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VS Bijane
Department of Fruit Science,
College of Horticulture, Dr.
PDKV, Akola, Maharashtra,
India

PS Joshi
Horticulture Section, College of
Agriculture, Dr. PDKV, Akola,
Maharashtra, India

SR Dalal
Horticulture Section, College of
Agriculture, Dr. PDKV, Akola
Maharashtra, India

CA Shingnare
Government Vidarbha Institute of
Science and Humanities,
Amravati, Maharashtra, India

Studies on quality and organoleptic evaluation of guava syrup

VS Bijane, PS Joshi, SR Dalal and CA Shingnare

Abstract

An investigation on “Studies on quality and organoleptic evaluation of guava syrup” was conducted at the Post-Harvest Technology Laboratory, Section of Horticulture, College of Agriculture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth Akola during the year 2021 with the objectives to study the different levels of pulp and acidity on ascorbic acid and sensory qualities during storage and to find out suitable combination of pulp and acidity for better organoleptic quality of guava syrup. The experiment was laid out in Factorial Completely Randomized Design with three replications and twelve treatments. Different levels of guava pulp (20, 25, 30 and 35%) and acidity levels (1.0, 1.5 and 2.0%) were tried to standardize proper combination for the development of guava syrup. The guava syrup was filled in 200 ml pre-sterilized plastic bottles and stored at ambient storage condition. From the findings it was noticed that, there was decrease in ascorbic acid. The guava syrup prepared with using 30 per cent pulp and 2.0 per cent acidity found to be best among all other treatments in ascorbic acid. The guava syrup prepared with using 30 per cent pulp maintaining 2.0 per cent acidity when stored at ambient storage condition remain better without spoilage up to 120 days. Similarly the guava syrup prepared with 30 per cent pulp and 2.0 per cent acidity and stored at ambient condition secured the highest score for colour, taste, flavour and overall acceptability as compared to all over treatments at 120 days of ambient storage.

Keywords: Guava, pulp, organoleptic score, ambient storage

1. Introduction

Guava (*Psidium guajava* L.) belongs to family Myrtaceae is one of the important fruit crop of tropical and subtropical region of India. It is a hardy crop and can be grown satisfactorily on marginal soil with minimum care. It is popularly known as ‘Apple of Tropics’ claims to be the fourth most important fruit in area and production after mango, banana and citrus.

Hundred gram of guava pulp is rich source of vit-C (75-260 mg) and pectin (0.5-1.8%). Fruit contain moisture (77.9-86.9%), dry matter (12.3-26.3%), ash (0.5-1.02%), crude fat (0.10-0.70), crude protein (0.82-1.45%) and crude fiber (2-7.2%). Fructose (59%), glucose (36%), and sucrose (5%) are predominant sugars in ripe guava. Guava is also a fair source of vit-A, iron, calcium and phosphorus. It processed into variety of products such as jam, jelly, cheese, toffee, squash, syrup, wine, dried fruit and canned slices. The greatest commercial use is for jelly preparation (Adsule and Kadam 1995) [1].

The main constituents of guava are vitamins, tannins, phenolic compounds, flavonoids, essential oils, sesquiterpene alcohols and triterpenoid acids. These and other compounds are related to many health effects of guava (Haida *et al.* 2011) [4]. Guavas are an excellent source of dietary fiber. Therefore, guava processed food products like guava syrup, juice, RTS, beverages are plays important role to immunity booster. Keeping all these views into consideration, the experiment was undertaken “Studies on quality and organoleptic evaluation of guava syrup”.

2. Material and Methods

The present investigation was carried out at Horticulture Section, College of Agriculture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. Fully ripened guavas of variety L-49 were brought from Main Garden, Department of Horticulture. Dr. P. D. K. V., Akola during the month of January 2021. The selected well matured, fresh guava fruits were washed thoroughly with water. The fruits were cut into four halves with knife and deseeding. After this, fruits were cut into small pieces and fed it into mixer for mashing into fine texture using the little amount of water. Thus, extracted pulp was used for preparation of guava syrup with following recipe.

