

# Microbiological Control of Cotton Bollworm in Tomatoes Based On Entomopathogenic Microorganisms

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**Abstract:** Protection of agricultural plants from harmful organisms successfully solves its problems when carrying out a complex integrated system, including compliance with quarantine rules, organizational, economic, agrotechnical, biological and chemical measures. According to the FAO, only harmful insects destroy at least 30% of the world's crop.

**Key words:** Biological measures, *Bacillus thuringiensis*, characteristics of biological preparations.

**Introduction:** Since gaining independence, Uzbekistan has been pursuing a unique agrarian policy in order to further develop agriculture, improve it with the help of modern technologies, and meet the demand of the population for food and other agricultural products. Increasing the productivity and improving the quality of crops are one of the key factors in the development of agricultural culture. Addressing these issues requires science and industry to increase the effectiveness of plant protection against pests, reduce pollution, develop ways to restore the biological and ecological balance in nature, and introduce them on farms.

Because protecting the health of the population and protecting the environment from the harmful effects of chemicals are one of the most pressing issues today. Therefore, scientists are currently working on a coordinated program to protect crops from pests. One of the main components of the program is the biological method. In many countries, new technologies are being introduced in the coming days to increase crop yields that are not only more productive and economical, but also healthier and more environmentally friendly. Nowadays, the Mendeleev University of Chemical Technology in Russia recommends the production of biopreparations in powder form [1].

**Main part:** In the presence of biological agents, pathogenic microorganisms limit the number of pests, not only to maintain a certain level of productivity, but also to isolate the product from pesticide residues. In Uzbekistan,

microbiological control has been used to protect cotton and horticultural crops from pests.

According to scientific sources, in a number of developed countries (USA, France, England, Germany, Italy, Russia, etc.), as well as in economically underdeveloped countries, biopreparations based on the bacterium *Bacillus thuringiensis* are used effectively. At the same time, they have proven to be a fully competitive and alternative method to chemicals.

An analysis of scientific research conducted in 1970-1989 has shown that microbiological drugs are very effective by a number of our scientists [2].

The results of scientific research in this area and the fact that these drugs are currently almost not used in agriculture, led us to conduct research on this problem.

As a microbiological agent for plant protection, several biologically non-bacterial, entom-F preparations have been recommended for disease control. Research has shown that the gene (plasmid) of *Bacillus thuringiensis* that allows crystal formation can be transferred to *Bacillus cereus* on its own. This fact proves that the two bacteria are genetically related. [3] Production and application of biopreparations based on *Bacillus thuringiensis* *b-exotoxins* not only provides an environmentally safe method and high efficiency of protection of plants from harmful insects and phytopathogenic microorganisms, but can also solve a number of veterinary and medical problems. [4]

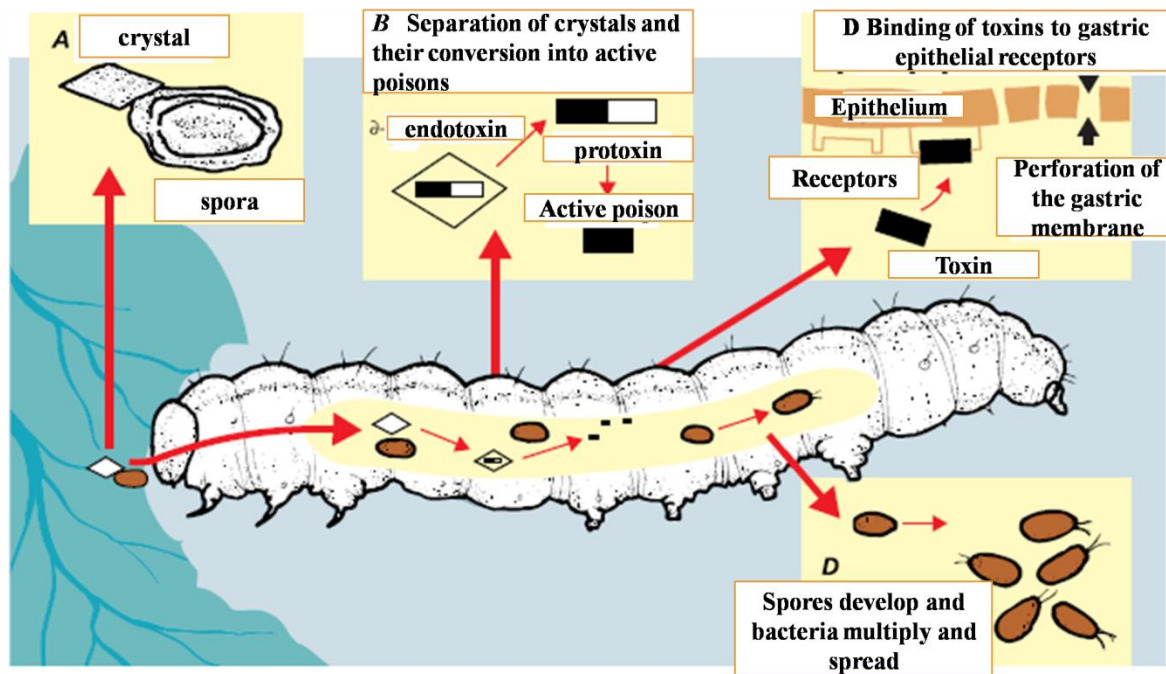


Figure 1. The mechanism of action of the bacterium *Bacillus thuringiensis* on insects

Uzbekistan currently uses mainly biological methods to control cotton bollworm, which is important for the protection of nature in densely populated areas with hot climates. In the fight against microbiological methods, it is necessary to look for entomopathogens that cause the disease, the composition of which must be specific to the conditions of Uzbekistan.

In recent years, there has been a significant increase in the number of cotton nightshade, the mass proliferation of autumn moths, whiteflies, tomato moths and other insects in tomato fields, causing serious damage to the tomato crop. If no control measures are taken, 30-40% of the crop will be lost.

About a thousand biolaboratories in the country breed beneficial insects such as trichogramma, poachers and goldfish, which are seasonally released into the cotton fields as beneficial entomophagous. While the trichogramma is effective against cotton bollworm eggs, the bracon is only effective against adult cocoon worms, while young worms have been shown to infect cotton generative organs en masse. This situation requires the development of technology for the use of microbiological drugs as an integrated system element in cotton fields.

There are no microbiological control measures against the pathogens of cotton bollworm in the tomato plant.

*Cotton nightshade* is one of the most dangerous pests of cotton. Cotton nightshade also infects tomatoes, hemp, corn, lentils and other crops. It infects and eats not only the leaves of cotton, but also the stems, flowers, buds and pods, especially the fruit of tomatoes. Cotton nightshade is ubiquitous in Central Asia, and plants are mainly affected during the walnut period. The cotton bollworm completes its

full development period from egg to butterfly in 30-35 days, and the female butterfly lays between 400 and 3,000 eggs. It spends the winter in the ground in the fields, along the ditches, at a depth of 4-12 cm. In Uzbekistan, a cotton night can produce 3-4 generations per season.

**Conclusion:** To date, the development of environmentally friendly pest management systems in a number of countries around the world is one of the key requirements (FAO, 2013). With this in mind, scientific research is being conducted at the *Andijan Experimental Station of the Institute of Vegetable, Melon and Potato Research* to control the cotton bollworm in tomato plants and to increase the yield of tomato plants on the basis of biopreparations that are less harmful to the environment. The experiment consisted of 3 variants of 4 turns, tomato variety TMK-22, planted in a scheme 70x30. It is important to apply and apply microbiological methods in the production of ecologically clean tomatoes.

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