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# Formulation, storability and quality assessment of blended nectar of guava (*Psidium guajava*) and papaya (*Carica papaya* ) pulp

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**ABSTRACT**

The experiment was conducted at School of Agriculture, ITM University, Gwalior, to standardize the blended nectar of guava (*Psidium guajava* L.) and papaya (*Carica papaya* L.) pulp during 2021-2022. Blended drinks were good alternative for development of new products to provide taste, nutrition as well as medicinal properties. Due to high amount of ascorbic acid and fibre, guava acts as an anti-oxidant, whereas papaya is highly rich in carotenoides and riboflavin. The Total Soluble Solids, acidity, reducing sugars and total sugars increased, whereas pH, ascorbic acid, non-reducing sugar and organoleptic score decreased with advancement in storage period in PET bottles. Nectar prepared with 20 % fruit pulp comprising 80 % guava and 20 % papaya with 13 % TSS, 0.3 % acidity and 70 ppm $SO_2$ ($T_6$) was found more acceptable (8.20) than other blend formulations. The nectar was organoleptically acceptable up to 4 months of storage at ambient temperature (18.3-27.9$^0$C) into PET bottles. Thus, guava and papaya can be utilized for valuable nectar beverage making which can be beneficial for consumers in terms of taste, colour, flavour and therapeutic properties.

**Key Words:** Nectar, Blended nectar, PET bottles, Storage, Organoleptic quality.

Guava (*Psidium guajava* L.) is a rich source of vitamin C and fair source of calcium, phosphorous and roughage, hence it is ideal fruit for nutritional security. It is also good source of pectin and therefore, it is useful for preparation of jam, jelly and nectar (Bairwa *et al.* 2020). Guava is considered as one of the exquisite, nutritionally valuable and remunerative fruit crop (Singh *et al.* 2013). It contains appreciable quantities of antioxidants like polyphenols and ascorbic acid. Similarly, papaya (*Carica papaya* L.) is a good source of natural sugars and vitamin C but is low in calories and has great medicinal value. It is highly used for making processed products, candy, toffee, jam, jelly and beverages such as RTS, squash and syrup. Keeping in view, an experiment was done to standardize appropriate combination of guava-papaya blends for preparation of nectar and also to assess the changes in chemical constituents and overall acceptability of beverage blends during storage.

## MATERIALS AND METHODS

Guava and papaya (local variety) fruits were purchased and their pulp were used for nectar preparation. The treatments were: $T_1$, 20 % blend comprising 100 % guava pulp + 0 % papaya juice and adjusted to 15% TSS, 0.30% acidity and 70 ppm $SO_2$; $T_2$, 20 % blend comprising 0 % guava pulp + 100 % papaya juice and adjusted to 15% TSS, 0.30% acidity and 70 ppm $SO_2$; $T_3$, 20 % blend comprising 50 % guava pulp + 50 % papaya juice and adjusted to 15% TSS, 0.30% acidity and 70 ppm $SO_2$; $T_4$, 20 % blend comprising 60 % guava pulp + 40 % papaya juice and adjusted to 15% TSS, 0.30% acidity and 70 ppm $SO_2$; $T_5$, 20 % blend comprising 70 % guava pulp + 30 % papaya juice and adjusted to 15% TSS, 0.30% acidity and 70 ppm $SO_2$; $T_6$, 20 % blend comprising 80 % guava pulp + 20 % papaya juice and adjusted to 15% TSS, 0.30% acidity and 70 ppm $SO_2$ and $T_7$, 20 % blend comprising 90 % guava pulp + 10 % papaya juice and adjusted to 15% TSS, 0.30% acidity and 70 ppm $SO_2$.

Nectar comprising 20% blend, 15% TSS, 0.30% acidity and 70ppm $SO_2$ were prepared by different treatments for each blend combination. This nectar was organoleptically evaluated on 9-point Hedonic scale to find out the best combination of blend.

Finally, 5 liters of nectar was prepared with best combination of blend, and filled into 200 ml sealed

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PET bottles of capacity leaving 1.6 cm head space and put for storage studies under ambient condition. During storage observation on changes in TSS, acidity, pH, vitamin-C, reducing sugars, non-reducing sugar, total sugars and organoleptic quality were recorded at monthly interval. Observations were recorded for changes in TSS, acidity, pH and vitamin-C (Rangana, 2010), sugars and organoleptic quality at monthly intervals during 4 months of storage period.