Corresponding Author:
VS Bijane
Department of Fruit Science,
College of Horticulture, Dr.
PDKV, Akola, Maharashtra,
India

Guava pulp	:	As per treatment
Citric acid to maintain acidity	:	As per treatment
Potassium metabisulphite (KMS)	:	300 ppm
Sugar	:	As per treatment

The experiment was conducted in Factorial Completely Randomized Design (FCRD) comprised four levels of pulp (20, 25, 30 and 35%) and three levels of acidity (1.0, 1.5 and 2.0%) and replicated thrice.

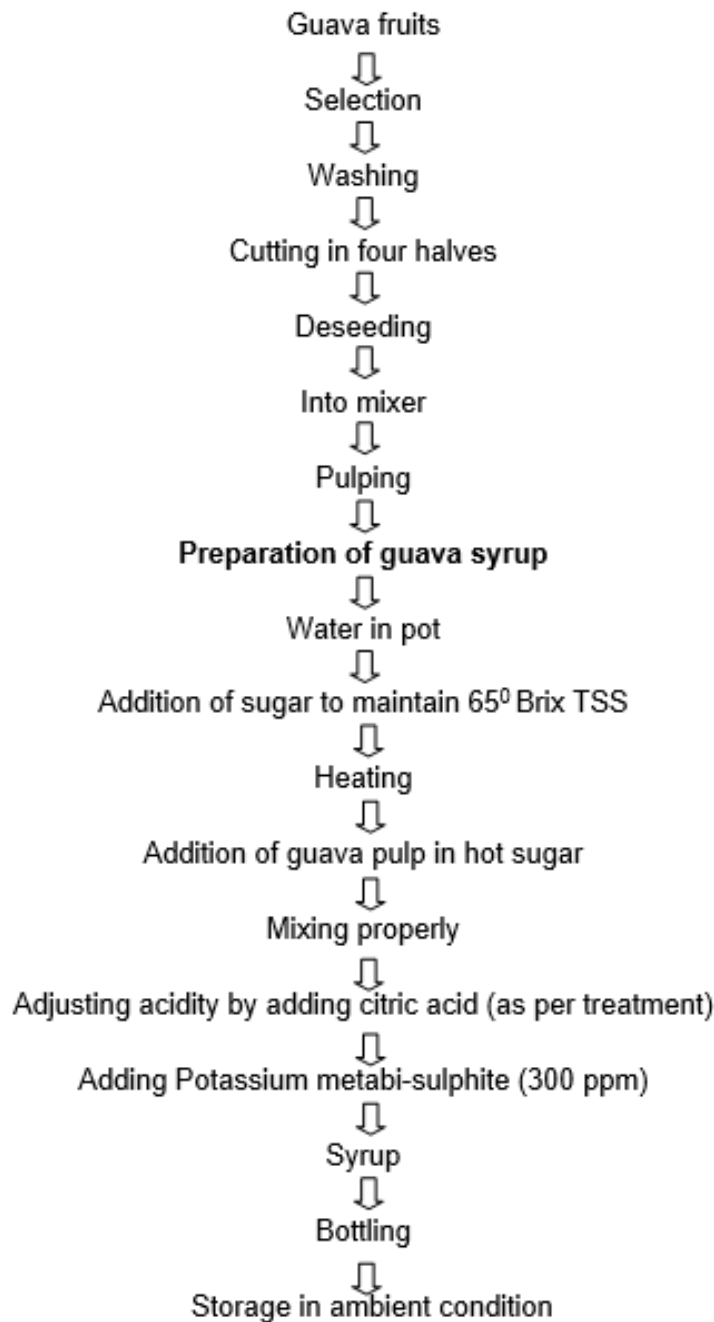
Guava syrup was filled into the pre-sterilized plastic bottles of 200 ml capacity and sealed air tight using caps. Then the product will be pasteurized, cooled immediately and be stored as per treatment for further observations.

Guava syrup prepared as per treatments was filled in 200 ml bottles and stored at ambient storage condition. The prepared

guava syrup was analyzed for ascorbic acid and sensory qualities fresh syrup and 120 days of storage. The observation on ascorbic acid, colour, taste, flavour and overall acceptability were recorded fresh syrup and 120th day of storage. Ascorbic acid content was estimated by using 2, 6-dichlorophenol indophenols dye as reported by Ranganna (1986) [10]. Guava syrup was evaluated for sensory qualities viz. colour, taste, flavour and overall acceptability each attribute was given a separate score of 9 point hedonic scale according to the method reported by Amerine *et al.*, (1965) [2].

