Development and standardization of aloe vera jam with fruit flavours and nutritional, organoleptic evaluation

E Vaishnavi, Dr. M Padma, Dr. Veena Joshi and Dr. R Purnima Mishra

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Abstract
The present research entitled “Development and Standardization of Aloe vera jam with fruit flavours and nutritional, organoleptic evaluation” was carried out at Post Harvest Technology Laboratory, College of Horticulture, Rajendranagar, Hyderabad during June 2019 to October 2019. The experiment was laid in factorial completely randomized block design with three replications. The experiment results revealed that, Highest reducing sugars (20.4%) were recorded in T6 (Aloe vera 40% + guava 60%) (20.4%), non-reducing sugars (12.5%), total sugars (32.9%). The highest colour appearance (8.4) were recorded the treatment Aloe vera 40% + guava 60% (T6), aroma (8.7), taste (8.7) and overall acceptability (8.8) on a 9 point Hedonic Rating Scale.

No detectable mould count and bacterial count and negligible total viable count were observed in all the above treatments during 4 months of storage period of 2nd experiment.

Keywords: Aloe vera, guava, pine apple, mango, reducing sugars, non-reducing sugars, total sugars, mould count, bacterial count

Introduction
The herb Aloe vera is as old as human civilization. It belongs to the family “Liliaceae”. The genus is found in Tropical and Southern Africa and Arabia. It was introduced into other parts of the world for ornamental purposes (Reynolds, 1985) [14]. Aloe was known to Indians for its medicinal value since time immemorial in the name of Ghrit Kumaree or Kanyasara. Several species of the genus aloe have been in use under the common name of aloe Viz., Aloe vera, Aloe barbadensis, Aloe ferox, Aloe chinensis, Aloe indica etc. Among these, Aloe vera Linn Syn. Aloe barbadensis Miller are accepted unanimously as the correct botanical source of aloe. In most of the references, Aloe barbadensis Miller is regarded as the correct name. The aloe is known as “Mussambar” in Indian market (Saroj et al., 2004) [15]. It is used in the food products like refreshing juice, ready-to-serve drinks, health drinks, sports drinks, diet drinks, soft drinks, laxative drinks etc. The flesh portion can also be converted into candies, squash, jam, bar, munch etc. Additionally, it can be incorporated into dairy products e.g. Yogurt, curd, lassi, ice creams etc. The gel can be dried using suitable drying techniques and the dried powder can be used in the development of various products.

Keeping in view of the above information, the present investigation was planned to development and standardization of Aloe vera jam with fruit flavours and nutritional and organoleptic evaluation.

Materials and Methods
The present investigation entitled "Development and standardization of Aloe vera jam with fruit flavours and nutritional and organoleptic evaluation" was carried out at Post Harvest Technology Laboratory, College of Horticulture, Rajendranagar, Hyderabad. The experiment was laid out in Factorial Completely Randomized Block Design replicated thrice. Aloe vera leaves utilized in this experiment were obtained from Medicinal and Aromatic Plants Research Station, Rajendranagar, Hyderabad. Healthy leaves were collected manually during June 2019.
Leaves with injuries and damages were discarded. The leaves which are mature for 9 months and healthy are used for carrying out the experiments.

**Preparation of Aloe vera juice**

The lower 1 inch of the leaf base, the tapering point (2-4 inch) of the leaf top and the short, sharp spines located along the leaf margins were removed with a sharp knife and then, the knife was introduced into the mucilage layer below the green rind, avoiding the vascular bundles, and the top rind was removed. The bottom rind was also similarly removed and the rind parts, to which a significant amount of mucilage remained attached was discarded. The filleting process was completed within 24 hours of harvesting the leaves. The pulp was heated to 60-65 °C for 10 min. The extracted pulp was thoroughly homogenized with a blending machine for 15 minutes. The mashed pulp was strained with muslin cloth to retrieve the Aloe vera juice which was stored under refrigerated conditions for preparation of treatments.

**Extraction of fruit pulp**

Fruits used in the experiment were washed thoroughly twice with clean water. The outer skins were peeled with a sharp knife in case of mango, sweet orange and pineapple and were cut into small pieces. These small pieces were thoroughly homogenized in a blending machine for 10 minutes. The homogenized fruit pulp was filtered to remove any foreign material.

