

## PREPARATION OF BLENDED GUAVA (*PSIDIUM GUAJAVA* L.)- PINEAPPLE (*ANANAS COMOSUS* L.) JELLY AND ITS QUALITY EVALUATION DURING STORAGE

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**Abstract**–The present investigation entitled Preparation of blended Guava (*Psidium guajava* L.) - Pineapple (*Ananas comosus* L.) Jelly and its quality evaluation during storage. The experiment was laid out in Completely Randomized Design (CRD) with three replicates and eight different combinations of recipes for blended guava-pineapple jelly. After processing in blended jelly, the blended jelly prepared from different recipes were analysed at 30 day intervals to assess the changes in various chemical constituents during storage. The organoleptic evaluation of processed product (blended jelly) was done by adopting 9 point hedonic rating scale to judge the various sensory parameters *i.e.* colour and appearance, taste and flavour, texture and overall acceptability during the storage up to three months. Among the different recipes of blended guava-pineapple jelly, the treatment T3 (Guava 80% + Pineapple 20%) was recorded best in respect to different quality parameters under the present investigation. The chemical composition of blended jelly, *i.e.* total soluble solids and pH were increased significantly, while acidity, ascorbic acids and pectin contents were found to be reduced under the treatment T3 (guava 80% + pineapple 20%) followed by the treatment T4 (guava 70% + pineapple 30%) and the lowest score was observed in the treatment T<sub>7</sub> (Guava 40% + Pineapple 60%) at 0, 30, 60 and 90 days of storage. With regard to the different sensory parameters of blended jelly, the treatment T3 (Guava 80% + Pineapple 20%) has registered the maximum score in respect to TSS (68.44), Ascorbic acid (60.75), Acidity (0.343), pH (3.35), Pectin content (1.27), colour and appearance (8.44), texture (8.28), taste and flavour (8.32) and overall acceptability (8.42) at 90 days of storage as compared to different recipe treatments under the present investigation. The best treatment total production cost (118.91 Rs.), the net return (241.09 Rs.) and the B: C ratio (3:02) of guava-pineapple blended jelly were recorded in T3 treatment (Guava 80% + Pineapple 20%). The lowest treatment total production cost (121.99 Rs.), the net return (28.01 Rs.) and the B: C ratio (1:22) of guava-pineapple blended jelly have been found in the T<sub>7</sub> (Guava 40% + Pineapple 60%).

### INTRODUCTION

Guava fruits belongs to kingdom Plantae; division *Mangoliophyta*; class *Mangoliophyta*; order *Myrtales*; family *Myrtaceae*; genus *Psidium* Linn; species *Psidium guajava* L.; botanical name *Psidium guajava* Linn.

In Chhattisgarh region it is generally consumed as fresh fruit. Total area under guava cultivation in 2018-19 is 20705ha with production 187288MT (Anonymous, 2018). This will help in development of processing industries in Chhattisgarh state. Moreover this will stimulate an increase in production and bring better return to the guava growers (Khatun, 2011). There are a number of

methods for processing guava. It seems that guava juice and guava jelly could be stored at normal temperature by using preservatives. The sucrose used in jelly and juices becomes crystalline and evolves sugar flavor on storage, carrying all these views and points in mind.

Guava fruit is an excellent source of vitamin C containing (70 to 350 mg/100 g), which is about two to five times more than orange and ten times to that of tomato. Fruit contains high amount of vitamin A (200 to 400 IU), ascorbic acid (88.2 to 250.8 mg/100 g), lycopene (45.3 µg/g Fruit weight), total sugars (10 to 15.3%), reducing sugars (2.05 to 6.08%), acids (10 to 15.3%), protein (2.3%), pectin (0.62%), phenols (170 to 345 GAE/g Fruit weight) and minerals, like

calcium (17.63 mg/100 g), Phosphorus (40mg/100 g) (Kaur *et al.*, 2009; Bogha *et al.*, 2020).