Hedonic scale

Like extremely – 9	Like slightly – 6	Dislike moderately – 3
Like very much – 8	Neither like nor dislike – 5	Dislike very much – 2
Like moderately – 7	Dislike slightly – 4	Dislike extremely – 1



Flow sheet for preparation of guava syrup

3. Result and Discussion

3.1 Ascorbic acid (mg/100 ml syrup)

The data in Table 1 exhibited significant differences in

ascorbic acid content of guava syrup due to pulp and acidity at fresh syrup and 120th day of storage.

3.1.1 Effect of pulp: In general, the ascorbic acid of guava syrup decreased in all pulp levels. Significantly minimum decrease (41.04 mg/ 100 ml syrup) i.e. from 158.11 to 117.07 mg/100 ml syrup in ascorbic acid during 120 days of storage was observed in treatment P₃ (30% guava pulp). However, more decrease (46.38 mg/100 ml syrup) i.e. from 132.45 to 86.38 mg/100 ml syrup was significantly found in treatment P₁ (20% guava pulp).

3.1.2 Effect of acidity: In general, the ascorbic acid of guava syrup decreased in all acidity levels. Significantly minimum decrease in ascorbic acid (44.21 mg/100 ml) of guava syrup i.e. from 148.13 to 104.01 mg/100 ml) in ascorbic acid was recorded in treatment A₃ (2.0% acidity). However, significantly maximum decrease (44.53 mg/100 ml) of guava syrup i.e. from 147.63 to 103.10 mg/100 ml syrup in ascorbic acid was recorded in treatment A₁ (1.0% acidity).

3.1.3 Interaction effect: The data presented in Table 2 exhibited significant differences in ascorbic acid of guava

syrup at fresh syrup and 120 days. In general, the ascorbic acid of guava syrup decreased in all pulp and acidity levels. During storage period, significantly minimum decrease (41.03 mg/100 ml) i.e. from 158.24 to 117.21 mg/100 ml of guava syrup in ascorbic acid was recorded in treatment combination P₃A₃ (30% pulp and 2.0% acidity). However, significantly maximum decrease (46.79 mg/100 ml) i.e. from 132.03 to 85.24 mg/100 ml of guava syrup in ascorbic acid was noticed in treatment combination P₁A₁ (20% pulp and 1.0% acidity). Ascorbic acid content of guava syrup was depend on pulp used. Therefore, the storage period inspite of degradation of ascorbic acid, higher concentration of ascorbic acid was found in the treatment with maximum pulp content. (Reddy and Chikkasubbanna, 2008) [11]. Mohire *et al.* (2016) [7] noticed decreasing trend in the ascorbic acid during storage period of 90 days in karonda syrup. Similar results were also reported by Hamid *et al.* (2017) [5] in mulberry syrup under ambient and refrigerated conditions and Kadge *et al.* (2020) [6] in lime blended bael syrup.

Table 1: Change in ascorbic acid (mg/100 ml syrup) of guava syrup during storage due to pulp and acidity

Treatments	Ascorbic acid (mg/100 ml juice)		
	Storage period (Days)		
	Fresh syrup	120 th day	Decrease in ascorbic acid (mg/100 ml syrup)
Pulp levels			
P ₁ - 20% Guava pulp	132.45	86.07	46.38
P ₂ - 25% Guava pulp	140.52	94.95	45.57
P ₃ - 30% Guava pulp	158.11	117.07	41.04
P ₄ - 35% Guava pulp	160.34	116.09	44.25
F test	Sig	Sig	Sig
SE(m)±	0.007	0.010	0.007
CD at 5%	0.021	0.030	0.021
Acidity levels			
A ₁ - 1.0% acidity	147.63	103.10	44.53
A ₂ - 1.5% acidity	147.81	103.52	44.29
A ₃ - 2.0% acidity	148.13	104.01	44.21
F test	Sig	Sig	Sig
SE(m)±	0.006	0.009	0.006
CD at 5%	0.018	0.026	0.018

3.2 Colour score

The data in respect of colour of guava syrup as influenced by different combination of pulp and acidity at ambient storage condition was recorded up to 120 days of storage and presented in Table 2. The data exhibited that, the colour score of guava syrup was decreased during storage period (0 to 120 days). Minimum decrease in colour score (0.19) i.e. from 8.98 to 8.79 was noticed in treatment combination P₃A₃ (30% pulp and 2.0% acidity) which was ranked 'Like Extremely' (8.79) at 120 days of storage period. However, decrease in colour score was found to be maximum (0.46) i.e. from 8.23 to 7.77 in treatment combination P₁A₁ (20% pulp and 1.0% acidity) from initial to 120 days of storage period.

