



Effect of pre- and post-harvest treatments
on quality and storability of Manfalouty
pomegranate fruits

By

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SUMMARY AND CONCLUSION

This study were carried out during two seasons 2011 and 2012 on "Manfalouty" pomegranate cultivars grown at the experimental orchard of Department of Pomology, Faculty of Agriculture, Assiut University. Healthy trees and approximately uniformity in growth were selected for this study. The trees age was 35 years. The investigation aimed to give the best fruits quality and test the quality and storability under room temperature and cold storage.

The first experiment: field work:

It selected 30 trees of "Manfalouty" pomegranate had been conducted as field to achieve the aim pre-harvest of sprayed gibberellic acid (GA₃ 100 ppm) and calcium chloride (CaCl₂ 4%). On the tree where the 1st application time was two months after fruit setting and the 2nd application time was at month later of the 1st in during the two study seasons (2011-2012).

- 1- Untreated trees (sprayed with water).
- 2- Sprayed trees with GA₃ at 100 ppm
- 3- Sprayed trees with CaCl₂ at 4%. The experiments were set upon split-plot arrangement in complete randomized block design (CRBD).

The second experiment:

The pre-harvest treated were harvest on group alone at the commercial ripe stage and transported after cleaning fruits with water tap and allowed to air drying. They were divided into main groups, one for storing fruits under room temperature.

Experimental fruits were divided into four similar groups. Each group was subsection to one of the following treatments:

- 1- Control group (untreated fruits).
- 2- Dipping fruits in jasmine oil.
- 3- Dipping fruits in olive oil.
- 4- Coating with vapor gard.
- 5- Wrapping with polyolefin.

Half of the experimental fruits were stored at ($22\pm 5^{\circ}\text{C}$). Changes in some physical and chemical fruits properties were determined every 15 days interval under room temperature and 30 days under cold storage ($5^{\circ}\pm 1$ and 85-90% RH).

Some physical and chemical properties were measured as follows:

Effect of pre- and post-harvest treatments on physical and chemical properties:

*** Fruit weight:**

- Pre-harvest sprayed with GA_3 (100 ppm) gave the heaviest fruit weight, followed the group of fruits sprayed with CaCl_2 4% then the group of untreated (control) fruits gave the lowest value of fruit weight during 2011 and 2012.
- Wrapping fruits resulted significant increase in fruit weight, followed vapor gard under room temperature and cold storage during 2011 and 2012 seasons.
- The effect of post-harvest treatments on fruit weight within sprayed fruits with GA_3 (100 ppm) or CaCl_2 (4%) it could be noticed that all post-harvest treatments induced significant improve in fruit weight under room temperature and cold storage compared with untreated fruits per group, it could be observed that wrapping fruits and vapor

gard treatments indicated that heaviest fruit weight in seasons 2011 and 2012.

***Peel weight:**

- The effect of pre-harvest treatments on peel weight was clear that sprayed GA₃ (100 ppm) resulted in heaviest peel weight, followed by spraying CaCl₂ (4%) in seasons 2011 and 2012.
- The effect of post-harvest treatments on peel weight of pomegranate fruits under room temperature, it could be deduced that wrapping fruits gave the best treatments in both the group of untreated fruits and the effect of post-harvest treatments on peel weight under cold storage it was clear that wrapping fruits gave the heaviest peel weight at the end of cold storage periods, followed by vapor gard treatments in seasons 2011, while wrapping fruits and olive oil treatments resulted in heaviest peel weight in 2012, increased storage period induced were reduction in peel weight of stored fruits under cold storage during the two studied seasons.
- The wrapping fruits gave the best treatments of pre-harvest fruits sprayed with CaCl₂, while spraying vapor gard on group of fruits sprayed with GA₃ gave the best treatments and CaCl₂ it could be concluded that vapor gard treatment gave the heaviest peel weight, followed by wrapping in season 2011, while wrapping fruit gave the heaviest peel weight followed by vapor gard in season 2012.

*** Arils weight:**

- The pre-harvest sprayed with GA₃ (100 ppm) gave the heaviest arils weight followed by pre-harvest spraying with CaCl₂ (4%) compared with untreated fruits in 2011 and 2012.
- The effect of post-harvest treatments on arils weight, it could be observed that within the group of untreated fruits, post-harvest

treatment with wrapping gave the best results, followed by sprayed fruits with Jasmine oil at room temperature. The effect of post-harvest treatments arils weight during the cold storage it could be noticed that all treatments induced significant reductions of arils weight, that both treatments with Jasmine oil or wrapping fruits revealed that highest value of arils weight in the two studied seasons compared with other post-harvest treatments in seasons 2011-2012.

- The group of sprayed with GA₃ both wrapping fruits and vapor gard treatments gave the heaviest arils weight and the group of sprayed with CaCl₂ both vapor gard and jasmine oil treatments gave the heaviest arils weight.

