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**BP Bisen**
Department of Horticulture, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Madhya Pradesh, India

**Ruchi Verma**
Department of Horticulture, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Madhya Pradesh, India

**Corresponding Author:**
**BP Bisen**
Department of Horticulture, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Madhya Pradesh, India

# Standardization of recipes on chemical characteristics and storability of guava and papaya mixed fruit bar

**BP Bisen and Ruchi Verma**

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**Abstract**
The present investigation was carried out in preservation laboratory, Dept. of Horticulture, JNKVV, Jabalpur during 2016-2017. The mixed fruit bar was prepared by the different blending ratio of guava and papaya pulp in a ratio (80:20, 70:30, 60:40, 50:50) in preparation of mixed fruit bar. Among them, 50% guava pulp and 50% papaya pulp of treatment (P4) recorded as best blending ratio as the treatment recorded maximum TSS (36.16 °Brix), pH (3.54), moisture (17.25%), acidity (1.18%), ascorbic acid (158 mg/100 g), reducing sugar (48.82%) and total sugar (77.13%) contents. The prepared mixed fruit bar was stored at ambient temperature (25 ± 2 °C) for 100 days to study their storage feasibility. The storage studies indicate that there was a gradual decrease in, ascorbic acid with advancement of storage period. While TSS, acidity, reducing sugars and total sugars increased continuously.

**Keywords:** Guava, bar, papaya, pulp, blending ratio

## Introduction
Fruits are excellent source of energy, minerals, vitamins, bioactive compounds (Phenols, carotenoids) and fibre. Fruits are an important nutritional requirement of human being as these foods not only meet the quantitative needs to some extent but also supply vitamins and minerals which improve the quality of the diet and maintain health. It is, therefore, necessary to make them available for consumption throughout the year in fresh or processed/preserved form. The post-harvest losses of fresh fruits are estimated to be 25-30% due to inadequate post-harvest handling and non-availability of good post-harvest infrastructure. Preservation of the produce is one of the ways to control post-harvest losses.

Guava (*Psidium guajava* L.) and Papaya (*Carica papaya* L.) are important tropical fruits and claim superiority over other fruits by virtue of their commercial and nutritional values. Guava (*Psidium guajava* L.) is one of the dominant fruit crop of tropical and sub-tropical regions of India. It has been popularly known as “Poor man’s apple” because of its plenty availability to every person at a very low price. Guava is a fruit with excellent digestive and nutritive value, pleasant sour-sweet taste, high palatability and availability in abundance at moderate price. The high vitamin C(260 mg/100gm.), content of guava makes it a power house in combating free radicals and oxidation which are key enemies that cause many degenerative diseases (Kadam *et al*., 2012) [14]. Guava fruits are used both for fresh consumption and processing purposes.

Papaya is an important tropical fruit because of its nutritive contribution rich in vitamin A content (2020 IU/100g) and proteolytic enzymes papain which help in digestion of protein rich foods. Papaya fruits are called protective foods because of their nutritive contributions such as vitamins, minerals, bulk cellulose and protopectin. Fruit contains moisture (85%), protein (0.6%), sugar (10-13%), proteolytic enzyme, papain, which helps in digestion of protein rich foods. Papaya is also a rich source of other vitamins like thiamine, riboflavin, nicotinic acid and ascorbic acid. Due to its sweet taste and attractive colour, it has a great application in preparation of fruit salad and deserts. It is available in plenty during particular season but fresh fruits being perishable in nature cannot be stored for a long time. Processing and preservation could provide an option to utilize fruits at the time of glut in the market.

The fresh papaya and guava fruits have limited shelf life. Therefore, it is necessary to utilize this fruit for making different products to increase its availability over an extended period and to stabilize the price during glut season. Unfortunately papaya fruit has not caught the fancy of the consumers as much as it deserves, mainly because of its odour which is not appealing and thus limits its commercial exploitation at processing levels. However, papaya fruit has blood red pulp, good taste and low acid content hence; it can be used for blending with other fruits and also for preparation of nutritional enriched food products. (Attri *et al.*, 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) [12]. The present study aimed to standardize the blend ratio and recipe for better quality of mixed fruit bar, to evaluate sensory parameters during storage and to find out the consumer acceptability and economic feasibility of mixed fruit bar.

