

## **APPLICATION OF LACTIC ACID BACTERIA IN AGRICULTURE: PERSPECTIVES AND CHALLENGES**

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Application of lactic acid bacteria for plant protection and stimulation of plant growth started in 1980s with works of Visser et al. (1986) and Higa et al. (1989). Nevertheless, till now there is no clear scientific explanation of the mechanism of growth stimulation. We found out that lactobacilli can increase growth of stems, roots and stimulate the germination of tomatoes, garden cress and wheat (Limanska, 2013; unpublished data). But it also was shown that in consortia the positive capabilities of *Lactobacillus plantarum* increased. What is the mechanism of such beneficial co-existence? It is still unknown. Only one work of Goffin et al. (2010) described the possible synthesis of plant hormones or hormone-like compounds of *L. plantarum*. The mechanism of such mutual effects could be based on cell-cell interactions. Induction of bacterial activity of lactobacilli as the result of interaction with microorganisms of other species is known for the synthesis of bacteriocins (Rojo-Bezares, 2007). It is possible that the similar mechanism exists for the synthesis of stimulating compounds.

Antagonistic activity in case of consortia was not increased. In all of the tested strains it depended on the synthesis of organic acids. We found out the inhibition of some phytopathogens like *Agrobacterium tumefaciens*, *Agrobacterium vitis*, *Agrobacterium rhizogenes*, *Ralstonia solanacearum*, *Erwinia carotovora* by *Lactobacillus plantarum* strains. The most active strains could be used as the basic components for biological preparations.

The challenges of application of lactic acid bacteria concern their survival on plant surfaces and in soil. It is a very poorly studied phenomenon. We showed that lactobacilli could survive in soil for at least 21 days and on plant surfaces - at least for a month. Selection of *L. plantarum* strains with the most stable viability could solve this problem.