

**STANDARDIZATION OF TECHNOLOGY FOR
PREPARATION OF FIG FRUIT (*FICUS CARICA* L.) CV.
DEANNA POWDER AND ESTIMATION OF ITS
PHYSICO-CHEMICAL CHARACTERISTICS**

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ABSTRACT

Fresh fig fruits cv. *Deanna* were evaluated for their physical and chemical characteristics. The fresh fig fruits were found to be very rich source of potassium (370 mg/100 g), total sugars (19.60 g/100 g) and appreciable source of fiber (1.34 g/100 g) and therefore fig have great potential for processing. Fig fruits were dried by subjecting them in the form of small shreds in a Cabinet drier at 60±5°C temperature for 20-24 hrs. Finally, powder was obtained by grinding of dried shreds in a mixer/grinder. Fig powder was rich source of fiber (18.6 g/100 g), sugar (73.52 g/100 g) and potassium (26.3 g/100 g). In future, the prepared fig powder will be utilized in the various value added products viz. ice cream, milk shake, burfi and toffee.

Key words: Cabinet dryer, tricalcium phosphate, shape index, water solubility and mesh size.

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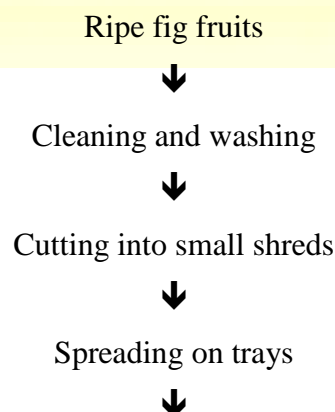
Introduction

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, 2002). As per the annual report of year 2011 given by Department of Agriculture, Maharashtra State assert that, the area under cultivation of fig fruits was 300 hectares up to 1990, which further increases to 3443 hectares in 2011. 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, 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.

Materials and Methods

Preparation of Fig Powder

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 (Figure 1).



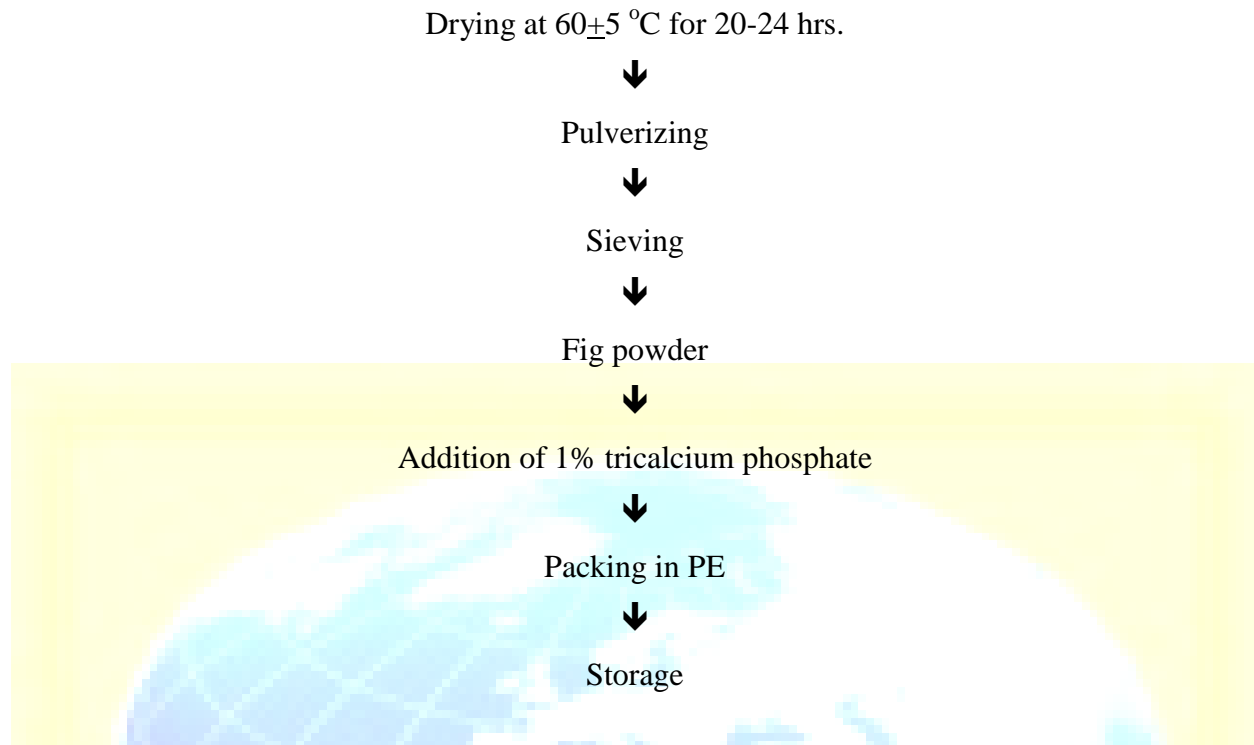


Figure 1: Flow sheet for Preparation of Fig (*Ficus carica* L.) fruit Powder by Cabinet Drying

Physical Analysis

Fully mature fig fruits, cv. *Deanna* were obtained from the farmer's field. Fruits were washed with clean running water. Then, the fig fruits and fig powder were analyzed for various physical characteristics like colour, length, width, weight, volume, specific gravity, shape index, fullness index and waste (%).

Chemical Analysis

The fresh fig fruits and cabinet dried fig powder were analyzed for moisture, ash, T.S.S., pH, acidity, sugar, protein, fat, fiber, ascorbic acid, β -carotene and potassium by the methods given by A.O.A.C. (1990) and Ranganna (1995).