**Preparation of aloe vera jam with fruit flavours**

Blending of fruit pulp with Aloe vera juice was prepared as per treatments. The sugar and citric acid were added to this blend. Thereafter, blend was heated till 68.5°Brix TSS was arrived. To this blend Chemical preservative was added to this blend as per the requirement of the treatments. The bottles used for filling were prepared by thorough washing and sterilization. Further the prepared jam with different treatments was filled into the bottles upto the neck portion leaving a small gap. The filled in bottles were capped with bottle corks and sterilized up to 30 minutes. The treated bottles were rested for cooling of the product. After cooling of the product, treatments with replications were kept for storage studies at room temperature and refrigerator.

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**Experimental details Factor I: Treatments**

T1: Aloe vera 60% + Mango 40%  T2: Aloe vera 50%+ Mango 50%  T3: Aloe vera 40% + Mango 60%  T4: Aloe vera 60% + Guava 40%  T5: Aloe vera 50% + Guava 50%  T6: Aloe vera 40% + Guava 60%  T7: Aloe vera 60% + Pineapple 40%  T8: Aloe vera 50% + Pineapple 50%  T9: Aloe vera 40% + Pineapple 60%  T10: Aloe vera 100%
* Note: Sugar 1000g/kg of Aloe vera jam, Pectin 50g/kg of Aloe vera jam. Citric acid 25ml/kg of Aloe vera jam and KMS 350ppm were added to all the treatments.

**Factor II**

**Storage conditions**

1. Ambient storage conditions.
2. Cool storage conditions

Number of Replications : 3  
Number of Treatments : 20  
Sample size : 5 (in each treatment)  
Storage: Aloe vera jam products are stored at ambient temperature (25 °C) and cool temperature (7-10 °C) for 4 months period. The data were recorded at 15 days of interval.

**Proximate nutrient composition parameters**

**Reducing Sugars (%)**

For estimating reducing sugars, the sample size of 10 ml was taken and analyzed by using the procedure as outlined by Lane and Eynon method (Ranganna 1977) [13]. Sample of 10 ml was blended with distilled water and neutralized with 0.1 N NaOH after adding lead acetate for clarification. Potassium Oxalate was added to remove excess of lead and volume was made up to 250 ml with distilled water and filtered. Filtrate of 20 ml was further diluted to 100 ml and used for analysis and expressed as per cent.

**Total sugars (%)**

For estimating total sugars, 10 ml of sample was taken and analyzed by using the procedure as outlined by Lane and Eynon method (Ranganna 1977) [13]. For estimation of total sugars, 50ml of the filtrate was hydrolyzed with 5ml of concentrated hydrochloric acid at room temperature for a day and there after neutralizing with NaOH using phenolphthalein indicator. The volume was made up to 100ml with distilled water and this aliquot was used for estimation of total sugars. Total sugars were expressed as per cent.

**Non-Reducing Sugars (%)**

For estimating non-reducing sugars, sample size of 10 ml was taken and analyzed by using the procedure as outlined by Lane and Eynon method (Ranganna 1977) [13]. Non-Reducing sugars were estimated by the estimation of total sugars and reducing sugars and expressed as per cent. Non-Reducing Sugars were calculated by using the following formula:

Non-Reducing Sugars (%) = Total Sugars (%) – Reducing Sugars (%).

**Organoleptic evaluation: Organoleptic characters**

The organoleptic evaluation for assessing the sensory of samples were conducted by a panel of 5 judges and the samples were rated on a 9 point Hedonic Rating Scale (Amerine et al., 1965) [1] as mentioned below:

| Organoleptic score       | Rating |
|--------------------------|--------|
| Like extremely (LE)      | 9      |
| Like very much (LVM)     | 8      |
| Like moderately (LM)     | 7      |
| Like slightly (LS)       | 6      |
| Neither like nor dis like (NLND) | 5   |
| Dislike slightly (DS)    | 4      |
| Dislike moderately (DM)  | 3      |
| Dislike very much (DVM)  | 2      |
| Dislike extremely (DE)   | 1      |

Statistical analysis

The data recorded on various parameters in different experiments were subjected to statistical analysis. The experiments were designed under Completely Randomized Block design with a factorial concept. Observations were recorded with three replications and the data were analyzed with 5% level of significance.

