Studies on Preparation of Mango-Sapota Mixed Fruit Bar

R.F. Chavan^{1*}, V.G. Jadhao¹ and B.K. Sakhale²

¹Department of Agricultural Engineering, MIT, Aurangabad (MS)

²Department of Chemical Technology, Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad-431004, M.S., India

*E-mail: ramesh.chavaan@gmail.com

Abstract

The mixed fruit bars were prepared from sapota and mango pulp at different proportions viz. (0:100, 10:90, 20:80, 30:70 and 40:60) with sugar, citric acid (30 and 1% citric acid by weight of pulp respectively) and evaluated the physico-chemical and sensory quality characteristics. All fruit bars were analyzed for their organoleptic characteristics such as color, flavor, taste, appearance and overall acceptability. The highly acceptable and desirable fruit bar with respect to color, taste, flavour, mouth feel and overall acceptability can be obtained with combination of 30 percent sapota pulp and 70 percent mango pulp. The product scored maximum score (8.1) for color, taste, flavor and overall acceptability.

Key words: Drying, fruit bar, mango, sapota, sensory evaluation.

Paper cited: Chavan, R.F., Jadhao, V.G. and Sakhale, B.K. (2016). Studies on preparation of mango sapota mixed bar. *South Asian Journal of Food Technology and Environment*, 2(2): 361-365.

Introduction

Fruit bars can be simply defined as dried sheets of fruit pulp that have a soft, rubbery texture and a sweet taste. These fruit bars are prepared by dehydrating fruit puree into a sheet. The edible portion of fruit is pulped, pureed, mixed with different ingredients to improve its physicochemical and sensory characteristics. These are then heated, formed and dried on flat trays until cohesive fruit bar is obtained. Fruit bars can be eaten as snack foods or added to a variety of food preparations (Raab and Oehler, 1999). The mango fruit is a rich source of vitamins and minerals. Mango accounts the highest among fruits for vitamin C, vitamin A, riboflavin, folate, calcium, thiamine, iron, niacin, potassium and fiber. The comparative low calorie content (32 kcal /100 g of fruit) makes it a favourite fruit for obese people who are on a weight reducing regime (Liebman, 1992). Sapotas are one of the most consumed fruits worldwide and are consumed fresh or in processed forms such as jam, juice or dried. Due to the varied and well balanced composition of

sapotas, they have the potential to prevent digestive cancers, colon and liver cancers, coronary heart disease, lung function disorder and asthma (Feliciano *et al.*, 2010).

Materials and Methods

The present study was carried in the Agricultural Process Engineering Laboratory, Department of Agricultural Engineering, Maharashtra Institute of Technology, Aurangabad, Maharashtra. Fresh Mango (*Mangifera indica*) fruit cultivar of *Kesar* and Sapota (*Manilkara zapota*) fruit cultivar of *Kalipatti* were obtained from the local market of the Aurangabad city.

Extraction of pulp: Ripened sapotas were thoroughly washed with water, cut into pieces and passed through grinder-cum-mixer to obtain the fine pulp. The pulp was filtered through muslin cloth to remove fibrous materials and seeds. The mango pulp from the *Kesar* mango fruits was also extracted as per the process suggested by (Sakhale *et al.*, 2012).

Preparation of fruit bar: The process of manufacturing the mango-sapota fruit bar was

followed as per given in the (Fig.1). The different proportions were made in order to standardize the formulations (Chavan and Ingle, 2015). The standard formula for making the mango-sapota fruit bar has been given in (Table

1). According to that fruit pulps of mango and sapota fruits were taken in different proportion in order to standardize the formulation (Revanwar and Sakhale, 2003).

