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Short communication

Evaluation of guava (*Psidium guajava* L.) varieties and standardization of recipe for nectar preparation

Madan Lal Choudhary¹, S.N. Dikshit², Neeraj Shukla and R.R. Saxena³

Department of Horticulture
College of Agriculture, IGAU, Raipur - 492006 (C.G.), India
E-mail: sndikshit@rediffmail.com

ABSTRACT

The nectar prepared from guava variety L-49 had highest ascorbic acid, pH and non-reducing sugar. The recipe with 20 per cent pulp, 0.3 per cent acidity and 17°Brix (TSS) recorded highest organoleptic score. The acidity, TSS, total and reducing sugar of nectar showed an increasing trend during the progress of storage upto five months under ambient conditions. However, these chemical constituents did not change markedly until five months of storage as compared to fresh nectar at the time of preparation.

Key words: Guava varieties, nectar, recipe, storage, ambient condition, organoleptic score

Guava (*Psidium guajava* L.) is one of the most important commercial fruit crops of India (Tandon *et al*, 1983). The guava fruit is an excellent source of vitamin C ranging from 70 to 350 mg/100 g, and a rich source of minerals like calcium, phosphorus and iron. The fruit also contains substantial quantity of vitamin A, pantothenic acid, riboflavin, thiamin and niacin. The fruits can be processed into various products like jam, jelly, cheese, ketchup, clarified juice, powder, toffee, flakes, nectar and butter paste for domestic market as well as export. The present study deals with the evaluation of four guava varieties for nectar preparation.

Firm ripe fruits of four guava varieties were selected for the preparation of guava nectar. The fruits were washed, sliced blended with equal amount of warm water in a waring blender and sieved to obtain a fine fruit pulp free from seeds and epicarp. For nectar preparation, 20% pulp was used. The total soluble solids of pulp was adjusted to 15, 16, 17, 18, 19 and 20° Brix with the addition of calculated amount of sugar and the acidity at 0.3% in the final product by the addition of required amount of citric acid. The nectar was filtered and the filtrate was filled in to hot sterilized crown bottles of 250 ml capacity with air tight corking. The bottles were pasteurized in boiling water till the temperature of product reached 100° C and stored at ambient condition for 150 days. TSS was determined by hand refractometer. Total sugar, reducing and non-reducing sugar, acidity and ascorbic acid were estimated as described

by Ranganna (1997). The pH was measured using digital pH meter. Organoleptic scoring was done by a panel of five judges using 9 point hedonic scale (Amerine *et al*, 1965). The data were statistically analysed using completely randomized design with factorial arrangement.

The chemical composition of guava varieties is presented in Table 1. Data revealed that among four varieties of guava, the fruits of Lucknow-49 had maximum TSS, total sugar, reducing and non-reducing sugars as well as ascorbic acid (366.50 mg/100 g). However, the acidity was found medium (0.76%) having slightly acidic pH (5.51).

The data pertaining to biochemical changes in guava nectar prepared from the recipe with 20% pulp, 17° Brix (TSS) and 0.3% acidity during storage of five months are presented in Table 2.

Ascorbic acid

The ascorbic acid content in guava nectar showed a decreasing trend during storage period from the time of preparation (0 day) to five months at ambient condition. The nectar of variety L-49 had significantly higher ascorbic acid followed by Allahabad Safeda, Apple Colour and R-72 in fresh samples at the time of preparation (0 day) to five months of storage. The decrease in ascorbic acid in nectar during storage might be due to oxidation or irreversible conversion of L-ascorbic acid into dehydro ascorbic acid in the presence of enzyme ascorbic acid

¹ College of Agriculture, RAU, Bikaner (Rajasthan)

² Corresponding author's e-mail

³ Department of Statistics and Computer Science

Table 1. Chemical composition of guava fruits used for nectar

Characters	TSS (°Brix)	Total Sugar (%)	Reducing sugar (%)	Non-reducing sugar (%)	Ascorbic acid (mg/100g)	Acidity (%)	pH
Varieties							
Apple Colour	11.32	9.32	4.73	4.49	241.40	0.64	4.87
Allahabad Safeda	13.49	10.24	6.46	3.77	332.10	0.49	5.52
Lucknow-49	14.52	11.63	6.62	5.05	366.50	0.76	5.51
Rewa-72	13.09	10.06	6.52	135.25	0.94	4.25	

Table 2. Compositional changes in guava nectar with recipe of 20% pulp, 17° Brix (TSS) and 0.3% acidity during storage