Pineapple (*Ananas comosus* L.) belongs to Bromeliaceae family, originated from warm climates in America. Pineapple is a wonderful tropical and subtropical fruit having exceptional juiciness, vibrant tropical flavor and immense health benefits. It contains a significant amount of ascorbic acid (36.20 mg/100 g), sugar (9.26%), TSS (13-19%). It also contains good source of calcium, phosphorus, magnesium, potassium, iron, crude fibre, protein and different minerals, which are good for the digestive system and helps in maintaining ideal weight and balanced nutrition (Farid *et al.*, 2015).

Pineapple ranks as third significant fruit globally after Banana and Citrus (Bartholomew *et al.*, 2003). Pineapple is produced around the globe in the countries like Philippines, Thailand, China, Brazil, India, Mexico and South Africa. India ranks as the fourth largest producer of pineapple in the world that contributes to almost 9 % to the world's production of fresh pineapple (Anonymous, 2003). Pineapple is one of the fruit crops of great importance in North Eastern India especially in Arunachal Pradesh. Thailand, Philippines, Brazil and China are the main countries producing pineapple in the world supplying nearly 50 per cent of the total output. India, Nigeria, Kenya, Indonesia, Mexico, Costa Rica are the other significant pineapple producing countries and these countries contribute to in providing most of the remaining fruit. Canned slices, jams, juice, sugar syrup, alcohol, chunk and dice, in fruit salads, citric acid, chips and puree are the various processed forms in which pineapple is broadly consumed all around the world (Chaudhary *et al.*, 2019).

Juice blends are produced from blending of two or more fruit juices to obtain a new flavour. Recently, fruit juice blends have been extensively marketed due to their unique and palatable flavor (Handwerk and Allen, 1969). Increasing demand for healthy and fresh products and increasing health awareness among consumers renders juice blend market to bloom. Blending different fruit juices enhances the overall nutritional quality of juice blends (Jothi *et al.*, 2014).

Jelly should not contain gumminess, stickiness or be syrupy or have crystallized sugar. The product should be free from any dullness should have shiny consistency. It should neither be tough nor rubbery with no sign of syneresis. Pectin, sugar and acid are essential ingredient. For the better quality of jelly,

pectin test and determination of end point of jelly formation are two important aspects. Pectic substances are present in the form of calcium pectate and they are responsible for the firmness of fruits and vegetables. To produce good jelly, about 0.5-1.5 per cent of pectin of a good quality in the extract is sufficient. If the pectin content is higher, then jelly turns out to be firm and tough and if it is lesser in content than the jelly may fail to set. The amount of acid and pectin present in the fruits and vegetables decides the jelling of extract. A high quantity of acid may cause syneresis so the final jelly should contain at least 0.5-1.5 per cent but not more than that quantity. Sugar an essential constituent of Jelly that imparts to it sweetness, i.e., taste as well as body. If the quantity of sugar used is high, the jelly retains less water resulting in a stiff jelly because of dehydration (Chaudhari and Nikam, 2015).

### Justification

In view of the nutritional, therapeutical and commercial importance of the fruits (Guava and Pineapple), the present investigation has been planned to explore the above fruits for preparation of value added food products i.e., Jelly along with standardizing the recipe and process with its quality assessment and also to explore its nutritional value for health conscious consumers and raise market prices of guava, pineapple by its processing.

Thus, a research work was conducted on "Preparation of blended Guava (*Psidium guajava* L.) - Pineapple (*Ananas comosus* L.) Jelly and its quality evaluation during storage" the work was carried out at Post Harvest Laboratory in the Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during session of 2021- 22.

### Objectives

1. To develop and preserve processed product jelly from Guava + Pineapple and evaluation of their nutritional qualities on the basis of their physico-chemical properties.
2. To reduce losses (Both physical and market value) between harvest and consumption.
3. To workout the economics of the treatments.

### MATERIALS AND METHODS

The experiment on the "Preparation of blended guava (*Psidium guajava* L.) - Pineapple (*Ananas*

*comosus* L.) Jelly and its quality evaluation during storage" was carried out under Post Harvest Laboratory in the Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during session of 2021-22. The Preparation of blended jelly from Guava and Pineapple extract with 8 treatments and 3 replicates were stored for 90 days under ambient temperature.

