Studies on standardization of fig fruit (Ficus carica L.) powder enriched cookies and its composition

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ABSTRACT
In this study, it is aimed to develop the processing technology for preparation of powder from fresh Fig (Ficus carica L.) fruits and the prepared fig powder was subsequently utilized in cookies. Fig fruits of Dinkar variety were dried in the form of small shreds in a cabinet drier at 60±5°C temperature for 20-24 hrs and powder was obtained by grinding of dried shreds in a grinder. The prepared fig powder was incorporated in cookies preparation at different levels like 0, 6, 12 and 18 %. The proximate composition of fig powder and cookies was evaluated for nutritional and sensory properties. Results of study showed that fig powder enriched cookies containing 12 % fig powder have good nutritional value with acceptable organoleptic qualities. Fig cookies contained 3.1 % dietary fiber, 6.9 % protein, 1.1 % potassium and its reducing and non-reducing sugar content was 53.1 % and 22.9 % respectively.

Key words: Fig powder, Cabinet dryer, Cookies, Nutritional value, Organoleptic qualities.

INTRODUCTION
Nutritional enrichment is current interest because of consumer trends and Government guidelines. These factors are causing industry to be aware of need for nutritional food products. Nutritional significance of bakery products is well recognized. Attempts are being made to enrich the products with high quality non-wheat flour. Bakery products can serve as a good vehicle for carrying the significant nutrients to target populations.

Fig (Ficus carica L.) belongs to the family moraceae. The fig is a native of southern Arabia. In India, its commercial production is limited to a few centers in Maharashtra and south India. In Maharashtra, it is cultivated on commercial scale in adjoining areas of Pune and Aurangabad (Anonymous, 2012). Fig fruit is a combination of fiber and minerals such as calcium, iron, potassium and nutrients that are unequalled in nature. The edible fig as a powerhouse of nutrients and is known since the prehistoric times (Venu et al., 2005).

The fig fruit, one of the most important fruit species in the Mediterranean area, bears fruits that are highly perishable, even in refrigerated conditions (Piga et al., 1995) and thus nearly all the world production is preserved in the dried form. Cabinet drying considered being the generic drying method followed for preparation of various food powders. During present investigation due care was taken to control various variables which affects the quality such as temperature and period of drying.

Cookies are rich in fat content and sugar content than whole breads. The lower content of dietary fiber, vitamins and minerals are the nutritional problems with most bakery products. Fig powder enrichment adds dietary fiber, vitamins and minerals.

MATERIALS AND METHODS
Preparation of fig powder: Fresh fig fruits of variety Dinkar were obtained from the farmer’s fields (Parbhani district). The fruits were washed, cleaned and used for the experiment. The technology for preparation of powder of fig fruits by using cabinet dryer has been standardized. In case of fig fruit because of high sugar content (TSS), more period of drying is required. The procedure followed during the cabinet drying of fig fruit is summarized in following flow sheet (Fig. 1).

Preparation of fig powder enriched cookies: Cookies were prepared by adding fig powder according to the formula of Akpapunam and Darbe (1994) with slight modification in which refined wheat flour replaced with fig powder up to an acceptable level. Fig powder in 0, 6, 12 and 18 % mixed with butter or vegetable fat, sugar, baking powder and beaten eggs and dough was prepared. The dough was cut in to rectangular shape and baked on greased pan in an oven.

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Ripe fig fruits
↓
Cleaning and washing
↓
Cutting into small shreds and spreading on trays
↓
Drying at 60±5 °C for 20-24 hrs.
↓
Pulverizing and Sieving
↓
Fig powder
↓
Addition of 1 % Tricalcium phosphate and packing in PE
↓
Storage

FIG 1: Flow sheet for preparation of fig fruit (*Ficus carica* L.) powder by Cabinet drying at 160°C for 15 min (Fig. 2). The various recipes used for preparation of fig powder enriched cookies are given in Table 1.

**Chemical analysis:** The value added products prepared by processing of fresh figs viz. fig powder and fig cookies were analyzed for moisture, ash, T.S.S., pH, acidity, sugar, protein, fat, fiber, ascorbic acid, â-carotene and potassium by the methods given by A.O.A.C. (1990) and Ranganna (1995).

