

*Research Paper*

## **Effect of Storage Period on Quality Characteristics of Two Cultivars of Apricot (*Prunus armeniaca L.*)**

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**Abstract:** *The present study was carried out for two successive seasons 2011, 2012 to study the effect of storage period on some physico- chemical characteristic fruit for two local cultivars of apricot (Kaysi and Turkey Red Early). Fruit of both cultivars manually harvested from 10 years old apricot trees grafted on seedling rootstock grown in Malta nursery –Horticulture office- General Agriculture Directorate- Duhok- Iraq, then stored at 3°C and 85- 90% RH. The results showed that fruit weight loss% and total soluble solid % significantly increased in "Kaysi" and "Turkey Red Early" cultivars at 2010 and 2011 as the storage period prolonged from 0 to 8 and 16 days, but fruit acidity and Vitamin C. was significantly decreased with the extension of storage period, Pulp thick not influenced by storage period. On other hand result showed that Turkey Red Early cultivar superior over Kaysi cultivar in total soluble solid%, acidity, vitamin C and fruit weight loss% at 2010 and 2011.*

**Keywords:** Local cultivar, Apricot, Storage period.

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### **1. Introduction**

Apricot (*Prunus armeniaca L.*) is the species of *Prunus*, classified with the *Prunoidae* subfamily *Rosaceae*, family of the *Rosales* (Haydar *et al.*, 2007). The apricot is native to central and western China. This fruit was brought to Italy about 100 B.C., to England in the 13<sup>th</sup> century and to North America by 1720 (Carlos and Adel, 1999). Apricot plays a significant role in preserve human health, because the apricot fruit contains carotene and lycopene pigment that prevent the heart and eyes, also disease fighter effects of fiber that protect digestive condition fruits are antipyretic,

antiseptic, emetic, and ophthalmic. Fruit of apricot reach in different antioxidant compound such as phenolic, vitamins and carotenoids (Re *et al.*, 1999). They are able to scavenge reactive oxygen species due to their electron donator properties. The levels of phenolic compound are different in apricot varieties. (Macheix *et al.*, 1990).

Fruit of apricot is not only consumed fresh but also used to produce dried, frozen, jam, jelly, marmalade, pulp, and juice nectar and extrusion products. Moreover, apricot kernel is used in production of oil. (Yildiz, 1994).

It was found that apricot is fragile fruit having short storage life (3-5 days) at ambient conditions, 2-4 weeks at cold storage, depending on cultivar. The short storage life of it due to short time period from commercial ripening to the degradation process like senescence (Egea *et al.*, 2007), or the short life of its storage at ambient conditions might be attributed to its high respiration rate under natural conditions ( El-Badawy and El-Salhy, 2011) also due its high moisture content and metabolic activities take place during post harvest, therefore, low storage temperature are used to extend fruit post-harvest life (Manning, 1996).(Ezzat *et al.*, 2012) showed that the 10 varieties of apricot take different trends in behavior of storage ability.

This study has been carried out to investigate the physicochemical changes occur in the fruit of two local varieties apricot during storage at 3°C for 18 days.

## 2. Materials and Methods

The present study was carried out for two successive seasons (2011-2012) on 10 years old Kaysi and Turkey Red Early cultivars of local apricot trees grafted on seedling rootstock grown in Malta nursery-Horticulture office- General Agriculture Directorate- Duhok – Iraq.

Fruit of both cultivars Manually harvested at optimal commercial fresh stage at 28 May 2011 and 1 June 2012 and transported in plastic boxes to the central laboratory of Agriculture Faculty, Duhok University, then fruit were selected for uniformity, shape, color and size and any blemished fruits were discarded, after that fruit transferred to the cold room for precooling, the fruit was divided into equal lots, these lots were packaged in performed polyethylene and stored at 3°C and 85-90% RH for 18 days. The initial values of apricot fruits parameters were taken periodically after 8 and 18 days out of cold storage (we did all the measurement on about 10 fruit) to determine fruit quality characteristic such as:

- 1- Weight loss%: Fruits in each treatment were weighed by using electronic balance according to AOAC (1990).
- 2- Total soluble solids (%): Total soluble solids were determined by taking representative juice of each sample on hand refractometer, closing the lid and taking reading directly at room temperature according to AOAC (1990).
- 3- Titratable acidity( %): Titratable acidity was determined according to AOAC (1990).
- 4- Ascorbic Acid (mg/100ml fruit juice): Ascorbic acid was determined according to AOAC (1990).

## Statistical Analysis

The data obtained was statistically analyzed using two-factor factorial in complete randomized design. The angular conversion for the results have been analyzed by SAS program (2001). Duncan test under probability level (5 %) has been used for means comparing.

### 3. Results and Discussion

Data of 2011 -2012 seasons as shown in table (1) clearly indicated that there was no significant difference between the two cultivars (Kaysi and Turkey Red Early) in fruit weight loss (%). On other hand fruit weight loss increased with prolonged of storage period in both seasons. The lowest fruit weight loss observed in the interaction between Turkey Red Early cultivar and 8 day storage in 2011, but in 2012 the lowest fruit weight loss obtained in the interaction between Kaysi and 8 days storage. Weight loss of fruit was mainly due to water loss through transpiration process, while some weight loss is due to loss of carbon in respiration process, but this was only a minor part of the total (Mehaisen, 1999).