## Materials and Methods

The present experiment was carried out in Post-Harvest Laboratory, Department of Horticulture, College of Agriculture, JNKVV, Jabalpur (M.P.) The fully matured fresh guava fruits were collected from the orchard of the College of Agriculture, JNKVV and papaya fruits from the local market for this study. Mixed fruit bar was prepared from pulp of guava and papaya, sugar and citric acid. The experiment comprised of 12 treatment combinations consisting of 4 levels of fruit pulp i.e. guava and papaya ratio and 3 levels of sugars. The various recipes used for preparation of mixed fruit bar were arranged in a factorial completely randomized design with three replications and then recorded data were analyzed accordingly. For assessing the chemical qualities of stored guava and papaya mixed bar sample were analyzed at an interval of 20 days from 0 to 100 days.

| S. No. | Factor A (Pulp ratio) | Notation |
|---|---|---|
| 1. | 80% Guava pulp + 20% Papaya pulp | P1 |
| 2. | 70% Guava pulp + 30% Papaya pulp | P2 |
| 3. | 60% Guava pulp + 40% Papaya pulp | P3 |
| 4. | 50% Guava pulp + 50% Papaya pulp | P4 |

| S. No. | Factor B (Sugar level) | Notation |
|---|---|---|
| 1. | 200 g | S1 |
| 2. | 250 g | S2 |
| 3. | 300 g | S3 |

**Details of treatment combinations**

| Treatment | Combinations | Guava pulp (%) | Papaya Pulp (%) | Sugar (g) |
|---|---|---|---|---|
| T1 | P1S1 | 80 | 20 | 200 |
| T2 | P1S2 | 80 | 20 | 250 |
| T3 | P1S3 | 80 | 20 | 300 |
| T4 | P2S1 | 70 | 30 | 200 |
| T5 | P2S2 | 70 | 30 | 250 |
| T6 | P2S3 | 70 | 30 | 300 |
| T7 | P3S1 | 60 | 40 | 200 |
| T8 | P3S2 | 60 | 40 | 250 |
| T9 | P3S3 | 60 | 40 | 300 |
| T10 | P4S1 | 50 | 50 | 200 |
| T11 | P4S2 | 50 | 50 | 250 |
| T12 | P4S3 | 50 | 50 | 300 |

**Procedure of pulp preparation**

**Selection of fruit:** The fully mature uniformly ripe, disease free, fresh guava and papaya fruits were selected for the preparation of pulp.

**Preparation of fruit 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 out using the following procedure.

**Extraction of pulp:** In pulp preparation procedure, pulp, was extracted separately from both the fruits. The fruits were cut into small pieces with the help of stainless steel knife. Small pieces of guava, then grind in a mixer for 5-10 min for making pulp. The seeds were separated from pulp with the help of stainless steel sieve. Potassium meta bisulphate was added to pulp and mixed thoroughly before filling it in sterilized glass jars.

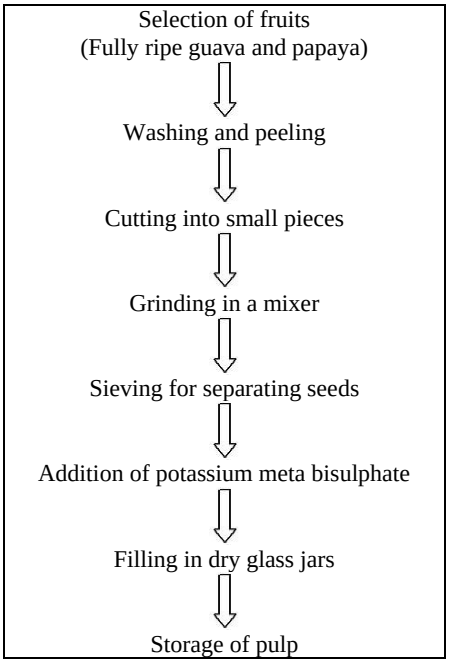


**Fig 1:** Flow chart for extraction of guava and papaya pulp

**Preparation of mixed fruit bar**

The mixed fruit bar was prepared by mixing the pulp of both fruits according to different recipe. Then bar was dried, packed and stored at room temperature. The detail description of preparation of mixed fruit bar is as follows:-

**Blending of guava and papaya pulp for mixed fruit bar:**

The freshly prepared guava and papaya pulp was used for preparation of mixed fruit bar as per their pulp compatibility. In four different ratio of pulp both fruits were mixed to make a definite weight of 1000 gm or 1kg.

**Spreading on polythene sheets**

Polythene sheet was cut according to size of trays and greased with glycerol. Then mixture of fruit pulp was poured into trays of 0.5-1.0cm thick layer. After that, trays placed into vacuum dryer at 60 °C for 8-10 hrs.

**Packaging and Storage**

Dried mixed fruit bar was cut into uniform pieces of 3x4cm size and wrapped with polythene sheets. The leather and bar was stored at room temperature.

