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Quality evaluation of guava fruit cheese and blending with papaya and medicinal herbs

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Abstract
The experiment carried out at Post Harvest Management Lab Department of Horticulture College of Agriculture, RVSKVV Gwalior, (M.P.). Over the course of a four-month storage period, guava-papaya cheese was created and changes in its chemical and sensory quality characteristics were assessed monthly. After four months of storage, the guava-papaya cheese's total soluble solids, total sugar, and reducing sugar all greatly rose, whereas ascorbic acid and acidity dramatically reduced. Over the course of the four months that the guava-papaya cheese was stored, its flavor, appearance, and general acceptability all dramatically declined; that being said, the product was still deemed to be acceptable. Most people judged cheese made with a 50% guava/50% papaya pulp ratio to be the most palatable.

Keywords: Cheese, quality evaluation, sensory parameters and storage

Introduction
Goods for confectionery are regarded as a vast market category. The majority of confectionery products are made with fruit flavors and concentrates, not from pulp that is harmful to our health. However, fruit cheese is made from the pulp or puree of healthy, ripe fruits, whether they are frozen, cooked fresh, or have been preserved beforehand. It is thickened with nutritive sweeteners and salt to set when cooled. Chewing cheese shouldn't be too difficult or too soft. Any acceptable fruit can be used to prepare it, either separately or in combination. The natural fruit flavor is still present.

The tropical fruit guava (*Psidium guajava* L.) grows well in sub-tropical climates; commonly known as the "Apple of Tropics." It is indigenous to tropical and subtropical climates and a member of the Myrtaceae family. It is regarded as the fourth most significant fruit in India in terms of production and area, behind citrus, mango, and banana. It is an extremely resilient fruit that bears well and pays off. It grows well on a variety of soil types, from lateritic to alluvial, although it is susceptible to water logging conditions (Bose *et al*., 2001) [6]. Due to its wide range of adaptability and higher yield per unit area, guava is a highly favored fruit crop by fruit growers. It is an important commercial fruit of India, valued for its good digestibility and nutritional value, pleasant flavor, high palatability, and affordable availability. India, with an output of 4359'000 MT from an area of 290 thousand hectares, is the world's second-largest producer of guavas (Anon 2019 - 2020). In India, guava is widely cultivated in Maharashtra, Bihar, Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Odisha, West Bengal, Gujarat, Andhra Pradesh, Punjab, Tamil Nadu, Karnataka and Assam. In Madhya pradesh, it occupies 21.016-thousand-hectare area and from this area production of 192.005 MT was obtained (Anon 2019-2020.) and is mainly cultivated in districts namely Raipur, Durg, Dhamtari, kawardha, bemetara, rajnandgoan and bilaspur. Popular variety of guava fruit, include 'Lucknow 49', 'Allahabad Safeda' and 'Lalit'."

It is thought that the antioxidants in guava may lower the chance of developing cancer. Guavas contain 200-300 mg/100 g of vitamin C, which increases the effectiveness of vitamin E absorption in lowering lipid oxidation. It has a high content of minerals (potassium, copper, manganese, calcium, iron, phosphorus), vitamins (ascorbic acid, thiamine, riboflavin, nicotinic acid, and vitamin A), fiber, pectin, and folic acid. Guavas' fiber helps with digestion and eases bowel motions.

The guava fruit's insoluble fiber helps both prevent and cure diverticulitis. Guavas' high vitamin A concentration is essential for preserving the integrity of the mucous membranes, teeth, skin, vision, and bones.

