



ISSN (E): 2277- 7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2021; 10(9): 1282-1285  
© 2021 TPI  
[www.thepharmajournal.com](http://www.thepharmajournal.com)  
Received: 12-07-2021  
Accepted: 18-08-2021

**S Alekya Naidu**  
M.Sc. Scholar, Department of  
Horticulture and Fruit Science,  
NAI, SHUATS, Prayagraj,  
Uttar Pradesh, India

**Dr. VM Prasad**  
Professor, Department of  
Horticulture, NAI, SHUATS,  
Prayagraj, Uttar Pradesh, India

**Vijay Bahadur**  
Associate Professor, Department  
of Horticulture, NAI, SHUATS,  
Prayagraj, Uttar Pradesh, India

**M Kamala Priya**  
M.Sc. Scholar, Department of  
Horticulture and Fruit Science,  
NAI, SHUATS, Prayagraj,  
Uttar Pradesh, India

## Studies on Preparation of value added pineapple cheese blended with guava (*Ananas comosus* - *Psidium guajava*)

**S Alekya Naidu, Dr. VM Prasad, Vijay Bahadur and M Kamala Priya**

### Abstract

The present investigation was carried out during Nov 2020 to Feb 2021 in Post-Harvest Laboratory of Department of Horticulture, SHUATS, and Prayagraj. The experiment was conducted in Completely Randomized Design (CRD), with six treatments and three replications. The Physio-chemical parameters viz., T.SS, Acidity, Ascorbic acid, reducing and non-reducing sugars, Total sugars as well as organoleptic attributes viz., Flavor, texture, color and overall acceptability of Pineapple cheese were evaluated at an interval of 0 days up to 45 days of storage. An overall result of pineapple cheese was found better in the treatment T<sub>2</sub> (60% Pineapple pulp + 40% Guava pulp) proved to be best in terms of overall acceptability, economic return on value addition of pineapple cheese blended with guava at room temperature.

**Keywords:** Pineapple, guava, pulp, value added cheese, T.S S, overall acceptability, storage

### Introduction

Pineapple (*Ananas comosus*), is an important fruit crop in India and belongs to the family Bromeliaceae. Pineapple is believed to have been originated in Brazil and it was spread to other tropical parts of the world. The cultivation of pineapple is confined to high rainfall and humid coastal regions in the peninsular India and hilly areas of North Eastern region of the country. At present, pineapple is commercially grown in Assam, Meghalaya, Tripura, Mizoram, West Bengal, Kerala, Karnataka and Goa. Bromelian enzyme is Present in all parts of the pineapple plant

Guava (*Psidium guajava* Linn.) is an arbore scent shrub or a small tree. It belongs to the family *Myrtaceae* and is one of the most gregarious of fruit trees. The somatic chromosome number is diploid  $2n=22$ . The place of origin of the guava is believed to be an area extending from the Southern part of Mexico up to the Central part of America. It has been disseminated by man, birds and other animals to all warm areas of tropical America and the West Indies Source: (United States Department of Agriculture [USDA], 2004).

Value-added food products are raw or pre-processed commodities whose value has been increased through the addition of ingredients or processes that make them more nutritive and attractive to the buyer and more readily usable by the consumer. It is a production strategy driven by customer needs and perceptions. Pineapple and Guava fruits may be utilized to make products like jam, jelly, cheese, juice. Canned segment, nectar, RTS beverage dehydrated slice, flakes, Toffee, sauce and guava lather, baby food puree, etc. Fruit cheese is an important product of commerce in all fruit growing areas of India. The main objective of fruits processing is to supply wholesome safe, nutritious and acceptable food to consume throughout the year and the main objectives of post-harvest studies are reduction of fruit losses, imports of produce and generation of Urban and Rural employment.

### Materials and Methods

The details of the various materials used and methods adopted in laid out the experiment are given below:

The Experimental work of “Studies on preparation and evaluation of Pineapple- Guava cheese” was conducted in the Post-Harvest Laboratory of Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during the year 2020-2021. The value added Pineapple - Guava blended cheese prepared has 6 treatments with 3 replications and stored for 45 days under ambient temperature.

