

Studies on preparation and preservation of low calorie guava (*Psidium guajava* L.) nectar using stevia as low calorie sweetener

■ JYOTI SWAROOP, SANJAY PATHAK, M.S. JAKHAR AND SANJAY KUMAR

SUMMARY : The experiment was conducted to standardization of the suitable ratio of sugar and stevia for the preparation of quality low calorie guava nectar beverage and observed their chemical changes during storage for three months at ambient temperature. The prepared nectars were organoleptically evaluated by adopting 9 point hedonic rating scale. Among the different sugar-stevia ratios, nectar prepared by using 50 per cent stevia+ 50 per cent sugar was found to be the best on overall sensory score. Best nectar stored in glass bottles and chemical changes during storage were also studied at monthly intervals. Total soluble solids, acidity, ascorbic acid content and non- enzymatic browning of nectar did not change upto the entire period of storage whereas, organoleptic score slightly decreased after two month of storage. According to the organoleptic score, the low calorie guava nectar was found to be acceptable upto three months of storage at ambient temperature with good appearance, flavour, taste and overall acceptability.

KEY WORDS : Guava fruits, Low calorie beverage, Stevia, Sugar- Stevia ratio, Nectar, Organoleptic quality, Storage

How to cite this paper : Swaroop, Jyoti, Pathak, Sanjay, Jakhar, M.S. and Kumar, Sanjay (2012). Studies on preparation and preservation of low calorie guava (*Psidium guajava* L.) nectar using stevia as low calorie sweetener. *Internat. J. Proc. & Post Harvest Technol.*, 3 (2) : 283-285.

Research chronicle : Received : 20.09.2012; Revised : 10.10.2012; Accepted : 21.11.2012

Guava (*Psidium guajava* L.) is an important tropical and subtropical fruit of India, acknowledged as apple of the tropics and belongs to family Myrtaceae. In India, It has fourth position in area and production among all fruits after mango, banana and citrus. It is a rich source of ascorbic acid and pectin and also contains appreciable amount of minerals, vitamins, proteins and sugars like fructose, glucose and sucrose. Fructose is the principal sugar in green ripe fruits, while, sucrose is the main one in fully ripe fruits. Guava cv L-49 (Sardar) is the most important cultivar of Uttar Pradesh. Its

fruits are large- roundish sized, white-yellowish skin coloured, white fleshed, sweet and strongly flavoured with few seeds potential and high pulp percentage.

Guava fruit is recognized as a most promising and well accepted fruit among the processing industries due to its luscious taste, excellent flavour, attractive fragrance and nutritional value. Guava fruits have high percentage of pectin content which is an important constituent of jelly as well as thickening agent of beverages. Row fruits are used for making of several products viz., RTS, nectar, squash, jam, jelly, ice-cream, sherbet, cheese, toffee, etc.

Being a climacteric fruit, guava is very perishable in nature and possesses short shelf life therefore, may have enormous potential if converted into nutritious beverages with exotic taste. The finished beverages contain about 8 to 14 per cent sugar. Today's consumers expect more and more pleasure from food. They want to drink that type of beverage which should be lower in fat and sugar. These facts resulted in development of sugar free as low calorie sweetness. Therefore, fruit beverages can be made with lower calorie sugar like stevia.

Stevia (*Stevia rebaudiana*) belongs to family Asteraceae

MEMBERS OF THE RESEARCH FORUM

Author for Correspondence :

JYOTI SWAROOP, Department of Post Harvest Technology, College of Horticulture and Forestry, N.D. University of Agriculture and Technology, FAIZABAD (U.P.) INDIA
Email : monijakhar@gmail.com

Coopted Authors:

SANJAY PATHAK AND M.S. JAKHAR, Department of Horticulture, N.D. University of Agriculture and Technology, FAIZABAD (U.P.) INDIA

SANJAY KUMAR, Department of Applied Plant Science (Horticulture), B.B. Ambedkar University, LUCKNOW (U.P.) INDIA

and also known as sweet leaf of paraguay, caa-he-ee, kaajhee ervadoce, honey yerba sweet herbs, meethi tulsi etc. It contains approximately 10 per cent of glucose and 150-300 times sweeter than sugar. It is being used as a sugar replacer in manufacturing low calorie processed products. Pure stevia extract (Stevioside) have been suggested to exert beneficial effects on human health, including anti- hypertensive, anti-hyperglycemic, anti-toxicant, non-carcinogenic, anti-bacterial, anti-fungal, anti-inflammatory, anti-microbial, anti-viral and anti-yeast cardio tonic for diuretic people. It is a suitable natural alternative sweetener for diabetics and phenylketonuria patients as well as for observes persons intending to lose weight by avoiding sugar supplements in the slit. No allergic reaction to it was claimed to exist (Bright, 1999). There is a great possibility of obtaining an excellent quality low calorie beverage of guava fruits with pleasant flavour, good taste, medicinal and nutritional properties. Therefore, attempts were made to prepare a quality and healthful low calorie guava nectar beverage by using stevia as sugar replacer.

