutrient media on the characteristics of microbial communities was investigated;

– the stimulating and destructive factors of the use of biocontrol in Ukraine are determined;

– a SWOT analysis of the application of the biological method of plant protection in Ukraine was carried out;

– individual nodes of the experimental model of the economic fermentation plant for the production of microbiological means of plant protection were refined, commissioning works and functional tests of the experimental model were carried out;

– the structure of an innovative intelligent control system; a three-layer neural network of direct signal propagation was developed, which classifies the quality of entomological products in the production of an entomophages *Habrobracon hebetor*;

– works were carried out on finalizing the experimental sample of the technological complex for production *Chrysoperla carnea* Steph. and functional testing of an experimental sample;

– the breeding process of *Aphidoletes aphidimyza* Rond was investigated with the use of a designed slag for obtaining eggs;

– the biological parameters of *Hermetia illucens* during cultivation in the developed equipment for growing larvae and collecting prepupae were investigated.

Analytical and experimental (in laboratory and production conditions) methods were used during the research; mathematical, computer and physical modeling.

Conclusions. The results of scientific research of the Engineering and Technological Institute "Biotechnica" of the National Academy of Sciences of Ukraine regarding the innovative provision of biologization of agriculture in Ukraine are of a complex nature, which is determined by the combination of technical, biological and agricultural components; can be used in the industrial production of biological means of plant protection for the accelerated development of the greening of agriculture, in scientific institutions of the corresponding profile.

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