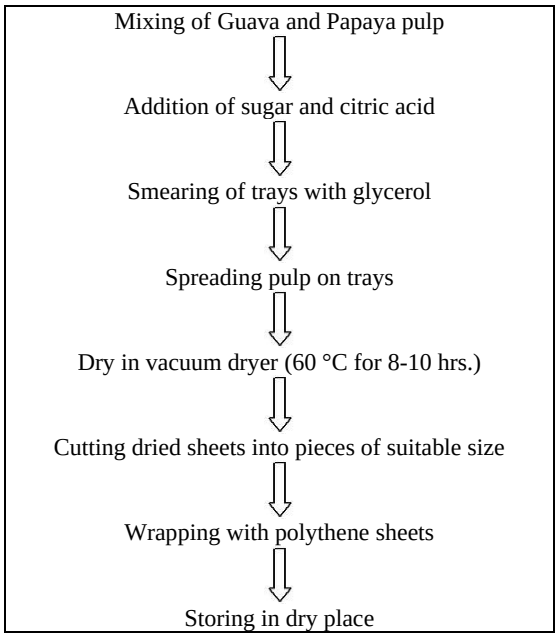


**Fig 2:** Flow chart for preparation of Mixed Fruit Bar

The qualitative character (*i.e.* TSS, pH, percent acidity, ascorbic acid content) of mixed fruit bar were recorded for each variety and recipe. For evaluation of various organoleptic quality attributes, the method discussed by Amerine *et al.* (1965) [1] was adopted using a nine-point hedonic scale basis (1 = dislike extremely and 9 = like extremely). Moisture content was estimated according to method given in AOAC (1980). Thickness of the bar was measured with the help of micrometer before and after drying of mixed fruit bar. The total soluble solids in the pulp were measured with the help of hand refractometer. pH of extracted pulp was measured using Elmer pH meter after calibration of the instrument with standard buffer solutions. The titrable acidity and ascorbic acid content were determined by the method prescribed by A.O.A.C. (2005) [2].

The data obtained in this study were subjected to statistical analysis by adopting the factorial completely randomized design to test the significant differences between the treatment mean for different recipes (Snedecor and Cochron, 1967) [22].

## Result and Discussion

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

### TSS (°Brix)

As per the results recorded from present investigation, the TSS content of mixed fruit bars ranged from 30.87 to 38.00. From Table 1, it was found that the highest score for TSS (36.16) was observed in treatment P4 (50% guava + 50% papaya). The increase in TSS content might be due to decrease in moisture content.

As the period of storage increased, the TSS value of mixed fruit bar increased significantly up to 100 days of storage but there were no significant differences among treatments for the total soluble solids of both products during the storage period. In all the treatments of mixed fruit bar, there was an increase in total soluble solids content with the progress of storage period. The slight increase in total soluble solids during storage might be due to conversion of left over polysaccharides into soluble sugars by acid hydrolysis. Similar inference was drawn by findings of Singh *et al.* (2012) [21] in guava-carrot jelly and Attri *et al.* (2014) [3] in papaya toffee. This might be due to conversion of some of the insoluble fraction. Similar trend was reported by Kumar *et al.* (2017) [16]. Jakhar and Pathak (2012) [13] reported that TSS increased gradually during storage of blended RTS from ber and jamun and increase in TSS during storage might be attributed in conversion of polysaccharides and other constitutes of juice into sugar. The increase in TSS might be due to moisture loss during storage. These findings have been well supported by Sreemathi *et al.* (2008) [23] as they reported increase in TSS of fruit bar (sapota 50: papaya 50) throughout the storage of 3 months.

### Acidity Percentage

From the investigation, Table 2 showed that the acidity of the guava leather was found higher value 1.27 in treatment P1 (80% guava + 20% papaya) and minimum 1.18 in P4 (50% guava + 50% papaya). Further, it was observed that acidity of the leather also decreased significantly with increase in sugar content. Similar results were also reported by Chavan and Shaik (2015) [7] in guava leather production. Results noted for the acidity percentage clearly indicated that the acidity of mixed fruit bar increased with the increasing storage period continuously up to 100 days of storage. A slight increase in acidity during storage was also reported by Fulchand *et al.* (2015) [9] in papaya and apple fruit leather and Shakir *et al.* (2008) [20] in apple pear mixed fruit jam. These findings are in conformation with the findings of Litaf *et al.* (2014) [17] who observed that there was a gradual increase in acidity value with an increase in the storage period in apple leather. Increase in acidity during storage might be due to the formation of organic acid by degradation of ascorbic acid. Jain and Nema (2007) [11] and Manimegalai (2001) [18] indicated that there was an increase in acidity and reducing sugar and a decrease in pH, total sugars and ascorbic acid during storage of 3 months. These results are in agreement with results reported by Choudhary *et al.* (2006) [6] in guava RTS, Byanna and Gowda (2012) [5] in sweet orange RTS beverages and Nidhi *et al.* (2008) in bael guava blends beverage.