**Results and Discussion**

**Proximate nutrient composition**

1. **Reducing Sugars (%)**

The data recorded on reducing sugars of Aloe vera jam with fruit flavours presented in table 1 and depicted in Fig 2. The treatment (T6) Aloe vera 40% + guava 60% recorded the highest reducing sugars (20.4%). Among the different storage conditions, cool storage condition (S2) recorded the highest reducing sugars (18.4%). Among the interactions effects, the treatment Aloe vera 50% + pine apple 50% at cool storage condition (T8S2) recorded the highest reducing sugars (24.6%). Reducing sugars in Aloe vera jam followed an increasing trend during storage. This could be due to the inversion of non-reducing sugars that are being converted to reducing sugars caused by hydrolysis. Corroborative findings to the present study reported by Talmiz Ur Rahaman et al., (2018) [17] where maximum mean value observed in (T0) (23.55%) with maximum percentage increase found in (T0) (42.62%) during 90 days of storage; Madhuri Dahiwale et al., (2017) [10] reported maximum mean value of reducing sugars observed in (14.0%) guava 40% + carrot 60% + tulasi 5ml (T4) stored at ambient condition.

2. **Total sugars (%)**

The data recorded on reducing sugars of Aloe vera jam with fruit flavours presented in table 2 and depicted in Fig 3. The treatment (T6) Aloe vera 40% + guava 60% recorded the highest total sugars (32.9%). Among the different storage conditions, cool storage condition (S2) recorded the highest total sugars (30.1%). Among the interactions effects, the treatment Aloe vera 50% + pine apple 50% at cool storage condition (T8S2) recorded the highest total sugars (35.7%). Total sugar content in all the treatments increased with increase in storage period. The increase in sugar content with the passage of time might be due to conversion of starch and other carbohydrates into sugars. Corroborative findings to the present study reported by Patel et al., (2015) [12] where highest total sugar increase from (52.81% to 54.88%) reported in (T3) banana 75% + pine apple 25% at ambient storage condition from 0 to 9 months of storage respectively.

3. **Non-reducing sugars (%)**

The data recorded on reducing sugars of Aloe vera jam with fruit flavours presented in table 3 and depicted in Fig 4. The treatment (T6) Aloe vera 40% + guava 60% recorded the highest non-reducing sugars (12.5%). Among the different storage conditions, Ambient storage condition (S1) recorded the highest non-reducing sugars (11.6%). Among the interactions effects, the treatment Aloe vera 40% + pine apple 60% at ambient storage condition (T9S1) recorded the highest non-reducing sugars (13.0%). Non-reducing sugars in Aloe vera jam followed an increasing trend during storage. Corroborative findings to the present study reported by Patel et al., (2015) [12] where the highest non reducing sugars reported in (T4) 100% banana + 0% pine apple (18.53%) and gradually increased with respect of storage period.
5. Aroma

The data recorded on aroma of Aloe vera jam with fruit flavours presented in table 4 and depicted in Fig. 6. The treatment Aloe vera 40% + guava 60% (T6) recorded the highest aroma (8.7). Among the different storage conditions, cool storage condition (S2) recorded the highest aroma (8.2). Among the interactions effects, the treatment Aloe vera 40% + guava 60% at cool storage condition (T6S2) recorded the highest aroma (8.9).

The aroma mean score was highest on the day of preparation of the product. Considerable decrease was noticed in all the treatments at all the intervals of storage. Corroborative findings reported by Talmiz Ur Rahaman et al., (2018) [17] where sensory panelists scores for colour of guava jam decreased gradually (< 0.05) during the storage time. The maximum mean value for aroma (6.94) was observed in (T6) 50% guava + 50% sugar + 1.2% pectin stored at ambient condition.