**Sensory evaluation:** The sensory evaluation of fig cookies samples were examined by trained/semi-trained judges on nine point Hedonic scale for its color and appearance, taste, flavor, texture and overall acceptability (Amerine *et al.*, 1965).

**Statistical analysis:** The data obtained on various parameters were recorded and statistically analyzed by Completely Randomized Design (CRD) as per the method proposed by Panse and Sukhatme in 1967.

**RESULTS AND DISCUSSION**

**Chemical composition of fig fruit (*Ficus carica* L.) powder**

The data pertaining to chemical composition of fig powder is given in Table 2.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Ingredients</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Sample (<em>S₀</em>)</td>
<td>Flour (gm)</td>
<td>100</td>
<td>0</td>
<td>40</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Sample (<em>S₁</em>)</td>
<td>Fig powder (gm)</td>
<td>94</td>
<td>6</td>
<td>40</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Sample (<em>S₂</em>)</td>
<td>Vegetable fat (gm)</td>
<td>78</td>
<td>12</td>
<td>40</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Sample (<em>S₃</em>)</td>
<td>Beaten egg (gm)</td>
<td>72</td>
<td>18</td>
<td>40</td>
<td>20</td>
<td>40</td>
</tr>
</tbody>
</table>

The results of chemical properties of fig powder indicated that the moisture content of fig powder was 10.43 per cent. Hence, due to the less moisture content it is safe for future storage. Dietary fiber content of fig powder was found to be 15.41 per cent. So, the prepared fig powder is fiber rich and significant from nutritional point of view. The values observed for reducing and non-reducing sugar content of fig powder was found to be 55.41 and 6.11 per cent respectively. It was also observed that the protein content of fig powder was found to be 5.26 per cent. It was revealed that the ascorbic acid content of fig powder was found to be 5.12 mg/100 g. The ascorbic acid content of powder was decreases than that of fresh fruit due to loss of ascorbic acid during drying due to heat sensitivity of nutrient. The value of potassium found
in fig powder was 2200 mg/100g and therefore it is rich source of potassium as mineral. Similar results were reported by Polat and Caliskan (2008).

Chemical parameters of fig powder enriched cookies: The mostly accepted sample (based on sensory evaluation) of fig cookie was subjected to chemical analysis and the data pertaining to the present investigation is tabulated in Table 2.

The nutrient analysis of fig cookie shown that it was dense source of carbohydrate and potassium. The dietary fiber content was reported 3.1 per cent. The fig cookie also contained 76 per cent total soluble solids. It was also reveals that the fig cookie contained reducing and non-reducing sugar 53.1 and 22.9 per cent respectively. Fig cookie was rich in protein and contained 6.9 per cent protein. The ascorbic acid of cookie decreased as compared to fresh figs and it was 3.8 mg/100 g. The â-Carotene content of fig cookie was found to be 53.20 µg/100g. The value of potassium found in fig cookie was 1100 mg/100g and therefore it is rich source of potassium. Similar results were also reported by Secil and Berrin (2011) for Pumpkin and Carrot pomace powder incorporated cookies.

Sensory evaluation: The fig cookies prepared from different levels of fig powder was evaluated for their organoleptic properties. It was found that texture and taste of cookie was influenced by the incorporation of fig powder. The sensory analysis of fig cookies shown that the Sample 2 (S₂) was selected as most acceptable cookies based on the sensory evaluation. The mean values of scores for color and appearance, taste, flavor, texture and overall acceptability are presented in Table 3.

CONCLUSION
In the present research work, the fig powder prepared by cabinet drying method was utilized as a novel food ingredient for enrichment of cookie. The value added products prepared by processing of fresh figs viz. fig powder and fig cookie were assessed for their nutritional composition and compared with similar products available in market at present. However, comparison with market products showed that fig powder incorporated cookies were rich in nutrients like dietary fiber (3.1 %) and potassium (1.1 %).

REFERENCES