Fig.1: Flow Sheet for Preparation of Mango-Sapota fruit bar

Table 1: Standard Recipe for Formulation of Mango-Sapota Fruit Bar

Ingredients	Treatments				
	C ₀	C ₁	C ₂	C ₃	C ₄
Sapota: mango (g)	0:100	10:90	20:80	30:70	40:60
Sugar (g)	20	20	20	20	20
Citric acid (g)	1	1	1	1	1

Physico-chemical analysis: The pulp of sapota and mango was evaluated for various physico-chemical properties like moisture, TSS, pH, acidity, ash, reducing sugars, total sugars, ascorbic acid, crude protein, crude fat and crude fiber. The fruit bars prepared with various combination of sapota and mango pulp were also evaluated for moisture, crude protein, fat, total sugars, acidity and ash content as per the

standard methods suggested by (Ranganna, 2000).

Organoleptic Evaluation: Fruit bar was evaluated for sensory characteristics like color, taste, flavor, mouth feel and overall acceptability at room temperature using departmental semi trained panel members on 9- point Hedonic rating (Amerine *et al.*,1965). The scores obtained were then statistically

analyzed as per the methods given by (Panse and Sukhatme, 1985).

Results and Discussion

Formulation of mango-sapota mix fruit bar:

After standardization of sugar-acid ratio the efforts were made to prepare sapota-mango mixed fruit bar. The sapota pulp was admixed with mango pulp at 10, 20, 30, and 40 percent and evaluated for sensory analysis by panel members. Sincere efforts were made to prepare mixed fruit bar using sapota-mango pulp at various levels ranging from (0:100 to 40:60).

The sensory quality results are presented in (Table 1).

With increase in the level of sapota pulp in mixture reduced the color, flavor and taste score. It might be due to addition of higher level of sapota pulp proportionately decreased the mango pulp level in the mixture. This affects directly in reducing the appealing yellowish red color of the product and increase in dull color. Not only this, the higher sapota pulp in the mixture increases the breaking of bar texture in final bar but also lowers the overall acceptability of the products.

Table 2: Proximate composition of mango and sapota pulp *

Parameters	Composition	
	Mango Pulp	Sapota Pulp
Moisture (%)	74.6	76.1
Protein (%)	0.49	1.06
Fat (%)	0.56	1.1
Total sugar (%)	16.8	17.4
Ash (%)	0.29	1.57
Fiber (%)	0.33	2.6
Reducing sugar (%)	10.2	5.2
T.S.S.(⁰ Bx)	16.1	19.4
Titrate acidity (%)	0.43	0.25
pH	3.5	5.01
Ascorbic acid(mg/100g)	22.3	9.8

*Each value is the average of three determinations.

Physico-chemical properties: The results for physico-chemical composition of sapota and mango pulp are presented in (Table 2). The TSS content in sapota pulp was found higher (19.4⁰Brix) than in mango pulp (16.1⁰Brix) but was less acidic (0.25%) than mango pulp (0.43%). The mango pulp was also rich in ascorbic acid content (22.3mg/100g) compared to sapota pulp which contained only 9.8 mg/100g. The data on proximate composition of mixed fruit bar prepared from various blends of

sapota and mango pulp showed a marked difference (Table 3).

The fruit bar prepared with different blends of sapota and mango pulp contained total sugar in the range between 77.23 to 79.12% and more acidic (0.78 to 0.87%) than the fruit bars prepared with either mango or sapota pulp. All the blends produced the fruit bars with comparable ash and protein contents. The fruit bar prepared from blend of (30:70), resulted protein content of (1.5%). Both the fruits are

good sources of sugars, ascorbic acid, crude fiber and reducing sugar.

Organoleptic Evaluation: The data presented in (Table 4) indicates that the fruit bar prepared from a blend of sapota and mango pulp at 30:70 ratio resulted into highest score in all the sensory quality parameters followed equally by a blend of 20:80. The color, taste, flavor, mouth feel and overall acceptability of this fruit bars were as

good as to the fruit bar prepared from the single pulp of either fruit. However, the color, taste, flavor, mouth feel and overall acceptability scores of fruit bar prepared by a blend of 30:70 was comparatively higher than the fruit bars prepared from any of the blends. It might probably be due to synergistic effect of flavor of sapota and mango pulps.