Table 1: Development and Standardization of Aloe vera jam with fruit flavours and evaluation of storage stability on Reducing sugars (%)

| Reducing sugars (%) | Day 1 | 15th Day | 30th Day | 45th Day | 60th Day | 75th Day | 90th Day | 105th Day | 120th Day |
|---------------------|-------|----------|----------|----------|----------|----------|----------|-----------|-----------|
| T1                  | 12.1  | 21.9     | 14.0     | 13.3     | 14.4     | 14.6     | 14.6     | 16.2      | 18.5      |
| S1                  | 11.2  | 19.4     | 13.5     | 13.8     | 14.8     | 15.3     | 15.3     | 17.0      | 19.4      |
| T2                  | 12.1  | 21.9     | 14.0     | 13.3     | 14.4     | 14.6     | 14.6     | 16.2      | 18.5      |
| S2                  | 11.2  | 19.4     | 13.5     | 13.8     | 14.8     | 15.3     | 15.3     | 17.0      | 19.4      |
| T3                  | 7.1   | 12.0     | 7.9      | 8.0      | 8.1      | 8.9      | 9.0      | 10.3      | 11.4      |
| S3                  | 11.2  | 19.4     | 13.5     | 13.8     | 14.8     | 15.3     | 15.3     | 17.0      | 19.4      |
| T4                  | 6.9   | 12.2     | 7.5      | 8.0      | 8.1      | 8.9      | 9.0      | 10.3      | 11.4      |
| S4                  | 11.2  | 19.4     | 13.5     | 13.8     | 14.8     | 15.3     | 15.3     | 17.0      | 19.4      |
| T5                  | 11.8  | 16.6     | 11.1     | 11.6     | 11.7     | 12.5     | 12.6     | 14.2      | 16.0      |
| S5                  | 11.2  | 19.4     | 13.5     | 13.8     | 14.8     | 15.3     | 15.3     | 17.0      | 19.4      |
| T6                  | 12.7  | 20.3     | 16.5     | 16.6     | 16.7     | 18.4     | 19.1     | 21.6      | 24.2      |
| S6                  | 11.2  | 19.4     | 13.5     | 13.8     | 14.8     | 15.3     | 15.3     | 17.0      | 19.4      |
| T7                  | 17.2  | 10.8     | 14.0     | 17.1     | 17.7     | 19.5     | 19.1     | 21.6      | 24.2      |
| S7                  | 11.2  | 19.4     | 13.5     | 13.8     | 14.8     | 15.3     | 15.3     | 17.0      | 19.4      |
| T8                  | 10.6  | 12.2     | 5.7      | 10.6     | 11.6     | 13.3     | 13.8     | 15.6      | 18.0      |
| S8                  | 11.2  | 19.4     | 13.5     | 13.8     | 14.8     | 15.3     | 15.3     | 17.0      | 19.4      |
| T9                  | 11.3  | 19.5     | 13.7     | 13.9     | 14.0     | 14.6     | 14.7     | 17.0      | 19.4      |
| S9                  | 11.2  | 19.4     | 13.5     | 13.8     | 14.8     | 15.3     | 15.3     | 17.0      | 19.4      |
| T10                 | 18.6  | 12.4     | 13.5     | 13.7     | 14.0     | 14.6     | 14.7     | 17.0      | 19.4      |
| S10                 | 11.2  | 19.4     | 13.5     | 13.8     | 14.8     | 15.3     | 15.3     | 17.0      | 19.4      |
| Mean                | 12.5A | 14.5B   | 12.6A     | 13.4A     | 13.5A     | 13.6A     | 13.7A     | 15.6A     | 17.8A     |
| Ftest               | S     | S       | S         | S         | S         | S         | S         | S         | S         |
| Emean               | 0.068 | 0.028   | 0.089     | 0.065     | 0.042     | 0.087     | 0.050     | 0.023     | 0.027     |
| CD at %             | 0.063 | 0.028   | 0.089     | 0.065     | 0.042     | 0.087     | 0.050     | 0.023     | 0.027     |

5.1 - Ambient storage, 5.2 - cool storage

T1-Aloe vera 60% + mango 40%, T2-Aloe vera 50% + mango 50%, T3-Aloe vera 40% + mango 60%, T4-Aloe vera 60% + guava 40%, T5-Aloe vera 50% + guava 50%, T6-Aloe vera 40% + guava 60%, T7-Aloe vera 60% + pome apple 40%, T8-Aloe vera 50% + pome apple 50%, T9-Aloe vera 40% + pome apple 60%, T10- Aloe vera 100%.

