

*

(/ / : / / :)

pH

:

°C

(Anonymous, 2006)

(Defilippi et al.,

2006; Elyatem & Kader, 1984)

(Palou et al., 2007)

(Artes et al.,

(Mirdehghan, 1999)

(Mirdehghan et

2000)

(Ben-Arie et al., 1984;

Elyatem & Kader, 1984; Kader et al., 1984;

Mirdehghan, 2006)

1. Segments

E-mail: m.babalar@ut.ac.ir

تلفن: ۰۲۶۱-۲۲۴۸۷۲۱

* نویسنده مسئول: مصباح بابالار

)

al., 2007)

(

(Nanda et al., 2001)

(Wang et al., 2006) (Ding et al., 2001)

(Fung et al., 2004)

%

°C

(Ding et al., 2001)

:(Wang et al., 2006)

$$CI = \frac{\sum (ni \times i)}{N \times 4}$$

ni

CI

i

i

(Eraslan et al., 2007;

.Holcroft et al., 1998)

(:

(

(

(

N .

(

/

()

pH

/ /

CETI, belgium

pH

-
- 3. Chilling index
 - 4. Arils

-
- 1. Phenylalanine Ammonia Lyase (PAL)
 - 2. Trans – Cinnamic acid

:(McCollum & McDonald, 1991)

$$\%IL = \frac{EC(primary)}{EC(Total)} \times 100$$

pH

/

/ pH

(Ghasemnejad,

:2006)

(2003) Qin et al.

$$\%TA = \frac{V \times N \times MeqCA}{Y} \times 100$$

)

:TA

:V (

:N

:MeqCA

:Y

/ pH

(PVP)

°C

/ pH

°C

(Majedi,

:1994)

$$C = \frac{0.88 \times V}{5} \times 100$$

C

Perkin Elmer,

Lambda EZ 201

V

)

.(Qin et al., 2003)

(

.(Bradford, 1976)

(EC)

Metrohm 644

°C

Excel

SAS

1. Cork borer

2. L-Phenylalanine

pH

()

pH

pH

()

()

pH

(Wang et al.,

.2006)

(%)

pH .

)

(%) pH

(%)

(%)

()

PAL (nM/mg/h)	(%)	(%)	pH	()
** /	** /	** /	** /	** /
* /	** /	** /	** /	* /
/	/	/	** /	* /
/	/	/	/	/
/	/	/	/	/

C.V

x

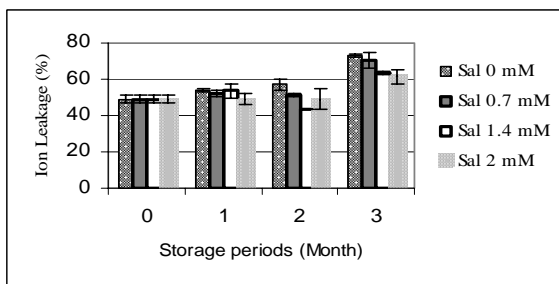
C.V

PAL	()	(%)	()	(%)	pH	()
b	c	/ b	/ a	/ d	/ c	/ a
ab	/ c	/ b	/ ab	/ a	/ ab	/ a
b	/ b	/ b	/ ab	/ b	/ a	/ a
a	/ a	/ a	/ b	/ c	/ b	/ a

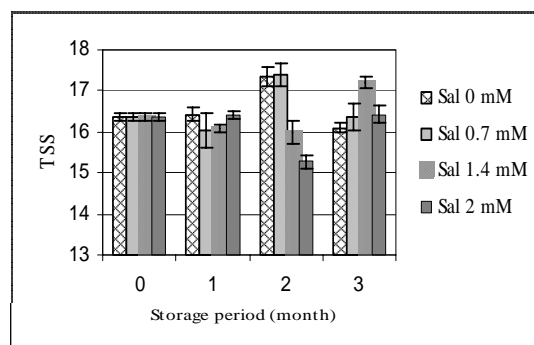
%

PAL

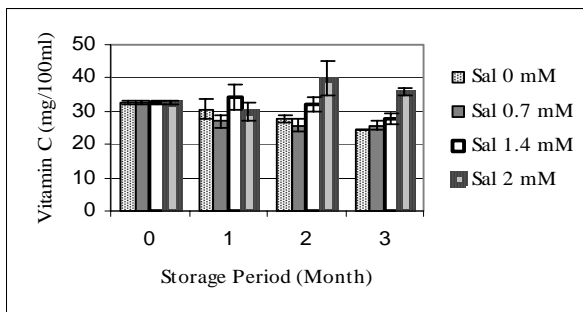
) PAL			
((%)	((%)
pH			
((%)	((%)
b	/ a	/ a	/ bc
ab	/ ab	/ ab	/ c
a	/ b	/ b	/ ab
a	/ c	/ b	/ a