Table 3: Proximate composition of mixed fruit bar

Parameters	C ₀	C ₁	C ₂	C ₃	C ₄
Moisture (%)	17.26	16.78	16.63	16.58	16.54
Protein (%)	1.29	1.36	1.4	1.51	1.53
Fat (%)	0.69	0.71	0.73	0.72	0.75
Total sugars (%)	77.2	78.2	78.6	78.7	79.1
Titration acidity (%)	0.78	0.83	0.84	0.86	0.87
Ash (%)	1.25	1.69	1.72	1.74	1.74

C₀- Mango pulp 100 %, C₁- Sapota pulp 10 % : mango pulp 90 %, C₂- sapota pulp 20 % : mango pulp 80 %, C₃-sapota pulp 30 % : mango pulp 70 %, C₄-sapota pulp 40 % : mango pulp 60 %

Table 4: Sensory quality attributes of Mango-Sapota fruit bar

Blends of mixed fruits pulp	Color	Appearance	Flavor	Taste	Overall Acceptability
C ₀	7.6	7.3	7.3	7.2	7.4
C ₁	7.7	6.9	6.7	7.4	7.3
C ₂	7.6	7.4	7.0	7.2	7.5
C ₃	8.6	7.7	7.9	9.0	8.1
C ₄	7.5	7.4	7.3	7.3	7.3

C₀- Mango pulp 100 %, C₁- Sapota pulp 10 % : mango pulp 90 %, C₂- sapota pulp 20 % : mango pulp 80 %, C₃-sapota pulp 30 % : mango pulp 70 %, C₄-sapota pulp 40 % : mango pulp 60 %

Conclusion

The highly acceptable and desirable products with respects to colour, taste, flavour and overall acceptability can be obtained with combination of 30 per cent sapota pulp and 70 per cent mango pulp. The mixed fruit bars prepared from sapota and mango pulp at

different proportions were found almost similar with respect to proximate composition. With increase in the level of sapota pulp in mixture reduced the overall acceptability value, hence higher level of sapota pulp in mango pulp is not desirable from overall acceptability point of view. Therefore the best recommendable ratio of

sapota-mango pulp for excellent quality mixed fruit bar is 30:70.

References

1. Amerine, M.S., Pangborn, R.M. and Roessler, E.A. (1965). Principles of sensory evaluation of foods. Academic Press, New York.
2. Chavan, R.F. and Ingle, M.P. (2015). Studies on formulation of papaya-apple mixed fruit leather and drying characteristics of apple and papaya fruits. *Beverage and Food World*, 42(9): 44-46.
3. Feliciano, R.P., Antunes, C., Ramos, A., Serra, A.T., Sapotaueira, M.E., Duarte, M.M., de Carvalho, A., Bronze, M.R.(2010).Characterization of traditional and exotic sapota varieties from Portugal. *J. Funct. Foods*, 2: 35–45.
4. Liebman, B. (1992). A mango a day nutrition action health letter. *Nutrition action health letter*”.
5. Panse, V.G. and Sukhatme, P.V. (1985). Statistical Method for Agricultural Workers.
6. Raab, C. and Oehler, N. (1999). Making dried fruit leather fact sheet. Oregon State University Extension Service. *USA Fact Sheet*, 232: 1–4
7. Ranganna, S. (2000). Handbook of Analysis and Quality Control for Fruits and Vegetable products, 2nd edition, Tata McGraw Hill Publ. Co.; New Delhi.
8. Revanwar, D.S. and Sakhale, B.K. (2003). Studies on preparation and recipe standardization of papaya toffee. *Beverage Food World*, 33(10): 42-44.
9. Sakhle, B.K., Pawar, V.N. and Ranveer, R.C. (2012). Studies on the development and storage of whey based RTS beverage from Mango cv. Kesar. *Journal of Processing and Preservation*, 3(3):1-4.