

Short Communication

Varietal Suitability and Storage Stability of Mango Squash

IMTIAZ HUSSAIN¹, SABEEN NAZ GILANI, MUHAMMAD RIAZ KHAN[†], M. TARIQ KHAN AND IFTIKHAR SHAKIR
Faculty of Agriculture and [†]Department of Chemistry AJK University Rawalakot, Kotli Azad Kashmir

¹Corresponding author's e-mail: saimasheikh_61@hotmail.com

ABSTRACT

Comparative study was carried out on the effect of cultivars and storage on overall quality of mango squash. Squash were prepared from five different cultivars by mixing pulp, sugar and water in the ratio of 1:1:1. Potassium meta-bisulphite was added @ 0.06% to each formulation. All the samples were packed in 250 mL transparent glass bottles and stored at room temperature for three months. The samples were analyzed for pH, TSS, % acidity, ascorbic acid, reducing and non-reducing sugars and organoleptically evaluated for colour and flavour at zero storage and at interval of 15 days up to three months. During storage, TSS and reducing sugars and pH significantly increased while ascorbic acid, non-reducing sugar and acidity significantly decreased the score for colour and flavor significantly decreased during storage.

Key Words: Mango; Squash; Ascorbic acid; Varietal; Storage; Sugars

INTRODUCTION

Pakistan produces mangoes in large quantities. The bulk of mango fruit is consumed as fresh fruit, but is perishable in nature and cannot be stored for long time. Therefore, it is also processed in order to make juices, jams, squashes, nectars, chutneys, pickles, toffees, canned mango slices, frozen mango slices etc. Various preservatives and cultivars, however, have been reported to affect different contents of mango (Saeed & Abu-Sin, 1971; Chudhry *et al.*, 1984; Narayanan *et al.*, 1998). This study was carried out on the effect of cultivars and storage on overall quality of mango squash.

MATERIALS AND METHODS

Fully ripened, sound healthy mangoes of five different varieties (Fajri, Desi, Ting, Chonsa and Totapari) were procured from Nawabshsh (Sindh). The fruits were sorted out, washed with tap water and peeled manually. The flesh was cut into small pieces with stainless steel knives and pulp was made using an electric blender. The pulp was strained through muslin cloth and used for preparation of squash. Squash was prepared by mixing pulp, sugar and water in ratio of 1:1:1. Citric acid was added to adjust the acidity to 1%. For preservation, potassium meta-bisulphite was added @ 0.06% to each formulation (Awan & Salim, 1997). Samples were filled in transparent glass bottles of 250 mL capacity and stored at room temperature for analysis at interval of 15 day for a total period of 90 days. The parameters for chemical analysis were pH, total soluble solids, total titratable acid, ascorbic acid and sugars (AOAC, 1984). Organoleptic evaluation was carried out by nine point hedonic scale of Larmond (1977). The data were statistically analyzed and means were separated by LSD test as described by Steel and Torrie (1980).

RESULTS AND DISCUSSION

The mean values of ascorbic acid were 27.44, 24.96,

21.07, 26.73 and 3.031 mg/ 100 mL for Fajri, Desi, Ting, Chonsa and Totapari squash samples, respectively during storage (Table I). Loss of ascorbic acid content during storage was significant ($P < 0.05$) in all the samples. Bender (1958) has reported that loss of ascorbic acid up to 20% in six months, 50% in 19 months and 60% in two years. Loss of ascorbic acid in stored squashes has also been reported by Reman *et al.* (1964) and Chudhry *et al.* (1984) up to 15 and 30%.

After 90 days storage, the mean values of TSS were significantly ($P < 0.05$) increased being 52.6, 45.83, 52.64, 53.74 and 44.6 of squash sample prepared from Fajri, Desi, Ting, Chonsa and Totapari, respectively. The minimum increase (2.22%) was noted in Desi cultivars (Table II). These results are in agreement with Chudhry *et al.* (1984). The pH of squash samples showed significant ($P < 0.05$) increase in all squash samples. The mean values for pH were 2.44, 2.28, 2.24, 2.56 and 2.15 for squash samples prepared from the Fajri, Desi, Ting, Chonsa and Totapari, respectively (Table III). The minimum increase was observed in Desi cultivar (16%).

Titrateable acidity during storage period decreased being 0.955, 1.149, 0.971, 0.933 and 1.075% for squash prepared from Fajri, Desi, Ting, Chonsa and Totapari, respectively (Table IV). The maximum decrease was observed in samples of Ting cultivar (46%). Analysis of variance showed that the decrease in acidity during storage is significant ($P < 0.05$) in all samples. These results are agreement with the findings of El-Ashwah *et al.* (1974) and Chudhry (1984). The reducing sugars for squash samples during storage increased being 16.57, 14.78, 16.47, 18.36 and 14.33 for squash prepared from Fajri, Desi, Ting, Chonsa and Totapari, respectively (Table V). These results are in agreement with Hamad (1966), Saeed Abu-Sin (1971) and Home *et al.* (1997). The mean values of non-reducing sugars were 35.41, 29.61, 35.84, 35.14 and 31.36 for squash samples, respectively. The Desi cultivar retained maximum

Table V. Effect of storage on present reducing sugar of mango squashes prepared from different cultivars

Cultivars	Storage Intervals (Days)							Means
	0	15	30	45	60	75	90	
Fajri	12.80	13.50	15.10	15.6	17.80	19.50	21.70	16.57b
Desi	10.56	12.00	13.63	15.65	16.17	17.10	18.41	14.78c
Ting	11.10	12.10	15.30	16.10	16.60	21.50	22.60	16.47b
Chonsa	13.80	14.90	16.10	17.80	18.50	23.50	23.80	18.36a
Totapari	9.76	11.69	13.93	14.88	15.41	15.80	18.84	14.33c

