

Original Research Article

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## Organoleptic Evaluation of Preserved Guava Pulp during Storage

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### ABSTRACT

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This study was carried out to evaluate the best preservation methods and suitable variety for guava pulp preservation. Two guava varieties (L-49 and Lalit) pulp preserved with nine different treatments viz., potassium meta bi-sulphite 0.1% (T1), sodium benzoate 0.1% (T2), potassium meta bi-sulphite + sodium benzoate 0.05% each, sodium benzoate + potassium sorbate 0.05% (T4), potassium meta bi-sulphite + potassium sorbate 0.05% each (T5), potassium sorbate 0.025% (T6), potassium sorbate 0.05% (T7), potassium sorbate 0.1% (T8) and frozen storage -20°C (T9) and replicated four times with two experimental sets under Factorial CRD. The results revealed that at the end of storage (90 days) analyzed good qualitative characters organoleptic value (flavor, taste, colour, texture and overall acceptability) and colour a\* and b\* value by in low temperature storage (-20°C) followed by addition of potassium meta bi-sulphite 0.1%, sodium benzoate + potassium meta bi-sulphite 0.05% each and potassium sorbate 0.1%.

### Introduction

Guava (*Psidium guajava* L.) is widely grown all over the tropics and sub-tropics including India. Fruit consist of 20 per cent peel, 50 per cent flesh and remaining portion as seed core (Wilson, 1980). It has been in cultivation in India since early 17th century and gradually became a crop of commercial importance. Guava fruit normally consumed as fresh as a dessert fruit due to excellent quality. Abundant availability of guava fruits shows great potential for processing into valuable products. It's a better option for further use to make number of processed products such as nectar, squash, clarified juice, concentrates,

canned, dehydrated powder, jam, RTS, cheese and blends with other juices. Surplus produce use in processing of fruit into various products is one of the best ways to reduce post-harvest losses (Bons *et al.*, 2013).

Guava tree bears two crops during rainy and winter season in sub tropics. Guava tree has tendency to bear maximum crop during rainy season that's poor in fruit quality e.g. rough, insipid, watery and less nutritive. Rainy season fruits are also spoiled rapidly due to loss of glossy appearance with discoloration followed by blemishes, desiccation, loss of

firmness and vitamin C after harvest. The post-harvest losses occurs about 22 per cent (Bons and Dhawan, 2006). Therefore, need of the hour to use this rainy season crop through stored in form of pulp to increase its availability over an extended period and to stabilize the price during glut season and can be further utilize for preparation of various value added products. Keeping this in view the present experiment was conducted.

## Materials and Methods

The experiment was carried out in the Fruit & Vegetable Processing Lab, Department of Horticulture, Rajasthan College of Agriculture, MPUAT, Udaipur (Raj.) during the year July, 2015 to November, 2015. Fully mature and ripe guava cv. Lalit and L-49 fruits were procured from horticulture farm. The pulp was exerted by hot method (90°C).

Obtained pulp was preserved with nine different treatments namely, potassium meta bi-sulphite 0.1% (T1), sodium benzoate 0.1% (T2), potassium meta bi-sulphite + sodium benzoate 0.05% each, sodium benzoate + potassium sorbate 0.05% (T4), potassium meta bi-sulphite + potassium sorbate 0.05% each (T5), potassium sorbate 0.025% (T6), potassium sorbate 0.05% (T7), potassium sorbate 0.1% (T8) and frozen storage -20°C (T9) and replicated four times with two units. Physico-chemicals parameters of samples were observed at 0, 30, 60, 90 days of storage. The pulp was evaluated organoleptically (flavour, texture, taste and overall acceptability) by a panel of five judges by Hedonic Rating Test (Amerine *et al.*, 1965).

The score was expressed on 0-9 scale and averaged. The colour parameters of guava pulp was measured by using a Hunter Lab Colourimeter (model Hunter Colour Flex, Reston, USA), with reflectance mode (RSIN), CIE Lab scale (a\* and b\*) according to Nielsen (2010). a\* is the chromatic coordinate

that represents the proportion of redness and varies from green (-) to red (+) and b\* is the chromatic coordinate that represents the proportion of yellowness and varies from blue (-) to yellow (+). The data were analyzed by using Factorial completely randomized design (F CRD) using standard statistical tool (Online statistical tool, HAU, Hisar, Haryana).

## Results and Discussion

### Flavour and taste

#### Flavour

It is evident from the data (Table 1) that flavor value of stored guava pulp was decrease with the advancement of storage period in all the treatments. It was significantly unaffected by any pulp preservation methods from 0 to 60 days of storage duration. The maximum flavour value was recorded from treatment T9 (frozen storage) followed by T1 (KMS@0.1%) and minimum flavour value from T6 (PS@0.025%) *i.e.*, 6.30, 6.24 and 5.12, respectively. Loss of flavour and taste may be due to the degradation of ascorbic acid and furfural production (Shimoda and Osajima, 1981; Perez and Sanz, 2001). Varietal influence was also evident from the same table that flavour value of preserved pulp of Lalit was higher as compared to L-49. Regards to flavour value, Lalit scored 5.85, whereas L-49 scored 5.66 at 90th days of storage duration. Present study is in agreement with the findings of Khan *et al.*, (2014) in strawberry jam and Hussain *et al.*, (2003) in mango pulp.

