

Quality and Postharvest Performance of New Strawberry Breeding Selections

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Summary

Postharvest performance of strawberry cultivars 'Florida Radiance', Sweet Sensation® 'Florida 127', 'Florida Beauty', 'Florida Brilliance' and FL 14.34-33 was evaluated for 9 days at 1.5 °C. Overall, during cold storage, 'Florida Brilliance' strawberries maintained good overall sensory quality, were less dark red, and thus appeared less ripe than the other cultivars and were firmer than the other cultivars.

Methods

Storage conditions. 'Florida Radiance', Sweet Sensation® 'Florida 127', 'Florida Beauty', 'Florida Brilliance' and FL 14.34-33 were harvested on January 28, February 18 and March 4, 2019, 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 (an average of color, firmness,

shriveling and decay was calculated and shown as overall quality) and for physical and compositional attributes at harvest (day 0) and after 3, 5, 7 and 9 days of storage. Only data for overall quality, instrumental color and texture, and weight loss are presented in this report.

Results

Sensory quality. Strawberry cultivars FL 14.34-33, 'Florida Radiance', Sweet Sensation® 'Florida 127', 'Florida Beauty' and 'Florida Brilliance' maintained good overall sensory quality during cold storage (Fig. 1). On average, after 9 days, the ratings for color, firmness, shriveling and decay were still above a rating of 3.0 (acceptable) for all cultivars. However, FL 14.34-33 strawberries from the third harvest (March 4, 2019) had objectionable shriveling ratings (2.4; data not shown) after 9 days of cold storage most likely due to a significantly higher weight loss (14%; data not shown) than the other cultivars. On average (three harvests combined), 'Florida Brilliance' received the highest ratings for overall quality (3.8) whereas FL 14.34-33 received the lowest rating for overall quality (3.5). 'Florida Beauty' and 'Florida Radiance' received an average quality rating of 3.7 and Sweet Sensation® 'Florida 127' received an average quality rating of 3.6. Overall, these results suggest that the postharvest life of the selected strawberry cultivars could be extended beyond 9 days if kept constantly at 1.5 °C and 85% RH.

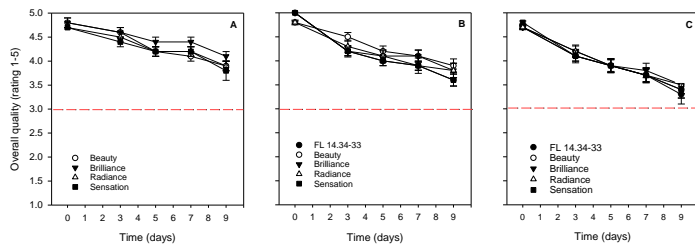


Figure 1. Overall sensory quality of FL 14.34-33, ‘Florida Radiance’, Sweet Sensation® ‘Florida 127’, ‘Florida Beauty’ and ‘Florida Brilliance’ strawberry cultivars after 9 days of storage at 1.5 °C and 85% RH. Dashed red lines represent the maximum acceptable for sale (5 = best, 3 = acceptable; 1 = poor).