### Experimental Details

Fruit: - Guava (*Psidium guajava* L.), Pineapple (*Ananas comosus* L.)

Product name: - Blended jelly

Ingredients: - Sugar, Citric acid, Pectin, KMS

Design of experiment: - Completely Randomized Design (CRD)

Number of Treatments: - 8

Number of Replicates: - 3

Duration of the experiment: - January 2022 to April 2022

Date of start of the experiment: - 10/01/2022

The jelly was prepared with blending of fruits guava and pineapple into different proportions. The quantity of sugar and the citric acid was kept the same for all the treatments. Sugar was 55 % and the citric acid used was 0.6%. The quantity of pectin varied in different treatments, as pineapple contains negligible pectin content. The additional pectin in accordance with the pineapple is added for the jelly to set well.

## RESULTS AND DISCUSSION

The present investigation entitled "Preparation of blended guava (*Psidium guajava* L.)- Pineapple (*Ananas comosus* L.) jelly and its quality evaluation during storage" was carried out under Post Harvest Laboratory in the Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom

University of Agriculture, Technology and Sciences, Prayagraj during session of 2021- 22.

- In terms of Total Soluble Solids, The highest score of TSS (68.44 Brix) at 90 days after storage was observed in treatment T<sub>3</sub> (80 % Guava + 20% Pineapple) followed by treatment T<sub>4</sub> (70 % Guava + 30% Pineapple) with (67.48 Brix) at 90 days after storage, whereas the lowest score was observed in treatment T<sub>7</sub> (40% Guava + 60% Pineapple) with (66.19 Brix) during 90 days storage.
- Effect of Treatment T<sub>3</sub> (80 % Guava + 20% Pineapple) with (60.75) was found best and recorded significantly the highest Vitamin C (Ascorbic acid) mg/100g pulp where as treatment T<sub>7</sub> (40 % Guava + 60% Pineapple) with (46.94) recorded significantly the lowest Vitamin C (Ascorbic acid) mg/100 g pulp at 90 days storage.
- In terms of Acidity the highest score of Acidity (0.343) during 90 days after storage was observed in the treatment T<sub>3</sub> (80 % Guava + 20% Pineapple), followed by treatment T<sub>4</sub> (70 % Guava + 30% Pineapple) with (0.336) at 90 days after storage, whereas the lowest score was observed in the treatment T<sub>7</sub> (40% Guava + 60% Pineapple) with (0.288) during 90 days storage.
- Effect of Treatment T<sub>3</sub> (80 % Guava + 20% Pineapple) was recorded significantly the highest pH (3.35) whereas treatment T<sub>7</sub> (40 % Guava + 60% Pineapple) recorded significantly the lowest pH 3.02.
- Effect indicated that maximum pectin content (1.27) was observed in T<sub>3</sub> (80 % Guava + 20% Pineapple) and minimum was noticed 1.22. During storage, pectin content decreased significantly in storage period in blended jelly.
- In terms of colour and appearance. The maximum score of colour (8.44) at 90 days respectively was observed in treatment T<sub>3</sub> (80 %

**Table 1.** Details of Treatments showing symbols and ingredients used in the experiment

T. No.	Treatment combination	Juice extracts (ml)	Sugar (g)	Citric acid (g)	Pectin (g)
T <sub>1</sub>	100% Guava + 0% Pineapple (Control)	1000	550	3	-
T <sub>2</sub>	90% Guava + 10% Pineapple	1000	550	3	0.5
T <sub>3</sub>	80% Guava + 20% Pineapple	1000	550	3	1
T <sub>4</sub>	70% Guava + 30% Pineapple	1000	550	3	1.8
T <sub>5</sub>	60% Guava + 40% Pineapple	1000	550	3	2.2
T <sub>6</sub>	50% Guava + 50% Pineapple	1000	550	3	2.6
T <sub>7</sub>	40% Guava + 60% Pineapple	1000	550	3	3.2
T <sub>8</sub>	30% Guava + 70% Pineapple	1000	550	3	3.5



