



ISSN (E): 2277-7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2022; SP-11(12): 439-441  
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[www.thepharmajournal.com](http://www.thepharmajournal.com)  
Received: 08-10-2022  
Accepted: 16-11-2022

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## Standardization of designer fig spread

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### Abstract

The present investigation was conducted at Department of Fruit science laboratory, College of Horticulture, Rajendranagar, during the year 2022. The experiment was laid out in completely randomized design. Trials were conducted to develop fig spreads by incorporating fig pulp with different proportions of defatted sesame cake. The standardization trials of protein rich designer fig spread resulted in development of two products with 5% defatted sesame cake and 10% defatted sesame cake with organoleptic scores for overall acceptability in "Like very much" range on nine point hedonic scale.

**Keywords:** Fig, standardization, defatted sesame cake, protein

### Introduction

The fig tree (*Ficus carica* L.) is a deciduous tree belongs to Moraceae family, and is one of the earliest cultivated fruit trees (Stover *et al.*, 2007) [11]. Fig are rich source of Calcium (Ca 8.19-13.64 mg.g<sup>-1</sup>), Iron (Fe 0.12-0.5 mg.g<sup>-1</sup>), Potassium (K 6.15 mg.g<sup>-1</sup>), Magnesium (Mg 2.02 ± 1.42 mg.g<sup>-1</sup> dry weight), Fiber (14.20% dry weight), Energy (332.7 ± 0.74 kcal·100 g<sup>-1</sup> dry weight) (Sadia *et al.*, 2014) [9]. Fiber, trace minerals, antioxidant polyphenols, carbohydrates, and organic acids are all abundant in figs (Slatnar *et al.*, 2011) [10]. Khan *et al.* (2020) [3] reported that figs are fat free, sodium free and cholesterol free. Due to their highly perishable nature and a lack of proper post-harvest methods, fig fruit cannot be kept for long periods of time. One of the most severe dietary deficiencies in newborns and young children is Protein-Energy Malnutrition (PEM). More than 50% of child deaths in poor nations are a result of it. Kwashiorkor, marasmus, and intermediate phases of kwashiorkor are among the allied illnesses that are related to PEM (Batoool *et al.*, 2015) [2]. After extracting the oil from sesame, defatted sesame cake can be used as a suitable protein source for food protein fortification and sesame cake provides a good amount of crude fiber (Mohdaly *et al.*, 2011) [5]. The preparation of jam uses the most amount of fruit pulp and low cost, year-round availability, and organoleptic qualities, jams are one of the most popular foods (Asha *et al.*, 2017) [1]. Spreadability, on the other hand, relates to how easily a product may be spread into a uniform layer on a flat surface using another flat surface (Khan *et al.*, 2015) [4]. This study aims at developing fig spread incorporated with protein rich defatted sesame seed cake and evaluate its sensory properties and acceptability.

### Material and Methods

The present investigation was carried out at College of Horticulture, Rajendranagar, Hyderabad during the year 2022. Fig fruits of were procured for conduct of proposed research work from the farmers field near Sanga Reddy Hyderabad, and other raw materials required for product development were procured from the local market in Hyderabad.

### Total soluble solids (° Brix)

The total soluble solids were measured at room temperature with the help of 'Erma-hand refractometer' equipped with a percent scale and was recorded and expressed as degree Brix (°B) after making necessary temperature corrections.

### Titrateable acidity

Acidity of the sample was determined by titration method using 0.1N sodium hydroxide (NaOH) as suggested by Ranganna (1986) [8]. Five gram of Fig jam was taken and blended with distilled water and it is filtered and volume made to 100ml. An aliquot of 10 ml was taken from this sample and titrated against 0.1N NaOH using phenolphthalein as indicator.

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The appearance of light pink colour was marked as the end point. Acidity was computed and expressed as percent citric acid. The acidity was calculated by using the following formula.

$$\text{Acidity (\%)} = \frac{\text{Titre value} \times \text{Normality of alkali} \times \text{Eq. Weight of acid} \times \text{Volume made (ml)} \times 100}{\text{Volume of aliquot (ml)} \times \text{Weight of sample (g)} \times 1000}$$

### Organoleptic evaluation (9 Point hedonic scale)

The product samples were subjected to sensory evaluation soon after preparation and after 1, 2 and 3 months of storage period by a panel of ten judges following the hedonic rating scale (see appendix) as described by Ranganna (1986)<sup>[8]</sup>. The products were evaluated for colour and appearance, taste, flavour, mouth feel and overall acceptability. The overall acceptability of product samples was based on mean scores obtained from all the sensory characters. The characters with mean scores of 6 or above out of 9 were considered acceptable.

### Results and Discussion

Trials were conducted to develop fig spreads by incorporating fig pulp with different proportions of defatted sesame cake and the process was standardized successfully and presented in Table 1.