The papaya (*Carica papaya* L.) is the fruit in the Caricaceae family with the greatest commercial significance. It is accessible all year round in India and is cultivated in all tropical and subtropical nations. The fruits are full of minerals, including β-carotene, which the body uses to make vitamin A. Additionally, it is a great source of nutrients, vitamins C, E, flavonoids, B vitamins, folate, pantothenic acid, and fiber, as well as minerals like potassium and magnesium (Ramachandran & Nagarajan, 2014) [15]. The shelf life of fresh guava and papaya fruits is short. Consequently, in order to improve this fruit's availability throughout time and stable its price during glut season, it must be used to make a variety of goods. Papaya fruit, however, has not attracted the attention of customers as much as it might. This is mostly due to its disagreeable smell, which restricts its economic exploitation at the processing level. On the other hand, papaya fruit may be used to combine with other fruits or to prepare food products that are enhanced with nutrients due to its blood red pulp, nice flavor, and low acid content. (Attri and others, 2014) [3]. Whereas guava emits a sweet aroma which is pleasant, refreshing and acidic in flavour and besides being rich source of pectin, its pulp shows compatibility and suitability for blending and making mixed fruit products *viz*., jam, jelly, candy, leather etc. However, blending of these two fruits could be an economic preposition to utilize them profitably (Jain *et al.,* 2011) [13]. Some consumers do not like the typical flavour of papaya pulp/juice; however, its blending with other fruit pulp/juice may provide processed products of better nutrition and sensory quality. Guava is not only a delicious and nutritious fruit but may also be utilized to make products like jam, jelly, cheese, bar, juice, canned segments, squash, nector, RTS, dehydrated slice, flakes, toffee, sauce, guava lather, baby food puree etc. Fruit cheese and fruit squash has recently become very popular. Guava cheese is confectionary, tasty, nutritious, chewy and relished products by all categories of people, particularly very popular among children.

Medicinal herbs are actually a boon to mankind. They are not only used solely to cure any disease but their food additive quality. Incorporation of medicinal plants in processed food products started way back but guava cheese and squash supplemented with quality of medicinal plants are yet to be harnessed. In the study ginger, cardamom, lemon grass are used solely or in combination in the guava cheese and squash so as to ensure the presence of their benefits solely or in combination.

Ginger is very useful in treating chronic inflammation and also effective against osteoarthritis, rheumatism, and cancer. It is used in two forms dried and flesh. Lemongrass is used for treating digestive tract spasms, stomach ache, high blood pressure, pain, vomiting, cough, fever, cold, and exhaustion. Cardamom have antioxidant and diuretic properties. it also help in digestive problems, ulcers, bad breath and cavity.

Materials and Methods

The experiment was undertaken at post-harvest and Processing Laboratory of Department of Horticulture, College of Agriculture, RVSKVV, Gwalior M.P. during the year 2019 – 2021. The fully matured fresh guava fruits were collected from the orchard of the College of Agriculture, RVSKVV Gwalior (M. P.) and papaya fruits from the local market for this study. Mixed fruit cheese was prepared from pulp of guava and papaya, sugar and citric acid. The experiment comprised of 18 treatment combinations consisting of 2 levels of variety (V1: local white fleshed variety of guava and V2: Local red fleshed variety of guava, three of guava and papaya pulp (S1: 100% Guava, S2: 75% Guava + 25% Papaya and S3: 50% Guava + 50% Papaya) and 3 levels of medicinal herbs (M1: Cardamom, M2: Ginger and M3: Lemon grass). The various recipes used for preparation of mixed fruit cheese were arranged in a factorial completely randomized design with three replications and then recorded data were analyzed accordingly. For assessing the organoleptic qualities of stored guava and papaya mixed cheese sample were analyzed at an interval of 30 days from 0 to 120 days.

Treatment combinations

LWV+ 100% Guava + Cardamom, LWV+ (75% Guava + 25% Papaya) + Cardamom, LWV+ (50% Guava + 50% Papaya) + Cardamom, LWV+100% Guava + Ginger, LWV+ (75% Guava + 25% Papaya) + Ginger, LWV+ (50% Guava + 50% Papaya) + Ginger, LWV+ 100% Guava + Lemon grass, LWV+ (75% Guava + 25% Papaya) + Lemon grass, LWV + (50% Guava + 50% Papaya) + Lemon grass, LRV + 100% Guava + Cardamom, LRV + (75% Guava + 25% Papaya) + Cardamom, LRV + (50% Guava + 50% Papaya) + Cardamom, LRV + 100% Guava + Ginger, LRV + (75% Guava + 25% Papaya) + Ginger, LRV + (50% Guava + 50% Papaya) + Ginger, LRV + 100% Guava + Lemon grass, LRV + (75% Guava + 25% Papaya) + Lemon grass and LRV + (50% Guava + 50% Papaya) + Lemon grass.

