

## Standardization of process for preparation of fig-mango mixed toffee

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**Abstract:** The mixed fruit toffees were prepared from fig and mango pulp at different proportions viz. (100:0, 80:20, 60:40, 40:60, 20:80 and 0:100) with sugar, liquid glucose, hydrogenated fat and khoa (40, 10, 5 and 10% by weight of pulp respectively) and evaluated for physico-chemical and sensory quality characteristics. It was observed that the toffee prepared by blending the fig and mango pulp at 80:20 proportions was found superior with respect to protein content and organoleptic quality parameters.

**Key words:** Fig, mango, blending, liquid glucose, toffee, sensory quality

### Introduction

Fig (*Ficus carica* L.) is grown in most of the countries bordering the Mediterranean climate. Botanically fig is not a fruit but a fleshy receptacle containing numerous flowers. The area under fig cultivation is increasing day by day (Thonte and Patil, 1988). The fresh fig is rich in calcium, iron, and vitamin A and C. According to

Condit (1977), the nutritive index of fig is as high as 11 as compared to 9 of apple, 8 of raisin and 6 of dates and pears. Figs are specially valued for their laxative effect and high alkalinity. These are principally used as an item of diet and in preventing the diseases of bladder and lungs (Parmar and Kaushal, 1982).

Mango (*Mangifera indica* L.) is king of fruits due to its high palatability, excellent taste and flavor. Mango pulp is rich in the essential minerals, vitamins and other nutritive factors. Due to shorter shelf life of the mango, it must be converted into various processed products.

The confectionery products are highly popular among the children throughout the world due to their taste and flavor. Toffee is one of the sugar based products which is largely consumed by the children. The conventional toffees are generally made from sugar, skim milk powder and other synthetic colors and flavors. In the present investigation, the efforts have been made to incorporate the natural fig and mango pulp in the toffee and to evaluate its quality.

### Materials and Methods

The fig of 'Poona' cultivar and the mango of 'Kesar' variety were procured from the local market.

Sugar, liquid glucose, vegetable fat and skim milk powder were also purchased from the local market.

#### Extraction of pulp

Ripened figs 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 Benero and Rodriguez (1971).

#### Preparation of toffee

The toffee was prepared by taking various combinations of fig and mango pulp viz. (100:0, 80:20, 60:40, 40:60, 20:80 and 0:100) and to all these combinations, the levels of other ingredients such as sugar (40 %), liquid glucose (10%), vanaspati/fat (5%) and khoa (10%) were added by weight of pulp as per the procedure described by Revanwar and Sakhale (2003). The blend of pulps was heated for concentration up to 1/3 of its original volume. Sugar was added and heated till the total soluble solids (TSS) was reached to 65°-70° Brix. The glucose syrup and vanaspati were added, mixed well and cooked up to final concentration of 85° Brix. The prepared toffees were cut into desired size and wrapped in butter paper.

#### Physico-chemical analysis

The pulp of fig and mango was evaluated for various physico-chemical properties like moisture, TSS, pH, acidity, reducing sugars, total sugars, ascorbic acid, crude protein, crude fat and crude fiber. The toffees prepared with various combination of fig and mango pulp were also evaluated for moisture,

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crude protein, fat, total sugars, acidity and ash content as per the standard methods suggested by Ranganna, (2000).

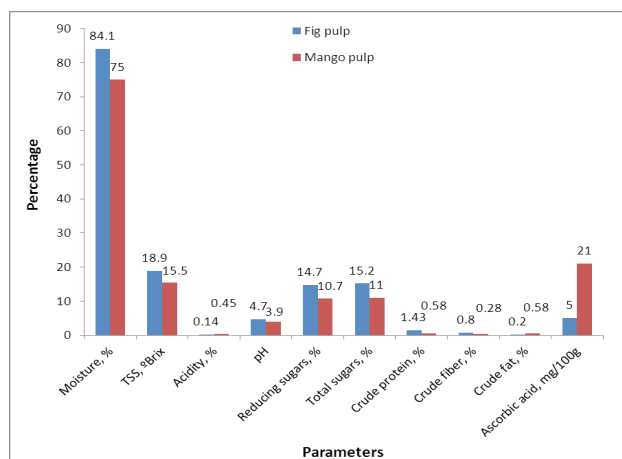
**Sensory evaluation**

The toffees were evaluated for various sensory quality parameters like color, flavor, texture, mouthfeel and overall acceptability by a semi trained panel of 10 judges on a 9-point Hedonic scale (Amerine *et al.*, 1965). The scores obtained were then statistically analyzed as per the methods given by Panse and Sukhatme (1985).

