

COMPLEX APPLICATION OF *BACILLUS SPP.* AND BIOREGULATORS FOR THE CONTROL OF PESTS

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The losses to the world agriculture, various crops and agricultural products caused by diseases, weeds and pests, account for 35% of the annual production. An increase in yield per hectare can be obtained through the use of scientifically based protection systems. On a global scale, microbial pesticides only account for approximately 1–2% of all pesticides sold; however, they have shown long term growth over the past decade in contrast to chemical pesticides, which have consistently declined in the global market (Bailey et al., 2010). Some sources have recently estimated that the growth in microbial pesticides could reach 3% of the pesticide market in 2014 (Glare et al., 2012). The development and use of bacterial biopesticides as classical, conservation and augmentative biological control agents have included a number of successes and some setbacks in the past 15 years.

The aim of the work was to establish the possibility of entomopathogenic strains *Bacillus thuringiensis* ssp. *kurstaki* (Bt) and *Bacillus thuringiensis* ssp. *thuringiensis* (BT) application in a tank mixture for spraying. For this purpose, the effect of the recommended and half concentrations of para-aminobenzoic acid (PABA) on the above-mentioned bacteria colonies was examined *in vitro*. Bacteria were cultivated in liquid mineral nutrient medium for 48 hours at 29°C to the titer of 10⁹ CFU/ml. The suspension was inoculated on the agarized CGA nutrient media in Petri dishes. After bacterial cultures had grown for 24 hours, sterile disks (five disks per three Petri dishes) soaked in the substance biologic active emulsions were placed on their surfaces. After a week of incubation, the interaction of the studied concentrations of para-aminobenzoic acid (PABA) with bacterial culture was recorded. Bacterial growth inhibition zones were not found. This allows to assume that it is possible to combine working solutions of bioregulators with bacterial strains suspensions and at the same time to reduce the para-aminobenzoic acid (PABA) after effect. The similar results have been reported for *B. thuringiensis* mixtures with the pesticides Sumi-Alpha, Regent, Decis and *Pseudomonas* sp. *Bacillus* sp. with the pesticides Ridomil, Quadris, Raxil and Colfo-Super (Адрианов Ф.Д., 2011; Попов Ю.Б., 2008; Войтка Д.В., 2018).

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