

***Bacillus subtilis* AS PROMISING BIOLOGICAL AGENT FOR SUSTAINABLE PLANT PROTECTION**

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Aim of the study. In the context of sustainable agriculture and the need to reduce chemical pesticide use, beneficial microorganisms represent an eco-friendly alternative for plant protection. *Bacillus subtilis* is recognized for its biocontrol potential due to its ability to inhibit phytopathogens and promote plant growth. The aim of this study was to analyze and synthesize information from the scientific literature regarding the role of *Bacillus subtilis* in biological plant protection and its potential applications in horticultural and field crops.

Materials and Methods. The study was based on a review of scientific publications addressing the biological activity of *Bacillus subtilis* in plant protection. Scientific articles, conference proceedings, and other relevant literature were analyzed to identify the mechanisms responsible for pathogen suppression, induction of plant resistance and growth promotion. Particular attention was given to studies involving horticultural crops and to research conducted in the Republic of Moldova.

Results. The literature analysis showed that *Bacillus subtilis* is one of the most effective biological control agents used against plant pathogens. Its activity is associated with the production of antimicrobial metabolites, competition for nutrients and ecological niches, and induction of systemic resistance in plants. In addition to disease control, *Bacillus subtilis* contributes to plant growth by improving nutrient availability and stimulating root development. Studies conducted on cucumber plants reported positive effects on plant growth, rhizosphere microbial communities and crop quality. Research conducted in the Republic of Moldova demonstrated the effectiveness of a *Bacillus subtilis*-based biological preparation (strain IAB/BS03) against pathogens affecting winter wheat, confirming the practical potential of this bacterium under local conditions.

Conclusions. *Bacillus subtilis* represents a promising biological agent for sustainable plant protection. Scientific evidence confirms its ability to suppress phytopathogens and enhance plant growth, making it a valuable component of integrated crop management systems. Future studies should focus on evaluating the effects of *Bacillus subtilis* treatments on cucumber plants under local environmental conditions and developing recommendations for its practical application in horticulture.

Keywords: *Bacillus subtilis*, biological control, sustainable agriculture, plant protection, cucumber, plant growth promotion.

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