

Postharvest Quality of Strawberries 12.121-5 ‘Florida Beauty’ and 13.26-134

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Summary

Strawberries are an important source of vitamin C and other bioactive compounds. Storage temperatures higher than 0°C (32°F) greatly affect strawberry quality and shelf life. At harvest, some cultivars may show improved quality traits, yet their superior quality at harvest does not guarantee superior performance during postharvest. The development of new strawberry selections with superior postharvest performance will provide advantages to the industry and the consumer.

Objectives

The objective of this work was to provide the Florida growers and the strawberry breeding program with additional data that compare the postharvest quality of new breeding selections with current commercial cultivars. Specifically, we compared the sensory and physicochemical quality of 12.121-5 ‘Florida Beauty’ and breeding selection 13.26-134 against that of ‘Florida Radiance’ and Sweet Sensation® ‘Florida127’ at harvest and during postharvest under simulated commercial conditions.

Material and Methods

Strawberries ‘Florida Radiance’, ‘Florida127’, ‘Florida Beauty’ and 13.26-134 were harvested three times during the 2016-17 season, stored at 1.5 °C (34.7 °F)

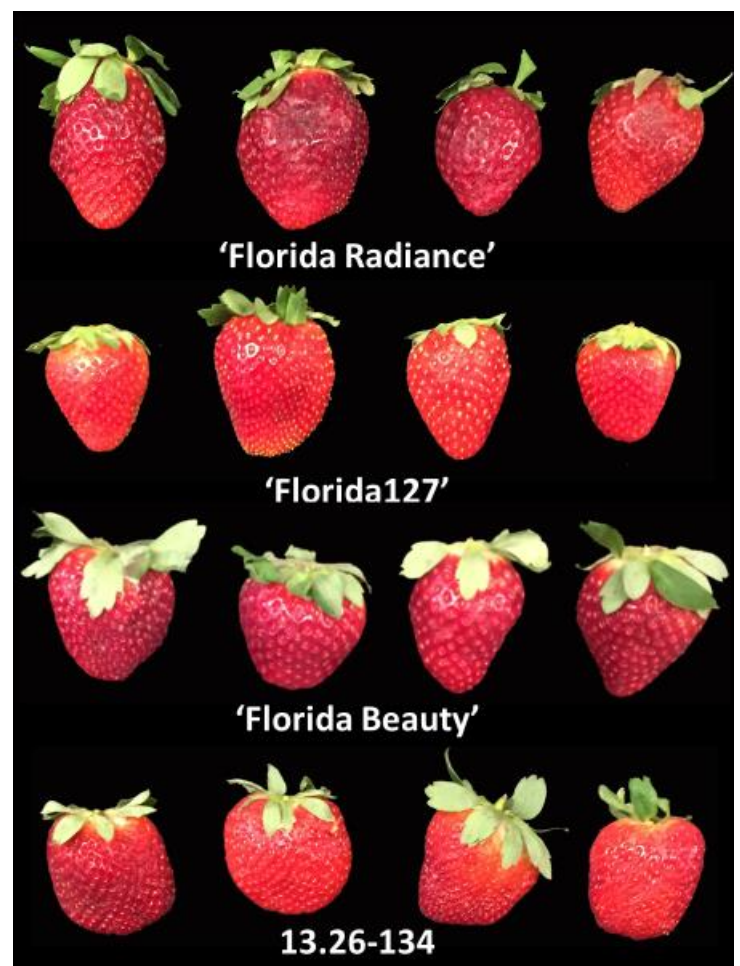


Figure 1. Appearance of commercial strawberry cultivars and new selections after 9 days at 1.5 °C (34.7 °F)

and 85% relative humidity (RH) and quality evaluated at harvest and after 3, 5, 7 and 9 days. Color, shriveling and firmness were determined subjectively using a rating scale where: 1 = very poor, 3 = acceptable and 5 = excellent. Surface color

measurements were taken using a colorimeter. Firmness was measured using Texture Analyzer. Titratable acidity was determined with an automatic titrometer, and soluble solids content (SSC) was measured with a digital refractometer. Total anthocyanins were determined spectrophotometrically.