Table 2: Development and Standardization of Aloe vera jam with fruit flavours and evaluation of storage stability on Total sugars (%)

| Total sugars (%) | Day 1 | 15th Day | 30th Day | 45th Day | 60th Day | 75th Day | 90th Day | 105th Day | 120th Day |
|------------------|-------|----------|----------|----------|----------|----------|----------|-----------|-----------|
| T1               | 20.5  | 27.2     | 23.9     | 20.6     | 27.3     | 21.9     | 22.6     | 29.3      | 25.9      |
| S1               | 22.5  | 29.2     | 25.9     | 22.6     | 29.3     | 25.9     | 24.5     | 31.2      | 27.9      |
| T2               | 24.1  | 16.2     | 20.2     | 24.2     | 16.3     | 20.2     | 16.1     | 18.3      | 22.7      |
| S2               | 24.1  | 16.2     | 20.2     | 24.2     | 16.3     | 20.2     | 16.1     | 18.3      | 22.7      |

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Table 3: Development and Standardization of Aloe vera jam with fruit flavoured in a model medium rich or poor in nutrients. The results were evaluated on the basis of sensory characteristics.

| Day | Aloe vera 60% + mango 40% | T2-Aloe vera 50% + mango 50% | T3-Aloe vera 40% + mango 60% | T4-Aloe vera 60% + guava 45% | T5-Aloe vera 50% + guava 50% | T6-T4-Aloe vera 40% + guava 60% | T7-Aloe vera 50% + pineapple apple 46% | T8-Aloe vera 50% + pineapple apple 45% | T9-Aloe vera 40% + pineapple apple 46% | T10-Aloe vera 100%
|---|---|---|---|---|---|---|---|---|---|---
| 1st Day | 7.8 | 7.5 | 7.8 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5
| 10th Day | 6.9 | 7.0 | 6.9 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0
| 30th Day | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4
| 90th Day | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7
| 105th Day | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0
| 120th Day | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3

Table 4: Development and Standardization of Aloe vera jam with fruit flavoured in a model medium rich or poor in nutrients. The results were evaluated on the basis of sensory characteristics.

| Colour appearance | Day 1 | 15th Day | 30th Day | 45th Day | 60th Day | 75th Day | 90th Day | 105th Day | 120th Day |
|---|---|---|---|---|---|---|---|---|---|
| S1 | 7.9 | 8.0 | 8.4 | 8.3 | 8.0 | 7.9 | 7.8 | 7.7 | 7.6 |
| S2 | 7.8 | 8.0 | 8.3 | 8.1 | 8.0 | 7.9 | 7.8 | 7.7 | 7.6 |
| S3 | 8.0 | 8.2 | 8.5 | 8.4 | 8.2 | 8.1 | 7.9 | 7.8 | 7.7 |

S1-ambient storage, S2-cool storage.
T1-Aloe vera 60% + mango 40%, T2-Aloe vera 50% + mango 50%, T3-Aloe vera 40% + mango 60%, T4-Aloe vera 60% + guava 45%, T5-Aloe vera 50% + guava 50%, T6-T4-Aloe vera 40% + guava 60%, T7-Aloe vera 50% + pineapple apple 46%, T8-Aloe vera 50% + pineapple apple 45%, T9-Aloe vera 40% + pineapple apple 46%, T10-Aloe vera 100%.
Table 5: Development and Standardization of Aloe vera jam with fruit flavours and evaluation of storage stability on Aroma