### pH

The pH value of a product plays an important role in preservation of pulp. Lowering of pH value is the result of increased acidity. The low pH inhibits the activity of microorganism specially the Bacteria. An overall pH less than 7.0 *i.e.* acidic was observed in mixed fruit bar. The pH values however, observed to be high at initial day of storage (0 day) in all the ratio of recipes. It is evident from the data given in Table 3 that the highest value of pH 3.54 of guava leather was observed in combination P4 (50% guava + 50% papaya) which was significant over the rest of combinations at 0 days of storage and similar trend for pH value was observed followed by the next days of storage with an interval of 20 days up to 100 days of storage period. These results were supported by the results obtained by Litaf *et al.* (2014) [17] as they reported slight decrease in pH during 60 days storage of apple leather. Similarly, Babalola *et al.* (2002) [4] found a fall in pH values during study of pawpaw and guava leathers. Natalia *et al.* (2012) [19] also observed a decrease in pH values during study of apple leather from 3.50-3.30. This might be due to the formation of organic acid by ascorbic acid degradation.

**Ascorbic acid (mg/100 g)**

Data regarding ascorbic acid (mg/100g) of guava leather during storage have been presented in Table 4, the treatment P1 (80% guava + 20% papaya) showed highest value 186 and lowest value 158 was shown by treatment P4 (50% guava + 50% papaya) in mixed fruit bar. With regard to sugar content, the S1 (200g sugar) showed highest value 182 and lowest value 170 was noticed in S3 (300g sugar). In support to the results, Kumar *et al.* (2017) [16] reported the same result in guava and papaya leather, Jain and Nema (2007) [11] with guava leather. Harsimart and Dhawan (1998) [10] analysed the decrease content of ascorbic acid during storage of guava bar. Perhaps it might be due to decrease in quantity of acids (citric acid) and increase in enzymatic oxidation particularly when guava pulp was mixed with papaya pulp. Similar results were obtained by Attri *et al.* (2014) [3] in papaya leather/bar.

**Moisture percentage**

As per the results recorded from present investigation shown in Table 5, it was found that the highest score for moisture (17.25) was observed in P4 (50% guava + 50% papaya) with S3 (300 g sugar). During the period of storage, moisture decreases with increase in storage period. There was a slight decrease in moisture content which may be due to evaporation of water from bar during storage. Similar inference was drawn by findings of Chavan and Shaik (2015) [7] who describes the difference in moisture loss in two different conditions (refrigerated and at ambient temperature) during storage. Similarly, Kumar *et al.* (2017) [16] reported reduction in moisture content during storage. Similar results were reported by Khan *et al.* (2014) [17] in guava bar and Litaf *et al.* (2014) [17] in apple leather. Fulchand *et al.*, (2015) [9] concluded similar trend with fall of moisture content in papaya and apple fruit leather.

**Reducing sugar percentage**

As per the results recorded from present investigation shown in Table 6, the reducing sugar showed highest value 48.82 in P1 (80% guava + 20% papaya) with highest value 45.95 of sugar content in S1 (200g sugar) were recorded. The reducing sugar content in mixed fruit bar increases with the progress of storage period while non-reducing sugar decreases. It might be due to more inversion of added sugars in guava leather samples during storage. Similar findings were reported by Chavan and Shaik (2015) [7] in guava leather, and by Khan *et al.* (2014) [17] with guava leather. Attri *et al.* (2014) [3] analysed the increase in reducing sugar content during storage.

**Total sugar percentage**

On the basis of data obtained from the investigation shown in Table 7, mixed fruit bar showed the highest value 48.82 was obtained with P1 (80% guava + 20% papaya) and minimum value 42.21 with P4 (50% guava + 50% papaya). With regard to sugar content the highest value 45.95 in S1 (200 g sugar) and lowest value 45.47 in S3 (300g sugar) recipe was obtained. In total sugar content, there was gradual increase with increase in storage. Supporting results were concluded by Chavan and Shaik (2015) [7] in guava leather. Cheman and Taufik (1995) in jack fruit leather, Doreyappa *et al.* (1995) [8] in fig and other fruit products, Vennilla *et al.* (2004) [24] in guava papaya fruit bar and Kohinkar (2014) [15] in mixed fruit toffee from fig and guava fruits.

