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Scientists from BAS created a biopesticide for use with vegetable crops and ornamental plants

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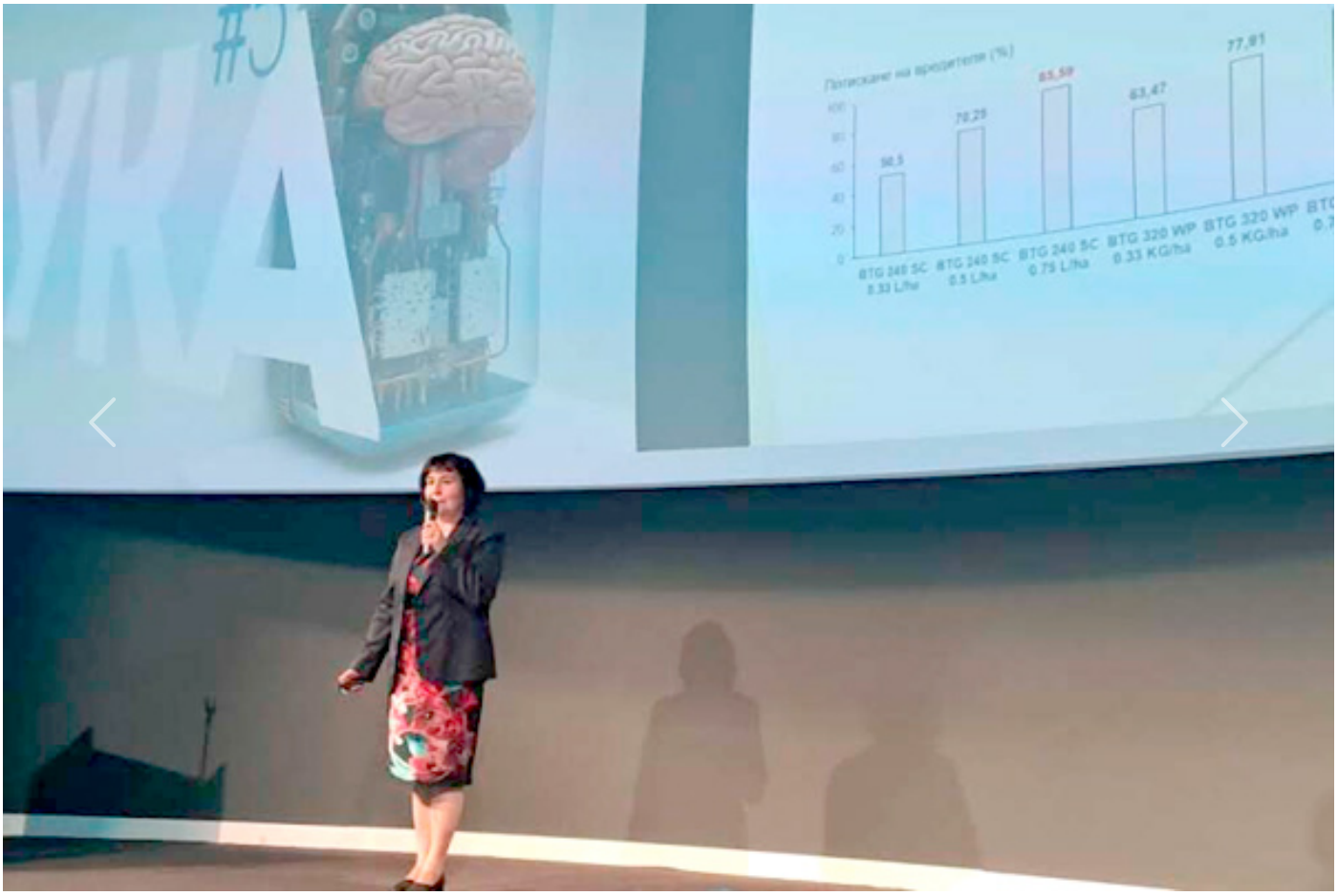

The innovative broad-spectrum biological insecticide was developed jointly by the Institute of Microbiology and the Institute of Chemical Engineering at the Bulgarian Academy of Sciences (BAS), and is supported by the company "Agria" AD. This was announced in an interview for BTA by Prof. Dr. Penka Petrova - Director of the Institute of Microbiology. The active ingredients of the biopesticide are not chemical compounds, but microorganisms, spores, and toxins with insecticidal action.

