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Identification of suitable variety of guava for preparation of nutritious cheese

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Abstract

Six different varieties of guava fruits viz., Lucknow-49, Allahabad Safeda, Chittidar, Apple Colour, Arka Amulya and Jawahar Guava (Pink Flesh), were harvested at mature and ripened stage. They were used to prepare guava cheese by standard method, which was then stored for 90 days. The influence of guava cheese made from matured and ripened fruits of different varieties of guava on chemical composition and storability were evaluated on the basis of pH, total titrable acidity, ascorbic acid, reducing sugar, non-reducing sugar and total sugar were determined on 0, 30, 60 and 90 days of storage.

Keywords: Fruit, variety, stage, cheese, remunerative price, TSS

1. Introduction

Guava (*Psidium guajava* L.) is one of the most nutritious fruit. It is richer source of vitamin C than ber, citrus and apple. Guava is a very popular fruit in India and thrives well both in tropical and subtropical climates. The fruits of guava should be processed into acceptable products so that the growers get a remunerative price and consumers of all over the world, get the opportunity to enjoy the fruits of guava in the form of its products such as jelly, toffee, nector, squash, vinegar, canned guava, etc. Besides these products, guava has tremendous scope for the preparation of new products like "Cheese".

Fruit cheese has recently become very popular. It is confection of the type of Karachi halwa and is prepared from fruit like Guava, Apple, Pear and Plum. Fruit cheese has a long shelf life. Fruit cheese contains a minimum 68% TSS and 45% prepared fruit in final product (F.P.O. Specifications).

2. Methodology

The methods adopted and the material used in carrying out this experiment is presented below:

		Varieties			Stages
V ₁	:	Lucknow-49	S ₁	:	Mature
V ₂	:	Apple Colour	S ₂	:	Ripened
V ₃	:	Allahabad Safeda			
V ₄	:	Chittidar			
V ₅	:	Arka Amulya			
V ₆	:	Jawahar Guava (Pink Fleshed)			

3. Results and discussion

(i). pH

The data with respect to pH is presented in the Table No.1. Which indicates that there was a gradual decrease in pH among all the samples of cheese prepared from different guava varieties and stages at ambient storage. The maximum pH was observed in treatment V₁S₁ (4.35, 4.30, 4.25 and 4.20 at 0, 30, 60, and 90 days respectively) followed by V₄S₁ (4.38, 4.28, 4.23 and 4.18 at 0, 30, 60, and 90 days respectively) and finally it was minimum in V₄S₂ (4.22, 4.09, 4.05 and 4.01 at 0, 30, 60, and 90 days respectively) in guava cheese.

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Flow chart of guava cheese preparation

