

## LACTOBACILLI FROM PLANT SURFACES: THE PERSPECTIVES FOR BIOTECHNOLOGY

Limanska N., Merlich A., Galkin M., Vasylieva N., Samoilenko O., Filimonov V.,  
Ivanytsia V., Sokol D., Sviridov I.

*Chair of Microbiology, Virology and Biotechnology, Odesa National  
I. I. Mechnikov University, Dvorianska str. 2, 65082 Odesa, Ukraine*

E-mail: [limanska@gmail.com](mailto:limanska@gmail.com)

The advantages of organic agriculture seem more and more attractive today. That's why the lactobacilli with their GRAS (Generally Recognized As Safe) status could be the widely used microorganisms in biotechnology of plant protection and stimulation of plant growth.

To study the antagonistic effect *in vitro*, the well-diffusion method was applied. For experiments *in vivo*, kalanchoe and tomato plants, and carrot explants were used. Stimulation of plant growth was observed on tomato seedlings. Biofilm formation was studied on *Lepidium sativum* seedlings. To reveal a *plnA* gene, the polymerase chain reaction was used.

The scope of our work was to evaluate the stimulation and antagonistic effect of *L. plantarum* strains isolated in Ukraine and France. All the studied strains have shown the strong inhibition activity against the phytopathogens *Agrobacterium tumefaciens*, *A. rhizogenes*, *Agrobacterium vitis*, *Erwinia carotovora* and *Ralstonia solanacearum* as the result of the production of organic acids. All the strains could form the biofilms on plant surfaces although the level of biofilm formation was a strain-specific characteristic. It was supposed that the ability to form biofilms on *Lepidium sativum* root surfaces correlated with the possession of *plnA* gene revealed in the genome of lactobacilli.

The ability to attach to plant surfaces and to inhibit the phytopathogens enabled us to choose the certain strains of *L. plantarum* as the perspective agents of biological control. The significant stimulation effect was also observed using tomato plants. Previous authors have supposed the ability of *L. plantarum* to synthesize plant hormones or their precursors [Goffin et al., 2010]. We showed the increase of stimulation activity when several strains of lactobacilli were used in consortium. Rojo-Bezares et al. (2007) reported about the synthesis of some bacteriocins in *L. plantarum* induced by the presence of other microorganisms. It is possible that certain combination of *L. plantarum* strains increased each other stimulation activity.

1. Goffin P., de Bunt B., Giovane M., Leveaue J.H.J., Hoppener-Ogawa S., Teusink B., Hugenholtz J. Understanding the physiology of *Lactobacillus plantarum* at zero growth // Molecular Systems Biology. – 2010. – Vol. 6, № 431. doi: 10.1038/msb.2010.67

2. Rojo-Bezares B., Saenz Y., Navarro L., Zarazaga M., Ruiz-Larrea F., Torres C. Coculture-inducible bacteriocin activity of *Lactobacillus plantarum* strain J23 isolated from grape must // Food Microbiol. - 2007. – Vol. 24 – P. 482-491.