Total soluble solids was measured by using ERMA company made hand refractometer at ambient temperature and corrected at 20°C using reference table, whereas acidity was determined by titrating known quantity of sample against 0.1 N sodium hydroxide solution using phenolphthalein as an indicator and expressed in per cent anhydrous citric acid. The pH was estimated by digital pH meter at room temperature, while vitamin C content was estimated by preparing sample in 3 per scent metaphosphoric acid solution and titrating against 2, 6 dichlorophenol indophenols dye solution till the appearance of light pink colour. The reducing, non-reducing and total sugars were analyzed by using Fehling's solution A and B and methylene blue as an indicator. A panel of 9 semi trained judges including male and female evaluated nectar for its colour, flavour, taste, appearance and overall acceptability on 9-point Hedonic scale.

The experiments were conducted in 3 replications. The statistical analysis of data was done by computer software as per Panse and Sukhatne (1985).

## RESULTS AND DISCUSSION

Fresh guava pulp used in nectar making contained 10.33 $^0$B Total Soluble Solids, 0.48 per cent acidity, 4.02 pH, 212 mg/100g vitamin C, 6.32 per cent reducing sugars, 3.38 per cent non-reducing sugar and 9.70 per cent total sugars. Kumari (2016) reported similar findungs in gauva. Papaya pulp contained 12.55 $^0$B Total Soluble Solids, 0.25 per cent acidity, 4.70 pH, 55.08 mg/100g vitamin-C, 8.64 per cent reducing sugars, 2.10 per cent non-reducing sugar and 10.74 per cent total sugars. Balaswamy *et al.* (2013) reported the similar reading.

A quality blended nectar with 20 per cent blend comprising 80 per cent guava pulp and 20 per cent papaya pulp with 15 percent sugar, 0.30 per cent acidity and 70 ppm $SO_2$ ($T_6$) was organoleptically found best for preparation of blend nectar**.** Similarly, Salvi *et al.* (2015) reported that the nectar containing 75 % guava pulp and 25 % papaya pulp has secured maximum organoleptic score.

The Total Soluble Solids of nectar increased gradually after one month of storage from 15.00 to 15.44 per cent. This change might be due to the conversion of polysaccharides into simple sugars (Table 1). Similarly increasing trend in TSS during storage was noticed in guava nectar supplemented with Aloe vera gel **(**Abed *et al.,* 2014), rangpur lime based RTS (Deen and Harendra, 2022) and paniol (*Flacourtia jangomos*) jam and jelly (Baruah *et al.* 2019) which are in agreement of present observations.

The acidity of nectar increased gradually during storage period. Total acidity increased from 0.30 per cent at initial day to 0.45 per cent at final day of storage.

The increasing trend in acidity during storage was observed by Rohila *et al.* (2017) on bael-guava nectar and Baruah *et al.* (2019) in paniol (*Flacourtia jangomos*) jam and jelly. The pH content continuously decreased from the first day 3.95 to 3.58 throughout the storage period. This decrease in pH content might be due to degradation of carbohydrates present in mixed fruit juices by the action of microorganisms. Similarly decreasing trend in pH during storage was observed by Priyanka *et al.* (2015) in jamun based RTS. vitamin C content was continuously decreased from the first day (13.36 mg/100ml) to the end of storage (13.09 mg/100ml) throughout the storage period. This decrease in vitamin C content might be due to oxidation of ascorbic acid into dehydro-ascorbic acid in the presence of oxygen.

The loss of vitamin C in nectar of different fruits-based beverages during storage at ambient temperature was also reported by Selvi *et al.* (2018) and Baruah *et al.* (2019). The reducing sugars and total sugars of blended nectar, increased gradually and it was increased from 6.44 per cent to 6.85 per cent and 9.46 per cent to 9.65 percent, respectively. These finding were supported by Singh and Singh (2014); Rohila *et al.* (2017) and Baruah *et al.* (2019). The non-reducing sugar of blended nectar, decreased continuously throughout the entire period of storage and it was decreased from 3.02 to 2.80 %. This finding was supported by Deen and Harendra (2022) in rangpur lime based RTS. Organoleptic score of blended RTS decreased gradually with the storage period at room temperature (18.3-27.9$^0$C). The acceptability of nectar was maintained up to four months. The score was significantly decreased

**Biochemical assessment and organoleptic changes of nectar during storage period into PET bottles**

| Storage period (months) | TSS (0Brix) | Acidity (%) | pH | Vitamin-C (mg/100ml) | Reducing sugars (%) | Non-reducing sugar (%) | Total sugars (%) | Organoleptic | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Score | Rating |
| 0 | 15.00 | 0.30 | 3.95 | 13.36 | 6.44 | 3.02 | 9.46 | 8.20 | LVM |
| 1 | 15.04 | 0.30 | 3.90 | 13.35 | 6.49 | 3.00 | 9.49 | 8.00 | LVM |
| 2 | 15.11 | 0.33 | 3.83 | 13.30 | 6.58 | 2.95 | 9.53 | 7.75 | LM |
| 3 | 15.25 | 0.38 | 3.72 | 13.22 | 6.70 | 2.88 | 9.58 | 7.42 | LM |
| 4 | 15.44 | 0.45 | 3.58 | 13.09 | 6.85 | 2.80 | 9.65 | 7.12 | LM |
| **SE.m±** | 0.04 | 0.01 | 0.02 | 0.03 | 0.02 | 0.02 | 0.03 | 0.03 | |
| **CD (1%)** | 0.17 | 0.06 | 0.08 | 0.12 | 0.07 | 0.09 | 0.13 | 0.15 | |
| **CD (5%)** | 0.12 | 0.04 | 0.06 | 0.08 | 0.05 | 0.06 | 0.09 | 0.10 | |
| **CV** | 0.43 | 6.60 | 0.88 | 0.34 | 0.42 | 1.20 | 0.54 | 0.78 | |