#### Colour

Fig spread prepared as per recipe of T<sub>1</sub> (fig spread with 5% Sesame cake) recorded the highest sensory score for colour (8.39) and differed significantly from others but was on par with T<sub>2</sub> (fig spread with 10% Sesame cake) and the lowest sensory score for colour (7.48) was recorded in T<sub>7</sub> (fig spread with 35% Sesame cake).

#### Flavour

Fig spread prepared as per recipe of T<sub>1</sub> (fig spread with 5% Sesame cake) recorded the highest sensory score for flavour (8.40) and differed significantly from others but was on par with T<sub>2</sub> (fig spread with 10% Sesame cake) and the lowest sensory score for flavour (7.43) was recorded in T<sub>7</sub> (fig spread with 35% Sesame cake).

#### Texture

Fig spread prepared as per recipe of T<sub>1</sub> (fig spread with 5% Sesame cake) recorded the highest sensory score for texture (8.35) and differed significantly from others but was on par with T<sub>2</sub> (fig spread with 10% Sesame cake) and the lowest sensory score for texture (6.97) was recorded in T<sub>7</sub> (fig spread with 35% Sesame cake).

#### Taste

Fig spread prepared as per recipe of T<sub>1</sub> (fig spread with 5% Sesame cake) recorded the highest sensory score for taste (8.41) and differed significantly from others but was on par with T<sub>2</sub> (fig spread with 10% Sesame cake) and the lowest sensory score for taste (6.89) was observed in T<sub>7</sub> (fig spread with 35% Sesame cake).

#### Overall acceptability

Fig spread prepared as per recipe of T<sub>1</sub> (fig spread with 5% Sesame cake) recorded the highest sensory score for overall acceptability (8.48) and in "Like very much range" on 9 point Hedonic scale and differed significantly from other variations, but was on par with T<sub>2</sub> (fig spread with 10% Sesame cake) and the lowest sensory score for overall acceptability (6.67) was observed in T<sub>7</sub> (fig spread with 35% Sesame cake). The highest overall acceptability of T<sub>1</sub> (fig spread with 5% Sesame cake) and T<sub>2</sub> (fig spread with 10% Sesame cake) might be due to best acceptable colour, flavour, texture and taste. The findings of the present investigation are in accordance with Pinandoyo and Siddiqui (2020)<sup>[7]</sup> in soya protein isolate fortified papaya jam, Pinandoyo and Masnar (2020)<sup>[6]</sup> in papaya jam fortified with soya protein.

#### TSS

Significant difference was not recorded among Fig spread treatments prepared with different proportion of sesame cake.

#### Titrateable acidity

Fig spread prepared as per recipe of T<sub>6</sub> (fig spread with 30% Sesame cake) recorded the highest score for titrateable acidity (0.74%) and differed significantly from others, but on par with T<sub>7</sub> (fig spread with 10% Sesame cake) and the lowest score for titrateable acidity (6.64%) was observed in T<sub>1</sub> (fig spread with 5% Sesame cake).

**Table 1:** Organoleptic evaluations of different variations of fig spread during standardization.

Treatment		Colour	Flavour	Texture	Taste	Overall acceptability	TSS (° brix)	Titrateable acidity (%)
T <sub>1</sub>	Fig spread with 5% Sesame cake	8.39	8.40	8.35	8.41	8.48	68.60	0.64
T <sub>2</sub>	Fig spread with 10% Sesame cake	8.35	8.38	8.34	8.33	8.37	68.40	0.70
T <sub>3</sub>	Fig spread with 15% Sesame cake	7.98	7.99	7.98	8.08	8.12	68.30	0.71
T <sub>4</sub>	Fig spread with 20% Sesame cake	7.87	7.87	7.56	7.79	7.89	68.20	0.65
T <sub>5</sub>	Fig spread with 25% Sesame cake	7.67	7.74	7.32	7.35	7.47	68.70	0.67
T <sub>6</sub>	Fig spread with 30% Sesame cake	7.56	7.60	7.08	7.12	7.15	68.50	0.74
T <sub>7</sub>	Fig spread with 35% Sesame cake	7.48	7.43	6.97	6.89	6.67	68.80	0.73
S Em±		0.129	0.124	0.096	0.09	0.101	0.833	0.01
CD at 5%		0.395	0.381	0.295	0.275	0.31	NS	0.03

### Conclusion

Based on organoleptic scores, TSS and titrateable acidity, the best two product formulae were identified T<sub>1</sub> [fig spread prepared by adding 5% defatted sesame cake as first best formulae] and T<sub>2</sub> [fig spread prepared by adding 10% defatted sesame cake as second best formulae]. Fig spread incorporated with protein rich defatted sesame cake was developed and

evaluated for its sensory properties and acceptability. It contributed to higher protein content. A protein rich shelf stable product could also aid to contribute to the nutrition and health benefits of the consumers throughout the year. The results exhibited that fig fruits may be processed into a quality and stable product by incorporating defatted sesame cake.

### Acknowledgement

The authors are thankful to College of Horticulture, Rajendranagar, Hyderabad, SKLTS Horticultural University, Hyderabad, Telangana State for providing all necessary facilities during research work.

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