EXPERIMENTAL METHODS

The investigation was carried out at Babasaheb Bhimrao Ambedker University, Lucknow (U.P.) during the year 2009-2010. The freshly ripe fruits of guava cv. L-49 were collected and washed thoroughly in running water. Fruits were cut in to pieces and then added water in 1:0.25 ratios, thereafter passed through pulper. The seeds were removed by staining through muslin cloth then pulp was collected. Stevia used as sugar replacer was purchased from the local market of aliganj, lucknow. One g stevia was prescribed to contribute no calorie but equivalent to 300 times in sweetness then sugar (one g stivia is equivalent to 300 g of sugar).

Guava nectars were prepared by standard procedure (Fig. A) with 20 per cent pulp, 0.25 per cent acidity and 14 per cent TSS. 14 per cent TSS of nectar was maintained by the calculated amount of stevia and sugar in different ratio *viz.*, 100 per cent stevia + 0 per cent sugar, 75 per cent stevia + 25 per cent sugar, 50 per cent stevia + 50 per cent sugar, 25 per cent stevia + 75 per cent sugar, 0 per cent stevia + 100 per cent sugar. It was noticed that the stevia did not affect the TSS per cent in nectar. The nectar of best sugar-stevia ratio was selected by organoleptic evaluation of a panel of judges and used to prepare final product for the storage studies.

The nectar of best sugar-stevia ratio was bottled and kept for three months in storage at ambient temperature. Chemical changes during storage were determined at monthly intervals. The TSS (⁰Brix) was determined with hand refractometer. Acidity, ascorbic acid and non-enzymatic browning were determined by the procedures of Ranganna (1986). Organoleptic evaluation for assessing sensory attributes of the sample was conducted by a panel of eight judges and samples were rated on the nine point

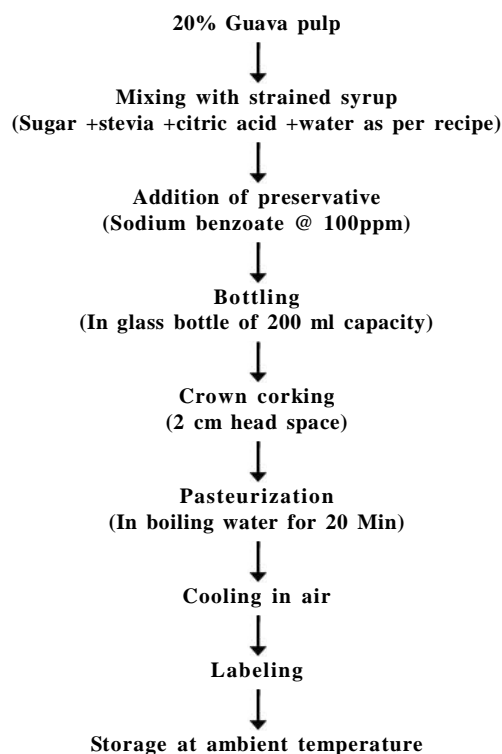


Fig. A: Flow chart for the preparation of low calorie guava nectar

hedonic rating scale described by Amerine *et al.* (1965). The analysis of variance (ANOVA) of the data was carried out by the techniques as by Raghuramula *et al.* (1983).

EXPERIMENTAL FINDINGS AND ANALYSIS

From the data presented in Table 1, result revealed that the organoleptic quality of nectar contained 50 per cent sugar + 50 per cent stevia was found to be significantly superior among all the blending ratios of sugar and stevia with 8.2 organoleptic score (Like very much). This ratio was selected for the preparation of final product. Sharma (2006) reported a well acceptable low calorie aonla and ginger RTS and Singh *et al.* (2012) reported aonla based low calorie nectar, which are very close to present finding.