Results

Color. ‘Florida127’ had the lightest red color whereas ‘Florida Radiance’ had the darkest red color at harvest and after storage (Figs. 1 and 2). The color of strawberry 13.26-124 was comparable to that of ‘Florida127’ and, the color of ‘Florida Beauty’ was slightly lighter than that of ‘Florida Radiance’.

Firmness: After storage, ‘Florida Radiance’ was the firmest of all cultivars whereas the firmness of ‘Florida127’, ‘Florida Beauty’ and 13.26-124 were not significantly different (Fig. 2). Strawberry 13.26-124 softened the most (20%) compared to values at harvest whereas ‘Florida Beauty’ softened the least (3%) (data not shown).

Shriveling. After 9 days, shriveling was below the rating of 3 and was considered objectionable for all strawberry cultivars (Fig. 1). ‘Florida127’ had the highest rate of shriveling whereas 13.26-134 had the least shriveling (Fig. 2). Shriveling limited the shelf life of strawberries to about 5-8 days, depending on the cultivar.

Weight loss. ‘Florida127’ had the highest weight loss (9.1%) after storage followed by ‘Florida Radiance’, and ‘Florida Beauty’ (8.7 and 7.7%, respectively). Strawberry 13.26-134 had the least amount of weight loss after storage (6.6%). Weight loss during storage is caused by loss of moisture and is strongly correlated to shriveling. Thus, ‘Florida127’ had the highest weight loss during storage and showed the highest rate of shriveling. Conversely, strawberry 13.26-134 had the lowest weight loss and least shriveling.

Acidity. Strawberry 13.26-134 had the highest acidity levels after storage whereas ‘Florida127’ had the lowest acidity (Fig. 3). ‘Florida Beauty’ acidity was similar to that of ‘Florida Radiance’.