Cost of guava- pineapple blended jelly preparation and Benefit Cost ratio as influenced by various treatments:

T. No.	Treatment	Total cost of production (Rs)	Guava- Pineapple jelly output (kg)	Selling rate (Rs/per kg)	Gross return (Rs)	Net return (Rs)	Benefit: cost ratio
T <sub>1</sub>	100% Guava + 0% Pineapple (Control)	116.6	0.6	500	300	183.4	2.58
T <sub>2</sub>	90 % Guava + 10% Pineapple	118.14	0.6	400	240	121.86	2.03
T <sub>3</sub>	80 % Guava + 20% Pineapple	118.91	0.6	600	360	241.09	3.02
T <sub>4</sub>	70 % Guava + 30% Pineapple	119.68	0.6	550	330	210.32	2.75
T <sub>5</sub>	60 % Guava + 40% Pineapple	120.45	0.6	450	270	149.55	2.24
T <sub>6</sub>	50 % Guava + 50% Pineapple	121.22	0.6	350	210	88.01	1.73
T <sub>7</sub>	40 % Guava + 60% Pineapple	121.99	0.6	250	150	28.01	1.22
T <sub>8</sub>	30 % Guava + 70% Pineapple	122.76	0.6	300	180	57.24	1.46

Guava + 20% Pineapple), followed by treatment T<sub>4</sub> (70 % Guava + 30% Pineapple) with (8.21) whereas the minimum score was observed in treatment T<sub>7</sub> (40 % Guava + 60% Pineapple) with (5.34) during 90 days storage.

- In terms of taste and flavour, The maximum score of taste and flavour (8.32) at 90 days respectively was observed in the treatment T<sub>3</sub> (80 % Guava + 20% Pineapple) followed by treatment T<sub>4</sub> (70 % Guava + 30% Pineapple) with (8.25) whereas the minimum score was observed in treatment T<sub>7</sub> (40 % Guava + 60% Pineapple) with (5.36) during 90 days storage.
- In terms of texture quality, the maximum score of texture (8.28) at 90 days respectively was observed in the treatment T<sub>3</sub> (80 % Guava + 20% Pineapple) followed by treatment T<sub>4</sub> (70 % Guava + 30% Pineapple) with (8.16) whereas the minimum score was observed in treatment T<sub>7</sub> (40 % Guava + 60% Pineapple) with (5.36) during 90 days storage.
- In terms of Overall acceptability, The maximum score of Overall acceptability (8.42) at 90 days respectively was observed in the treatment T<sub>3</sub> (80 % Guava + 20% Pineapple), followed by treatment T<sub>4</sub> (70 % Guava + 30% Pineapple) with (8.29) whereas the minimum score was observed in treatment T<sub>7</sub> (40 % Guava + 60% Pineapple) with (5.21) during 90 days storage.
- In terms of the maximum benefit cost ratio was recorded in. The highest net return (241.09 Rs.) and benefit: cost ratio (3.02) was observed in the treatment T<sub>3</sub> (80 % Guava+ 20 % Pineapple), followed by net return (210.32 Rs.) and benefit: cost ratio (2.75) was observed in the treatment T<sub>4</sub> (70 % Guava + 30% Pineapple) while the lowest net return (28.01 Rs.) and benefit: cost ratio (1.22) was observed in the treatment of T<sub>7</sub> (40 % Guava + 60 % Pineapple).

## CONCLUSION

Based on the findings of the present experiment it is concluded that treatment T<sub>3</sub> (80% Guava + 20% Pineapple) was found superior in respect of the parameters like physico-chemical and organoleptic attributes, viz. respectively colour and appearance, taste and flavour, texture and overall acceptability also T<sub>3</sub> was found to be the best. The highest score of appearance of jelly was noted when T<sub>3</sub> (80 % Guava + 20% Pineapple) were used for making of jelly. The highest net return Rs.241.09, Gross return Rs.360 and Benefit Cost Ratio 3.02 was found in T<sub>3</sub> (80 % Guava + 20% Pineapple).

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