LVM, Like very much; LM, Like moderately

from 8.20 at first day to 7.12 at final day of storageinto PET bottles. Reduction in organoleptic quality is also reported in guava-papaya blended fruit bar (Avhad *et al.,* 2019).

## CONCLUSION

It may be concluded that nectar prepared from 20 % blend pulp comprising 80 % guava pulp and 20 % papaya pulp containing 20 % TSS, 0.30 % acidity and 70 ppm $SO_2$ ($T_6$) was found best during organoleptic evaluation. The TSS, acidity, reducing sugars, total sugars increased, whereas pH, vitamin C, non-reducing sugar and organoleptic quality decreased during storage into PET bottles. The nectar can be stored up to 4 months at ambient storage (18.3-27.9$^0$C) with acceptable quality into PET bottles.

## REFERENCES


Abed S M, Elbandy M A, Gad S S A and Abdel F M G. 2014. Production of guava nectar supplemented with Aloe vera gel. *World J. Dairy Food Sci.* **9**(2): 1-19.

Avhad B A, Kotecha P M, Lande S B and Chavan U D. 2019. Studies on preparation of fruit bar from papaya and guava. *J. Pharmacogn. Phytochem* **8**(4): 3219-23.

Bairwal S K, Singh N, Verma H and Asarey R. 2020. Analysis of attitude of fruit growers towards guava (*Psidium guajava* L.) cultivation in Sawai Madhopur district of Rajasthan, India. *Current Horticulture* **8**(1): 33–36.

Baruah A, Langthasa S, Hazarika D N, Kalita M K and Goswami R K. 2019. Evaluation of physico-chemical and sensory properties of jam and jelly prepared from paniol (*Flacourtia jangomos*) fruits. *Current Horticulture* **7**(1): 59–63.

Balaswamy K, Rao P, Nagender A, Rao N, Sathiya M G, Jyothirmayi T, Math R G and Satyanarayana A. 2013. Development of smoothies from selected fruit pulps/ juices. *International. Food Res. J.* **20**(3): 1181-85.

Deen B and Harendra. 2022. Studies on RTS preparation from aonla (*Emblica officinalis*), rangpur lime (*Citrus×limonia*) and ginger *(Zingiber officinale* Rosc.) Blends. *Scientist* **1**(3): 6209-6215.

Kumari Y. 2016. Studies on effect of blending impact of guava (*Psidium guajava* L.) and papaya (*Carica papaya* L.) pulp on recipe standardization of blended nectar and RTS (Ready to Serve) beverages. Biology.

Panse V G and Sukhatme P V. 1985. Statistical Methods for Agricultural Workers. *Indian Council of Agricultural Research Publication,* 3rd rev. edn.

Priyanka N, Dorajeerao A V D and Sudhavani V. 2015. Utilization of Jamun juice by making blended RTS beverages. *Plant Archives* **15**(2): 1083-88.

Ranganna S. 2010. Analysis and quality control for fruit and vegetable products, *Tata Mc Graw-Hill Ltd.,* New Delhi.

Rohila H, Gehlot R, Siddiqui S and Rekha. 2017. Changes in chemical constituents and overall acceptability of bael-guava nectar and crush during storage. *J. Hort. Sci.* **12**(1):65-70.

Salvi S P, Pawar S N and Zote V K. 2015. Sensory evaluation of blended nectar of guava-papaya. *International Journal of Processing and Post Harvest Technology* **6**(2): 168-71.

Selvi J, Banumathi P, Kanchana S and Kamaraj P. 2018. Studies on preparation of guava-lime-ginger ready to serve (RTS) beverage. *International. J. Chem. Stud.* **6**(5): 336-340.

Singh L B, Singh R, Singh J and Gurjar P S. 2013. Correlation studies on integrated plant nutrient management in guava (Psidium guajava) cv. Allahabad Safeda. *Current Horticulture* **1**(2): 58–61.

Singh O and Singh R. 2014. Development and Evaluation of Aonla based blended nectar drink from different fruits using stevia for low calorie. *Plant Archives* **14**(1): 115-19.