

Peach-gum: A promising alternative for retarding the ripening and senescence in postharvest peach fruit

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Abstract

To evaluate the potential of peach-gum coating in retarding postharvest fruit ripening and softening, the effects of peach-gum treatment on storage performance and transcriptomes of peach fruit were studied during cold storage. Compared to the controls (CK), treatment with all tested concentrations (1 %, 5 %, and 10 %, v/v) of peach-gum repressed ethylene production and fruit softening, and to some extent, prevented weight loss. Peach-gum treatment did not alter malic acid, citric acid, quinic acid, glucose, fructose, or sucrose content, but it repressed the reduction in sorbitol. Transcriptomic analysis revealed that the expression of numerous genes related to fruit softening and cell wall degradation were repressed by peach-gum treatment, in accordance with the delayed softening observed. Meanwhile, the expression of senescence-associated genes, chitinase genes, and pathogenesis-related genes that were up-regulated during cold storage, were also inhibited by peach-gum treatment. Among the genes differentially expressed between peach-gum-treated and control fruit, genes involved in indole-3-acetic acid (IAA) transport and auxin response were relatively statistically overrepresented. A total of 90 transcription factors belonging to 26 families were differentially expressed. 21 of 23 zinc finger proteins from the four TF families, C2H2, C3H, CO, and Dof, were up-regulated in peach-gum-treated fruit. Additionally, abscisic acid and IAA content were markedly lower in peach-gum-treated fruit than in control fruit. Taken together, our study demonstrated that peach-gum can potentially serve as a new edible coating to preserve peach fruit. These results establish the basis for the future development of improved peach-gum-based edible coatings, by incorporating other effective compounds, and provide valuable information for further investigation of the regulatory mechanisms underlying fruit ripening and senescence in peaches.