Title Establishment of favorable physical and environmental conditions for the optimization of the total product quality of fresh-cut 'Kent' mangoes

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Abstract

Mango (*Mangifera indica* L.) fruit popularity and consumption have increased significantly in recent years. With the expansion of fresh-cut products, there appears to be an incentive to improve the intrinsic qualities of fresh-cut mango. This study aimed to develop optimum procedures for preparing and handling fresh-cut mango slices to maintain maximum total product quality (i.e., aroma, appearance, texture, and nutritional value). Mature green mango fruit were ripened to three ripeness stages based on whole fruit firmness, then processed into fresh-cut slices and stored at 5°C for 10 d. A ripeness stage equivalent to an initial fruit firmness of 30 N was the optimum for processing 'Kent' mangoes into fresh-cut slices. At that stage, a maximum shelf life of 7 d at 5°C was achieved. The effect of the USDA-APHIS hot water (HW) quarantine treatment on the total product quality during subsequent storage at 5°C for 10 d was evaluated. Overall, the results suggested that the HW quarantine treatment applied to whole, mature 'Kent' mangoes did not significantly affect the quality of the fresh-cut slices stored at 5°C. The occurrence of chilling injury (CI) in fresh-cut mango was investigated using partially ripe 'Kent' mangoes stored for 10 d at chilling (5°C) and non-chilling (12°C) temperatures. It is unclear whether this storage period at 5°C causes CI since no visual injury symptoms were observed. However, occurrence of lower ascorbic acid content and increased softening at 5 °C suggest that the fresh-cut slices did experience chilling stress. The potential for storing fresh-cut mango in reduced O_2 plus elevated CO_2 atmospheres at a non-chilling temperature was examined. An O_2 partial pressure of 2.5 kPa combined with 10 kPa CO_2 prolonged the shelf life by only 1 d when fresh-cut slices were stored at 15 °C (4 d total) compared to storage in air, which was significantly less than the previously determined shelf life of 7 d in air at 5°C. The commercial application of those findings was validated using a modified atmosphere packaging system designed to maintain beneficial O_2 plus CO_2 atmospheres at 5°C or 15°C.