**Corresponding Author:**  
**S Alekya Naidu**  
M.Sc. Scholar, Department of  
Horticulture and Fruit Science,  
NAI, SHUATS, Prayagraj,  
Uttar Pradesh, India

**Table 1:** Treatment details

Treatment Symbol	Treatment Combination
T0	100% Pineapple Pulp
T1	80% Pineapple Pulp + 20% Guava Pulp
T2	60% Pineapple Pulp + 40% Guava Pulp
T3	40% Pineapple Pulp + 60% Guava Pulp
T4	20% Pineapple Pulp + 80% Guava Pulp
T5	100% Guava Pulp

### Method of preparation

Select firmly ripe Pineapple and Guava fruits wash with clean water and then cut into pieces. After that boil it with 500ml of water/kg of Pineapple and 300ml of water /kg of guava, till the pieces becomes soft then, either sieve in a muslin cloth or in a pulping machine to remove seeds and skin to make a fine pulp. Take each 500g of Pineapple and Guava pulp and cook it for 5-10min after that add sugar and butter to the pulp again cook it for 10min then add citric acid after that judge the end point. Evenly distributed the mixture over butter coated tray and left it for 3 hours to set. After that packed in a polythene bag and stored at ambient temperature.

### Statistical analysis

The design of the experiment Completely Randomized Design (CRD) was followed. The impact of storage and physio-chemical parameters were analyzed during the storage of Pineapple – guava blended cheese.

### Results and Discussions

#### TSS

The TSS (Total Soluble Solids) showed that there were significant differences among all the treatments during storage. There was subsequent increase in TSS content at different periods of storage. The maximum score of TSS (76.16, 76.22, 76.36, 76.42) at Initial, 15 days, 30 days and 45 days respectively was observed in treatment T5 (Guava 50%), followed by treatment T4 (Pineapple Pulp 20% + Guava pulp 80%) with (75.16, 75.22, 75.36 and 75.42) whereas the minimum score was observed in treatment T0 (Pineapple pulp 100%) with (70.15, 70.22, 73.45 and 70.42) during 45days storage.

#### Acidity

The Acidity (%) showed that there were significant differences among all the treatments during storage. There was subsequent increase in Acidity content at different periods of storage. The maximum score of Acidity (0.88, 0.89, 0.65 and 0.67) at Initial, 15, 30 and 45 days respectively was observed in treatment T0 (Pineapple pulp100%), followed by treatment T1 (Pineapple Pulp 60% +Guava pulp 40%) with (0.58, 0.60, 0.90 and 0.93) whereas the minimum score was observed in treatment T4 (Pineapple pulp 20% + Guava pulp 80%) with (0.48, 0.45, 0.47 and 0.49) during 45 days storage.

#### PH

The pH showed that there were significant differences among all the treatments during storage. There was subsequent

decrease in pH content at different periods of storage. The maximum score of pH (4.55, 4.59, 4.72 and 4.85) at Initial, 15, 30 and 45 days respectively was observed in treatment T4 (Pineapple pulp 20% + Guava Pulp 80%), followed by treatment T5 (Guava Pulp 100%) with (4.52, 4.60, 4.71 and 4.79) whereas the minimum score was observed in treatment T0 (Pineapple pulp 100%) with (3.43, 3.58, 3.67 and 3.79) during 45 days storage.

#### Ascorbic acid

The Ascorbic acid showed that there were significant differences among all the treatments during storage. There was subsequent decrease in Ascorbic acid content at different periods of storage. The highest score of Ascorbic acid (116.81, 114.54, 109.21 and 106.95 mg/100g) at Initial, 15, 30, and 45 days respectively was observed in treatment T5 (Guava pulp 100%), followed by treatment T4 (Pineapple pulp 20% + Guava pulp 80%) with (114.70, 111.41, 106.82 and 100.75 mg/100 g) whereas the minimum score was observed in treatment T0 (Pineapple pulp 100%) with (33.22, 29.54, 23.94 and 19.32 mg/100 g) during 45 days storage.

#### Reducing sugar

The Reducing Sugar showed that there were significant differences among all the treatments during storage. There was subsequent increase in Reducing Sugar content at different periods of storage. The highest score of Reducing Sugar (3.72, 3.86, 3.92, and 4.04%) at Initial, 15, 30 and 45 days respectively was observed in treatment T4 (Pineapple pulp 20% + Guava pulp 80%), followed by treatment with (3.73, 3.84, 3.93 and 4.02%) whereas the minimum score was observed in treatment T0 (Pineapple pulp 100%) with (2.42, 2.52, 2.62 and 2.72%) during 45 days storage.