The data on chemical changes in finally prepared low calorie nectar during storage are presented in Table 2. Result revealed that the total soluble solids (%), total acidity (%), ascorbic acid content (%) and non- enzymetic browning (%) did not change upto the 3 months of storage period in low calorie guava nectar. Organoleptic score of nectar did not change upto two month of storage and then slightly decreased in third month. Organoleptic quality determines the storage stability of the products. The nectar was found acceptable up to three month of storage at ambient temperature with 8.1

Table1: Organoleptic quality of sugar and stevia ratio for the preparation of low calorie guava nectar

Sr.No.	Sugar + Stevia ratio	Organoleptic quality	
		Score	Rating
1.	100% Stevia + 0% Sugar	7.6	LM
2.	75% Stevia + 25% Sugar	6.9	LM
3.	50% Stevia + 50% Sugar	8.2	LVM
4.	25% Stevia + 75% Sugar	7.9	LVM
5.	0% Stevia + 100% Sugar	7.2	LM
	C.D at 5%	0.3	-

Table 2: Chemical changes in low calorie guava nectar during the storage period at ambient temperature

Sr. No.	Storage period (months)	TSS (%)	Acidity (%)	Ascorbic acid (mg/100g)	Non enzymatic browning (O.D)	Organoleptic quality	
						Score	Rating
1.	0	10.3	0.25	28.6	0.16	8.4	LVM
2.	1	10.3	0.25	28.6	0.16	8.4	LVM
3.	2	10.3	0.25	28.6	0.16	8.2	LVM
4.	3	10.3	0.25	28.6	0.16	8.1	LVM
	C.D. @ 5%	NS	NS	NS	NS	NS	-

organoletic score (Like very much) along with good appearance, flavour, taste and overall acceptability. Very closely reports to the present findings have also been reported by Jain and Broker (1970) in guava RTS, Sharma (2006) low calorie aonla and ginger RTS, Singh *et al.* (2007) in guava and pineapple blended nectar, Jakhar and Pathak (2012) in ber and jamun blended RTS and Singh *et al.* (2012) in aonla based low calorie nectar.

Conclusion :

Thus, it is concluded that a guava nectar beverage containing 20 per cent pulp, 0.25 per cent acidity and 14 per

cent TSS (adjusted by using 50% sugar + 50% stevia) may be prepared for obtaining a new low calorie beverage. This product has excellent taste, attractive colour and pleasant flavour along with nutritional and medicinal properties. This product can be stored upto three month at ambient temperature without any change in its chemical and nutritional compositions along with all over acceptability. Therefore, this is the possibility to process a good quality low calorie beverage which may have a good acceptability, marketability and long storage life.

LITERATURE CITED

Amerine, M.A., Panghorn, R.M. and Roessler, E.B. (1965). *Principales of sensory evaluation of food*. Academic press, LONDON.

Bright, G. (1999). Low calorie sweeteners from molecules to mass markets. *World Rev. Nutr. Diet*, **85**:3-9.

Jain, N.L. and Broker, D.K. (1970). Preservation and storage stability of ready-to-serve from guava (*Psidium guajava* L.). *Indian food Packer*, **11**:24-29.

Jakhar, M.S and Pathak, S. (2012). Studies on the preparation and storage stability of blended ready-to-serve from ber (*Zizyphus mauritiana* Lamk.) and jamun (*Syzygium cuminii* Skeels.) pulp. *Plant Archives*, **12** (1):533-536

Raghuramula, H., Mahadavan, Nair, K. and Kalian, S. (1983). *A manual of lab technology*. National institute of Nutrition. Indian Council of Medicinal Research, Haidrabad (A.P.) INDIA.

Ranganna, S. (1986). *Handbook of analysis and quality control for fruit and vegetables products*. Tata McGraw-Hill Publish. Co. Ltd., p.1103.

Sharma, R.D. (2006). Studies on preparation of low calorie RTS beverage from aonla, lime and ginger using stevia. M.Sc. Thesis, G.B. Pant University of Agricultural and Technology, Pant Nagar, UTTARAKHAND (INDIA).

Singh, Om, Pathak, S. and Singh R. (2012). Evaluation of sugar and stevia ratio for the preparation of aonla based low calorie quality beverages. *Beverages & Food World*, **39**(4): 221-224.

Singh, P., Shukla, A., Singh, R. and Singh, A.K. (2007). Utilization of guava juice by value addition through blended beverage. *Acta Hort.*, **735**: 639-645.

