

Biochemical Characterization and Postharvest Performance of Florida White-fruited Strawberry FL 16.78-109 and the Newest Breeding Selections FL 16.30-128, FL 17.14-250, and FL 17.15-86

Maria Cecilia do Nascimento Nunes

Summary

Quality of ‘Florida Brilliance’, FL 16.30-128, FL 16.78-109, FL 17.14-250, and FL 17.15-86 was evaluated during cold storage. Overall, FL 17.14-250 had better color and texture. In contrast, FL 17.15-86 had lower weight and higher SSC and anthocyanins. White-fruited strawberries had lower acidity but were less firm than the red cultivars.

Methods

Storage conditions. ‘Florida Brilliance’, FL 16.30-128, FL 16.78-109 (white-fruited), FL 17.14-250, and FL 17.15-88 were harvested on January 23, February 13, and March 5, 2021, and transported to the USF Food Quality Laboratory in Tampa. On arrival, the fruit was selected for uniformity of color and freedom from defects, carefully packed in polyethylene terephthalate vented clamshells. Then stored for nine 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 (34.7 °F) and 85% RH, which simulates the lowest temperature and highest RH measured during actual strawberry field-to-store trials.

Quality evaluation. Strawberries were evaluated for sensory quality (color, firmness, shriveling, and decay) and physical and compositional attributes at harvest (day 0) and after 3, 5, 7, and 9 days of

storage. Only data for days 0 and 9 are presented in this report. Data are averages of three harvests.

Results

Sensory quality. Color of red strawberry cultivars changed during storage from bright to darker red, whereas white-fruited FL 16.78-109 developed a yellow-brownish appearance (Figs. 1-3).

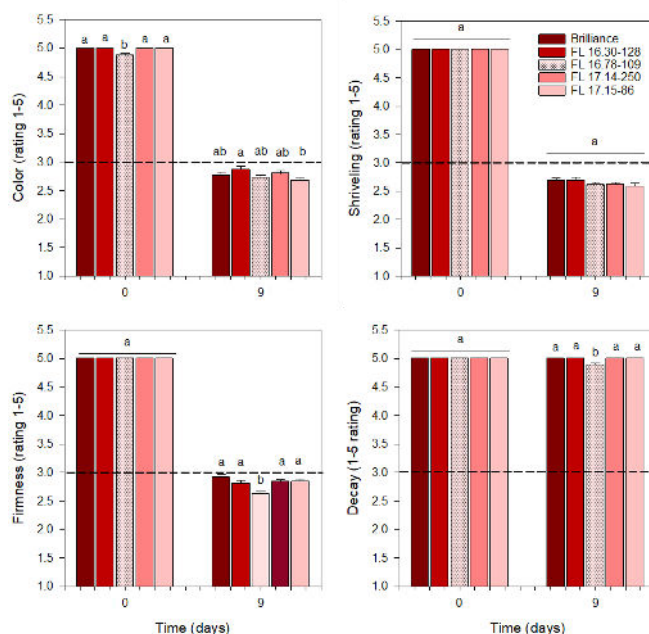


Figure 1. Color, shriveling, firmness, and decay of ‘Florida Brilliance’, FL 16.30-128, FL 16.78-109 (white-fruited), FL 17.14-250, and FL 17.15-86 after 9 days of storage at 1.5 °C (34.7 °F) and 85% RH. Dashed red lines represent the maximum acceptable for sale (5 = best, 3 = acceptable; 1 = poor).

On average, after 9 days, the ratings for color, firmness, and shriveling were below 3.0 (acceptable) for all cultivars. However, after cold storage, FL 16.30-128 received better ratings for color when compared to other cultivars. After 9 days, FL 16.78-109 (white-fruited) was less firm than the red-fruited cultivars and showed some signs of decay (Figs. 1-2).



Figure 2. The appearance of ‘Florida Brilliance’, FL 16.30-128, FL 16.78-109 (white-fruited), FL 17.14-250, and FL 17.15-86 (top to bottom) at harvest (left) and after 9 days (right) of storage at 1.5 °C (34.7 °F) and 85% RH.

Physicochemical quality. As expected, the white-fruited cultivar had a much lighter red coloration than the red cultivars (higher L* and hue values and lower a*; Fig. 3). After cold storage, FL 17.14-250 had a lighter (higher L*) and less red color (lower a* and higher hue) than other cultivars. On average, after 9

days, there was no significant difference between the L* values of Brilliance, FL 16.30-128, and FL 17.15-86. However, FL 17.15-86 was slightly more red (lower hue), and FL 17.14-250 was somewhat less red (higher hue) than the other cultivars.