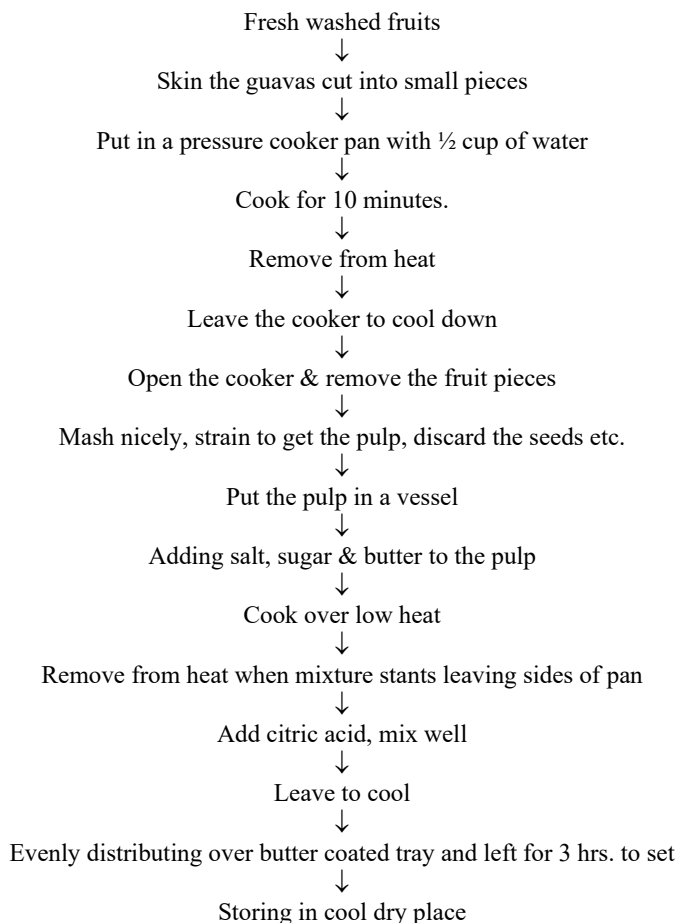


Table 1: Change in pH of guava cheese during storage

S. No.	Variety	0 day			30 days			60 days			90 days		
		Stage		Mean (V)	Stage		Mean (V)	Stage		Mean (V)	Stage		Mean (V)
		S ₁	S ₂		S ₁	S ₂		S ₁	S ₂		S ₁	S ₂	
1.	V ₁	4.35	4.26	4.30	4.30	4.24	4.27	4.25	4.21	4.23	4.20	4.18	4.19
2.	V ₂	4.30	4.27	4.28	4.22	4.20	4.21	4.17	4.15	4.16	4.12	4.10	4.11
3.	V ₃	4.27	4.24	4.25	4.21	4.19	4.20	4.16	4.14	4.15	4.11	4.08	4.09
4.	V ₄	4.33	4.22	4.27	4.28	4.09	4.18	4.23	4.05	4.14	4.18	4.01	4.09
5.	V ₅	4.29	4.25	4.27	4.26	4.11	4.18	4.23	4.07	4.15	4.20	4.03	4.11
6.	V ₆	4.30	4.28	4.29	4.27	4.25	4.26	4.23	4.21	4.22	4.19	4.17	4.18

(ii). Total titrable acidity (%)

The perusal of Table No.2 reveals that there was a significant effect in all the samples of cheese prepared from different varieties of different stages at different period of storage. A gradual decrease in the total titrable acidity was observed during the storage period. The maximum acidity was observed

in treatment V₂S₁ (0.44, 0.41, 0.40 and 0.38% at 0, 30, 60, and 90 days respectively) followed by V₃S₁ (0.41, 0.37, 0.36 and 0.32% at 0, 30, 60, and 90 days respectively) while it was minimum in V₆S₁ (0.253, 0.22, 0.21 and 0.18% at 0, 30, 60, and 90 days respectively) in guava cheese.

Table 2: Change in total titrable acidity of guava cheese during storage

S. No.	Variety	0 day			30 days			60 days			90 days		
		Stage		Mean (V)	Stage		Mean (V)	Stage		Mean (V)	Stage		Mean (V)
		S ₁	S ₂		S ₁	S ₂		S ₁	S ₂		S ₁	S ₂	
1.	V ₁	0.31	0.39	0.35	0.29	0.38	0.33	0.28	0.35	0.31	0.26	0.33	0.29
2.	V ₂	0.44	0.31	0.37	0.41	0.30	0.35	0.40	0.27	0.33	0.38	0.25	0.31
3.	V ₃	0.41	0.35	0.38	0.37	0.30	0.33	0.36	0.29	0.32	0.32	0.24	0.28
4.	V ₄	0.38	0.31	0.34	0.37	0.29	0.33	0.33	0.25	0.29	0.28	0.20	0.24
5.	V ₅	0.35	0.28	0.31	0.32	0.24	0.28	0.29	0.21	0.25	0.25	0.17	0.21
6.	V ₆	0.23	0.35	0.29	0.22	0.33	0.27	0.21	0.32	0.26	0.18	0.30	0.24

(iii). Ascorbic acid (mg/100g)

The ascorbic acid content of the guava cheese was determined at various intervals of storage and the results were depicted in

Table No.3. The ascorbic acid content tended to decrease in all the cheese samples of different varieties and stages during storage. However, retention of ascorbic acid was found

maximum in V₃S₂ (59.68, 54.16, 49.26 and 48.12 mg/100g at 0, 30, 60, and 90 days respectively) followed by V₂S₁ (53.43, 53.91, 49.01 and 47.87 mg/100g at 0, 30, 60, and 90 days

respectively) and while V₆S₂ treatment retained minimum ascorbic acid (50.31, 46.34, 42.30 and 38.15 and 38.40 mg/100g at 0, 30, 60, and 90 days respectively).

