



## Short communication

# Physical and bio-chemical composition of value-added pomegranate toffee during storage

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### ABSTRACT

Toffee was prepared from dry pomegranate arils using different treatments comprising of cardamom, vanilla flavour, citric acid flavours. Treatment comprising of sulphitation + cardamom flavour was found superior with respect to different parameters. It had acceptable organoleptic quality at the end of 120 days storage at 7-10°C.

**Key words:** Biochemical composition, pomegranate toffee, storage.

Pomegranate (*Punica granatum* L.) belonging to the family Punicaceae, is a favourite table fruit of tropical and subtropical regions. Pomegranate aril juice provides about 16% of an adult's daily vitamin C requirement per 100 ml serving, and is a good source of vitamin B<sub>5</sub> (pantothenic acid), potassium and polyphenols, such as tannins and flavonoids. The seeds and juice are considered a tonic for the heart and throat. Pomegranate fruit having fabulous reputation for its healthy, dietetic and many medicinal properties, can be processed into a variety of novel products like juices, concentrates, champagne punches, jelly, grenadine etc. (Singh, 6). Among the different products of pomegranate, toffee is preferred by all groups of people. But standardized recipe of a good quality toffee has not yet been reported. Undoubtedly, this product holding all the characteristics of pomegranate will have a good market value with longer shelf-life than its other products. The present investigation was laid out in the 2 × 4 factorial CRD with eight treatments and three replications in the post harvest laboratory of Department of Horticulture, SHIATS, Allahabad during the year 2011-2012.

The treatments were T<sub>0</sub> = hot water + without any flavour, T<sub>1</sub> = hot water + cardamom flavour, T<sub>2</sub> = hot water + vanilla flavour, T<sub>3</sub> = hot water + citric acid flavour, T<sub>4</sub> = sulphitation + without any flavour, T<sub>5</sub> = sulphitation + cardamom flavour, T<sub>6</sub> = sulphitation + vanilla flavour and T<sub>7</sub> = sulphitation + citric acid flavour. These pre-treatments were applied on pomegranate fresh arils in order to get quality dry arils. Material used for toffee preparation (per kg) were pomegranate powder (400 g), sugar (500 g), water (200 ml), chocolate powder (100 g), butter (25 g), milk powder (20 g), flavours (cardamom, vanilla, and citric acid) and wrapped in butter paper.

Dry arils were taken and then ground with the help of a grinding machine followed by sieving with

the help of a sieve. In a container, 200 ml of water and add 500 g sugar were boiled for 10-15 min. at 100°C temperature. About 400 g pomegranate powder was added and cooked to 70°Brix, followed by addition of 100 g of chocolate powder and slowly stirring all the mixture with the help of a spatula upto 82-85°Brix for 10-15 min. Twenty gram milk powder was added, followed by addition of 25 g butter for the 1 kg prepared mixture. All the mixture was spread in a stainless steel tray left for 8 to 10 h. After proper cooling, round shaped pieces, measuring (5 g), of uniform size were prepared and wrapped in butter paper and was kept in low temperature (7-10°C) storage.

Moisture content and total soluble solids (Table 1) of value added pomegranate toffee showed an increasing trend during the entire storage period (120 days). Maximum moisture (16.96%) was recorded in T<sub>0</sub> and minimum (16.63%) was with T<sub>5</sub>. Increase of moisture content during storage period could be due to variation in their permeability, which helped in gain/ loss of moisture from the atmosphere (Thakur, 7; Sagar and Islam, 5). Maximum TSS (14.15°Brix) increase was recorded in T<sub>5</sub> and minimum (12.00°Brix) was with T<sub>0</sub>. An increase in total soluble solids content of value-added pomegranate toffee during storage may possibly be due to degradation of polysaccharides / oligosaccharides (Manivassagan *et al.*, 2).