*LWV- Local white fleshed guava variety and LRW- Local red fleshed guava variety

Preparation of fruits for pulping

The fruits were washed in running tap water for removing the adhering dirt after washing of fruits, preliminary trial was conducted to standardize the method of extraction of pulp. The pulp was extracted using the following procedure.

Extraction of pulp from fruit

The fruits were cut into small pieces with the help of stainless-steel knife, then the Small pieces of guava mixed with some quantity of water and steamed for pulp preparation. The steamed pulp was prepared with the help of mixer cum grinder and the seeds were strained with stainless steel sieve.

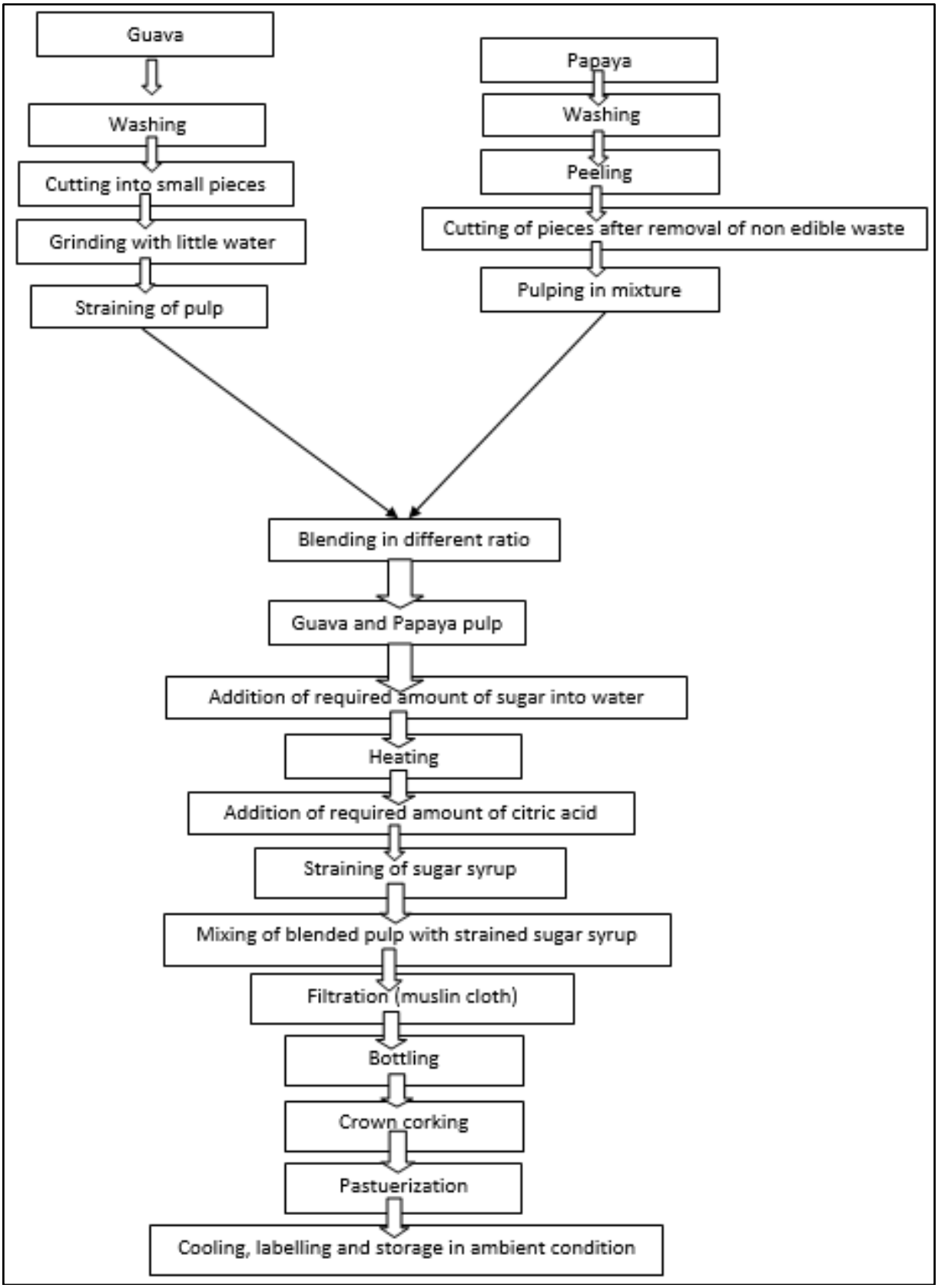
Preparation of blends of guava pulp and papaya pulp