| Aroma | 15th Day | 30th Day | 45th Day | 60th Day | 75th Day | 90th Day | 105th Day | 120th Day |
|-------|----------|----------|----------|----------|----------|----------|-----------|-----------|
| Mean S1 | Mean S2 | Mean S1 | Mean S2 | Mean S1 | Mean S2 | Mean S1 | Mean S2 | Mean S1 | Mean S2 |
| T1 | 8.4 | 8.9 | 8.7 | 8.3 | 8.8 | 8.6 | 8.0 | 8.5 | 8.3 |
| T2 | 7.8 | 8.1 | 8.0 | 7.7 | 8.0 | 7.9 | 7.5 | 7.8 | 7.7 |
| T3 | 7.0 | 7.3 | 7.2 | 6.9 | 7.2 | 7.1 | 6.8 | 7.0 | 6.9 |
| T4 | 8.2 | 8.5 | 8.4 | 8.1 | 8.4 | 8.3 | 8.0 | 8.1 | 8.0 |
| T5 | 7.7 | 8.0 | 7.9 | 7.6 | 7.9 | 7.8 | 7.4 | 7.7 | 7.6 |
| T6 | 8.4 | 8.9 | 8.7 | 8.3 | 8.8 | 8.6 | 8.0 | 8.5 | 8.3 |
| Mean T9 | 7.9 | 7.6 | 7.7 | 7.3 | 7.8 | 7.6 | 7.0 | 7.5 | 7.3 |
| F test | 0.03 | 0.02 | 0.04 | 0.02 | 0.01 | 0.04 | 0.02 | 0.01 | 0.03 |
| T | 7.8 | 8.1 | 8.0 | 7.7 | 8.0 | 7.9 | 7.5 | 7.8 | 7.7 |
| T9 | 7.1 | 7.3 | 7.2 | 6.9 | 7.2 | 7.1 | 6.8 | 7.0 | 6.9 |
| T3 | 8.2 | 8.5 | 8.4 | 8.1 | 8.4 | 8.3 | 8.0 | 8.1 | 8.0 |
| T7 | 7.7 | 8.1 | 7.9 | 7.6 | 8.0 | 7.9 | 7.4 | 7.7 | 7.6 |
| T8 | 7.4 | 7.6 | 7.5 | 7.3 | 7.5 | 7.4 | 7.1 | 7.4 | 7.3 |
| T9 | 7.8 | 8.4 | 8.1 | 7.8 | 8.2 | 8.1 | 7.9 | 8.2 | 8.1 |
| T5 | 7.7 | 8.1 | 7.9 | 7.6 | 8.0 | 7.9 | 7.4 | 7.7 | 7.6 |
| T7 | 8.6 | 8.8 | 8.7 | 8.5 | 9.1 | 8.9 | 8.7 | 9.1 | 8.9 |
| T8 | 7.8 | 8.4 | 8.1 | 7.7 | 8.3 | 8.0 | 7.6 | 8.1 | 7.9 |
| T9 | 7.4 | 7.6 | 7.5 | 7.3 | 7.5 | 7.4 | 7.1 | 7.4 | 7.3 |
| T7 | 7.8 | 8.4 | 8.1 | 7.6 | 8.1 | 7.9 | 7.4 | 7.7 | 7.6 |
| T8 | 7.4 | 7.6 | 7.5 | 7.3 | 7.5 | 7.4 | 7.1 | 7.4 | 7.3 |
| T9 | 7.8 | 8.4 | 8.1 | 7.6 | 8.1 | 7.9 | 7.4 | 7.7 | 7.6 |
| Mean S2 | 7.9 | 7.6 | 7.7 | 7.4 | 8.0 | 7.8 | 7.5 | 8.0 | 7.8 |
| F test | 0.03 | 0.02 | 0.04 | 0.02 | 0.01 | 0.04 | 0.02 | 0.01 | 0.03 |

Table 6: Development and Standardization of Aloe vera jam with fruit flavours and evaluation of storage stability on Taste S1- ambient storage, S2- cool storage