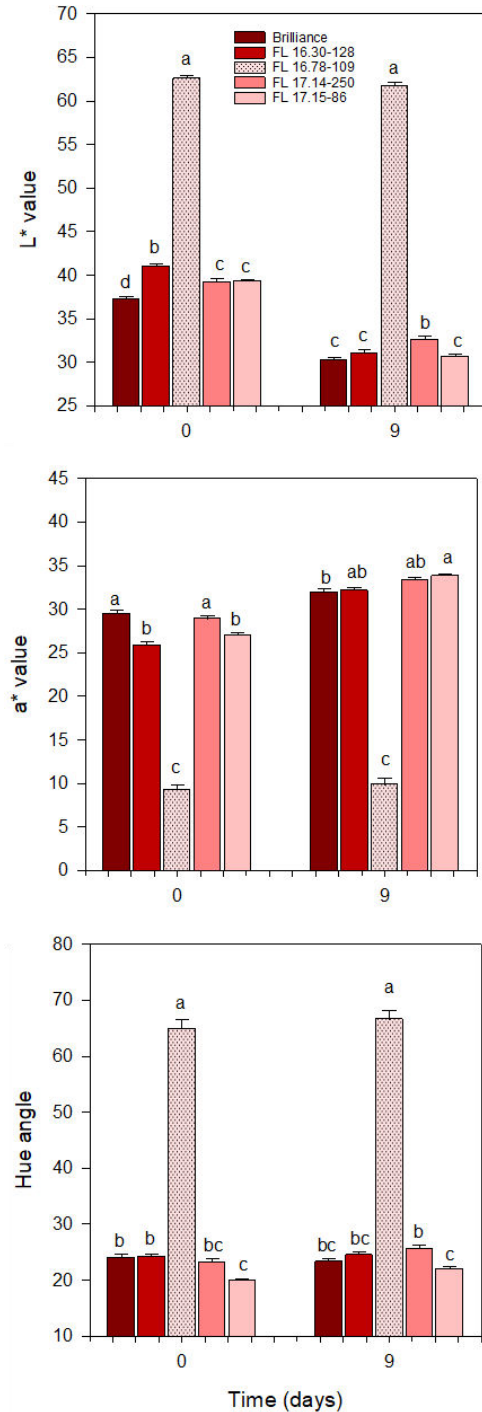


Figure 3. Color attributes (L* = lightness; a* = red-green and hue angle = color) and texture of ‘Florida Brilliance’, FL 16.30-128, FL 16.78-109 (white-fruited), FL 17.14-250 and FL 17.15-86 after 9 days of storage at 1.5 °C (34.7 °F) and 85% RH.

After cold storage, FL 17.14-250 was, on average, the firmest cultivar, followed by FL 16.30-128 (Fig. 4). White-fruited strawberry FL 16.78-1-9 was the softest cultivar.

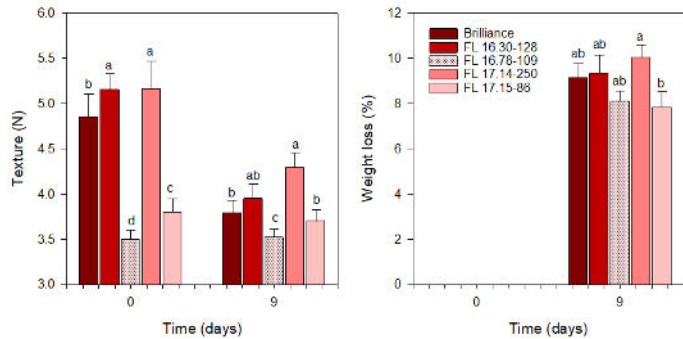


Figure 4. Texture and weight loss of ‘Florida Brilliance’, FL 16.30-128, FL 16.78-109 (white-fruited), FL 17.14-250 and FL 17.15-86 after 9 days of storage 1.5 °C (34.7 °F) and 85% RH.

Strawberries FL 17.14-250 lost the most weight during storage (10%), whereas FL 17.15-86 (8%) lost the least weight (8%). After 9 days, there was no difference between the weight loss of the remaining cultivars (Fig. 4).

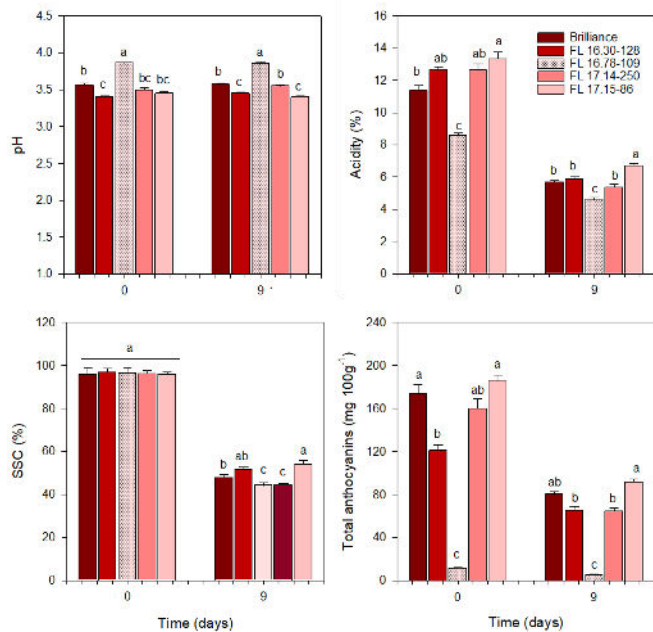


Figure 5. Chemical attributes of ‘Florida Brilliance’, FL 16.30-128, FL 16.78-109 (white-fruited), FL 17.14-250 and FL 17.15-86 after 9 days of storage at 1.5 °C (34.7 °F) and 85% RH.

White-fruited strawberries were on average less acidic (higher pH and lower acidity) than the red cultivars, whereas FL 16.30-128 and FL 17.15-86 had the highest acidity levels after storage (Fig. 5).

At harvest, soluble solids content (SSC) was not significantly different between cultivars (Fig. 5). However, after storage, FL 17.15-86 had the highest, and FL 16.78-109 and FL 17.14-250 the lowest SSC.

Anthocyanin content (red pigments) was the lowest in white-fruited strawberries and highest in FL 17.15-86, which agrees with data collected from analytical surface color (Figs. 3 and 5).

Contact

Dr. Cecilia Nunes
 Food Quality Laboratory
 Department of Cell Biology, Microbiology and
 Molecular Biology
 University of South Florida
 P: 813. 974-9307
 E: mariacecilia@usf.edu