**Results and Discussion**

*Physicochemical properties:*

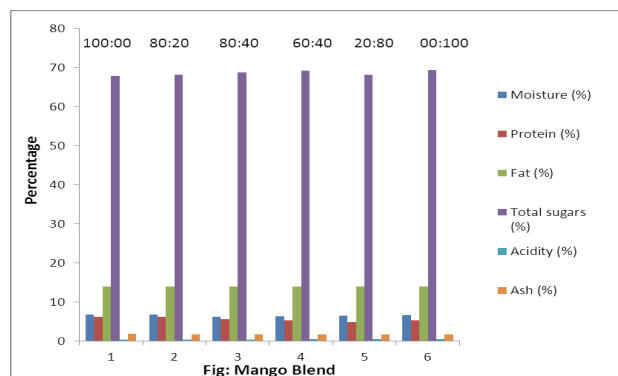
The results for physico-chemical composition of fig and mango pulp are graphically presented in Figure 1.



**Figure 1.** Physico-chemical composition of fig and mango pulp

The TSS content in mango pulp was found higher (24 °Brix) than in fig pulp (16 °Brix) but was more acidic (0.3%) than fig pulp (0.25%). The mango pulp was also rich in ascorbic acid content (21 mg/100g) compared to fig pulp which contained only 5 mg/100g. The data on proximate composition of mixed fruit toffee prepared from various blends of mango and fig pulp showed a marked difference (Figure 2). The toffees prepared with different blends of fig and mango pulp contained total sugar in the range between 68.1 to 69.2% and more acidic (0.39 to 0.58%) than the toffees prepared with either mango or fig pulp. All the blends produced the toffees with comparable ash and protein contents. The toffee prepared from blend of 80:20 resulted into high protein content (6.3%), which could be due to higher protein content in fig than in mango. Both the fruits are good sources of sugars, ascorbic acid, crude fiber and protein as reported by many researchers (Pawar

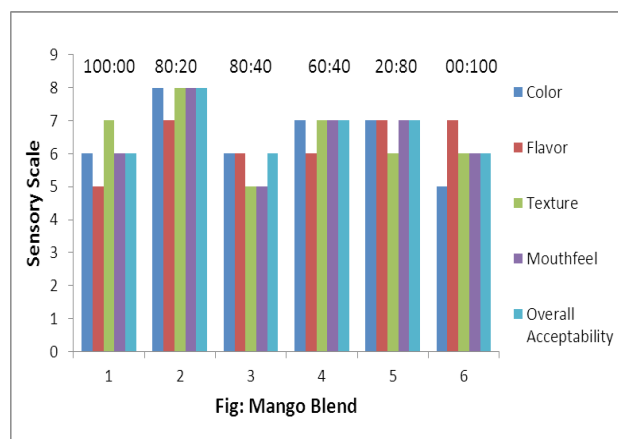
*et al.* (1992), Kalra and Tondon (1985) and Condit (1977).



**Figure 2.** Proximate composition of mixed fruit toffee

*Sensory quality*

The data presented in Fig.3 indicated that the toffee prepared from a blend of fig and mango pulp at 80:20 ratio resulted into highest score in all the sensory quality parameters followed equally by a blend of 20:80 and 40:60. The taste, flavor, texture, mouth feel and overall acceptability of this toffee were as good as to the toffee prepared from the single pulp of either fruit. However, the flavor, mouth feel and overall acceptability scores of toffee prepared by a blend of 80:20 was comparatively higher than the toffees prepared from any of the blends. This may probably be due to synergistic effect of flavor of fig and mango pulps.



**Figure 3.** Sensory evaluation of mixed fruit toffee

**Conclusion**

The mixed fruit toffees prepared from fig and mango pulp at different proportions were found almost similar with respect to proximate composition. However the combination of 80:20 contained highest protein and prepared with this combination had also

highest scores for all sensory quality attributes than the rest of the combinations.

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