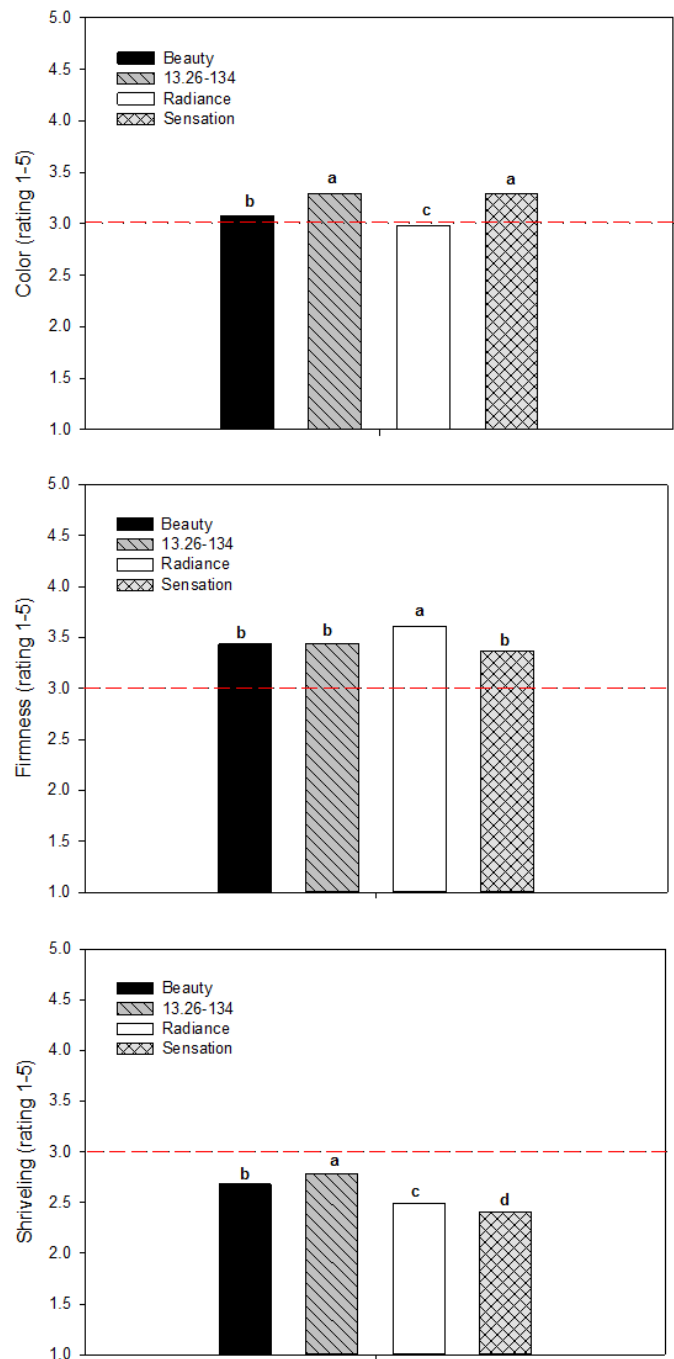


Figure 2. Color, firmness and shriveling of commercial strawberry cultivars and new selections after 9 days at 1.5 °C (34.7 °F). Dash lines represent the maximum acceptable for sale (rating of 3). Means are averages of three harvests

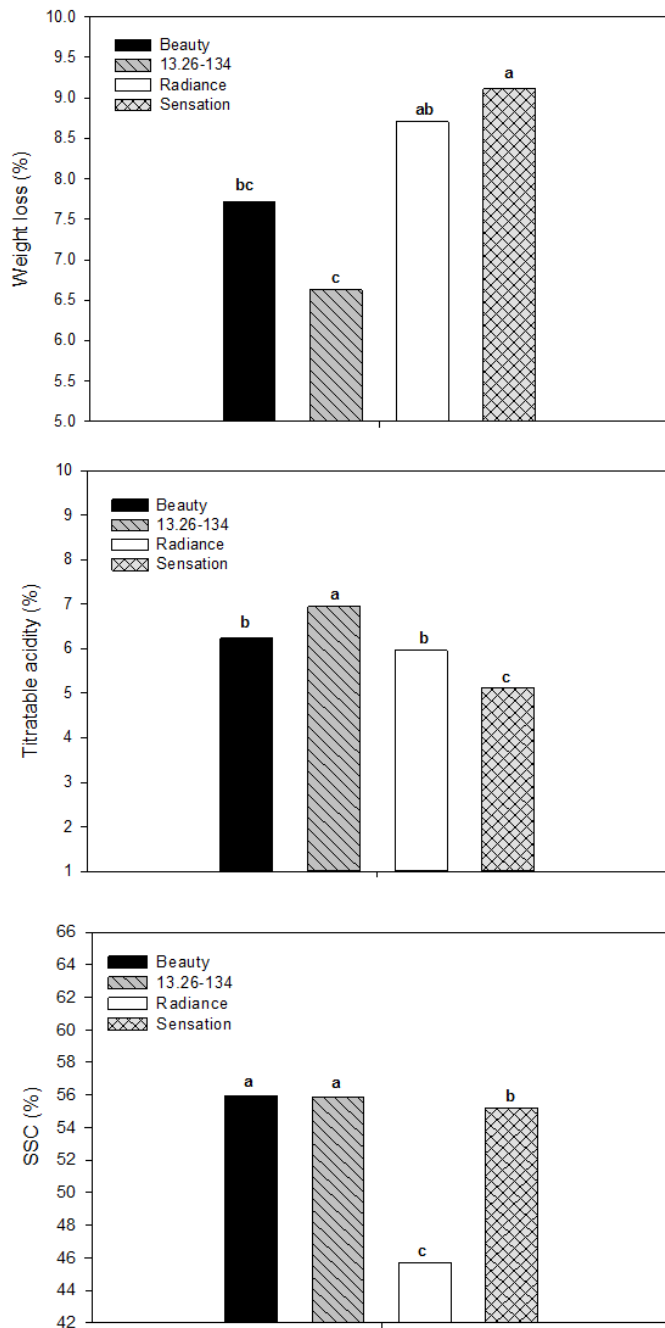


Figure 3. Weight loss, acidity, and SSC of commercial strawberry cultivars and new selections after 9 days at 1.5 °C (34.7 °F). Acidity and SSC are expressed on a dry weight basis to compensate for water loss during storage. Means are averages of three harvests

