

LACTOBACILLI FOR PLANT PROTECTION AND STIMULATION OF PLANT GROWTH

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A lot of consumers all around the world are interested in plant products from organic agriculture. The harmless effect of biological control on nature and human health enforce modern consumers and farmers to change their mind about the best ways of plant protection. Not only plants but consumers should be protected. The representatives of *Lactobacillus* genus have the GRAS status (Generally Recognized As Safe) and could be applied to plant surface without any harmful effect for human health. Investigations of previous authors have shown the antagonistic effect of *Lactobacillus* from various species against number of phytopathogens [Visser et al., 1986; Trias et al., 2008; Corsetti et al., 1998; Wang et al. 2012; Lutz, 2012]. The significant plant growth stimulation effect has been also observed [Higa and Wididana, 1989; Chekasina et al. 1996; *Sadif et al. 2005*; Hamed et al. 2011; Rzhevskaya, 2013; Limanska, 2013].

We used strains of *Lactobacillus plantarum* species to protect test-plants against the phytopathogens. A significant decrease of agrobacterial infection level (60–100 %) in carrots, tomatoes and kalanchoe plants was observed when lactic acid bacteria were applied simultaneously with the pathogen *Agrobacterium tumefaciens* C58. Lactobacilli by themselves could form the spots of necroses on wound surfaces but these spots were restricted to small areas and seemed to be a reaction of hypersensitivity response which could protect the plant from the further spread of the pathogen. Some perspective strains were chosen as the best antagonists because the effect of suppressing the pathogen was strain-specific.

An increase in the mean shoot lengths (14,5–18,2 %) was observed in case of soaking tomato seeds in suspensions of lactobacilli. The effect on root lengths for some strains was more significant: from 10,5 to 31,4 %.

When lactobacilli were applied to grapevine cuttings, the effect was somehow unexpected. The number of rooted cuttings increased when agrobacteria were mixed with lactobacilli as compared with the positive controls inoculated only with agrobacteria. But this happened due to

antagonistic potential of *L. plantarum* killing the pathogen cells. The unexpected results were obtained when the number of buds that grew, significantly increased in 18–20 % when agrobacteria were applied in a mixture with lactobacilli. No tumors were formed.

The antagonistic and plant growth stimulation effect makes lactobacilli the promising agents for biological control.