| Taste | 15th Day | 30th Day | 45th Day | 60th Day | 75th Day | 90th Day | 105th Day | 120th Day |
|-------|----------|----------|----------|----------|----------|----------|-----------|-----------|
| Mean S1 | Mean S2 | Mean S1 | Mean S2 | Mean S1 | Mean S2 | Mean S1 | Mean S2 | Mean S1 | Mean S2 |
| T1 | 8.6 | 8.8 | 8.4 | 8.4 | 8.6 | 8.5 | 8.5 | 8.4 | 8.5 |
| T2 | 7.8 | 8.4 | 8.1 | 7.7 | 8.3 | 8.0 | 7.6 | 8.2 | 7.9 |
| T3 | 7.4 | 7.6 | 7.5 | 7.3 | 7.5 | 7.4 | 7.1 | 7.3 | 7.3 |
| T4 | 8.3 | 8.5 | 8.3 | 7.9 | 8.1 | 8.3 | 8.3 | 8.2 | 8.3 |
| T5 | 7.7 | 8.1 | 7.9 | 7.6 | 8.0 | 7.9 | 7.5 | 8.2 | 7.9 |
| T6 | 8.6 | 8.8 | 8.7 | 8.5 | 8.4 | 8.5 | 8.4 | 8.5 | 8.4 |
| T7 | 7.8 | 8.4 | 8.1 | 7.6 | 8.1 | 7.9 | 7.4 | 8.1 | 7.8 |
| T8 | 7.4 | 7.6 | 7.5 | 7.3 | 7.5 | 7.4 | 7.1 | 7.4 | 7.3 |
| T9 | 8.3 | 8.5 | 8.4 | 8.1 | 8.3 | 8.2 | 8.1 | 8.3 | 8.2 |
| Mean Mean | 7.9 | 7.6 | 7.7 | 7.4 | 8.0 | 7.8 | 7.5 | 8.0 | 7.8 |
| F test | 0.03 | 0.02 | 0.04 | 0.02 | 0.01 | 0.04 | 0.02 | 0.01 | 0.03 |

Table 7: Development and Standardization of Aloe vera jam with fruit flavours and evaluation of storage stability on Overall acceptability

| Overall acceptability | 15th Day | 30th Day | 45th Day | 60th Day | 75th Day | 90th Day | 105th Day | 120th Day |
|----------------------|----------|----------|----------|----------|----------|-----------|-----------|-----------|
| Mean S1 | Mean S2 | Mean S1 | Mean S2 | Mean S1 | Mean S2 | Mean S1 | Mean S2 | Mean S1 | Mean S2 |
| T1 | 8.7 | 8.9 | 8.6 | 8.4 | 8.7 | 8.4 | 8.5 | 8.2 | 8.4 |
| T2 | 8.0 | 8.5 | 8.3 | 7.9 | 8.4 | 8.2 | 8.1 | 8.0 | 8.0 |
| T3 | 7.6 | 7.8 | 7.7 | 7.5 | 7.7 | 7.5 | 7.4 | 7.6 | 7.5 |
| T4 | 8.4 | 8.6 | 8.5 | 8.3 | 8.5 | 8.4 | 8.3 | 8.5 | 8.4 |
| T5 | 7.6 | 8.2 | 7.9 | 7.5 | 8.1 | 7.8 | 7.4 | 8.0 | 7.7 |
| T6 | 8.7 | 8.9 | 8.6 | 8.4 | 8.7 | 8.5 | 8.5 | 8.6 | 8.5 |

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T1 - Aloe vera 60% + mango 40%, T2 - Aloe vera 50% + mango 50%, T3 - Aloe vera 40% + mango 60%, T4 - Aloe vera 60% + guava 40%, T5 - Aloe vera 50% + guava 50%, T6 - Aloe vera 40% + guava 60%, T7 - Aloe vera 60% + pine apple 40%, T8 - Aloe vera 50% + pine apple 50%, T9 - Aloe vera 40% + pine apple 60%, T10 - Aloe vera 100%.

Fig 2: Development and Standardization of Aloe vera jam with fruit flavours and evaluation of storage stability on Reducing sugars (%)
Note: T1-Aloe vera 60% + mango 40%, T2-Aloe vera 50% + mango 50%, T3-Aloe vera 40% + mango 60%, T4-Aloe vera 60% + guava 40%, T5-Aloe vera 50% + guava 50%, T6-Aloe vera 40% + guava 60%, T7-Aloe vera 60% + pine apple 40%, T8-Aloe vera 50% + pine apple 50%, T9-Aloe vera 40% + pine apple 60%, T10-Aloe vera 100%.

Fig 4: Development and Standardization of Aloe vera jam with fruit flavours and evaluation of storage stability on Non-reducing sugars (%)

Note: T1-Aloe vera 60% + mango 40%, T2-Aloe vera 50% + mango 50%, T3-Aloe vera 40% + mango 60%, T4-Aloe vera 60% + guava 40%, T5-Aloe vera 50% + guava 50%, T6-Aloe vera 40% + guava 60%, T7-Aloe vera 60% + pine apple 40%, T8-Aloe vera 50% + pine apple 50%, T9-Aloe vera 40% + pine apple 60%, T10-Aloe vera 100%.