An increasing trend in the pH, titratable acidity and total sugars and the score for overall acceptability of value-added pomegranate toffee was recorded till 60 day of storage, whereas, it showed a decreasing trend till the end of storage (120 days). Minimum pH (4.204) was recorded in T<sub>6</sub> and maximum (4.876) was with T<sub>0</sub>. Similar findings were reported by (Manivasagan *et al.*, 2). Minimum (0.442%) acidity increase was recorded in T<sub>6</sub> and maximum (4.876) was with T<sub>0</sub>. The decrease in acidity during storage may be due to absorption of water vapour and thereafter, its conversion into sugars. Their findings are in conformity with the earlier findings

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**Table 1.** Effect of different treatments on compositions of value-added pomegranate toffee at different storage intervals.

Treatment	Moisture (%)			Total soluble solids (°Brix)			pH			Acidity (%)			Total sugars (%)			Overall acceptability		
	0	60	120	0	60	120	0	60	120	0	60	120	0	60	120	0	60	120
	day	day	day	day	day	day	day	day	day	day	day	day	day	day	day	day	day	day
T <sub>0</sub>	16.25	16.58	16.96	11.52	11.87	12.00	4.85	4.88	4.88	0.490	0.530	0.523	8.26	8.54	8.62	6.40	6.94	6.68
T <sub>1</sub>	16.03	16.35	16.68	13.56	13.86	14.05	4.49	4.54	4.52	0.450	0.472	0.465	8.43	8.83	8.94	7.36	7.93	7.72
T <sub>2</sub>	16.15	16.45	16.78	12.72	12.93	13.15	4.33	4.36	4.36	0.430	0.459	0.452	8.51	8.81	8.91	6.99	7.37	7.18
T <sub>3</sub>	16.20	16.49	16.81	12.25	12.52	12.55	4.57	4.60	4.60	0.455	0.475	0.469	8.47	8.74	8.84	6.68	7.21	6.96
T <sub>4</sub>	16.21	16.56	16.84	12.13	12.37	12.51	4.73	4.75	4.75	0.480	0.511	0.504	8.32	8.60	8.65	6.49	7.05	6.79
T <sub>5</sub>	15.90	16.30	16.63	13.67	13.96	14.15	4.42	4.45	4.45	0.445	0.469	0.462	8.45	8.83	8.94	7.70	8.36	8.03
T <sub>6</sub>	16.09	16.39	16.73	12.85	13.23	13.39	4.20	4.24	4.20	0.425	0.451	0.442	8.49	8.81	8.92	7.16	7.55	7.31
T <sub>7</sub>	16.15	16.42	16.80	12.30	12.57	12.70	4.57	4.60	4.59	0.450	0.476	0.467	8.48	8.76	8.86	6.75	7.29	6.99
F-test	NS	S	S	NS	S	S	NS	S	S	NS	S	S	NS	S	S	NS	S	S
CD at 5%	-	0.019	0.04	-	0.10	0.10	-	0.051	0.064	-	0.003	0.004	-	0.013	0.007	-	0.09	0.05

(Puruthi and Saxena, 4; Sagar and Islam, 5). Maximum (8.94%) increase in total sugars was recorded in T<sub>5</sub> and minimum (8.62%) was with T<sub>0</sub>. Increasing total sugars might be due to hydrolysis of polysaccharides like starch pectin etc. and their conversion into simple sugars. Similar trend has been reported by (Mehta *et al.*, 3; Sagar and Islam, 5; Tripathi *et al.*, 8). Maximum overall acceptability rating (8.03) was recorded with T<sub>5</sub> and minimum (6.68) was with T<sub>0</sub>. Similar findings were reported by Manivasagan *et al.* (2) and Sagar and Islam (5).

Based on the findings of the present experiment it may be concluded that treatment T<sub>5</sub> (sulphitation + cardamom flavour) was found superior with respect to all the parameters. Organoleptic quality of this treatment was also found superior with higher benefit: cost ratio (1:1.41).

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Received : May, 2015; Revised : February, 2016;

Accepted : April, 2016