

Physico-chemical changes during growth and development of tomato (*Solanum lycopersicum* L.) fruits

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ABSTRACT

The study aimed to investigate the physical and chemical properties of two tomato cultivars namely: Joude1F1 and Amani1F1 during the growth and development of fruits to determine the appropriate harvesting time. Seventy-five plants were selected and tagged from each cultivar then fruit samples were collected at different growing stages. The first samples were picked two weeks after anthesis (2WAA) and the sampling continued every two weeks up to the over-ripe stage (12 WAA). Flesh fruit weight, volume, length, diameter, respiration rate (RR), Treatable acidity content (TAC), Ascorbic acid (AA) and laycopen pigment were measured regularly from 2WAA to 8WAA. The results showed that fresh weight significantly ($p > 0.05$) increased in both cultivars at 4WAA and 8WAA comparing to other harvesting periods. RR decreased from 85.4 and 72.8 mg CO₂/kg-hr at 2 WAA to 28.7 and 24.7 mg CO₂/kg-hr in Joude 1F₁ and Amani 1F₁, respectively, and then increased to 45.4 and 32.7 mg CO₂/kg-hr and then decreased afterward to 19.9 and 8.0 mg CO₂/kg-hr at the canning - ripe stage in Joude 1F₁ and Amani 1F₁, respectively. Additionally, TAC increased from 0.21% and 0.37 % at 2 WAA to 0.53 (6 WAA) and 0.64% (8WAA) in Joude 1F₁ and Amani 1F₁, respectively, and then decreased to 0.26 and 0.50 % at the canning - ripe stage in Joude 1F₁ and Amani 1F₁, respectively. Furthermore, AA content was increased from 10.8 and 12.5 mg/100g at 2WAA to 27.08 mg/100g at 8 WAA and decreased from 18.9 and 20 mg/100g at the canning-ripe stage (12 WAA) in Joude 1F₁ and Amani 1F₁ respectively. In conclusion, the optimal time for harvesting tomato fruits in Joude 1F1 and Amani 1F1 is at 8 weeks after anthesis (8WAA) when the fresh weight, volume, and dimensions (length and diameter) of the fruit attain their maximum levels.

Keywords: Amani1F1, Joude1F1, growth and development, physic-chemical changes