Different ratios of guava and papaya pulp were made as per the recipe.

Recipes method of guava cheese

Fresh guava fruits were washed, cut into pieces and boil with equal quantity of water. Scum and pomace was removed by sieving and added sugar (700 g/Kg of pulp),butter (90 g/Kg of pulp), citric acid (2 g/Kg of pulp) and value additives (0.5 g,1.0 g and 1.5 g/Kg Ginger powder, Lemon grass extract and Ashwagandha powder) per Kg guava pulp cooked till, until mixture become sufficiently thick, and then after removed from fire when mixture starts

leaving side of the pan evenly distributed over butter coated tray and left for 3 hours to set cut into pieces, with a sharp knife pre packed with butter paper and then packed in polythene stored at ambient temperature.



Results and Discussion

The results of organoleptic parameters of the mixed fruit bar prepared using twelve different recipes are summarized below:

TSS (^{0}Brix): As per the results recorded from the present investigation, all treatments have slight differences in total soluble solid during storage for 120 days. The total soluble solid value of the guava and papaya cheese diminished gradually with an increase in storage. The highest total soluble solid value of 74.65, 75.25, 75.87, 76.57 and 77.25 was observed for the mixed fruit cheese with V1M3S3 (Local white fleshed guava variety + 50% guava +50%

papaya blending + Lemon grass) and minimum total soluble solid value of 67.76, 68.55, 69.13, 69.91 and 70.49 was observed for the mixed fruit cheese with V2M1S2 (Local red fleshed guava variety + 75% guava +25% papaya blending + Cardamom) at 0,30, 60, 90, and 120 days of storage Table 1. The perusal of data presented in Table 1 show an increasing trend in total soluble solids of guava-papaya cheese during 4 months storage. The increase in total soluble solids might be due to acid hydrolysis of insoluble polysaccharides especially gums and pectin, and its conversion into soluble sugars. Attri *et al*. (2014) [3] in papaya toffee and leather, and Chavan *et al*. (2016) [8] in papaya toffee also observed comparable increase in TSS of their products. An increase in total soluble solids content in fruit bar during storage period probably was due to loss of moisture content (Chavan and Shaikh. 2015) [7].

Total sugar: The total sugars content was observed up to six months of storage period thereafter, it increased (Table: 1) gradually during storage. The maximum total sugar value of 70.99, 71.78, 73.14, 74.03 and 75.06 was observed for the guava-papaya fruit cheese with V1M3S3 (Local white fleshed guava variety + 50% guava +50% papaya blending + Lemon grass) and minimum total sugar value of 62.97, 63.86, 65.22 and 66.12 and 67.14 was observed for the guava-papaya fruit cheese with V2M1S2 (Local red fleshed guava variety + 75% guava +25% papaya blending + Cardamom) at 0,30, 60, 90, and 120 days of storage. Both the evaporation of moisture during storage and the hydrolysis of polysaccharides like pectin, starch, etc. into simple sugars may be the cause of a rise in the total sugar content. Similar findings were reported in cheese and toffee of - guava blends (Reena., 2007) [16] and intermediate moisture guava slices (Harsimrat and Dhawan, 2002) [11].