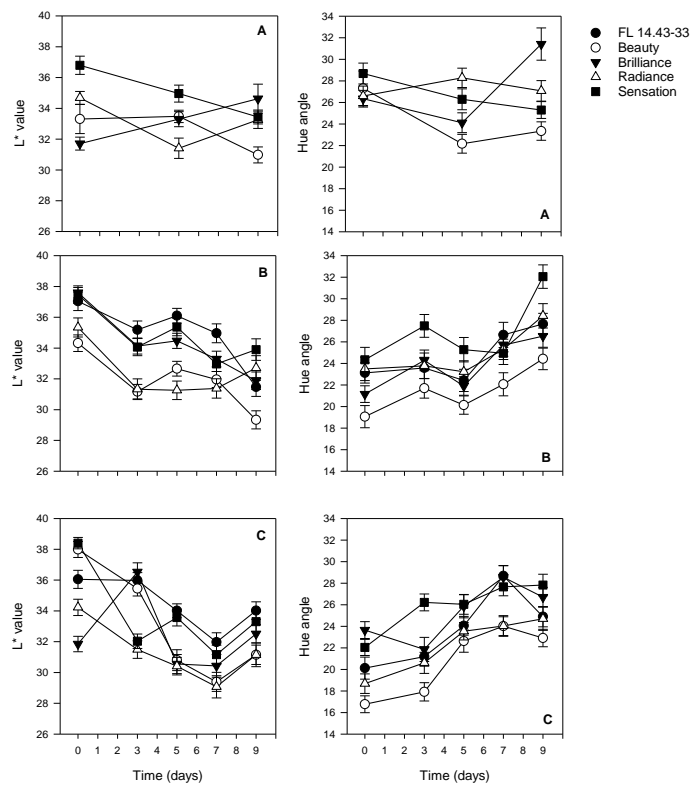


Figure 2. Color attributes (L^* = lightness; Hue angle = color) of FL 14.34-33, ‘Florida Radiance’, Sweet Sensation® ‘Florida 127’, ‘Florida Beauty’ and ‘Florida Brilliance’ strawberry cultivars after 9 days of storage at 1.5 °C and 85% RH.

Physicochemical quality. Although there were no significant differences among cultivars regarding sensory quality attributes (Fig. 1), analytical color data showed that on average (three harvest combined) after cold storage, ‘Florida Brilliance’ and Sweet Sensation® ‘Florida 127’ were lighter (higher L^*) and less red (lower hue) compared to FL 14.34-33,

‘Florida Beauty’ and ‘Florida Radiance’ strawberries (Fig. 2). ‘Florida Beauty’ was consistently darker across harvests when compared to the other cultivars.



Figure 3. The appearance of FL 14.34-33, ‘Florida Radiance’, Sweet Sensation® ‘Florida 127’, ‘Florida Beauty’ and ‘Florida Brilliance’ (top to bottom) strawberry cultivars after 9 days of storage at 1.5 °C and 85% RH.

On average, after 9 days of cold storage, ‘Florida Brilliance’ was the firmest of all cultivars whereas FL 14.34-33 was the softest cultivar (Fig. 4). The texture of ‘Florida Beauty’, ‘Florida Radiance’ and Sweet Sensation® ‘Florida 127’ was not significantly different after cold storage.

On average, FL 14.34-33 strawberries lost the most weight during storage (12%) whereas ‘Florida Beauty’ lost the least weight (10%). After 9 days, there was no significant difference among the weight loss of ‘Florida Brilliance’, ‘Florida Radiance’ and Sweet Sensation® ‘Florida 127’ (11%) (Fig. 4).

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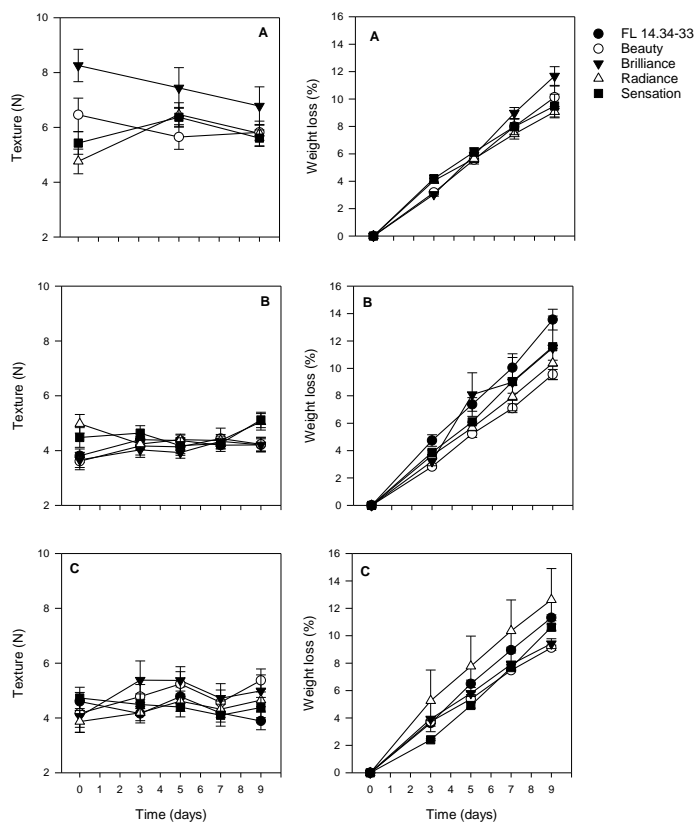


Figure 4. Texture and weight loss of FL 14.34-33, ‘Florida Radiance’, Sweet Sensation® ‘Florida 127’, ‘Florida Beauty’ and ‘Florida Brilliance’ strawberry cultivars after 9 days of storage at 1.5 °C and 85% RH.