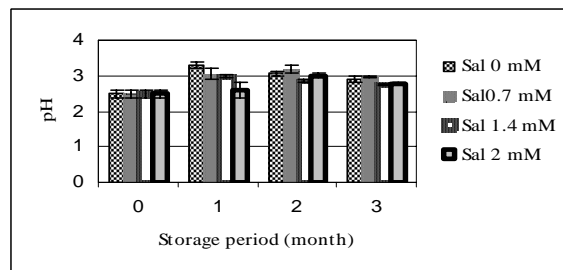
(SAL)



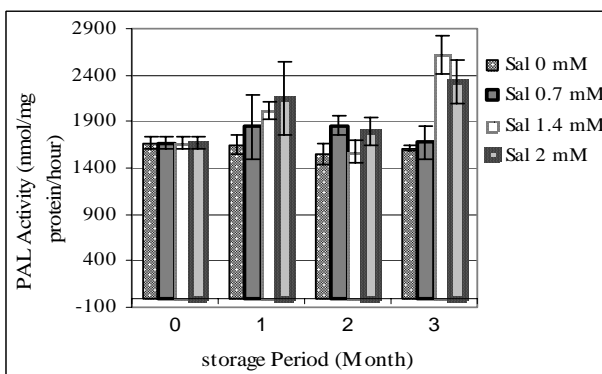
(SAL)



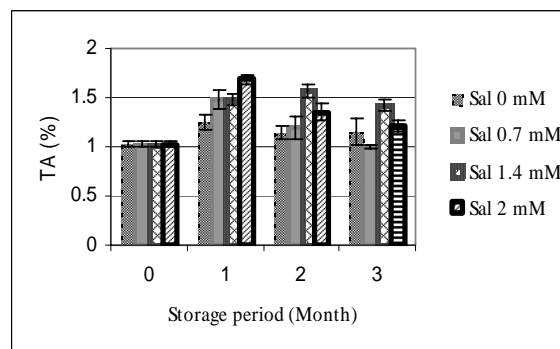
(SAL)



pH (SAL)



(SAL)

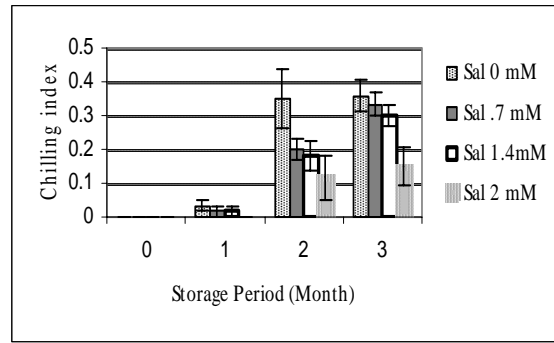


(SAL)

(Ding et al., 2001)

(Wang et al., 2006)

(Kang et al., 2003)
(EC4.31.5)



(SAL)

()
()
/

)

()

()

(

(Qin et al., 2003; Chen et

al., 2006)

(Wang et al.,

.2006)

)
(
(Solecka & Kacperska,

(Zhang et al., 2003)

.2003)

)

)

(...

(...

UV

)

(

PAL

(AIP) ¹

PAL

PAL

1)

(2006) Chen et al.

1. 2-amino – 2- Indanophonic acid (AIP)

