





Article

Impact of Storage Conditions on Fruit Color, Firmness and Total Soluble Solids of Hydroponic Tomatoes Grown at Different Salinity Levels

Khalid A. Al-Gaadi ^{1,2}, Ahmed M. Zeyada ¹, ElKamil Tola ^{2,*} , Abdullah M. Alhamdan ^{1,3} ,
Khalid A. M. Ahmed ^{3,4} , Rangaswamy Madugundu ²  and Mohamed K. Edris ²

¹ Department of Agricultural Engineering, College of Food and Agriculture Sciences, King Saud University, Riyadh 11451, Saudi Arabia; alhamdan@ksu.edu.sa (A.M.A.)

² Precision Agriculture Research Chair, Deanship of Scientific Research, King Saud University, Riyadh 11451, Saudi Arabia

³ Chair of Dates Industry & Technology, Deanship of Scientific Research, King Saud University, Riyadh 11451, Saudi Arabia; kehmed@ksu.edu.sa

⁴ Agricultural Research Centre, Agricultural Engineering Research Institute (AEnRI), Giza 12619, Egypt

* Correspondence: etola@ksu.edu.sa; Tel.: +966-11-469-1904

Abstract: Tomatoes are delicate and prone to damage quickly, which ultimately leads to lower quality and increased post-harvest losses. Hence, an ideal storage environment is very important to maintain the quality of tomato fruits after harvest. Therefore, this study was conducted to determine the effect of storage conditions on the quality parameters of tomato fruits. Experiments were de-signed for six storage periods (4, 8, 12, 16, 20, and 24 days) and two temperatures (12 °C and room air temperature “22 °C”). Three tomato fruit quality parameters (Brix, color, and firmness) have been selected and measured for three tomato varieties (Ghandowra-F1, Forester-F1, and Feisty-Red) grown hydroponically at three salinity levels (2.5, 6.0, and 9.5 dS m⁻¹) of the nutrient solution. Results showed that the highest mean Brix values, for all varieties, were recorded at the highest salinity (9.5 dS m⁻¹), and were significantly (Pr < 0.0001) higher than those at medium (6.0 dS m⁻¹) and low (2.5 dS m⁻¹) salinity levels. In addition, the highest fruit firmness was recorded at high salinity level (9.5 dS m⁻¹), but there was no significant difference to that recorded at medium salinity (6.0 dS m⁻¹). Regarding tomato fruit color, the highest average values were recorded for the Ghandowra-F1 (2.51) and Forester-F1 (2.69) varieties at medium salinity (6.0 dS m⁻¹), while the highest average color value for the Feisty-Red variety (1.54) was obtained at high salinity (9.5 dS m⁻¹). On the other hand, the Brix, color, and firmness of tomato fruits were significantly affected by the storage temperature. Moreover, the mean Brix values (7.66%) were slightly higher at 12 °C storage temperature compared to those at 22 °C (7.38%). In general, the fruit color values gradually increased with the storage period, especially under 22 °C storage temperature, with peak color values of 2.73, 2.70, and 1.66 recorded on the 12th day of the storage period for Ghandowra-F1, Forester-F1, and Feisty-Red, respectively. Tomato fruit firmness decreased faster with the storage period at 22 °C compared to the storage temperature of 12 °C. However, the highest average values of fruit firmness for Ghandowra-F1 (9.37 N cm⁻¹) and Forester-F1 (9.41 N cm⁻¹) recorded at control condition were not significantly different those recorded on the 8th day of storage at 12 °C storage temperature. By contrast, the highest average value of fruit firmness for Feisty-Red (8.85 N cm⁻¹) recorded at control condition was not significant than that recorded on the 4th day of the storage period at 12 °C storage temperature (8.82 N cm⁻¹). Overall, tomato fruits can be stored at 12 °C temperature for up to 20–24 days, without negative effects on fruit quality.

Keywords: tomatoes; quality; brix; firmness; storage period; temperature



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