At the fifth edition of the "Science for Business" forum, organized by BAS and the Executive Agency for Promotion of Small and Medium-sized Enterprises, a broad-spectrum biological insecticide was presented. The preparation is based on a new Bulgarian strain of *Bacillus thuringiensis*, which shows broad-spectrum efficacy

against key pests - such as moths, Colorado potato beetle, nematodes, and snails. Genomic analysis of the strain reveals the presence of toxin-coding genes, and microscopic studies confirm the presence of active spores and crystalline toxins.

Field experiments

Field trials conducted on tomatoes infested with pests show significant suppression of leaf miners and cotton bollworms, with the efficacy of the Bulgarian preparation being equal to or higher than that of established commercial products. The advantages of the new formulation are related to its significantly broader spectrum of action and relatively lower cost. The lyophilized formulation ensures stability and convenience in storage and application, and its environmental safety makes it suitable for both conventional and organic farming. The development is a vivid example of a successful partnership between science and business, offering a sustainable and ecological solution to an important agricultural problem, with high applicability in the context of climate change and the need for green technologies, noted Prof. Penka Petrova.

The advantages of the Bulgarian insecticide are related to it being a broad-spectrum preparation against five different pests: Lepidoptera (butterflies and moths), Coleoptera (beetles), Diptera (flies), Hemiptera (true bugs), and snails from the class Gastropoda.

The new preparation is an invention and is the first against the Colorado potato beetle

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The preparation is an invention, and through it, science truly helps business, and vice versa, which is of great importance. The patent is owned by the company "Agria", but the inventors are from the Bulgarian Academy of Sciences, thus giving them the opportunity to apply their knowledge and skills in practice. It was satisfying for us that what we understand can be applied in practice - in the field with agricultural crops, said Prof. Petrova.

"It is important that our strain is unique, isolated in Bulgaria, and has different qualities from those of commercial preparations. Most of them act against a single type of pest - for example, only against caterpillars of some butterflies and moths. Our preparation is broad-spectrum and can act against moths, the Colorado potato beetle, snails, and nematodes.

These qualities of the bacterial strain allow crops in the field to be protected from a very large number of pests after treatment," explained the Director of the Institute of Microbiology.

Prof. Petrova emphasized that this will be the first preparation with application against the Colorado potato beetle, a potato pest, as no such formulations are currently on sale. The preparation can be used for all types of agricultural crops, being most applicable to vegetables, but also to numerous ornamental plants - from roses to thujas, which are infested with aphids.

The preparation will be in two forms - liquid and lyophilized

Our preparation is made in two formulations - liquid and lyophilized, with the liquid form also being very active, but not very suitable for sale in large quantities and over long distances. The lyophilized formulation is in the form of a dry powder that dissolves in water, and when agricultural crops and plants are sprayed, it acts even more strongly. The quality of this type of formulation is related to the fact that the active ingredients are concentrated in a much smaller volume, said Prof. Penka Petrova.

She announced that the company "Agria" intends to offer the bioinsecticide preparation on the market in the very near future. It was developed as a result of a joint project from 2021, and four years later, the joint team succeeded in patenting the preparation. A complete technology has been created - from the isolation of the strain to production, and this is a long process. It is important that everything possible has been done to make production cheaper, and this new preparation has a lower cost than commercial preparations, and should be sold at lower prices in Bulgaria. All of this will now depend on the company "Agria". When asked what commercial preparations are, Prof. Petrova explained that American, French, and even Romanian preparations are sold, which use a different strain of the same type of bacteria. They are sold at much higher prices. It is

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assumed that due to the more favorable technology, we will be able to create a cheaper product, explained the Director of the Institute of Microbiology.

The company "Agria" has decades of traditions in the production and supply of plant protection products on five continents. The Bulgarian company also produces fertilizers, as well as many other products for the agro-industry and agriculture. The team's ambition is to offer an alternative to chemical pesticides on the market and to begin developing a series of biopesticides.

Source: BTA