#### Taste

An examination of data (Table 1) shows that taste of preserved guava pulp was decreased with the advancement of storage duration. This could be caused by development of

acidity and caramelization. Taste value of guava pulp was affected significantly at 75 and 90 days of storage duration. Maximum taste value was recorded in the treatment T9 (6.44) followed by T1 (6.03) and minimum in T6 (5.23) at 90 days of storage duration.

Maximum taste value scored by the cultivar L-49 as compared to Lalit up to 45 days of storage, while at 60, 75 and 90th days of storage taste value higher were recorded in cultivar Lalit compared to L-49. Taste value for L-49 was 5.65 and for Lalit 5.84 at 90th days of storage duration. The present study is in accordance with Sarolia and Mukherjee (2002) in lime juice.

**Texture and overall acceptability**

**Texture**

Data presented in table 2 shows that texture value of preserved guava pulp was decreased with the advancement of storage duration. At the end of storage duration *i.e.*, 90th day of storage showed significant influenced with maximum texture value was scored from treatment T9 (frozen storage) *i.e.*, 6.12 followed by T1 (KMS@0.1%) *i.e.*, 6.08 and minimum in T6 (PS@0.025%) *i.e.*, 5.59 at 90 days of storage.

**Table.1** Effect of preservation methods and varieties on flavour and Taste content of guava pulp during storage

Treatments	Storage duration (days)							
	Flavour				Taste			
	30	60	90	Mean	30	60	90	Mean
<b>Preservation Methods</b>								
T <sub>1</sub> (KMS-0.1%)	8.74	8.04	6.24	8.08	8.70	7.40	6.03	7.80
T <sub>2</sub> (SB-0.1%)	8.71	8.01	6.21	8.04	8.68	7.35	5.77	7.72
T <sub>3</sub> (SB+KMS -0.05%)	8.73	8.03	6.23	8.07	8.69	7.39	6.00	7.78
T <sub>4</sub> (PS+SB-0.05%)	8.67	7.97	5.17	7.72	8.62	7.32	5.50	7.62
T <sub>5</sub> (PS+KMS-0.05%)	8.69	7.99	5.19	7.73	8.63	7.34	5.55	7.65
T <sub>6</sub> (PS- 0.025%)	8.56	7.92	5.12	7.65	8.46	7.20	5.23	7.46
T <sub>7</sub> (PS-0.05%)	8.64	7.95	5.14	7.69	8.56	7.26	5.39	7.57
T <sub>8</sub> (PS-0.1%)	8.68	8.02	6.22	8.05	8.70	7.38	5.83	7.75
T <sub>9</sub> (Deep Freeze (-20 <sup>0</sup> C)	8.81	8.10	6.30	8.15	8.75	7.45	6.44	7.93
C.D. (P=0.05)	NS	NS	0.17		NS	NS	0.22	
<b>Varieties</b>								
V <sub>1</sub> (Lalit)	8.75	8.06	5.85	7.97	8.59	7.41	5.84	7.70
V <sub>2</sub> (L-49)	8.63	7.94	5.66	7.84	8.69	7.28	5.65	7.69
C.D. (P=0.05)	0.09	0.08	0.08		0.08	0.08	0.10	

**Table.2** Effect of preservation methods and varieties on colour and Texture of guava pulp during storage

Treatments	Storage duration (days)							
	Texture				Overall acceptability			
	30	60	90	Mean	30	60	90	Mean
<b>Preservation Methods</b>								
T <sub>1</sub> (KMS-0.1%)	6.73	6.53	6.08	6.56	8.22	7.36	6.09	7.56
T <sub>2</sub> (SB-0.1%)	6.71	6.50	6.04	6.53	8.20	7.33	5.95	7.51
T <sub>3</sub> (SB+KMS -0.05%)	6.73	6.53	6.07	6.55	8.21	7.36	6.08	7.55
T <sub>4</sub> (PS+SB-0.05%)	6.66	6.46	5.88	6.48	8.14	7.27	5.51	7.36
T <sub>5</sub> (PS+KMS-0.05%)	6.69	6.49	5.91	6.50	8.16	7.30	5.55	7.38
T <sub>6</sub> (PS- 0.025%)	6.60	6.41	5.59	6.39	8.04	7.14	5.29	7.24
T <sub>7</sub> (PS-0.05%)	6.63	6.43	5.77	6.43	8.10	7.20	5.42	7.31
T <sub>8</sub> (PS-0.1%)	6.72	6.51	6.05	6.54	8.19	7.35	5.97	7.52
T <sub>9</sub> (Deep Freeze (-20 <sup>0</sup> C)	6.78	6.60	6.12	6.62	8.26	7.42	6.32	7.67
C.D. (P=0.05)	NS	NS	0.271		0.126	0.122	0.161	
<b>Varieties</b>								
V <sub>1</sub> (Lalit)	6.63	6.38	5.86	6.44	8.16	7.34	5.84	7.47
V <sub>2</sub> (L-49)	6.76	6.61	6.03	6.58	8.17	7.27	5.75	7.46
C.D. (P=0.05)	0.07	0.06	0.13		NS	0.057	0.076	

