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RESEARCH ARTICLE

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Standardization of technology for development of guava – soybean toffee as a protein enriched product

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ABSTRACT

Guava-soya toffees are prepared by blending guava (*Psidium guajava* L.) pulp with soya (*Glycine max*) slurry for developing protein enriched product. With increase in concentration of soya, the level of protein and fat in the finished product was observed higher as a result of which the concentration of sugars decreased in the final product. Addition of guava increased the level of ascorbic acid, fibre, calcium and phosphorus. However, the product having 85% fruit pulp and 15% soya slurry recorded highest score in sensory attributes revealing better consumer acceptability. Thus, guava fruit being highly perishable and deficient in protein and fat can be utilized by blending with soybean products to yield a nutritious product.

Key words : Soya slurry, Toffees, Fruit pulp, Sensory attributes

INTRODUCTION

Guava (*Psidium guajava* L.) is cultivated in all parts of India. The tree is almost naturalised in our country and it is common to find this spreading shrub laden with aromatic fruits in some remote corner. The guava is known by different names such as amrud, piyara, peru, koyya, jamakaya, sede pandu etc.

The guava fruit is an excellent source of vit. C (Rathore, 1976) up to 2000 mg/100g fruit. Guava fruit is abundant in dietary fibre (from 5-7%), vitamin A, pectin, phosphorus, calcium and potassium. The predominant non-volatile organic compounds of guava fruit include citric, malic, lactic, ascorbic and galacturonic acids (Chan *et al.*, 1971). The strong aroma of guava fruits is attributed to carbonyl compounds.

Soybean belongs to the family Leguminasae. Its botanical name is *Glycine max*. A unique characteristic of soybean as compared to the legumes is of its high protein content. Soybean is a cheap source of quality protein (40-42%) and fat (18-20%) (Chauhan *et al.* 1993a).

Combination of guava pulp and soybean slurry in development of toffee provides the basic nutrients like protein, fat, ascorbic acid, fibre and some minerals. It is also beneficial to afford the healthful product to masses suffering from protein-energy malnutrition (PEM).

MATERIALS AND METHODS

Ripe guava fruits of the 'Sardar' variety were obtained from Department of Horticulture, Marathwada Agricultural University, Parbhani. Pulp was extracted after proper washing of fruit by hot method (Lal and Sharma, 1987) by adding water (100 ml/kg of fruit), heated for 5-7 minutes and passed through pulper.

Soybean was procured from the local market and ground to flour. Soya slurry was prepared by mixing soya flour to water (1:5) in a blender, followed by heating to boiling (5 min) and passing through a pulper (Chauhan *et al.* 1993b).

Guava soya toffees were prepared by following the standard recipe generally used for the preparation of fruit toffees. Only the proportions of fruit pulp and soya slurry were varied to find out the acceptable combinations. Different combinations of guava pulp and soya slurry used were 100:0(T_1), 93:7(T_2), 85:15(T_3) and 78:22(T_4).

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Table 1: Chemical characteristics of guava pulp and soybean slurry

Characteristics	Guava pulp	Soya slurry
Moisture (%)	81.4	86.9
Ash (%)	1.1	-
Titratable acidity (%)	0.52	-
Ascorbic acid (mg/100g)	215	-
Carbohydrate (%)	11.2	2.2
Protein (%)	0.9	7.6
Fat (%)	0.3	3.5

Table 2 :Chemical characteristics of guava-soya toffees

Characteristics	Guava-soya toffees
Moisture (%)	14.8
Ash (%)	3.3
Titratable acidity (%)	0.41
Ascorbic acid (mg/100g)	13.8
Carbohydrate (%)	62.3
Protein (%)	6.4
Fat (%)	11.1

Table 3 : Sensory evaluation scores of guava-soya toffees

Sample	Colour and appearance	Taste	Flavour	Texture	Overall acceptability
T_1	7.28	7.06	7.28	7.08	7.6
T_2	7.74	7.56	7.54	7.64	7.92
T_3	8.12	8.24	8.16	8.12	8.2
T_4	7.74	7.66	7.82	7.74	8.04
S.E. $\pm$	0.13	0.13	0.1	0.12	0.15
C.D. (P=0.05)	0.39	0.41	0.3	0.38	0.47

Besides guava pulp and soya slurry, other ingredients of a standard recipe used were sugar (350 g), liquid glucose (40 g), milk powder (80 g) and edible fat (50 g) per 500 g of the mixture. The prepared mixture was concentrated to about half of its volume by heating with continuous stirring, followed by addition of sugar, liquid glucose, milk powder and edible fat. The mass was heated to a thick consistency (75-80^{0}Bx.), followed by spreading as sheet of 1 cm thickness on a smeared (with edible fat) flat stainless steel tray and then it was cut into toffees of uniform size and wrapped first in butter paper followed by wrapping in toffee wrapper and stored in cool and dry place. Finally, toffees were analyzed for sensory and nutritional properties.

Analytical methods:

Protein (Micro Kjeldahl, N x 6.25), fat (solvent extraction), moisture, ash, acidity and ascorbic acid were determined by the AOAC (1990) methods. Carbohydrate was calculated by difference.

Sensory evaluation:

The sensory evaluation of Fig Toffee samples were examined by trained/semi-trained judges on nine point Hedonic scale for its colour and appearance, taste, flavour, texture and overall acceptability (Amerine *et al.*, 1965).

RESULTS AND DISCUSSION

Chemical characteristics of guava pulp and soya slurry have been given in the Table 1 and freshly prepared guava-soya toffees were analyzed for chemical and sensory characteristics. The protein and fat content of guava-soya toffees increased with the increase in the content of soya slurry as a result of high protein and fat content in soybean. However, the addition of guava increased the level of ascorbic acid, fibre, calcium and phosphorus (Table 2). However, no significant differences were observed among all the treatments with respect to the moisture content of toffees. Highest total sensory score (Table 3) obtained by T_3 treatment showed that 15% soya slurry with 85% guava pulp was the best combination for the preparation of guava-soya toffees.

Conclusion:

It can be concluded that guava fruit being highly perishable does not fetch good price in the market and is deficient in protein and fat. It can be gainfully utilized by blending with soybean to yield nutritious product like toffee. Thus, by preparing protein enriched fruit toffees, the processing industry can fulfill the dual purpose of gain full utilization of fruit and returns to growers besides providing healthful products to the consumers.

REFERENCES

Amerine, M.A., Pangborn, R.M. and Rossler, E.A. (1965). *Principles of sensory evaluation of food.* Academic Press Inc., London, 315pp.

A.O.A.C. (1990). *Official methods of analysis.* Association of Official Analytical Chemists, Washington, D.C.

Chan, H.T., Brekke, J.E. and Chan, T. (1971). Non-volatile organic acids in guava. *J.Food Sci.Technol.*, **36**:237-239.

Chauhan, S.K., Lal, B.B. and Joshi, V.K. (1993a). Development of protein rich apple beverage. *Res. Ind.*, **38**:327.

Chauhan, S.K., Joshi V.K. and Lal, B.B. (1993b). Apricot soya fruit bar: A new protein enriched product. *J.Food Sci.Technol.*, **30**:457.

Lal, B.B. and Sharma, T.R. (1987). Apricot is a potential fruit for processing. *Indian J. agric. Sci.* Nov-Dec: 4.

Rathore, D.S. (1976). Effect of season on the growth and chemical composition of guava (*Psidium guajava* L.) fruits. *J. Horti. Sci.*, **51**: 41-47.

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