Postharvest storage quality of citrus fruit treated with a liquid ferment of Chinese herbs and probiotics

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Scientia Horticulturae 255: 169-174. (2019)

Abstract

In this study, we produced a novel liquid fermentation compound (LFC) from the co-fermentation of probiotics and Chinese herbs and assessed its benefits on the postharvest storage quality of citrus fruit. Harvested fruit were treated with sterile water (Control), probiotic suspensions (PS), a combination of Chinese herbs (CHC) or LFC for 5 min and then stored at 20 °C and 85–90% RH for 42 d. The results of *in vitro* tests showed that LFC strongly inhibited the growth of *P. digitatum*. Storage trials showed that PS, CHC and LFC treated fruits had lower weight loss and higher vitamin C and total soluble solid contents at day 42 after treatment. However, there were no significant differences in firmness among all groups. Only LFC-treatment significantly delayed the loss of titratable acidity content at day 21 after treatment. Interestingly, decay incidence in LFC treated-fruit was also significantly lower than both CHC- and PS-treated fruit ($P < 0.05$). PAL and PPO activity in LFC-treated fruit were significantly higher than other groups at days 4 and 6, respectively, after incubation ($P < 0.05$). After incubation with green mold for 8 d, the disease index of fruit treated with PS, CHC, or LFC was 50, 58.3 and 33.3%, respectively, whereas complete decay was observed in water-treated fruit. A significant reduction of lesion diameters, was recorded for LFC-treated fruit, as compared to other treatments. Based on these results, LFC can be considered as a novel, efficient and natural antistaling agent for citrus fruit.