**Table 1:** Effect of different recipes on TSS (° Brix) of guava and papaya mixed fruit bar during storage

| Ratio of fruit pulp (Factor A) | 0 days | | | | 20 days | | | | 40 days | | | | 60 days | | | | 80 days | | | | 100 days | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | |
| | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean |
| P1 | 30.00 | 31.00 | 31.63 | 30.87 | 30.10 | 31.20 | 31.86 | 31.05 | 31.10 | 31.53 | 32.40 | 31.67 | 31.26 | 32.10 | 32.73 | 32.03 | 31.60 | 32.76 | 33.53 | 32.63 | 31.83 | 33.43 | 34.16 | 33.14 |
| P2 | 32.00 | 32.50 | 33.00 | 32.50 | 32.10 | 32.63 | 33.53 | 32.75 | 32.40 | 33.16 | 33.83 | 33.13 | 32.60 | 33.50 | 34.73 | 33.61 | 32.86 | 34.20 | 35.43 | 34.16 | 32.90 | 35.10 | 35.60 | 34.53 |
| P3 | 33.50 | 34.33 | 34.66 | 34.16 | 34.10 | 34.73 | 34.83 | 34.55 | 33.76 | 35.00 | 35.80 | 34.85 | 33.83 | 35.46 | 36.36 | 35.22 | 34.16 | 36.16 | 37.00 | 35.77 | 34.66 | 36.73 | 37.50 | 36.30 |
| P4 | 35.50 | 36.00 | 37.00 | 36.16 | 35.63 | 36.20 | 37.40 | 36.41 | 36.16 | 36.56 | 37.63 | 36.78 | 36.33 | 36.83 | 38.23 | 37.13 | 36.66 | 37.70 | 38.73 | 37.70 | 36.63 | 38.03 | 39.33 | 38.00 |
| MEAN | 32.75 | 33.45 | 34.07 | | 32.98 | 33.69 | 34.40 | | 33.35 | 34.06 | 34.91 | | 33.50 | 34.47 | 35.51 | | 33.82 | 35.20 | 36.17 | | 34.00 | 35.82 | 36.65 | |
| Factor | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | |
| SEm± | 0.388 | 0.336 | 0.672 | | 0.429 | 0.372 | 0.743 | | 0.485 | 0.420 | 0.840 | | 0.594 | 0.514 | 1.028 | | 0.695 | 0.602 | 1.203 | | 0.710 | 0.615 | 1.230 | |
| CD at 5% level | 1.139 | 0.986 | NS | | 1.260 | 1.092 | NS | | 1.424 | 1.233 | NS | | 1.743 | 1.510 | NS | | 2.039 | 1.766 | NS | | 2.086 | 1.806 | NS | |

**Table 2:** Effect of different recipes on acidity (%) of guava and papaya mixed fruit bar during storage

| Ratio of fruit pulp (Factor A) | 0 days | | | | 20 days | | | | 40 days | | | | 60 days | | | | 80 days | | | | 100 days | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | |
| | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean |
| P1 | 1.34 | 1.28 | 1.20 | 1.27 | 1.41 | 1.33 | 1.27 | 1.33 | 1.44 | 1.37 | 1.32 | 1.37 | 1.48 | 1.40 | 1.38 | 1.42 | 1.50 | 1.43 | 1.41 | 1.44 | 1.52 | 1.46 | 1.45 | 1.47 |
| P2 | 1.32 | 1.22 | 1.20 | 1.25 | 1.37 | 1.27 | 1.28 | 1.30 | 1.42 | 1.30 | 1.32 | 1.35 | 1.45 | 1.35 | 1.38 | 1.39 | 1.47 | 1.37 | 1.40 | 1.41 | 1.51 | 1.41 | 1.42 | 1.44 |
| P3 | 1.28 | 1.22 | 1.18 | 1.22 | 1.33 | 1.23 | 1.29 | 1.28 | 1.36 | 1.27 | 1.33 | 1.32 | 1.40 | 1.30 | 1.37 | 1.35 | 1.42 | 1.36 | 1.38 | 1.38 | 1.45 | 1.38 | 1.41 | 1.41 |
| P4 | 1.26 | 1.16 | 1.12 | 1.18 | 1.30 | 1.24 | 1.23 | 1.25 | 1.34 | 1.27 | 1.27 | 1.29 | 1.36 | 1.31 | 1.30 | 1.32 | 1.39 | 1.35 | 1.33 | 1.35 | 1.42 | 1.37 | 1.36 | 1.38 |
| MEAN | 1.30 | 1.22 | 1.17 | | 1.35 | 1.28 | 1.24 | | 1.39 | 1.30 | 1.29 | | 1.42 | 1.35 | 1.33 | | 1.44 | 1.38 | 1.33 | | 1.47 | 1.41 | 1.39 | |
| Factor | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | |
| SEm± | 0.021 | 0.018 | 0.036 | | 0.019 | 0.017 | 0.033 | | 0.020 | 0.018 | 0.035 | | 0.019 | 0.017 | 0.033 | | 0.019 | 0.017 | 0.033 | | 0.018 | 0.015 | 0.031 | |
| CD at 5% level | 0.061 | 0.053 | NS | | 0.056 | 0.049 | NS | | 0.060 | 0.052 | NS | | 0.057 | 0.049 | NS | | 0.055 | 0.047 | NS | | 0.052 | 0.045 | NS | |

