

## Post-Harvest Biopreservation of Fruit and Vegetables with Application of Lactobacillus Strains

**Authors :** Judit Perjessy, Zsolt Zalan, Ferenc Hegyi, Eniko Horvath-Szanics, Krisztina Takacs, Andras Nagy, Adel Klupacs, Erika Koppány-Szabo, Zhirong Wang, Kaituo Wang, Muying Du, Jianquan Kan

**Abstract :** The post-harvest diseases cause great economic losses in the fruit and vegetables; the prevention of these deterioration has great importance. Against the fungi, which cause most of the diseases, are extensively used the fungicides. However, there are increasing consumer concerns over the presence of pesticide residues in food. An alternative and in recent years, increasingly studied method for the prevention of the diseases is biocontrol, where antagonistic microorganisms are used for the control of fungi. The genera of Lactobacillus is well known and extensively studied, but its applicability as biocontrol agents in post-harvest preservation of fruit and vegetables is poorly investigated. However these bacteria can be found on the surface of the plants and have great antimicrobial activity. In our study we have investigated the chitinase activity, the antifungal effect and the applicability of several Lactobacillus strains to select potential biocontrol agents. We investigated the determination of the environmental parameters of a gene (encoding chitinase) expression and we also investigated the relationship between actual antifungal activity and potential chitinase activity. Mixed cultures were also developed to enhance the antifungal activity and determined the optimal mold spore and bacteria concentration ratio for the appropriate efficacy. Five Lactobacillus strains (*L. acidophilus* N2, *L. delbrueckii* subsp. *bulgaricus* B397, *L. sp.* 2231, *L. sake* subsp. *sake* 2471, *L. buchneri* 1145) possess chitinase-coding gene from the 43 investigated Lactobacillus strains. Proteins with similar molecular weight and separation properties like bacterial chitinases were detected from these strains, which also possess chitin-binding property. Nevertheless, they were inactive, lacks the chitinolytic activity. In point of the cumulative activity of inhibition, our results showed that certain strains were statistically significant in a positive direction compared to other strains, e.g., *L. rhamnosus* VT1 and *L. Casey* 154 have shown great general antifungal effect against 11 molds from the genera *Penicillium* and *Botrytis* and isolated from spoiled fruit and vegetables. Also, some mixed cultures (*L. rhamnosus* VT1 - *L. Plantarum* 299v) showed significant antifungal effects against the indigenous molds on the surface of apple fruit during the industrial storage experiment. Thus, they could be promising for post-harvest biopreservation.

**Keywords :** biocontrol, chitinase, Lactobacillus, post-harvest

**Conference Title :** ICPPFPHT 2020 : International Conference on Plant Protection, Fertilizers and Post Harvest Treatment

**Conference Location :** Athens, Greece

**Conference Dates :** April 09-10, 2020