#### Non-reducing sugar

The non-reducing sugar showed that there were significant differences among all the treatments during storage. There was subsequent increase in non-reducing sugar content at different periods of storage. The highest score of non-reducing sugar (5.73, 5.76, 5.83, and 5.96%) at Initial, 15, 30 and 60 days respectively was observed in treatment T2 (Pineapple pulp 60% + Guava pulp 40%), followed by treatment T1 (Pineapple pulp 80% + Guava pulp 20%) with (5.62, 5.68, 5.73 and 5.76%) whereas the minimum score was observed in treatment T5 (Guava pulp 100%) with (4.72, 4.79, 4.82 and 4.89%) during 45 days storage.

#### Total sugar

The total sugar showed that there were significant differences among all the treatments during storage. There was subsequent increase in total sugar content at different periods of storage. The maximum score of total sugar (9.02, 9.12, 9.22 and 9.26) at Initial, 15, 30 and 45 days respectively was observed in treatment T2 (Pineapple pulp 60% + Guava pulp 40%) followed by treatment T1 (Pineapple Pulp 80% + Guava pulp 20%) with (8.92, 8.81, 8.71 and 8.78) whereas the minimum score was observed in treatment T5 (Guava pulp 100%) with (7.82, 7.92, 8.02 and 8.04) during 45 days storage.

**Table 2:** Effect of different treatments of value addition of Pineapple cheese on physio-chemical changes during different storage period.

Treatment details	Days	TSS	Ascorbic acid	Acidity	P.H	Reducing sugars	Non-reducing sugars	Total sugars
T <sub>0</sub>	0	70.15	33.22	0.88	3.43	2.43	5.52	7.92
	15	70.24	29.59	0.89	3.58	2.52	5.57	8.02
	30	70.46	23.94	0.90	3.67	2.62	5.62	8.12
	45	70.45	19.32	0.93	3.79	2.72	5.77	8.16
T <sub>1</sub>	0	72.63	50.32	0.66	4.53	2.72	5.62	8.91
	15	72.73	47.74	0.68	4.56	2.78	5.68	8.51
	30	72.94	42.84	0.70	4.69	2.91	5.73	8.71
	45	73.01	37.82	0.72	4.47	2.99	5.76	8.70
T <sub>2</sub>	0	73.95	70.84	0.52	4.20	3.11	5.74	9.02
	15	74.13	66.62	0.54	4.29	3.19	5.76	9.12
	30	74.35	60.20	0.56	4.42	3.31	5.83	9.22
	45	74.66	56.40	0.58	4.32	3.40	5.96	9.26
T <sub>3</sub>	0	74.26	92.74	0.43	4.26	3.29	4.86	7.64
	15	72.42	88.38	0.52	4.27	3.40	4.89	7.72
	30	74.68	82.56	0.54	4.36	3.51	4.93	7.82
	45	74.86	78.96	0.56	4.60	3.59	4.96	7.91
T <sub>4</sub>	0	75.16	114.70	0.50	4.55	3.72	5.46	7.70
	15	75.22	112.41	0.46	4.59	3.86	5.10	7.81
	30	75.36	106.82	0.45	4.72	3.92	5.56	7.90
	45	75.42	100.75	0.49	4.85	4.04	5.61	8.57
T <sub>5</sub>	0	76.16	116.81	0.44	4.52	3.63	4.72	7.32
	15	76.22	114.54	0.46	4.60	3.70	4.79	7.92
	30	76.36	109.21	0.48	4.71	3.80	4.83	8.52
	45	76.42	106.95	0.50	4.79	3.90	4.89	8.04

### Organoleptic parameters

#### Color

The color showed that there were significant differences among all the treatments during storage. There was subsequent decrease in color at different periods of storage. The maximum score of color (8.52, 8.40, 8.34 and 8.20) at Initial, 15, 30 and 45 days respectively was observed in treatment T<sub>2</sub> (Pineapple pulp 60% + Guava pulp 40%), followed by treatment T<sub>1</sub> (Pineapple pulp 80% + Guava pulp 40%) with (8.46, 8.37, 8.32, and 8.19) whereas the minimum score was observed in treatment T<sub>0</sub> (Guava pulp 100%) with (6.85, 6.59, 6.39 and 6.32) during 45 days storage.