Fig 5: Development and Standardization of Aloe vera jam with fruit flavours and evaluation of storage stability on Colour appearance

Note: T1-Aloe vera 60% + mango 40%, T2-Aloe vera 50% + mango 50%, T3-Aloe vera 40% + mango 60%, T4-Aloe vera 60% + guava 40%, T5-Aloe vera 50% + guava 50%, T6-Aloe vera 40% + guava 60%, T7-Aloe vera 60% + pine apple 40%, T8-Aloe vera 50% + pine apple 50%, T9-Aloe vera 40% + pine apple 60%, T10-Aloe vera 100%.

Fig 6: Development and Standardization of Aloe vera jam with fruit flavours and evaluation of storage stability on Aroma
Conclusion
The experiment, Development and Standardization of Aloe vera jam with fruit flavours and nutritional and organoleptic evaluation, different analysis of nutritional, sensory evaluation treatment Aloe vera 40% + guava 60% (T6) stored at cool condition was found to be satisfactory and acceptable in terms of sensory and nutritional quality.

References
1. Amerine MA, Pangborn RM, Roessler EB. Principles of sensory evaluation of food. Food Science and Technology Monographs. New York 1965, 338-339.
2. Jasim A. Studies on Watermelon products. Indian Food Packer. 1996;50(3):15-20.
3. Jayabalan K, Karthikeyan C. Optimization of Ingredients for Sensory evaluation of Aloe vera Jam preparation using Response Surface Methodology (RSM). International Journal of Engineering Research and Applications 2013. ISSN: 2248-9622.
4. Kadam SS, Charan UD, Dhotre VA. Processing of ber-I preparation of ready to serve beverage and candy. Beverage and Food World 1991;18(3):13-15.
5. Kalra CL. The Chemistry and technology of amla (Phyllanthus emblica): A resume. Indian Food Packer 1988;42(4):67-82.
6. Kalra SK, Tandon DK. Guava nectars from sulphited pulp and their blends with mango nectar. Indian Food Packer 1987;38(1):74-77.
7. Khambalkar VP, Thakur KB, Amita Sawant Shilpa, Dahatonde Karale DS. Preservation of Aloe vera leaf juice by different methods. Asian Journal of Experimental Chemistry 2007;2(1, 2):10-14.
8. Khurdiya DS, Singh RN. Ber and its products. Indian Horticulture. 1975;20(1):25.
9. Koukounaras A, Siomos AS, Sfakiotakis E. Post harvest CO2 and ethylene production and quality of rocket (Eruca sativa Mill) leaves as affected by leaf age storage temperature. Postharvest Biology and Technology. 2007;46(2):167-173.
10. Madhuri Dahiwale, Priyanka Dhurve. Study on preparation of guava jam blended with carit and tulasi leaves. International journal of Recent Scientific Research 2017, 20923-20928.
11. Olugbenga Olufemi Awolu, Grace Oluwaseun Okedele, Modupe Elizabeth Ojewumi, Funmilayo Grace Oseyemi. 2018. Functional jam production from blends of banana, pine apple and water melon. International journal of Food science and Bio Technology.

12. Patel NV, Naik AG, Ashok K. Quality evaluation and storage study of banana-pine apple blended jam. International journal of food quality and safety 2015.

13. Ranganna S. Hand book of Analysis of quality control for fruit and vegetable products Tata Mc. Graw Hill Book Co., New Delhi 1977.

14. Reynolds T. The compounds in aloe leaf exudates: a review. Botanical Journal of the Linnean Society 1985;90:157-177.

15. Saroj PL, Dhandar DG, Singh RS. Indian Aloe. Central Institute for Arid Horticulture, Bikaner, Rajastha 2004, 3-6.

16. Shafaly Sharma, Rakesh Gehlot, Rattan Singh, Rekha, Ritu Sindhu. Preparation and evaluation of bale-mango jam. International journal of Current Microbiology and Applied Sciences 2019. ISSN: 2319-7706.

17. Talimiz Ur Rahman, Amanullah, Nazia Tahir, Said wahaab, Adnan Tahir, Ata Ur Rahman et al. Evaluation and preparation of guava jam stored at ambient temperature 2018;7(3):1064-1073.