Table VI. Effect of storage % non-reducing sugar of mango squashes prepared from different cultivars

Cultivars	Storage Intervals (Days)							Means	% Decrease
	0	15	30	45	60	75	90		
Fajri	39.0	38.5	37.1	36.0	34.2	33.0	30.1	35.41a	22.82
Desi	33.5	32.0	31.0	29.0	28.2	27.1	26.5	29.61c	20.89
Ting	40.5	40.1	37.0	36.2	36.0	31.1	30.0	35.84a	25.92
Chonsa	39.0	38.1	37.2	35.9	35.0	30.5	30.3	35.14a	22.30
Totapari	35.0	33.5	31.7	30.9	30.6	30.3	27.5	31.36b	21.42

Table VII. Mean score for color for mango squashes prepared from different cultivars

Cultivars	Storage Intervals (Days)							Means
	0	15	30	45	60	75	90	
Fajri	8.2	8.0	7.8	7.6	7.5	7.4	7.2	7.67a
Desi	6.7	6.5	6.3	6.1	5.9	5.8	5.6	6.12c
Ting	6.9	6.7	6.5	6.3	6.2	6.0	5.9	6.35b
Chonsa	5.3	5.2	5.1	4.9	4.9	4.7	4.7	4.97d
Totapari	4.1	4.0	3.9	3.7	3.6	3.4	3.3	3.70e

Table VIII. Mean score for flavor of mango squashes prepared from different cultivars

Cultivars	Storage Intervals (Days)							Means
	0	15	30	45	60	75	90	
Fajri	8.2	8.0	7.8	7.6	7.6	7.4	7.2	7.60b
Desi	8.5	8.4	8.3	8.2	8.1	8.1	8.0	8.22a
Ting	7.3	7.3	7.1	6.9	6.7	6.5	6.5	6.87c
Chonsa	5.7	5.7	5.6	5.5	5.3	5.1	5.1	5.42d
Totapari	4.5	4.4	4.4	4.2	4.0	3.8	3.6	4.12e

reducing and non-reducing sugars (Table VI). The analysis of variance revealed that non-reducing sugars significantly ($P < 0.05$) decreased during storage in all squash samples.

The maximum color was observed for samples of Fajri cultivar, being minimum for Totapari i.e. 3.70 after storage of 90 days (Table VII). The mean score for flavor were maximum for samples of Desi cultivar; whereas, it was minimum (4.12) for Totapari (Table VIII). The analysis of variance showed that there was a significant ($P < 0.05$) decrease in flavor and color. These results are in accordance with those of Saeed and El-Mubarak (1971).

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Table I. Changes in Vitamin-C (mg/100 mL) contents of mango squashes prepared from different cultivars during storage (33-16°C)

Cultivars	Storage Intervals (Days)							Means	%loss
	0	15	30	45	60	75	90		
Fajri	33.5	32.0	31.0	28.0	24.0	22.5	21.1	27.44a	37.0
Desi	28.0	27.5	26.5	24.5	23.9	22.5	21.84	24.96b	22.0
Ting	30.0	27.0	26.0	20.0	17.0	13.5	15.0	21.07c	50.0
Chonsa	31.0	29.5	29.0	27.0	24.0	23.7	22.94	26.73ab	26.0
Totapari	4.0	3.8	3.6	2.9	2.5	2.3	2.12	3.031d	47.0

Table II. Changes in TSS of mango squashes prepared from different cultivars during storage (33-16°C)

Cultivars	Storage Intervals (Days)							Means	% increase
	0	15	30	45	60	75	90		
Fajri	52	52.2	52.5	52.7	62.9	53.0	53.5	52.6b	2.81
Desi	44	44.2	44.5	44.6	44.47	44.8	45.0	45.83c	2.22
Ting	52	52.1	52.3	52.5	52.9	53.0	53.7	52.64b	3.16
Chonsa	53	53.3	53.5	53.7	54.0	54.2	54.5	53.74a	2.75
Totapari	45	45.3	45.6	45.8	46.0	46.5	46.6	44.66d	3.43

Table III. Changes in pH of mango squashes prepared from different cultivars during storage

Cultivars	Storage Intervals (Days)							Means	% loss
	0	15	30	45	60	75	90		
Fajri	2.0	2.2	2.3	2.4	2.5	2.7	2.8	2.44b	28.50
Desi	2.1	2.2	2.2	2.3	2.3	2.4	2.5	2.28c	16.00
Ting	1.9	2.0	2.1	2.25	2.3	2.3	2.8	2.24cd	32.14
Chonsa	2.0	2.3	2.5	2.7	2.7	2.8	2.9	2.56a	31.03
Totapari	1.8	1.9	2.0	2.1	2.3	2.4	2.55	2.15d	29.41

Table IV. Changes in present acidity of mango squashes prepared from different cultivars during storage

Cultivars	Storage Intervals (Days)							Means	% loss
	0	15	30	45	60	75	90		
Fajri	1.180	1.16	1.15	0.896	0.896	0.768	0.704	0.965c	40.33
Desi	1.400	1.34	1.28	1.080	1.024	0.960	0.960	1.149a	31.42
Ting	1.85	1.65	1.15	0.986	0.896	0.832	0.640	0.971c	46.0
Chonsa	1.100	1.09	1.08	0.960	0.896	0.704	0.704	0.933c	36.0
Totapari	1.370	1.29	1.216	1.150	0.896	0.832	0.768	1.075b	43.94

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