Soluble solids content (SSC). At harvest, ‘Florida Beauty’ and ‘Florida127’ had the highest SSC (8.3%; data not shown) whereas ‘Florida Radiance’ and strawberry 13.26-134 had the lowest SSC (6.9 and 6.8%, respectively; data not shown). During storage SSC decreased significantly; however, after 9 days

‘Florida Beauty’ and 13.26-134 had the highest SSC followed by ‘Florida127’ (Fig. 3). ‘Florida Radiance’ had the lowest SSC after storage compared to the other cultivars.

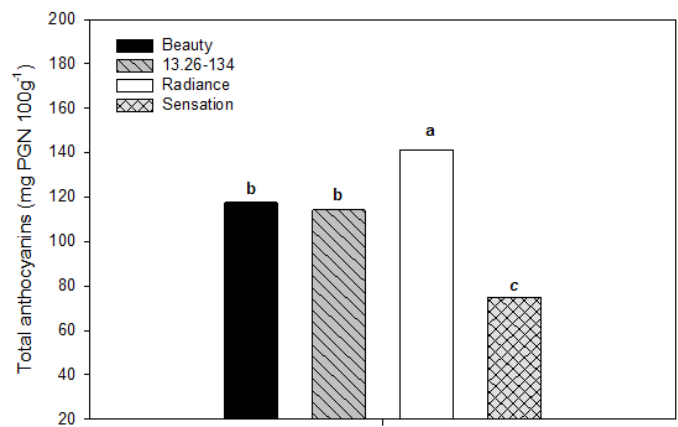


Figure 4. Total anthocyanin content of commercial strawberry cultivars and new selections after 9 days at 1.5 °C (34.7 °F). Data are expressed on a dry weight basis to compensate for water loss during storage. Means are averages of three harvests

Anthocyanins. Anthocyanins are plant pigments that give the red color to strawberry fruit. The levels of anthocyanins are therefore highly correlated with the visual color of the fruit. At harvest, ‘Florida Radiance’ had the highest anthocyanin content whereas ‘Florida127’ had the lowest content. ‘Florida Beauty’ and 13.26-134 had anthocyanin contents between the two other cultivars (data not shown). After 9 days of cold storage, the same trend was observed (Fig. 4). ‘Florida Beauty’ and strawberry 13.26-134 had similar anthocyanin contents, lower than ‘Florida Radiance’ but higher than ‘Florida127’.

Conclusions

Quality of ‘Florida Beauty’ and 13.26-134 compared to ‘Florida Radiance’ and ‘Florida127’

- Overall quality appearance: similar or better than ‘Florida 127’ and ‘Florida Radiance’.
- Texture: slightly softer than that of ‘Florida127’ and ‘Florida Radiance’.
- Weight loss: less loss of moisture than ‘Florida127’ and ‘Florida Radiance’.

- Anthocyanin content: higher than 'Florida127' but lower than 'Florida Radiance'.
- Acidity: 'Florida Beauty' had lower acidity compared to 'Florida Radiance' and 'Florida127'; acidity of strawberry 13.26-134 was higher than 'Florida Radiance' and 'Florida127'.

Quality of 'Florida Beauty' compared to that of 13.26-134

- Similar texture and SSC.
- 'Florida Beauty' had higher weight loss than 13.26-134 and consequently more shriveling.
- 'Florida Beauty' was darker and had slightly higher anthocyanin content than 13.26-134
- 'Florida Beauty' had slightly lower acidity than 13.26-134.

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