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Influence of humates on the growth of microorganisms

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Keywords:

humate preparation "Powhumus", effective concentration, *Bacillus thuringiensis.*

Research Objective: study of the effect of the preparation of humate "Powhumus" on the growth of *B. thuringiensis* ssp. *kurstaki.*

The objects of the study were *B. thuringiensis* ssp. *kurstaki* (from the collection of O.F. Vyatchina, Department of Microbiology, ISU).

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Results

Studies have shown that in the LB medium without the addition of humate, the number of cells of the studied *B. thuringiensis* strain increased by almost an order of magnitude during 24 hours of cultivation - from (2.75 ± 0.45) · 10^7 to (3.35 ± 0.45) · 10^8 CFU / ml. When 0.01% humate was added to the nutrient medium, the number of B. thuringiensis cells was almost three times higher than in the control ((9.05 ± 0.55) · 10^8 and (3.35 ± 0.45) · 10^8 CFU / ml, respectively). Humate at a concentration of 0.0001; 0.001 and 0.1% had no significant effect on the growth of the *B. thuringiensis* strain. The suppression of culture growth was noted during cultivation in a medium with 1% humate. At the same time, the number of cells was more than two times lower than in the control (table 1).

Table 1 – The effect of the "Powhumus" humate preparation on the growth of *B. thuringiensis* ssp. *kurstaki*

Humate concentration, %	Number of cells, CFU / ml
0,0001	$(5.0\pm0.79)\cdot10^8$
0,001	$(5.50\pm1.27)\cdot10^8$
0,01	$(9.05\pm0.55)\cdot10^8$
0,1	$(3.10\pm0.69)\cdot10^8$
1	$(1.40\pm0.11)\cdot10^8$
control	$(3.35\pm0.45)\cdot10^8$

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Conclusions

Thus, humate concentrations have been revealed that stimulate the growth of the entomopathogenic bacterium *B. thuringiensis* ssp. *kurstaki* (0.01%), as well as the humate content, at which it had no visible effect on the growth of the strain (0.0001; 0.001 and 0.1%). The concentration limit was established, above which the growth inhibition of *B. thuringiensis* (1%) was observed. The revealed ranges of effective concentrations of humates must be taken into account when using these substances in the biotechnology of plant protection against Lepidoptera pests.

References

Acknowledgement

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Thank you for your attention!

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