Table 3: Change in ascorbic acid of guava cheese during storage

S. No.	Variety	0 day			30 days			60 days			90 days		
		Stage		Mean (V)	Stage		Mean (V)	Stage		Mean (V)	Stage		Mean (V)
		S ₁	S ₂		S ₁	S ₂		S ₁	S ₂		S ₁	S ₂	
1.	V ₁	49.17	48.92	49.04	46.25	46.00	46.12	43.31	43.06	43.18	41.19	40.94	41.06
2.	V ₂	59.43	58.51	58.97	53.91	54.51	54.21	49.01	4.24	49.12	47.87	44.55	46.21
3.	V ₃	53.97	59.68	56.82	50.66	54.16	52.41	48.45	49.25	48.85	43.83	48.12	45.97
4.	V ₄	54.36	54.11	54.23	49.52	49.27	49.39	45.36	45.11	45.23	43.59	43.34	43.46
5.	V ₅	53.72	58.76	56.24	50.41	54.76	52.58	48.20	49.49	48.84	43.58	44.80	44.19
6.	V ₆	50.56	50.31	50.43	50.56	46.34	48.45	42.55	42.30	42.42	38.40	38.15	38.27

(iv). Non-reducing sugar (%)

The non-reducing sugar content of the guava cheese was determined at various intervals of storage and the results were depicted in Table No.4. There was a significant increase in non-reducing sugar contents of cheese with increased period of storage. The maximum non-reducing sugar content was found

in V₃S₁ (40.89, 43.47, 45.43 and 45.57% at 0, 30, 60, and 90 days respectively) followed by V₃S₂ (39.70, 42.68, 44.24 and 44.38% at 0, 30, 60, and 90 days respectively) and minimum in treatment V₆S₁ (28.92, 31.20, 31.30 and 32.15% at 0, 30, 60, and 90 days respectively) in guava cheese.

Table 4: Change in non-reducing sugar of guava cheese during storage

S. No.	Variety	0 day			30 days			60 days			90 days		
		Stage		Mean (V)	Stage		Mean (V)	Stage		Mean (V)	Stage		Mean (V)
		S ₁	S ₂		S ₁	S ₂		S ₁	S ₂		S ₁	S ₂	
1.	V ₁	39.81	38.62	39.21	38.11	36.92	37.51	38.64	37.45	30.04	38.73	37.54	38.13
2.	V ₂	30.11	26.64	28.37	32.39	35.17	33.78	32.49	39.36	35.92	33.34	32.78	33.06
3.	V ₃	40.89	39.70	40.29	43.47	42.68	43.07	45.43	44.24	44.83	45.57	44.38	44.97
4.	V ₄	33.86	32.67	33.26	39.59	38.40	38.99	41.70	40.51	41.10	36.62	35.16	35.89
5.	V ₅	26.71	25.52	26.11	35.49	34.30	34.89	39.24	38.05	38.64	33.05	31.86	32.45
6.	V ₆	28.92	25.45	27.18	31.20	33.98	32.59	31.30	38.17	34.73	32.15	31.59	31.87

(v). Total sugar (%)

The total sugar content of guava cheese was determined at various intervals of storage and results were depicted in Table No.5. There was a significant increase in total sugar content of cheese with increased period of storage. The maximum total sugar content was found in V₃S₂ (66.19, 69.02, 73.33

and 75.07% at 0, 30, 60, and 90 days respectively) followed by V₁S₂ (66.77, 68.46, 71.33 and 73.71% at 0, 30, 60, and 90 days respectively) and it was recorded minimum in V₆S₁ (63.42, 63.73 and 64.00% at 0, 30, 60, and 90 days respectively) in guava cheese.

