

Quality and Postharvest Performance of New Strawberry Breeding Selections

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Summary

Postharvest performance of strawberry cultivars 'Florida Radiance', Sweet Sensation® 'Florida127', 'Florida Beauty' and 'Florida Brilliance' was evaluated for 9 days at 1.5 °C. Overall, the newest strawberry cultivar, 'Florida Brilliance' had similar or longer shelf life than the other cultivars evaluated, maintaining a good appearance, color, texture and compositional attributes during cold storage.

Methods

Storage conditions. 'Florida Radiance', Sweet Sensation® 'Florida 127', 'Florida Beauty' and 'Florida Brilliance' were harvested on January 29, February 19 and March 12, 2018, and transported to the USF Food Quality Laboratory (FQL) in Tampa, within minimal delay after harvest. On arrival fruit were selected for uniformity of color and freedom from defects, carefully packed in polyethylene terephthalate (PET) vented clamshells (capacity ≈453 g), and stored for 9 days inside a temperature- and humidity-controlled chamber (Forma Environmental Chambers Model 3940 Series, Thermo Electron Corporation, OH, USA). Chamber conditions were set at 1.5 °C and 85% RH, which simulates the lowest temperature and highest RH measured during real strawberry field-to-store trials. Temperature and RH were monitored throughout the experiments using battery-powered data loggers (Hobo® U10 Temp/RH data logger, Onset Computer Corporation, Pocasset, MA, USA).

Quality evaluation. Strawberries were evaluated for sensory quality (color, firmness, shriveling and decay)

and physical and compositional attributes (color, texture, weight loss, acidity, soluble solids content, total anthocyanins and total ascorbic acid content) at harvest (day 0) and after 3, 5, 7 and 9 days of storage.

Results

Sensory quality. Surface color was the limiting quality factor for appearance, particularly for 'Florida Radiance' and 'Florida Beauty' for which color became objectionably dark after approximately 8.5 and 9 days of cold storage (Fig. 1). After 9 days, firmness, shriveling and decay were still acceptable in all cultivars.

Physicochemical quality. After cold storage, 'Florida Brilliance' and Sensation® were lighter (higher L*) and less red (lower hue) compared to 'Florida Beauty' and 'Florida Radiance' strawberries (Figs. 2 and 3).

'Florida Beauty' was the least firm amongst all cultivars at harvest and after storage, whereas there was no difference in the texture of the other cultivars after storage (Fig. 4). 'Florida Brilliance' was at harvest firmer than any of the other strawberry cultivars evaluated but softened the most during storage (Fig. 4).

Sensation® strawberries lost the most weight during storage (13%) whereas 'Florida Beauty' lost the least weight (11%). After 9 days, there was no significant difference between the weight loss of 'Florida Brilliance' and 'Florida Radiance' (Fig. 4).

'Florida Beauty' had the highest acidity compared to the other strawberry cultivars whereas Sensation® had the lowest acidity after storage (Fig. 5). While at harvest SSC of 'Florida Beauty' and Sensation® were similar, Sensation® showed the highest decrease in SSC during storage (58%) compared to 'Florida Beauty' (53%). After 9 days of cold storage, SSC of 'Florida Brilliance' and 'Florida Radiance' strawberries were similar; however, compared to 'Florida Radiance', 'Florida Brilliance' showed a slightly higher decrease in SCC from initial values at harvest (Fig. 5).

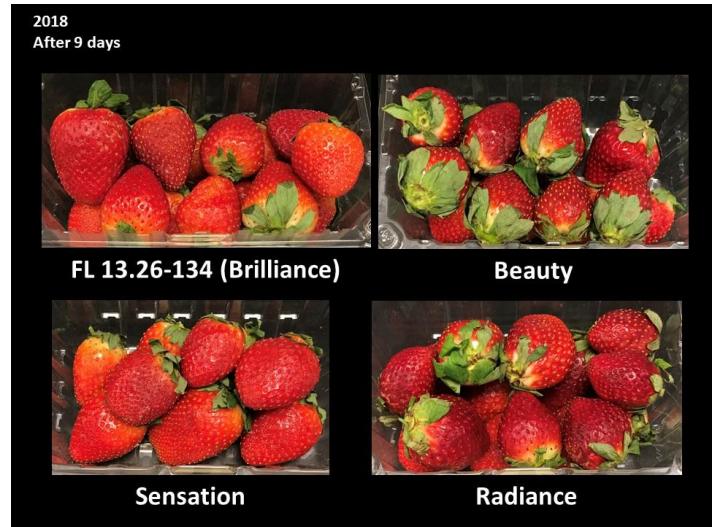


Figure 3. The appearance of Florida Radiance', Sensation®, 'Florida Beauty' and 'Florida Brilliance' strawberry cultivars 9 days of storage at 1.5 °C and 85% RH.