*** Juice volume (ml/100 g arils):**

- The effect of pre-harvest treatments on juice volume of pomegranate fruit that sprayed with GA₃ (100 ppm) gave the highest value of juice volume, followed by sprayed CaCl₂ (4%) then the untreated fruits during 2011 and 2012 seasons.
- Wrapping fruits gave the highest value of juice volume, followed by vapor gard and jasmine oil gave the lowest value of juice volume in the both seasons 2011, 2012 under room temperature and it was found that vapor gard and wrapping fruits resulted in the highest value of juice volume per 100 g arils, 2011 and wrapping fruits, followed by vapor gard showed the highest juice volume in season 2012 under cold storage.
- The group of fruits which sprayed with GA₃ treated fruits with vapor gard gave the highest value of juice volume, followed by wrapping fruits, in the both the studied two seasons, the group of sprayed with CaCl₂ treated fruits with wrapping gave the highest value of juice

volume in the first season and vapor gard in second seasons at room temperature and cold storage.

*** Weight loss:**

- That all pre-harvest treatments with GA₃ (100 ppm) and CaCl₂ (4%) significantly resulted in reducing weight loss % of stored Manfalouty pomegranate fruits under room temperature and cold storage conditions compared with untreated (control) fruits in 2011 and 2012.
- The effect of post-harvest treatments in reducing fruit weight loss % could be due to decreasing respiration rate as result of modifying the atmosphere, the wrapping fruits showed the lowest weight loss %, followed by vapor gard during the two seasons under room temperature and cold storage.
- That the stored fruits of the group of fruits sprayed with GA₃ or CaCl₂ or untreated (control) fruits, it was clear that wrapping fruits showed the lowest weight loss % followed by vapor gard during the two studied seasons, compared with either post-harvest treatments of stored fruits under cold storage conditions.

*** Total soluble solids percentage (TSS%)**

- Untreated pre-harvest treatments gave the highest value of TSS% in fruit juice during the two studied seasons compared with CaCl₂ (4%) and GA₃ (100 ppm).
- That post-harvest treatment on the untreated (control) fruits showed the highest percentage of TSS in fruit juice, followed by jasmine oil treatment under room temperature and cold storage.
- It was noticed that pre- and post-harvest untreatments (control) gave the highest percentage of TSS in fruit juice followed by the group of fruits sprayed with CaCl₂, while the group of fruits sprayed with

GA₃100 ppm revealed the lowest percentage of TSS during the two studied seasons under cold storage.

*** Titratable acidity %:**

- The effect of pre-harvest untreated fruits gave the lowest value of TA% but GA₃ 100 ppm gave the highest value.
- Treatments fruits with vapor gard gave the highest value of TA% followed by jasmine oil treatment, then untreated fruits with post-harvest treatments resulted in the lowest value of TA% under room temperature and cold storage.
- Sprayed with GA₃ (100 ppm) and CaCl₂ (4%) and wrapping fruits gave the highest value of TA% compared with untreated fruits in the two seasons 2011-2012.

*** TSS/TA ratio:**

- That untreated (control) fruits showed the highest ratio between the TSS% and TA% in the fruit juice, followed by sprayed with GA₃ then the fruit sprayed with CaCl₂ during seasons 2011, 2012.
- The post-harvest treatments in TSS/TA ratio in fruit juice took the same trend of the pre-harvest treatments untreated fruits gave the highest value of TSS/TA ratio, while jasmine oil treatments gave the highest value of TSS/TA ratio and wrapping gave the lowest value of TSS/TA ratio.
- The effect of pre and post-harvest treatments on the group of fruits sprayed or unsprayed with GA₃ (100 ppm) or CaCl₂ (4%) showed the highest TSS/TA ratio in fruit juice, it could be noticed that both the untreated fruits and jasmine oil revealed the highest value of TSS/TA ratio, followed by vapor gard fruits in 2011 and 2012 seasons under cold storage.

*** Total sugar %:**

- The effect of pre-harvest untreated fruits gave the highest value of the total sugar % followed by GA₃ (100 ppm), then sprayed with CaCl₂ gave the lowest value of the total sugars % in the first season, while the second season, spraying CaCl₂ gave the highest value of the total sugars %.
- Wrapping fruits gave the lowest total sugars % in fruit juice, untreated fruit with post-harvest treatments gave the highest value of total sugars %.
- Pre- and post-harvest treatments effects on total sugars % in juice of stored untreated fruits resulted in the highest value, that pre-harvest spray with GA₃ (100 ppm) and CaCl₂ (4%) resulted in significant decrease with jasmine oil in total sugars under cold storage.

*** Reducing sugar %:**

- Comparison between the groups of fruits sprayed with GA₃ (100 ppm) or CaCl₂ (4%) noticed that the group of fruits non-sprayed (control) indicated the highest value of reducing sugars, followed by the group of fruits sprayed with GA₃ (100 ppm), that vapor gard and untreated fruits the highest value of reducing sugars % during the two studied seasons.
- The group of fruits sprayed with CaCl₂ showed the same trend of the group of fruits while sprayed with GA₃ (100 ppm) and CaCl₂ (4%) with wrapping fruits showed lowest value of season 2012 under room temperature and cold storage and the group of fruits sprayed with GA₃ (100 ppm) it was noticed that jasmine oil gave the lowest value of reducing sugars in 2011 under room temperature and cold storage.

Conclusion

According to the obtained results of this study it could be recommended that spraying GA₃ (100 ppm) and CaCl₂ (4%) pre-harvest treatments improved the physicochemical characteristics of "Manfalouty" pomegranate fruits, as well as wrapping fruits, with polyolefin stretch and vapor guard of treated fruits with GA₃ or CaCl₂ gave the best positive effects and prolonging the storage periods with best fruit quality under the storage conditions.