Table 5: Change in total sugar of guava cheese during storage

S. No.	Variety	0 day			30 days			60 days			90 days		
		Stage		Mean (V)	Stage		Mean (V)	Stage		Mean (V)	Stage		Mean (V)
		S ₁	S ₂		S ₁	S ₂		S ₁	S ₂		S ₁	S ₂	
1.	V ₁	65.86	66.77	66.32	67.58	68.46	68.02	70.42	71.33	70.88	72.80	73.71	73.26
2.	V ₂	62.46	61.65	62.06	64.13	63.03	63.58	66.45	65.54	66.00	68.12	67.21	67.67
3.	V ₃	64.24	66.19	65.22	64.33	69.02	66.68	64.64	73.33	68.99	64.91	75.07	69.99
4.	V ₄	66.19	65.27	65.73	68.46	67.56	68.01	71.33	70.42	70.88	73.71	72.80	73.26
5.	V ₅	64.33	63.36	63.85	64.64	63.73	64.19	64.91	64.00	64.46	64.98	64.07	64.53
6.	V ₆	63.33	65.29	64.31	63.42	68.08	65.75	63.73	72.42	68.08	64.00	74.16	69.08

(vi). Reducing sugar (%)

The reducing sugar content of the guava cheese was determined at various intervals of storage and the results were depicted in Table No.6. There was a significant increase in reducing sugar contents of cheese with increase in duration of storage. The maximum reducing sugar content was found in

V₃S₂ (30.96, 32.28, 33.28, 33.65 and 38.55% at 0, 30, 60, and 90 days respectively) followed by V₁S₂ (30.47, 32.00, 33.37 and 38.27% at 0, 30, 60, and 90 days respectively) and minimum with V₆S₂ (21.03, 25.42, 28.02 and 34.44% at 0, 30, 60, and 90 days respectively) in guava cheese.

Table 6: Change in reducing sugar of guava cheese during storage

S. No.	Variety	0 day			30 days			60 days			90 days		
		Stage		Mean (V)	Stage		Mean (V)	Stage		Mean (V)	Stage		Mean (V)
		S ₁	S ₂		S ₁	S ₂		S ₁	S ₂		S ₁	S ₂	
1.	V ₁	28.89	30.47	29.68	30.90	32.00	31.45	33.14	33.37	33.26	34.44	38.27	36.36
2.	V ₂	28.36	25.15	26.76	30.62	29.42	30.02	32.86	32.12	32.49	34.16	38.54	36.35
3.	V ₃	25.64	30.96	28.30	29.70	32.28	30.99	32.40	33.65	33.03	38.82	38.55	38.69
4.	V ₄	25.25	24.76	25.01	29.41	29.13	29.27	35.53	35.25	35.39	40.40	40.12	40.26
5.	V ₅	26.05	25.35	25.70	29.70	29.42	29.56	33.40	32.12	32.76	38.82	38.54	38.68
6.	V ₆	21.73	21.03	21.38	25.70	25.42	25.56	28.30	28.02	28.16	34.72	34.44	34.58

4. Conclusion

On the basis of these investigations it was concluded that better quality of cheese could be obtained from the cultivar Allahabad Safeda at ripened stage which had highest reducing sugar, total sugar, non-reducing sugar. In respect of overall acceptability, texture, taste and flavour, also cultivar Allahabad Safeda at ripened stage was found superior. While highest colour/appearance score was recorded in Jawahar Guava (Pink Fleshed) at ripened stage.

5. Recommendations

1. Experiment can be done with other cultivars of guava. Pink fleshed varieties and white fleshed varieties can be mixed for the preparation of cheese.
2. Experiment can be done with different concentration of sugar and citric acid.
3. Mixed fruit cheese can also be prepared.
4. Storage studies can be done in different packaging materials.

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