The decrease in colour in guava syrup during storage can be attributed to catalytic effect of light on deteriorative changes as the bottles were transparent. Similar results were observed by Ghorai and khurdiya (1998) [3], Prasad and Mali (2000) [9] and Kadge *et al.*, (2020) [6].

3.3 Taste score

The data in respect of taste of guava syrup as influenced by different combinations of pulp and acidity at ambient storage condition was recorded upto 120 days of storage and presented in Table 3. The data exhibited that, the colour score

of guava syrup was decreased during storage period (0 to 120 days). Minimum decrease in taste score (0.20) i.e. from 8.86 to 8.66 was recorded in treatment combination P₃A₃ (30% pulp and 2.0% acidity) which was ranked 'Like Extremely' (8.66). However, maximum change in taste score (0.39) i.e. from 8.18 to 7.79 was observed in treatment combination P₁A₁ (20 % pulp and 1.0 % acidity) from fresh syrup to storage of 120 days.

The decrease in taste score of guava syrup during storage might be due to many factors which affects storage stability of products and temperature play important role among them. Similar results were observed by Pattar *et al.* (2013) [8] and Kadge *et al.* (2020) [6].

3.4 Flavour Score

The data in respect of flavour of guava syrup as influenced by different combinations of pulp and acidity at ambient storage condition was recorded upto 120 days of storage and presented in Table 3. The data exhibited that, the flavour score of guava syrup was decreased during storage period (0 to 120 days). Minimum decrease in flavour score (0.16) i.e. from 8.82 to 8.66 was recorded in treatment combination P₃A₃ (30 % pulp and 2.0% acidity). However, Maximum decrease in flavour score (0.41) i.e. from 8.17 to 7.76 was observed in

treatment combination P₁A₁ (20% pulp and 1.0% acidity). Similar results were observed by Prasad and Mali (2000) [9],

Mohire *et al.* (2016) [7] and Kadge *et al.* (2020) [6].

Table 2: Interaction effects of pulp and acidity on ascorbic acid content and colour scores of guava syrup

Treatments	Ascorbic acid (mg/100 ml syrup)			Colour score		
	Storage period (Days)			Storage period (Days)		
	Fresh syrup	120 th day	Decrease in ascorbic acid (mg/100 ml juice)	Fresh syrup	120 th day	Decrease in colour score
P ₁ A ₁ - 20% Guava pulp + 1.0% acidity	132.03	85.24	46.79	8.23	7.77	0.46
P ₁ A ₂ - 20% Guava pulp + 1.5% acidity	132.24	85.98	46.26	8.55	8.10	0.45
P ₁ A ₃ - 20% Guava pulp + 2.0% acidity	133.07	86.96	46.11	8.54	8.11	0.43
P ₂ A ₁ - 25% Guava pulp + 1.0% acidity	140.25	94.44	45.81	8.56	8.14	0.42
P ₂ A ₂ - 25% Guava pulp + 1.5% acidity	140.64	95.14	45.50	8.87	8.50	0.37
P ₂ A ₃ - 25% Guava pulp + 2.0% acidity	140.68	95.26	45.42	8.81	8.45	0.36
P ₃ A ₁ - 30% Guava pulp + 1.0% acidity	158.02	116.93	41.09	8.83	8.57	0.26
P ₃ A ₂ - 30% Guava pulp + 1.5% acidity	158.08	117.01	41.07	8.82	8.58	0.24
P ₃ A ₃ - 30% Guava pulp + 2.0% acidity	158.24	117.21	41.03	8.98	8.79	0.19
P ₄ A ₁ - 35% Guava pulp + 1.0% acidity	160.23	115.74	44.48	8.82	8.49	0.33
P ₄ A ₂ - 35% Guava pulp + 1.5% acidity	160.26	115.88	44.38	8.72	8.41	0.31
P ₄ A ₃ - 35% Guava pulp + 2.0% acidity	160.54	116.64	43.90	8.75	8.46	0.29
'F' test	Sig	Sig	Sig	-	-	-
SE(m)±	0.012	0.018	0.012	-	-	-
CD at 5%	0.036	0.051	0.036	-	-	-

