

Effect of lactic acid bacteria on the postharvest properties of fresh lotus root

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Abstract

The oxidation of phenolic compounds caused by polyphenol oxidase (PPO) often contributes to the browning and decaying of lotus root. However, methods are limited to solve this problem and to effectively extend the shelf life of fresh lotus. Thus, lactic acid bacteria (LAB) were used in this study as an alternative solution. Michaelies-Menten equations analysis indicated that gallic acid, chlorogenic acid and catechin of lotus were the most optimal substrates of PPO. So *Lactobacillus plantarum* (LH-B02), *Lactobacillus acidophilus* (LA-05) and *Lactobacillus casei* (LC-01) were cultivated at the presence of gradient concentrations of these phenols, presenting different dose-effect relationship. The decomposition of polyphenols by effective strains was detected by HPLC analysis, indicating that after interacted for 30 h, 84.17% of catechin was transformed by LH-B02. When LH-B02 suspension (1.44×10^{11} CFU L⁻¹) were sprayed on the surface of the lotus root for 1, 3, 5, and 8 times, the color loss of treated lotus root was significantly reduced ($p < 0.01$), compared with the control during the storage of 15 d. Texture properties involving hardness, chewiness, springiness and cohesiveness of the lotus was significantly ($p < 0.05$) enhanced, especially for the samples sprayed five and eight times, suggesting that LAB could improve the postharvest properties of lotus root.