Reducing sugar: The reducing sugar content was observed up to 4 months of storage period thereafter, it increased (Table: 2) gradually during storage. The maximum reducing sugar value of 34.90, 36.67, 37.98, 40.92 and 42.74 was observed for the guava-papaya fruit cheese with V1M3S3 (Local white fleshed guava variety + 50% guava +50% papaya blending + Lemon grass) and minimum reducing sugar value of 27.87, 29.64, 30.95, 33.92 and 35.75 was observed for the guava-papaya fruit cheese with V2M1S2 (Local red fleshed guava variety + 75% guava +25% papaya blending + Cardamom) at 0,30, 60, 90, and 120 days of storage. It could be caused by a high inversion of reducing carbohydrates from non-reducing sugars due to the high concentration of organic acid (citric acid). In order to stop reducing sugars from degrading and to avoid non-enzymatic browning, sulfur dioxide is thought to inhibit the carbonyl group of the reducing sugars engaged in the carbonyl amino process. Similar results were reported in dried chilli (Take, 2012) [18] and guava leather (Jain and Mandal, 2007) [12].

Ascorbic acid: The maximum ascorbic acid value of 231.17, 229.24, 227.20, 225.27 and 223.23 was observed for the guava-papaya fruit cheese with V1S2 M1 (Local white fleshed guava variety + 75% guava +25% papaya blending + Cardamom) and minimum ascorbic acid value of 110.50, 108.58, 107.37, 106.11 and 105.07 was observed for the guava-papaya fruit cheese with V2S1M3 (Local red fleshed guava variety + 100% guava blending + Lemon grass) at 0,30, 60, 90, and 120 days of storage (Table 2). During the course of four months of storage, the ascorbic acid level of guava-papaya cheese drastically dropped. The items' ascorbic acid level can decrease due to a number of circumstances, such as light, oxygen in the packaging, and temperature. Another possible cause might be the oxidation of ascorbic acid to dehydroascorbic acid. The variations in the raw material composition of the recipes may be the cause of the variations in ascorbic acid concentrations of blended cheese. Chavan *et al*. (2016) [8] in guava toffee and Anisa *et al*. (2016) [1] in peach-soy toffee reported similar grades of decrease in acidity.

Flavour: Terpenes, aldehydes, ketones, esters, and other volatile compounds are responsible for the scent. Aroma detection declines as a result of the depletion of these volatiles. As the amount of sugar increased, the mean panellist score for the flavor profile of mixed fruit cheese that was being stored showed a trend toward decline. It was also clear from the data presented in Table 3 that the higher guava percentage imparted more flavour to mixed fruit cheese therefore the highest value obtained 8.59, 7.91, 7.43, 6.08 and 5.39 was observed in treatments combination V1S1M2 (Local white fleshed guava variety + 100% guava + Ginger). Similar results were found by Jain and Nema (2007) [12] in guava leather. A decreasing pattern of flavour rating value observed during storage of products for 120 days. The result was in conformity with Baramanray *et al.* (1995) [5] as they reported that organoleptic quality like colour, flavour and taste of guava nector deteriorated with increase in storage time. Cherian and Cherian (2003) [9] also reported a little downfall in each sensory parameter in case of blended papaya leather.

Overall acceptability: The overall acceptability of mixed fruit cheese is dependent on colour, texture, flavour and taste rating of the product. The results obtained showed that highest score (8.15, 7.58, 6.72, 5.61, and 4.68) for overall acceptability of mixed fruit cheese was found in V1S1M2 (Local white fleshed variety + 100% guava + Ginger) combination up to 0 to 120 days of storage in Table 4. El-Mansy *et al.* (2005) [10] found the similar results and reported that nector consisting of 80% mango puree and 20% papaya puree with 17 °Brix and having a sensory score of 93.1 was found to be the best. Jain *et al.* (2011) [13] reported that blending of both pulps in different ratios, however, positively influenced sensory properties, which were found optimal at a ratio of 80% guava: 20% papaya. Cherian and Cherian (2003) [9] also reported that blended leather was superior in most of the quality parameters. Saravanan *et al.* (2004) [17] evaluated papaya jam and concluded that blending of fruit extracts improve the acceptability.