#### Flavor

The flavor and taste showed that there were significant differences among all the treatments during storage. There was subsequent decrease in taste and flavor at different periods of storage. The highest score of taste and flavor (8.45, 8.35, 8.20 and 8.10) at Initial, 15,30 and 45 days respectively was observed in treatment T<sub>2</sub> (Pineapple pulp 60% + Guava pulp 60%) followed by treatment T<sub>1</sub> (Pineapple pulp 80% + Guava pulp 20%) with (8.21, 8.13, 8.02 and 7.96) whereas the minimum score was observed in treatment T<sub>3</sub> (Pineapple pulp 40% + Guava pulp 60%) with (6.88, 6.78, 6.68 and 6.53) during 45 days storage.

#### Texture

The texture showed that there were significant differences among all the treatments during storage. There was subsequent decrease in texture at different periods of storage. The highest score of texture (8.60, 8.46, 8.32 and 8.10) at Initial, 15, 30 and 45 days respectively was observed in treatment T<sub>2</sub> (Pineapple pulp 60% + Guava pulp 40%), followed by treatment T<sub>1</sub> (Pineapple pulp 80% + Guava pulp 20%) with (8.29, 8.32, 8.22 and 8.04) whereas the minimum score was observed in treatment T<sub>0</sub> (Pineapple pulp 100%) with (6.96, 6.72, 6.52 and 6.32) during 45 days storage.

### Overall acceptability

The overall acceptability showed that there were significant differences among all the treatments during storage. There was subsequent decrease in overall acceptability at different periods of storage. The highest score of overall acceptability (8.63, 8.53, 8.42, 8.22) at Initial, 15, 30 and 45 days respectively was observed in treatment T<sub>2</sub> (Pineapple 60% + Guava pulp 40%), followed by treatment T<sub>1</sub> (Pineapple 80% + Guava pulp 20%) with (8.41, 8.33, 8.13 and 8.00) whereas the minimum score was observed in treatment T<sub>0</sub> (Pineapple pulp 100%) with (6.61, 6.75, 6.51 and 6.45) during 45 days storage.

### Conclusion

In present investigation efforts were made to develop Pineapple Cheese blended guava with various proportions. Based on findings it is concluded that treatment T<sub>2</sub> (60% Pineapple pulp + 40% Guava Pulp) was found superior in respect of the parameters like pH, Ascorbic acid, Reducing Sugar, Non Reducing Sugar, Total Sugar. With respectively Color and Appearance, Flavor and Taste, Texture and Overall Acceptability also T<sub>2</sub> was found best. In terms of cost benefit ratio the highest net return, Cost Benefit Ratio was found in T<sub>2</sub> (60% Pineapple pulp +40% Guava pulp).

### Future Scope

The value added fruit cheese market in India exhibited strong growth during 2015-2020. Fruit cheese has recently become very popular. It is a confection of the type of Karachi halwa and is prepared from fruits like Guava, Apple, Pear and Plum. Fruit cheeses have a long shelf life (Srivastava and Kumar, 2007). Fruit cheese contains a minimum 68% T.S.S. and 45% prepared fruit in final product, (F.P.O Specification). Fruit cheese are made from a stiff fruit puree. This is a good way of preserving fruit which has a lot of pips or stones. They use a larger portion of sugar to puree than fruit butters. Fruit cheeses can be turned out in one piece and cut with knife in

place of cheese or, cut into small pieces, as a sweetmeat. India is currently the world's largest producer of milk owing to which the cheese market holds significant growth potential. Although fruit cheese is extensively used in fast food items like pasta, pizzas, burgers, sandwiches, wraps, tacos, cakes, garlic bread, etc., These factors are anticipated to boost the consumption of cheese in the upcoming years.

#### Acknowledgement

The author conveys their thanks to the staff of Horticulture department Sam Higginbottom University of Agriculture, Technology & Sciences, Prayagraj (Uttar Pradesh) India for their colossal assistance, without which the trial would not have been successful.

#### Conflict of Interest

As a corresponding Author, I Alekya Naidu, confirm that none of the others have any conflicts of interest associated with this publication.