**Table (1):** Effect of cultivar, storage period and their interaction on apricot fruit weight loss (%) stored at 0±1 during 2011 and 2012 seasons

2011			
Cultivars	storage period(days)		Means
	8	16	
Kaysi	1.77 bc	2.82 ab	2.29 a
Turky Red Early	1.56 c	3.33 a	2.45 a
Means	1.66 b	3.07 a	
2012			
Kaysi	3.31 b	9.98 a	6.65 a
Turky Red Early	3.63 b	8.66 a	6.14 a
Means	3.47 b	9.32 a	

Means within a column, following with the same latter are not significantly different according to Duncan multiple range test at the probability of 5% levels.

In addition, it is clear from data in table (2) that the TSS was differ between cultivars at harvest and gets to increase significantly when storage period prolonged from initial day to 16 days in both season. The combination between Turkey Red Early and 16 days storage give the optimum fruit TSS. The increase in fruit T.S.S. content during storage may be attributed to the reduction of fruit moisture content degradation of complex insoluble compounds to simple soluble compounds and accumulation of soluble solids particularly sugars in fruit juice (Morga *et al.*, 1979).

**Table (2):** Effect of cultivar, storage period and their interaction on apricot fruit T.S.S (%) stored at 0±1 during 2011 and 2012 seasons

2011				
Cultivars	storage period (days)			Means
	0	8	16	
Kaysi	15.33b	17.0a	17.66a	16.66a
Turky Red Early	15.66b	17.0a	18.0a	16.88a
Means	15.5b	17.0a	17.83a	
2012				

Kaysi	14.33c	14.67c	15.3bc	14.78b
Turky Red Early	15.33bc	16.3ab	16.67a	16.11a
Means	14.83b	15.5ab	16.0a	

Means within a column, following with the same letter are not significantly different according to Duncan multiple range test at the probability of 5% levels.

The maximum value of total acidity was observed for Turkey Red Early cultivar which was significantly higher than the acidity on Kaysi cultivar, the maximum mean value of acidity recorded for overall acceptability during storage period at initial day in both season (2.12, 0.613%) respectively, decreased significantly at 16 days (1.55, 0.517%). On other hand the interaction between Turkey Red Early cultivar and 0day storage give the highest total acidity as compared to the lowest total acidity at the interaction between Turkey Red Early cultivar and 16 days storage in 2011, but in 2012 there were no significant deference between all interaction treatments in total acidity (table 3). The decrease in fruit acidity during storage period may be due to the metabolic changes in fruits or due to the use of organic acids in respiratory process (Echeverria and Valich, 1989).

**Table (3):** Effect of cultivar, storage period and their interaction on apricot fruit titratable acidity (%) stored at 0±1 during 2011 and 2012 seasons

2011				Means
Cultivars	Storage Period (days)			
	0	8	16	
Kaysi	1.54a	1.24e	0.96f	1.25b
Turky Red Early	2.69a	2.39b	2.15c	2.41a
Means	2.12a	1.81b	1.55c	
2012				
Kaysi	0.603a	0.646a	0.516a	0.589a
Turky Red Early	0.623a	0.623a	0.517a	0.588a
Means	0.613a	0.635a	0.517b	

Means within a column, following with the same letter are not significantly different according to Duncan multiple range test at the probability of 5% levels.

Data in table (4) demonstrated that the tow cultivars (Kaysi and Turkey Red Early) did not apper any remarkable effect on fruit ascorbic acid in both season (2011, 2012).

Furthermore, fruit ascorbic acid content was gradually decreased as the storage period advanced it both seasons. In addition, the combinations of Turkey Red Early cultivar with 16 day storage period in the first season recorded the highest fruit ascorbic acid content.

**Table (4):** Effect of cultivar, storage period and their interaction on apricot fruit ascorbic acid (mg/100ml fruit juice) stored at 0±1 during 2011 and 2012 seasons

2011				Means
Cultivars	Storage period (days)			
	0	8	16	
Kaysi	1.37c	1.37c	1.57ab	1.44a
Turky Red Early	1.40bc	1.40bc	1.63a	1.48a
Means	1.38b	1.38b	1.6a	
2012				
Kaysi	1.43a	1.43a	1.60a	1.49a
Turky Red Early	1.43a	1.60a	1.50a	1.51a
Means	1.43a	1.517a	1.55a	

Means within a column, following with the same latter are not significantly different according to Duncan multiple range test at the probability of 5% levels.

Table (5) there were no significant difference between cultivars and with the prolong storage and the interaction among cultivars and storage period in the first season 2011. But in second season 2012 Turkey Red Early superior on Kaysi in fruit pulp significantly. However fruit pulp not influenced significantly by prolonged storage period from 0, 8 to 16 days in cold storage. Interaction data illustrated that Kaysi fruit gave the lowest significant pulp at initial day as compared with the highest value of fruit pulp in combination between Turkey Red Early at initial day. The obtained results are in agreement with those obtained by El-Badawy and El-Salhy (2011) and Ezzat *et al.* (2012). This trend different between Turkey Red Early and Kaysi cultivars in behavior of storage ability which cleared by the term of the parameter under study refer to differences in genetic character beside environmental and agriculture treatment preharvest (Ezzat *et al.*, 2012).

**Table (5):** Effect of cultivar, storage period and their interaction on apricot fruit pulp thickens stored at 0±1 during 2011 and 2012 seasons

2011				Means
Cultivars	Storage period (days)			
	0	8	16	
Kaysi	5.0a	4.67a	5.33a	5.0a
Turky RedEarly	5.67a	5.33a	4.67a	5.22a
Means	5.33a	5.0a	5.0a	
2012				
Kaysi	4.33b	4.67ab	5.33ab	4.78b
Turky RedEarly	5.67a	5.00ab	5.67a	5.44a
Means	5.0a	4.83a	5.5a	

Means within a column, following with the same letter are not significantly different according to Duncan multiple range test at the probability of 5% levels.

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