**Table 3:** Effect of different recipes on pH content of guava and papaya mixed fruit bar during storage

| Ratio of fruit pulp (Factor A) | 0 days | | | | 20 days | | | | 40 days | | | | 60 days | | | | 80 days | | | | 100 days | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | |
| | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean |
| P1 | 3.30 | 3.32 | 3.43 | 3.35 | 3.28 | 3.30 | 3.41 | 3.33 | 3.26 | 3.27 | 3.40 | 3.31 | 3.23 | 3.26 | 3.36 | 3.28 | 3.20 | 3.23 | 3.33 | 3.25 | 3.18 | 3.20 | 3.30 | 3.22 |
| P2 | 3.36 | 3.43 | 3.53 | 3.44 | 3.33 | 3.40 | 3.51 | 3.41 | 3.30 | 3.39 | 3.48 | 3.39 | 3.28 | 3.34 | 3.44 | 3.35 | 3.26 | 3.33 | 3.41 | 3.33 | 3.23 | 3.29 | 3.40 | 3.30 |
| P3 | 3.36 | 3.46 | 3.50 | 3.44 | 3.32 | 3.43 | 3.48 | 3.41 | 3.30 | 3.40 | 3.46 | 3.38 | 3.28 | 3.36 | 3.43 | 3.35 | 3.25 | 3.35 | 3.40 | 3.33 | 3.22 | 3.33 | 3.36 | 3.30 |
| P4 | 3.43 | 3.60 | 3.60 | 3.54 | 3.40 | 3.56 | 3.55 | 3.50 | 3.38 | 3.53 | 3.52 | 3.47 | 3.36 | 3.50 | 3.50 | 3.45 | 3.33 | 3.42 | 3.48 | 3.41 | 3.33 | 3.46 | 3.46 | 3.41 |
| MEAN | 3.36 | 3.45 | 3.51 | | 3.33 | 3.42 | 3.48 | | 3.31 | 3.39 | 3.46 | | 3.28 | 3.36 | 3.43 | | 3.26 | 3.33 | 3.40 | | 3.24 | 3.32 | 3.38 | |
| Factor | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEm± | 0.028 | 0.024 | 0.049 | | 0.024 | 0.021 | 0.042 | | 0.023 | 0.020 | 0.039 | | 0.023 | 0.020 | 0.040 | | 0.026 | 0.022 | 0.044 | | 0.023 | 0.020 | 0.039 | |
| CD at 5% level | 0.082 | 0.071 | NS | | 0.072 | 0.062 | NS | | 0.067 | 0.058 | NS | | 0.067 | 0.058 | NS | | 0.075 | 0.065 | NS | | 0.066 | 0.057 | NS | |

**Table 4:** Effect of different recipes on ascorbic acid (mg/100gm) content of guava and papaya mixed fruit bar during storage

| Ratio of fruit pulp (Factor A) | 0 days | | | | 20 days | | | | 40 days | | | | 60 days | | | | 80 days | | | | 100 days | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | |
| | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean |
| P1 | 194 | 186 | 180 | 186 | 190 | 180 | 177 | 182 | 186 | 179 | 174 | 179 | 180 | 176 | 172 | 176 | 174 | 170 | 164 | 169 | 165 | 162 | 155 | 160 |
| P2 | 190 | 184 | 180 | 184 | 186 | 180 | 176 | 180 | 180 | 176 | 170 | 175 | 176 | 170 | 166 | 170 | 168 | 164 | 158 | 163 | 160 | 162 | 152 | 158 |
| P3 | 180 | 174 | 170 | 174 | 174 | 170 | 166 | 170 | 170 | 165 | 160 | 165 | 168 | 16 | 158 | 162 | 165 | 155 | 152 | 157 | 157 | 149 | 147 | 151 |
| P4 | 166 | 160 | 150 | 158 | 160 | 156 | 146 | 154 | 156 | 150 | 140 | 148 | 152 | 146 | 138 | 145 | 145 | 140 | 130 | 138 | 138 | 132 | 122 | 130 |
| MEAN | 182 | 176 | 170 | | 177 | 171 | 166 | | 173 | 167 | 161 | | 169 | 163 | 158 | | 163 | 157 | 151 | | 155 | 151 | 144 | |
| Factor | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | |
| SEm± | 2.456 | 2.127 | 4.254 | | 2.471 | 2.140 | 4.280 | | 2.474 | 2.142 | 4.285 | | 2.327 | 2.016 | 4.031 | | 2.432 | 2.107 | 4.213 | | 2.402 | 2.080 | 4.160 | |
| CD at 5% level | 7.211 | 6.245 | NS | | 7.25 | 6.283 | NS | | 7.264 | 6.291 | NS | | 6.834 | 5.918 | NS | | 7.142 | 6.185 | NS | | 7.052 | 6.107 | NS | |