**Table.3** Effect of preservation methods and varieties on colour  $a^*$  and  $b^*$  Value of guava pulp during storage

Treatments	Storage duration (days)							
	$a^*$ value				$b^*$ value			
	30	60	90	Mean	30	60	90	Mean
<b>Preservation Methods</b>								
T <sub>1</sub> (KMS-0.1%)	13.81	11.08	2.08	11.07	6.43	3.51	0.31	4.62
T <sub>2</sub> (SB-0.1%)	13.25	10.56	1.57	10.53	6.50	3.60	0.40	4.70
T <sub>3</sub> (SB+KMS -0.05%)	13.44	10.86	1.86	10.78	6.45	3.52	0.32	4.63
T <sub>4</sub> (PS+SB-0.05%)	13.12	10.30	1.28	10.31	6.58	3.67	0.47	4.77
T <sub>5</sub> (PS+KMS-0.05%)	13.15	10.35	1.35	10.38	6.53	3.64	0.40	4.73
T <sub>6</sub> (PS- 0.025%)	12.83	10.25	1.23	10.17	6.61	3.72	0.52	4.81
T <sub>7</sub> (PS-0.05%)	13.02	10.27	1.25	10.23	6.59	3.70	0.50	4.80
T <sub>8</sub> (PS-0.1%)	13.27	10.67	1.71	10.62	6.46	3.56	0.36	4.66
T <sub>9</sub> (Deep Freeze (-20 <sup>0</sup> C)	13.98	11.18	2.10	11.17	6.40	3.49	0.29	4.60
C.D. (P=0.05)	NS	0.60	0.09		NS	0.14	0.02	
<b>Varieties</b>								
V <sub>1</sub> (Lalit)	13.59	10.87	1.70	10.80	6.45	3.55	0.37	4.65
V <sub>2</sub> (L-49)	13.04	10.35	1.50	10.36	6.56	3.65	0.42	4.75
C.D. (P=0.05)	0.34	0.28	0.04		0.07	0.07	0.01	

It was recorded that texture value of L-49 was higher as compared to Lalit during the storage duration. At the end of storage duration texture value were 6.03 from L-49 and 5.86 from Lalit. Present study is in agreement with Tandon and Kalra (1984) and Yadav *et al.*, (2017) in guava pulp.

### Overall acceptability

An examination of data presented in table 3 shows that overall acceptability of preserved guava pulp was decreased with the advancement of storage duration. Maximum overall acceptability was recorded from treatment T9 (frozen storage) *i.e.*, 6.32 followed by T1 (KMS@0.1%) *i.e.*, 6.09 and lowest in T6 (PS@0.025%) *i.e.*, 5.29 at 90 days of storage duration. Varietal response were observed that L-49 was recorded higher overall acceptability from initial to 45th day of storage but later on *i.e.*, 60 to 90 days of storage duration Lalit exhibited higher overall acceptability. On mean value basis cultivar, Lalit was recorded higher overall acceptability over the cultivar, L-49. Present findings were accordance with Kalra and Tandon (1984) and Saini *et al.*, (2000).

### Colour value

#### a\* Value

Keen observation of data presented in table 4 reveals that the CIE a\* colour coordinate of preserved guava pulp was decreased with the advancements of storage duration (initial to 90th days of storage). The maximum CIE a\* colour coordinate was recorded from treatment T9 (2.10) which was closely followed by T1 (2.08) and minimum under T6 (1.23) at end of storage *i.e.*, 90th day of storage. Preserved guava pulp at 60, 75 and 90th days of storage duration exhibited significant affect with CIE a\* colour coordinate value. It was significantly affected by cultivars at all the storage duration except

at initial day. At the end of storage duration cultivar L-49 (1.50) scored lower CIE a\* colour coordinate as compared to Lalit (1.70). In none of the treatments negative value for a\* (green axis) was observed. Cumulative effect of a\* and b\* showed that dark colour increased with the advancement of storage duration.

#### b\* Value

A perusal of data presented in table 4 reveals that the CIE b\* colour coordinate of preserved guava pulp was decreased in all treatment with the advancement of storage duration. The minimum CIE b\* colour coordinate was recorded from treatment T9 (frozen storage at -20°C) *i.e.*, 0.29, which was closely followed by T1 (KMS@0.1%) *i.e.*, 0.31 and maximum CIE b\* colour coordinate was recorded from treatment T6 (PS@0.025%) *i.e.*, 0.52 at the 90th days of storage duration. However, CIE b\* colour coordinate value of preserved pulp was non significantly affected by preservation methods from initial to 45 days of storage duration. It was significantly affected by cultivars except at initial level of storage duration. It was observed that cultivar L-49 contained higher CIE b\* colour coordinate as compared to Lalit during the storage. CIE b\* colour coordinate for L-49 was 0.42 and for Lalit 0.37 at 90th days of storage duration. In none of the treatments negative value for b\* (blue axis) was observed.

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