Table 3: Interaction effects of pulp and acidity on taste, flavour and overall acceptability scores of guava syrup

Treatments	Taste score			Flavour Score			Overall acceptability score		
	Storage period (Days)			Storage period (Days)			Storage period (Days)		
	Fresh syrup	120 th day	Decrease in taste score	Fresh syrup	120 th day	Decrease in flavour score	Fresh syrup	120 th day	Decrease in overall acceptability score
P ₁ A ₁ -20% Guava pulp + 1.0% acidity	8.18	7.79	0.39	8.17	7.76	0.41	8.18	7.73	0.45
P ₁ A ₂ -20% Guava pulp + 1.5% acidity	8.25	7.90	0.35	8.20	7.86	0.34	8.48	8.18	0.38
P ₁ A ₃ -20% Guava pulp + 2.0% acidity	8.21	7.87	0.34	8.14	7.82	0.32	8.83	8.47	0.36
P ₂ A ₁ -25% Guava pulp + 1.0% acidity	8.15	7.82	0.33	8.12	7.82	0.30	8.21	7.88	0.33
P ₂ A ₂ -25% Guava pulp + 1.5% acidity	8.12	7.81	0.31	8.19	7.92	0.27	8.45	8.14	0.31
P ₂ A ₃ -25% Guava pulp + 2.0% acidity	8.22	7.92	0.30	8.24	7.98	0.26	8.77	8.47	0.30
P ₃ A ₁ -30% Guava pulp + 1.0% acidity	8.75	8.48	0.27	8.76	8.53	0.23	8.76	8.56	0.20
P ₃ A ₂ -30% Guava pulp + 1.5% acidity	8.83	8.59	0.24	8.80	8.60	0.20	8.83	8.64	0.19
P ₃ A ₃ -30% Guava pulp + 2.0% acidity	8.86	8.66	0.20	8.82	8.66	0.16	8.87	8.73	0.14
P ₄ A ₁ -35% Guava pulp + 1.0% acidity	8.25	7.96	0.29	8.16	7.91	0.25	8.14	7.88	0.26
P ₄ A ₂ -35% Guava pulp + 1.5% acidity	8.15	7.88	0.27	8.12	7.88	0.24	8.42	8.18	0.24
P ₄ A ₃ -35% Guava pulp + 2.0% acidity	8.80	8.55	0.25	8.79	8.54	0.25	8.79	8.56	0.23

3.5 Overall acceptability

The data in respect of overall acceptability of guava syrup as influenced by different levels of pulp and acidity at ambient storage condition was recorded upto 120 days of storage and presented in Table 3. The data exhibited that, the overall acceptability score of guava syrup was decreased during storage period (0 to 120 days). The minimum decrease in overall acceptability score (0.14) i.e. from 8.87 to 8.73 was recorded in treatment combination P₃A₃ (30% pulp and 2.0% acidity). However, the maximum decrease in overall acceptability score (0.45) i.e. from 8.18 to 7.73 was observed in treatment combination P₁A₁ (20% pulp and 1.0% acidity) from initial upto 120 days of storage. Similar results were observed by Reddy and Chikkasubbanna (2008) [11], Totad *et al.* (2014) [12] and Kadge *et al.* (2020) [6] in aonla syrup, sapota syrup and lime blended bael syrup respectively.

4. Conclusion

On the basis of present findings it is concluded that the guava syrup prepared with different levels of pulp and acidity stored at ambient condition was found best after 120 days of storage in ascorbic acid and organoleptic scores.

The guava syrup prepared with 30% guava pulp and 2.0% acidity stored at ambient condition secured highest score for

colour, taste, flavour and overall acceptability as compared to rest of all treatments.

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