REFERENCES

1. Anonymous. (2006). *Agriculture Statistical Information. Bureau of statistics and information technology.* Ministry of Iranian Jahad-e- Agricultural. 271pp. (In Farsi).
2. Artes, F., Tudela, J. A. & Villaescusa, R. (2000). Thermal postharvest treatments for improving pomegranate quality and shelf life. *Postharvest Biology and Technology*, 18, 245–251.
3. Ben-Arie, R., Segal, N. & Guelfat-Reich, S. (1984). The maturation and ripening of the ‘Wonderful’ pomegranate. *Journal of American Society for Horticultural Sciences*, 109, 898–902.
4. Bradford, M. M. (1976). A rapid and sensitive method for the quantitation of microgram quantities of protein utilizing the principle of protein-dye binding. *Analytical Biochemistry*, 72, 248 - 254.
5. Chen, J. Y., Wen, P. F., Kong, W. F., Pan, Q. H., Zhan, J. C., Li, J. M., Wan, S. B. & Huang, W. D. (2006). Effect of salicylic acid on phenylpropanoids and phenylalanine ammonia-lyase in harvested grape berries. *Postharvest Biology and Technology*, 40, 64–72.
6. Defilippi, B. G., Whitaker, B. D., Hess-Pierce, B. M. & Kader, A. A. (2006). Development and control of scald on wonderful pomegranates during long-term storage. *Postharvest Biology and Technology*, 41, 234–243.
7. Ding, C. K., Wang, C., Gross, K. & Smith, D. (2001). Reduction of chilling injury and transcript accumulation of heat shock protein genes in tomatoes by methyl jasmonate and methyl salicylate. *Plant Science*, 161, 1153–1159.
8. Elyatem, S. M. & Kader, A. A. (1984). Postharvest physiology and storage behaviour of pomegranate fruits. *Scientia Horticulturae*, 24, 287–298.
9. Eraslan, F., Inal, A., Gunes, A. & Alpaslan, M. (2007). Impact of exogenous salicylic acid on the growth, antioxidant activity and physiology of carrot plants subjected to combined salinity and boron toxicity. *Scientia Horticulturae*, 113, 120–128.
10. Fung, R. W. M., Wang, C. Y., Smith, D. L., Gross, K. C. & Tian, M. (2004). MeSA and MeJA increase steady-state transcript levels of alternative oxidase and resistance against chilling injury in sweet peppers (*Capsicum annuum* L.). *Plant Science*, 166, 711–719.
11. Ghasemnejad, M. (2006). *Response of different citrus fruits to low temperature storage.* Ph.D. Thesis. Faculty of Horticulturae. University of Tehran. Iran. (In Farsi).
12. Holcroft, D. M., Gil, M. I. & Kader, A. A. (1998). Effect of carbon dioxide on anthocyanins, phenylalanine ammonia lyase and glucosyltransferase in the arils of stored pomegranates. *Journal of American Society for Horticultural Sciences*, 123, 136–140.
13. Kader, A. A., Chordas, A. & Elyatem, S. (1984). Responses of pomegranates to ethylene treatment and storage temperature. In: *Proceedings of California Agriculture*, July–August, pp. 14–15.
14. Kang, G. Z., Wang, Z. X. & Sun, G. C. (2003). Participation of H₂O₂ in enhancement of cold chilling by salicylic acid in banana seedlings. *Acta Botanica Sinica*, 45, 567–573.
15. Maijedi, M. (1994). *Methods of foods chemicals analysis.* Jahad daneshgahi press. University of Tehran. (In Farsi).
16. McCollum, T. G. & McDonald, R. E. (1991). Electrolyte leakage, respiration and ethylene production as indices of chilling injury in grapefruit. *HortScience*, 26, 1191–1192
17. Mirdehghan, H. (1999). *The effects of chemicals and heat treatments on reducing of pomegranate chilling injury in cold storage.* M. Sc.Thesis. Faculty of Horticulturae. University of Shiraz. Iran. (In Farsi).

18. Mirdehghan, H. (2006). *Physiological and biochemical changes of pomegranate fruits in storage and during growth in relation to chilling injury: The role of heat treatment*. Ph.D. Thesis. Faculty of Horticulturae. University of Shiraz. Iran. (In Farsi).
19. Mirdehghan, S. H., Rahemi, M., Castillo, S., Martínez-Romero, D., Serrano, M. & Valero, D. (2007). Pre-storage application of polyamines by pressure or immersion improves shelf-life of pomegranate stored at chilling temperature by increasing endogenous polyamine levels. *Postharvest Biology and Technology*, 44, 26–33.
20. Nanda, S., Rao, D. V. S. & Krishnamurthy, S. (2001). Effects of shrink film wrapping and storage temperature on the shelf life and quality of pomegranate fruits cv Ganesh. *Postharvest Biology and Technology*, 22, 61–69.
21. Palou, L., Crisosto, C. H. & Garner, D. (2007). Combination of postharvest antifungal chemical treatments and controlled atmosphere storage to control gray mold and improve storability of 'Wonderful' pomegranates. *Postharvest Biology and Technology*, 43, 133–142.
22. Qin, G. Z., Tian, S. P., Xu, Y. & Wan, Y. K. (2003). Enhancement of biocontrol efficacy of antagonistic yeasts by salicylic acid in sweet cherry fruit. *Physiological and Molecular Plant Pathology*, 62, 147-154.
23. Solecka, D. & Kacperska, A. (2003). Phenylpropanoid deficiency affects the course of plant acclimation to cold. *Physiologia Plantarum*, 119, 253–262.
24. Wang, L., Chena, S., Kong, W., Li, W. & Archbold, D. D. (2006). Salicylic acid pretreatment alleviates chilling injury and affects the antioxidant system and heat shock proteins of peaches during cold storage. *Postharvest Biology and Technology*, 41, 244–251.
25. Zhang, Y., Chen, K., Zhang, S. & Ferguson, I. (2003). The role of salicylic acid in postharvest ripening of kiwifruit. *Postharvest Biology and Technology*, 28, 67- 74.