#### References

- Ahmad MA, Singh DB, Rather JA, Malik SH, Iqbal MN. Study of cheese prepared from five different varieties of apple. International seminar on recent trends in Hi-tech Horticulture and post-harvest technology. Organized by C.S.A. University of Agriculture. & Tech, Kanpur 2004;9(48):284.
- Adhau GW, Salvia VM. Formation and quality acceptable properties of Guava Cheese. International Journal of Advanced Research 2014;2(11):665-669.
- Awad RA, El-Shabrawy SA, Osman SG, Sad SA. Study on chemical composition of flavored processed cheese spreads with different fruit flavors. Egyptian Journal. Dairy Science 2003;31(2):335-344.
- Anupa T, Jaganath S, Girisha R, Mallikarjuna AP. Studies on qualitative characteristics in different genotypes of Apple Color guava. International Journal Agriculture, Environment and Biotechnology 2012;5(2):109-112.
- Bram MG, Barrie N. Processing and quality evaluation of Banana cheese. Journal Food Science and Technology. 2002;39(5):537-541.
- Chadha KL. Strategy for optimization and utilization of sapota. Indian Journal of Horticulture 1992;49(1):1-7.
- Chadha KL. Handbook of horticulture. ICAR publication, new crops. Director of horticulture, Gandhinagar, Gujarat 2001;1(10):308.
- Chen W, Zhang F. The formed and physiological changes of guava fruit juice during post-harvest storage. Plant Physiology, Communications 2001;37(1):25-26.
- Deka BC, Sethi V. Preparation of mixed fruit juice spiced RTS beverages. Indian Food Packer 2001;42(3):58-61.
- Dauda HA, Sadiu FU. Effects of storage conditions on ascorbic acid content of guava (*Psidium guajava* L.). International Journal of Applied Research and Technology 2013;2(6):68-73.
- Deepika PP, Marak DS, Thakur PK. Effect of packaging on quality of enriched fruit bars from anola (*Embilica officinalis*) during storage. International Journal of Agriculture, Environment and Biotechnology 2016;9(3):411-419.
- Hulme AC, Narain R. The ferricyanide method for determination of reducing sugars. A modification of Hag Edom-Jensen-Hanes technique. Biochemistry Journal. 1931;25:10511061.
- Hemalatha R, Anbuselvi S. Physicochemical constituents of pineapple pulp and waste. Journal of Chemistry and Pharmacy Research 2013;5(2):240-242.
- Jain PK, Asati VK. Evaluation of guava cultivars for pulp preparation. Journal of Food Science and Technology. 2004;41:684-86.
- Joseph B, Mini PR. Review on nutritional, medicinal and pharmacological properties of guava (*Psidium guajava* L.). International Journal of Pharma and Bio Sciences 2011;2(1):53-69.
- Kumar H, Katiyar SK, Rakha R, Java A, Singh K. Studies on physicochemical and quality materials in fruits of Guava (*Psidium guajava* L.) Pomace International Research Journal of Advanced Engineering and Science 2018;4(1):28-29.
- NHB. National Horticulture Board data base. <http://nhb.gov.in/estimates.xls>. 2019.
- Panse VG, Sukhatme PV. Statistical methods for agriculture workers. ICAR, New Delhi 1967.
- Patel P, Ellis K, Sunkara R, Shackelford L, Ogutu S, Walker LT *et al.* Development of a functional food product using Guavas. Journal of Food and Nutrition. 2016;7:927-937.
- Ranganna S. Manual of analysis of fruits and vegetable products, Tata McGraw Hill publishing Co., Ltd., New Delhi 1995;1:13.
- Singh KD, Verma OP. The effect of cultivars, seasons and storage on the nutritive value and keeping quality of guava cheese. Indian Food Packer 1983, 71-77.
- Sinha M, Mishra S. Effect of value addition on guava cheese with medicinal herbs under ambient storage condition (*Psidium guajava* L.) cv. Allahabad Safeda International Journal Pure and Applied Bioscience. 2017;5(3):559-566.
- Mahajan RN, Taur AT, Sawate AR, Kshrisagar RB. Studies on preparation of low calorie high protein pineapple bar. Beverage and food world 2011, 58-62.
- Mehto A. Identification of suitable variety of guava for preparation of nutritious cheese. International Journal of Home Science 2016;2(3):420-423.
- Mehta A, Macho PK. Guava cheese preparation to reduce the perishable loss of fruits and influence of the chemical composition during storage of cheese. International Journal of Food Sciences and Nutrition 2017;2(1):1-3. Sciences. 7: 927-937.
- Vohra JD, Mankame G, Madav P. Biochemical and nutritional assessment of guava (*Psidium guajava*). IOSR Journal of Biotechnology and Biochemistry 2018;4(5):1-7.
- Yadav SK. Studies on quality of guava products (Squash, RTS and Jam) from preserved pulp (3 Months). International Journal of Food Science and Nutrition 2019;4(6):77-79.