**Table 5:** Effect of different recipes on moisture (%) content of guava and papaya mixed fruit bar during storage

| Ratio of fruit pulp (Factor A) | 0 days | | | | 20 days | | | | 40 days | | | | 60 days | | | | 80 days | | | | 100 days | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | |
| | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean |
| P1 | 17.10 | 17.13 | 17.14 | 17.12 | 16.66 | 16.68 | 16.69 | 16.67 | 16.11 | 16.13 | 16.14 | 16.12 | 15.71 | 15.73 | 15.74 | 15.72 | 15.23 | 15.25 | 15.26 | 15.24 | 14.71 | 14.73 | 14.74 | 14.72 |
| P2 | 17.15 | 17.16 | 17.18 | 17.16 | 16.70 | 16.71 | 16.73 | 16.71 | 16.15 | 16.16 | 16.18 | 16.16 | 15.75 | 15.76 | 15.78 | 15.76 | 15.27 | 15.28 | 15.30 | 15.28 | 14.75 | 14.76 | 14.78 | 14.76 |
| P3 | 17.18 | 17.19 | 17.20 | 17.19 | 16.73 | 16.74 | 16.75 | 16.74 | 16.17 | 16.19 | 16.20 | 16.18 | 15.78 | 15.79 | 15.80 | 15.79 | 15.30 | 15.31 | 15.32 | 15.31 | 14.78 | 14.79 | 14.80 | 14.79 |
| P4 | 17.22 | 17.24 | 17.29 | 17.25 | 16.77 | 16.79 | 16.80 | 16.78 | 16.22 | 16.24 | 16.27 | 16.24 | 15.82 | 15.84 | 15.92 | 15.86 | 15.34 | 15.36 | 15.44 | 15.38 | 14.82 | 14.84 | 14.92 | 14.86 |
| MEAN | 17.16 | 17.18 | 17.20 | | 16.71 | 16.73 | 16.74 | | 16.16 | 16.18 | 16.19 | | 15.76 | 15.78 | 15.81 | | 15.28 | 15.30 | 15.33 | | 14.76 | 14.78 | 14.81 | |
| Factor | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | |
| SEm± | 0.003 | 0.003 | 0.006 | | 0.004 | 0.003 | 0.006 | | 0.003 | 0.003 | 0.006 | | 0.003 | 0.003 | 0.006 | | 0.003 | 0.003 | 0.006 | | 0.003 | 0.003 | 0.006 | |
| CD at 5% level | 0.010 | 0.009 | 0.017 | | 0.011 | 0.009 | NS | | 0.010 | 0.008 | 0.017 | | 0.009 | 0.008 | 0.016 | | 0.010 | 0.008 | 0.017 | | 0.009 | 0.008 | 0.016 | |