Parameters	Fresh sample (0 day)				After 5 months (150 days)			
	AC	AS	L-49	R-72	AC	AS	L-49	R-72
TSS (°Brix)	17.03	17.02	17.00	17.00	17.30	17.15	17.10	17.40
Acidity (%)	0.32	0.32	0.32	0.32	0.77	0.65	0.49	0.90
pH	4.41	5.43	5.89	4.31	3.42	4.25	4.65	3.44
Total sugar (%)	16.25	16.15	16.05	16.35	16.52	16.45	16.35	16.64
Reducing sugar (%)	6.17	5.85	5.75	6.35	8.63	8.40	7.24	10.40
Non- reducing sugar (%)	10.07	10.30	10.36	10.03	7.99	8.05	9.11	6.24
Ascorbic acid (mg/100g)	6.58	6.92	7.58	5.25	4.33	5.08	5.67	4.00
Organoleptic score	8.40	8.99	9.00	8.09	6.55	7.21	7.81	6.71

AC: Apple Colour; AS: Allahabad Safeda; L-49: Lucknow-49; R-72: Rewa-72

oxidase caused by trapped or residual oxygen in the glass bottles. Similar reductions in ascorbic acid content have also been reported in guava beverages (Baramanray *et al*, 1995; Pandey and Singh, 1998; Pandey, 2004).

Acidity

The acidity in guava nectar increased in all the varieties during storage. At the end of five months, the nectar of variety L-49 had an acidity of 0.49% followed by Allahabad Safeda, Apple Colour and R-72 (0.90%). The increased acidity in nectar during storage may be due to formation of organic acids as well as progressive decrease in pectin content. Similar findings have also been reported in the beverages of papaya (Kumar, 1990), mango (Rabbani, 1992) and guava (Baramanray *et al*, 1995; Pandey and Singh, 1998; Pandey, 2004).

Total soluble solids (TSS)

The TSS content in guava nectar showed an increasing trend in all the varieties at increasing period of storage upto five months at ambient condition. The nectar of variety R-72 had a higher TSS (17.40°Brix) followed by Apple Colour, Allahabad Safeda and L-49 after five months of storage period. The increased TSS in nectar during storage was probably due to conversion of left over polysaccharides into soluble sugars. Similar results have been reported in date juice RTS (Godara and Pareek, 1985) and guava beverages (Baramanray *et al*, 1995; Pandey and Singh, 1998; Pandey, 2004).

pH of nectar

The pH of guava nectar showed a decreasing trend in all the varieties with increasing period of storage from the time of preparation to five months under room temperature. In fresh nectar, the variety L-49 had the maximum pH of 5.89 followed by Allahabad Safeda, Apple Colour and R-72. After five months of storage period, the nectar of variety L-49 recorded the maximum pH of 4.65 followed by Allahabad Safeda. The reduction in pH could be attributed to simultaneous increase in acidity and TSS of nectar at storage temperature as reported by Sethi (1993) and Prasad and Mali (2000) in litchi and pomegranate squash, respectively.

Total and reducing sugars

The total and reducing sugar content in guava nectar showed an increasing trend in all the varieties with increasing period of storage upto five months under ambient conditions. The nectar of variety R-72 contained maximum total and reducing sugar followed by Apple Colour, Allahabad Safeda and L-49 in fresh samples at the time of preparation as well as at five months of storage. However, the levels of total and reducing sugars in nectar of variety L-49 did not increase much during storage period in comparison to fresh samples. The increased level of total sugar was probably due to conversion of starch and pectin into simple sugars. The increase in reducing sugar as well as total sugar corresponded to the increase in total soluble

solids and ultimate decrease in non-reducing sugar in the nectar during storage period (Murari and Verma, 1989).

Non-reducing sugar

The non-reducing sugar in nectar showed a decreasing trend in all the varieties with increasing period of storage upto five months. The variation in different fractions of sugar might be due to hydrolysis of polysaccharides like starch, pectin and inversion of non-reducing sugar into reducing sugar, as increase in reducing sugar could be correlated with the decrease in non-reducing sugar (Baramanray *et al*, 1995; Shrivastava, 1998).

Organoleptic evaluation

The organoleptic score of guava nectar of all the varieties decreased during storage. The nectar prepared from variety L-49 had a higher score followed by Allahabad Safeda, Apple Colour and R-72 in fresh samples and the products of L-49 and Allahabad Safeda were found to be acceptable upto five months of storage. Loss of volatile aromatic substances responsible for flavour and taste of nectar might have decreased organoleptic score as well as acceptability of nectar during storage at ambient condition as reported by Baramanray *et al* (1995) in guava nectar and Thakur and Barwal (1998) in kiwi fruit squash.

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