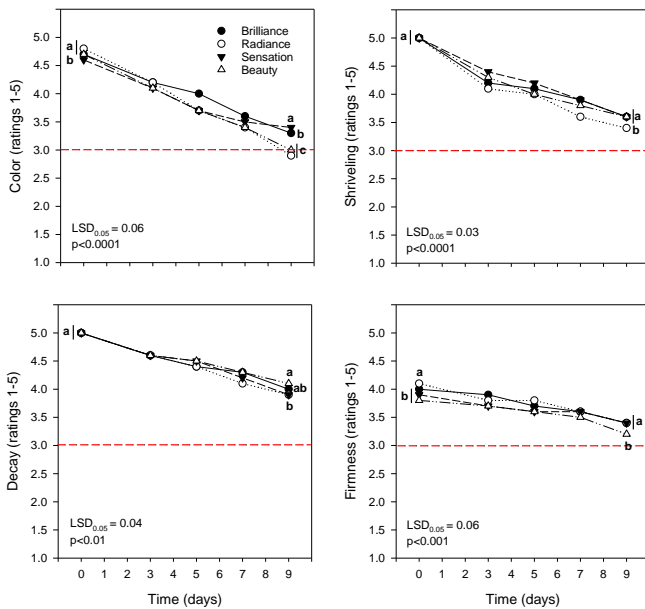


Figure 1. Sensory quality of Florida Radiance', Sensation®, 'Florida Beauty' and 'Florida Brilliance' strawberry cultivars after 9 days of storage at 1.5 °C and 85% RH. Dash red lines represent the maximum acceptable for sale (5 = best, 3 = acceptable; 1 = poor).

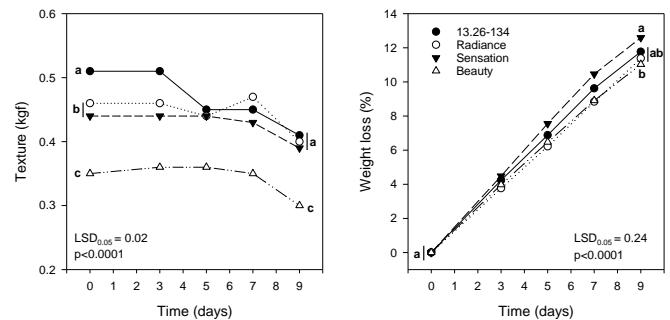


Figure 4. Texture and weight loss of Florida Radiance', Sensation®, 'Florida Beauty' and 'Florida Brilliance' strawberry cultivars after 9 days of storage at 1.5 °C and 85% RH.

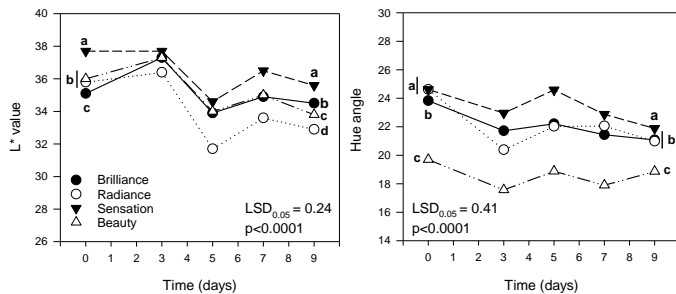


Figure 2. Color attributes (L* = lightness) of Florida Radiance', Sensation®, 'Florida Beauty' and 'Florida Brilliance' strawberry cultivars after 9 days of storage at 1.5 °C and 85% RH.

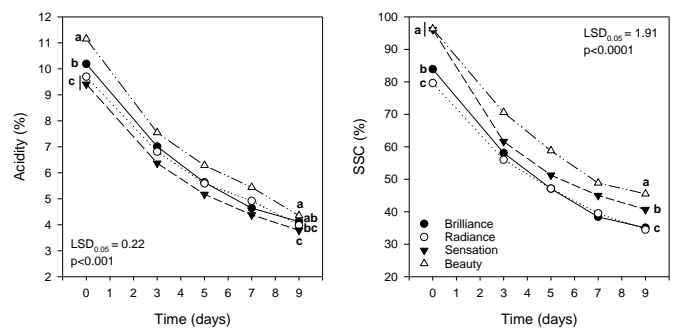


Figure 5. Acidity and soluble solids content (SSC) of Florida Radiance', Sensation®, 'Florida Beauty' and 'Florida Brilliance' strawberry cultivars after 9 days of storage at 1.5 °C and 85% RH.

At harvest and after cold storage, 'Florida Radiance' and 'Florida Beauty' strawberries had higher anthocyanin content compared to 'Florida Brilliance' and Sensation® and thus appeared redder (Figs. 3 and 6).

‘Florida Beauty’ had the highest levels of vitamin C (ascorbic acid) at harvest and after cold storage. Although there was a difference in the initial levels of vitamin C between ‘Florida Radiance’, Sensation® and ‘Florida Brilliance, after cold storage the levels were similar (Fig. 6). ‘Florida Brilliance’ showed the highest loss of vitamin C after storage (58%) whereas Sensation showed the least decrease (55%).

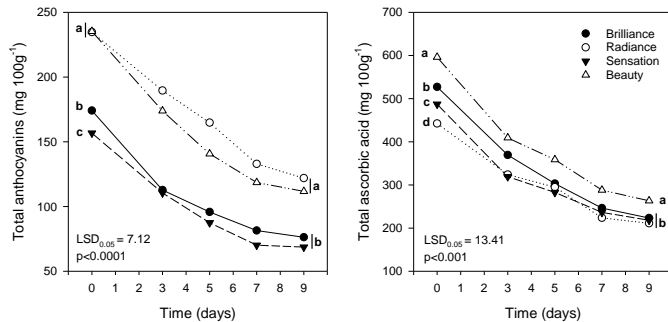


Figure 6. Total anthocyanins and ascorbic acid contents of 9 days of storage at 1.5 °C and 85% RH. after 9 days of storage at 1.5 °C and 85% RH.

Shelf life. Overall, development of an objectional dark red color during cold storage limited the shelf life of ‘Florida Beauty’ and ‘Florida Radiance’ to approximately 9 and 8.5 days, respectively. ‘Florida Brilliance’ and Sensation maintained their attractive red color during a longer period, and therefore based on color, firmness, shriveling and decay ratings, their shelf life would have been more than 9 days.

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