Table 1: TSS (°Brix) and quality of fruit cheese up to 120 days of storage

Treatment combination	TSS (°Brix)					Total sugar (%)				
	0 DAS	30 DAS	60 DAS	90 DAS	120 DAS	0 DAS	30 DAS	60 DAS	90 DAS	120 DAS
V1S1M1	70.14	72.03	71.85	72.37	73.01	65.61	66.57	68.10	68.99	70.05
V1S1M2	71.64	72.32	73.20	73.87	74.70	66.82	68.10	69.46	70.36	71.38
V1S1M3	73.73	74.39	75.08	75.93	76.64	69.03	69.96	71.40	72.30	73.33
V1S2M1	68.23	68.81	69.68	70.37	71.20	63.96	64.75	66.16	67.05	68.08
V1S2M2	69.69	70.46	71.08	71.71	72.65	65.69	66.97	68.33	69.22	70.25
V1S2M3	72.79	73.68	74.63	75.17	75.77	68.16	69.21	70.57	71.47	72.49
V1S3M1	70.99	71.90	72.40	73.15	73.66	65.95	66.84	68.20	69.09	70.12
V1S3M2	72.76	73.57	74.08	74.88	75.67	67.54	68.61	69.97	70.86	71.89
V1S3M3	74.65	75.25	75.87	76.57	77.25	70.99	71.78	73.14	74.03	75.06
V2S1M1	68.60	69.39	70.04	70.69	71.52	63.89	64.75	66.11	67.00	68.03
V2S1M2	70.14	70.67	71.40	72.13	72.94	64.89	66.13	67.49	68.39	69.42
V2S1M3	71.62	71.86	72.85	73.39	74.29	67.73	69.05	70.41	71.31	72.34
V2S2M1	67.76	68.55	69.13	69.91	70.49	62.97	63.86	65.22	66.12	67.14
V2S2M2	68.68	69.50	70.46	70.69	71.88	63.72	64.69	66.05	66.95	67.97
V2S2M3	72.67	73.27	73.42	74.50	75.11	68.11	69.01	70.37	71.26	72.29
V2S3M1	69.78	70.45	71.38	72.00	72.84	65.03	65.87	67.23	68.13	69.16
V2S3M2	72.72	73.28	73.95	74.43	75.60	67.92	68.81	70.17	71.07	72.09
V2S3M3	73.16	73.80	74.75	75.49	76.20	69.07	70.03	71.39	72.28	73.31
SEm±	0.489	0.384	0.301	0.205	0.322	0.412	0.494	0.514	0.545	0.607
CD at 5%	1.370	01.076	0.842	0.581	0901	1.154	1.383	1.440	1.525	1.700

Table 2: Reducing sugar (%) and Ascorbic acid (mg/100 gm) quality of fruit cheese up to 120 days of storage

