

Chitosan- and κ -carrageenan-based composite coating on dragon fruit (*Hylocereus undatus*) pretreated with plant growth regulators maintains bract chlorophyll and fruit edibility

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Scientia Horticulturae 281: 109916. (2021)

Abstract

Dragon fruit undergoes rapid senescence resulting in yellowing and wilting of bracts during storage. This study identified the synergistic effect of gibberellic acid (GA_3) or methyl jasmonate (MeJA) dipping combined with chitosan- and κ -carrageenan-based composite coating on the postharvest quality of dragon fruit during storage at 10 °C, 90–95% RH. Coating with 1.0% chitosan and 0.2% κ -carrageenan- based composite decreased the fruit weight loss to lower than 5% after 30 days of storage and had a positive effect on reducing disease infection. Fruit dipped in 50 mg L⁻¹ GA_3 or 0.1 mM MeJA for 5 min was maintained a better bract quality compared to the control. The treatment of 1.0 % chitosan and 0.2% κ -carrageenan- based composite combined with 50 mg L⁻¹ GA_3 or 0.1 mM MeJA pretreatment retained a higher chlorophyll content in bracts (47.98 and 48.43 mg 100 g⁻¹ DW, respectively) compared to the coating alone with 1.0% chitosan and 0.2% κ -carrageenan- based composite (45.46 mg 100 g⁻¹ DW) via inhibiting the activities of chlorophyll-degrading enzymes. However, bract colour was maintained in all coating treatments compared to the control. The composite coating alone or pretreatment with MeJA significantly maintained titratable acidity, while the combination of GA_3 or MeJA pretreatment and coating retained total soluble solids and increased vitamin C content. No treatment was found to have a significant effect on fruit firmness, ethanol and acetaldehyde, total phenolic content, antioxidant activity, and disease symptoms. We concluded that the chitosan- and κ -carrageenan-based composite coating was crucial for maintaining the freshness and bract colour, and in combination with GA_3 or MeJA pretreatment was better in retaining chlorophyll content and dragon fruit eating quality.