**Table 6:** Effect of different recipes on reducing sugar (%) of guava and papaya mixed fruit bar during storage

| Ratio of fruit pulp (Factor A) | 0 days | | | | 20 days | | | | 40 days | | | | 60 days | | | | 80 days | | | | 100 days | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | |
| | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean |
| P1 | 48.68 | 48.80 | 48.98 | 48.82 | 49.36 | 49.52 | 49.85 | 49.57 | 50.72 | 50.83 | 50.95 | 50.83 | 51.97 | 52.12 | 52.30 | 52.13 | 53.05 | 53.20 | 53.35 | 53.20 | 54.88 | 54.92 | 55.08 | 54.96 |
| P2 | 46.84 | 46.98 | 47.80 | 47.20 | 47.32 | 47.50 | 47.88 | 47.56 | 48.95 | 49.08 | 49.25 | 49.09 | 50.22 | 50.43 | 50.80 | 50.48 | 51.35 | 51.50 | 51.78 | 51.54 | 53.02 | 53.23 | 53.38 | 53.21 |
| P3 | 44.50 | 44.80 | 45.05 | 44.78 | 45.12 | 45.36 | 45.68 | 45.38 | 18.56 | 46.63 | 46.80 | 37.33 | 47.80 | 47.98 | 48.25 | 48.01 | 49.15 | 49.42 | 49.80 | 49.45 | 51.25 | 51.39 | 51.51 | 51.38 |
| P4 | 41.81 | 41.32 | 41.50 | 42.21 | 42.20 | 42.42 | 42.72 | 42.44 | 43.25 | 43.40 | 43.580 | 43.41 | 44.71 | 44.92 | 44.98 | 44.87 | 46.58 | 46.65 | 46.75 | 46.66 | 48.45 | 48.60 | 48.73 | 48.59 |
| MEAN | 45.45 | 45.47 | 45.83 | | 46.00 | 46.20 | 46.53 | | 40.37 | 47.48 | 47.64 | | 48.67 | 48.86 | 49.08 | | 50.03 | 50.19 | 50.42 | | 51.900 | 52.035 | 52.17 | |
| Factor | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | |
| SEm± | 0.225 | 0.195 | 0.389 | | 0.007 | 0.006 | 0.012 | | 2.305 | 1.997 | 3.993 | | 0.115 | 0.100 | 0.200 | | 0.039 | 0.034 | 0.067 | | 0.006 | 0.005 | 0.010 | |
| CD at 5% level | 0.660 | NS | 1.143 | | 0.020 | 0.017 | NS | | 6.769 | 5.862 | 11.724 | | 0.339 | 0.293 | NS | | 0.114 | 0.099 | NS | | 0.017 | 0.015 | 0.030 | |

**Table 7:** Effect of different recipes on total sugar (%) of guava and papaya mixed fruit bar during storage

| Ratio of fruit pulp (Factor A) | 0 days | | | | 20 days | | | | 40 days | | | | 60 days | | | | 80 days | | | | 100 days | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | | Sugar (Factor B) | | | |
| | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean | S1 | S2 | S3 | Mean |
| P1 | 76.99 | 77.02 | 77.38 | 77.13 | 77.60 | 77.80 | 77.89 | 77.76 | 78.10 | 78.30 | 78.50 | 78.30 | 78.80 | 78.99 | 79.02 | 78.93 | 79.30 | 79.52 | 79.77 | 79.53 | 79.90 | 79.99 | 80.07 | 79.98 |
| P2 | 75.25 | 75.38 | 75.81 | 75.48 | 75.56 | 75.74 | 75.88 | 75.72 | 76.05 | 76.21 | 76.50 | 76.25 | 76.70 | 76.89 | 76.99 | 76.86 | 77.20 | 77.38 | 77.57 | 77.38 | 78.22 | 78.43 | 78.66 | 78.43 |
| P3 | 73.05 | 73.38 | 73.95 | 73.46 | 73.62 | 73.75 | 73.92 | 73.76 | 73.99 | 74.06 | 74.23 | 74.09 | 74.55 | 74.66 | 75.51 | 74.90 | 74.95 | 75.00 | 75.20 | 75.05 | 75.36 | 75.51 | 75.63 | 75.50 |
| P4 | 71.40 | 71.60 | 71.98 | 71.66 | 71.98 | 72.00 | 72.10 | 72.02 | 72.08 | 72.55 | 72.77 | 72.46 | 72.88 | 72.92 | 73.00 | 72.93 | 73.30 | 73.53 | 73.66 | 73.49 | 73.75 | 73.89 | 73.98 | 73.87 |
| MEAN | 74.17 | 74.34 | 74.78 | | 74.69 | 74.82 | 74.94 | | 75.05 | 75.28 | 75.50 | | 75.73 | 75.86 | 76.13 | | 76.18 | 76.35 | 76.55 | | 76.80 | 76.95 | 77.08 | |
| Factor | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | | A | B | AB | |
| SEm± | 0.003 | 0.002 | 0.004 | | 0.002 | 0.001 | 0.003 | | 0.055 | 0.048 | 0.095 | | 0.111 | 0.096 | 0.193 | | 0.002 | 0.002 | 0.004 | | 0.005 | 0.004 | 0.009 | |
| CD at 5% level | 0.007 | 0.006 | 0.013 | | 0.005 | 0.004 | 0.008 | | 0.161 | 0.140 | NS | | 0.327 | 0.283 | NS | | 0.007 | 0.006 | 0.012 | | 0.015 | 0.013 | 0.026 | |

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