Treatment combination	Reducing sugar (%)					Ascorbic acid (mg/100 gm)				
	0 DAS	30 DAS	60 DAS	90 DAS	120 DAS	0 DAS	30 DAS	60 DAS	90 DAS	120 DAS
V1S1M1	30.02	31.78	33.09	36.16	37.99	226.17	224.24	222.70	220.77	219.73
V1S1M2	30.76	32.53	33.84	37.08	38.90	185.17	183.24	181.20	179.27	178.23
V1S1M3	33.18	34.94	36.21	39.25	41.07	149.17	147.24	145.70	143.27	141.73
V1S2M1	28.59	30.36	31.45	34.34	36.17	231.17	229.24	227.20	225.27	223.23
V1S2M2	29.68	31.44	32.61	35.63	37.45	190.17	188.24	186.70	184.77	183.73
V1S2M3	32.17	33.94	35.25	38.29	40.11	155.17	153.24	151.70	149.77	149.40
V1S3M1	30.34	32.11	33.31	36.36	38.18	227.50	225.41	223.87	221.94	221.07
V1S3M2	31.41	33.18	34.29	37.30	39.12	189.50	187.24	185.70	183.77	182.90
V1S3M3	34.90	36.67	37.98	40.92	42.74	150.50	148.41	146.87	144.44	142.90
V2S1M1	28.40	30.17	31.26	34.32	36.14	186.50	184.91	183.87	181.94	180.40
V2S1M2	29.24	31.01	32.22	35.27	37.09	156.50	154.58	153.03	151.11	149.57
V2S1M3	31.83	33.59	34.90	37.97	39.79	110.50	108.58	107.37	106.11	105.07
V2S2M1	27.87	29.64	30.95	33.92	35.75	191.50	189.58	188.37	186.44	185.73
V2S2M2	27.95	29.71	31.02	34.02	35.84	160.50	158.58	157.37	155.44	153.90
V2S2M3	32.21	33.98	35.05	38.13	39.95	114.50	113.24	111.70	110.94	109.57
V2S3M1	28.90	30.66	31.97	34.92	36.74	191.50	189.91	188.37	186.44	184.90
V2S3M2	31.87	33.64	34.95	37.99	39.81	158.50	156.58	155.37	153.44	152.40
V2S3M3	31.93	33.70	35.01	37.96	39.78	113.50	111.24	109.70	108.44	107.73
SEm±	0.361	0.366	0.361	0.354	0.426	0.628	0.765	0.913	0.008	1.112
CD at 5%	1.067	1.025	1.010	1.074	1.193	1.760	2.141	2.558	0.023	3.115

Table 3: Sensory quality of fruit cheese after up to 120 days of storage

Treatment combination	Aroma					Overall acceptability				
	0 DAS	30 DAS	60 DAS	90 DAS	120 DAS	0 DAS	30 DAS	60 DAS	90 DAS	120 DAS
V1S1M1	7.57	6.69	6.04	5.35	4.45	7.80	7.26	6.46	5.24	4.58
V1S1M2	7.97	7.24	6.51	5.53	4.83	8.15	7.58	6.72	5.61	4.68
V1S1M3	8.29	7.56	6.56	5.79	4.98	7.63	7.17	6.42	5.34	4.56
V1S2M1	7.24	6.61	5.53	4.74	4.38	7.06	6.07	5.42	4.44	4.02
V1S2M2	8.30	7.67	6.44	5.80	5.11	7.62	6.86	6.12	5.05	4.41
V1S2M3	7.15	6.41	5.63	4.78	4.51	7.29	6.83	6.08	5.06	4.40
V1S3M1	6.34	6.02	5.13	4.43	4.11	7.65	6.78	5.96	4.91	4.58
V1S3M2	7.14	6.36	5.61	4.73	4.35	6.32	5.76	5.61	4.05	3.70
V1S3M3	7.49	6.82	5.86	5.32	4.58	7.92	7.09	6.32	5.56	4.73
V2S1M1	7.39	6.93	6.40	5.55	4.62	7.68	7.23	6.53	5.34	4.70
V2S1M2	7.44	6.86	6.15	5.53	4.81	7.69	7.18	6.39	5.55	4.50
V2S1M3	7.39	7.53	6.99	6.22	5.77	7.93	7.35	6.84	5.59	5.08
V2S2M1	5.54	5.18	4.59	3.89	3.48	6.08	5.59	4.84	4.37	3.59
V2S2M2	7.45	6.88	6.20	5.72	4.77	7.67	7.23	6.58	5.73	4.77
V2S2M3	6.70	6.12	5.51	4.81	4.11	7.39	7.05	6.38	5.32	4.45
V2S3M1	6.52	6.02	5.42	4.53	4.05	7.31	6.83	6.00	5.18	4.23
V2S3M2	6.57	6.16	5.68	5.07	4.10	7.16	6.83	6.14	5.20	4.24
V2S3M3	6.35	5.99	5.60	4.79	4.01	7.13	6.58	5.80	4.66	4.17
SEm±	0.186	0.183	0.2284	0.196	0.199	0.089	0.112	0.116	0.113	0.126
CD at 5%	0.522	0.511	0.796	0.550	0.556	0.248	0.315	0.226	0.316	0.252

Table 4: Acidity (%) and Flavor Sensory quality of fruit cheese up to 120 days of storage

Treatment combination	Acidity (%)					Flavor				
	0 DAS	30 DAS	60 DAS	90 DAS	120 DAS	0 DAS	30 DAS	60 DAS	90 DAS	120 DAS
V1S1M1	0.34	0.32	0.30	0.28	0.26	8.46	7.81	7.04	5.98	5.05
V1S1M2	0.30	0.28	0.26	0.24	0.22	8.59	7.91	7.43	6.08	5.39
V1S1M3	0.26	0.24	0.22	0.20	0.18	8.14	7.50	6.54	5.85	4.99
V1S2M1	0.41	0.39	0.37	0.35	0.33	6.33	5.63	4.83	4.32	3.92
V1S2M2	0.35	0.33	0.31	0.29	0.27	7.60	6.91	5.77	5.03	4.63
V1S2M3	0.31	0.29	0.27	0.25	0.23	7.65	7.07	6.28	5.40	4.71
V1S3M1	0.32	0.30	0.29	0.27	0.25	7.99	7.08	6.45	5.63	4.82
V1S3M2	0.28	0.26	0.24	0.23	0.21	6.55	6.09	5.70	4.90	4.24
V1S3M3	0.29	0.27	0.26	0.24	0.22	7.16	6.58	5.82	5.02	4.37
V2S1M1	0.35	0.33	0.32	0.30	0.28	6.89	6.33	5.50	4.89	4.25
V2S1M2	0.31	0.29	0.28	0.26	0.24	7.45	6.99	6.33	5.45	4.64
V2S1M3	0.28	0.26	0.24	0.23	0.21	7.46	7.00	6.46	5.71	4.83
V2S2M1	0.43	0.41	0.39	0.36	0.34	5.74	5.03	4.49	3.93	3.61
V2S2M2	0.35	0.33	0.31	0.28	0.26	7.66	7.06	6.45	5.48	4.96
V2S2M3	0.32	0.30	0.28	0.25	0.23	7.36	6.84	6.35	5.59	4.67
V2S3M1	0.33	0.31	0.29	0.26	0.24	7.14	6.60	6.00	5.21	4.56
V2S3M2	0.29	0.27	0.25	0.22	0.20	6.36	5.94	5.16	4.33	3.96
V2S3M3	0.29	0.27	0.25	0.22	0.20	7.46	7.03	6.38	5.41	5.03
SEm±	0.006	0.007	0.007	0.007	0.008	0.159	0.166	0.166	0.170	0.250
CD at 5%	0.017	0.018	1.019	0.020	0.023	0.446	0.465	0.466	0.475	0.699

Conclusion

The findings of the experiment pertaining to varying pulp levels utilized in the production of papaya guava fruit cheese shown that the product made using various replications remained suitable for storage for a duration of 120 days at room temperature. According to the chemical parameters, the papaya guava fruit cheese's TSS, acidity, reducing sugars, and total sugars increased while its moisture, calcium, β-carotene, and ascorbic acid content decreased after each treatment. The papaya guava fruit cheese made with 50% guava and 50% papaya pulp yielded notable results across the various pulp levels employed. The treatment (T_2) that had the greatest overall acceptance score following a 120-day storage trial. On the basis of organoleptic properties and chemical analysis of the papaya guava fruit cheese with 50% guava and 50% papaya pulp, Lemon grass, Local white fleshed guava variety was considered as the best in comparison to the other treatments.

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