Results and Discussion

Physico-morphological characteristics of Fig (*Ficus carica* L.) fruit

The physico-morphological properties of Fig (*Ficus carica* L.) fruits are given in Table 1.

The Table 1 shows that, the external or skin color of *Deanna* cultivars of fig fruits was golden yellow. The average weight of fruit was recorded 43.61 g. The average length and diameter of *Deanna* cultivar was found to be 4.25 and 4.45 cm. The average volume of *Deanna* figs was 45.5 ml. The values of specific gravity of figs were found to be 0.958. Shape index of fruit was 0.955. The fullness index of *Deanna* figs was found to be 9.8. The values of per cent waste of fruits were found to be 2.5 %.

The above observations recorded for *Deanna* cultivars with respect to all the physico-morphological parameters are in close agreement with those reported by Waskar *et al.* (2003).

Photograph 1: Fig (*Ficus carica* L.) fruit cv. *Deanna*



Table 1: Physico-morphological properties of Fig (*Ficus carica* L.) fruit

Sr. No.	Physical Parameter	Measurement/Value
	Cultivar	<i>Deanna</i>
1	Color	Color
	(a) External	Golden Yellow
	(b) Flesh	Creamy White
2	Length (cm)	4.25
3	Width/ Diameter (cm)	4.45
4	Weight (g)	43.61
5	Volume (ml)	45.5
6	Specific Gravity	0.958
7	Shape Index	0.955
8	Fullness Index	9.8
9	Waste (%)	2.5

Chemical characteristics of Fig (*Ficus carica* L.) fruit

The chemical parameters of fig fruits with respect to its moisture, ash, T.S.S., pH, acidity, sugar, protein, fat, fiber, ascorbic acid, β -carotene and potassium were studied in detail. The data pertaining to various chemical properties of fig fruit is depicted in Table 2.

The chemical composition results obtained in the present investigation revealed that the moisture content of fig fruit was 75.3 per cent. The dietary fiber content of fig fruit (*Deanna* cultivar) was found 1.34 per cent. The total acidity as citric acid content was observed as 0.23 per cent against pH value of 5.4. It was also revealed that the fig contained 22°Bx total soluble solids. The values observed for reducing and non-reducing sugar content of *Deanna* cultivar was found to be 17.43 and 2.17 per cent respectively. The value of potassium content was found in fig fruit was 370 mg/100 g.

Table 2: Chemical properties of Fig (*Ficus carica* L.) fruit

Sr. No.	Chemical Parameter	Measurement/Value
1	Moisture (%)	75.3
2	Ash (%)	1
3	T.S.S. (°Bx)	22
4	Acidity (%) (As citric acid)	0.23
5	T.S.S. : Acid Ratio	95.65
6	pH	5.4
7	Total Sugar (%)	19.60
8	Reducing Sugar (%)	17.43
9	Non-reducing Sugar (%)	2.17
10	Protein (%)	1.75
11	Fat (%)	0.52
12	Ascorbic Acid (mg/100 g)	12.95
13	β -Carotene ($\mu\text{g}/100\text{ g}$)	41.44
14	Potassium (mg/100 g)	370
15	Dietary Fiber (%)	1.34

Physical parameters of Fig (*Ficus carica* L.) fruit Powder

The results of the physical properties of fig fruit powder viz. *Deanna* indicated that, the colour of cabinet dried fig powder was observed as dark brown. The appearance of fig powder was examined by visual mean and appearance was 'course'. In the present investigation, the water solubility for fig fruit powder was recorded as 165 seconds. The solubility is a function of effective moisture content of the finished food powder coupled with low moisture content responsible for fast dissolution. On account of the vital role of bulk density in handling, packaging, transportation and defining processing conditions, studies on bulk density of fig powder was carried out. So, the bulk density of fig fruit powder was 0.64 g/ml. Finally, the prepared fig powder was sieved and categorized into two sieve sizes as, 22/0.71 and 30/0.50 (BSS/mm).

Table 3: Physical properties of Fig (*Ficus carica* L.) fruit Powder

Cultivar	Physical properties of Fig powder				
	Colour	Appearance	Water Solubility (Sec)	Bulk Density (g/ml)	Mesh Size (BSS/mm)
<i>Deanna</i>	Dark Brown	Course	165	0.64	22/0.71 30/0.50

Chemical parameters of Fig (*Ficus carica* L.) fruit Powder

The data pertaining to various chemical properties of fig powder is given in Table 4.

The results of chemical properties of fig powder indicated that the moisture content of fig powder was 9.8 per cent. Hence, due to less moisture content it is safe for future storage. The dietary fiber content of fig powder was found to be 18.6 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 63.3 and 10.22 per cent respectively. It was also observed that the protein content of fig powder was found to be 3.78 per cent. It was revealed that ascorbic acid content of Fig powder was found to be 4.57 mg/100 g. 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. Value of potassium found in fig powder was 2630 mg/100g and therefore it is rich source of potassium as mineral.

Photograph 2: Powder of Fig (*Ficus carica* L.) fruit cv. *Deanna*



Table 4: Chemical properties of Fig (*Ficus carica* L.) fruit Powder

Sr. No.	Chemical Parameter	Measurement/Value
1	Moisture (%)	9.8
2	Ash (%)	4.3
3	Acidity (%) (As citric acid)	1.57
4	pH	5.14
5	Total Sugar (%)	73.52
6	Reducing Sugar (%)	63.30
7	Non-reducing Sugar (%)	10.22
8	Protein (%)	3.78
9	Fat (%)	4.2
10	Ascorbic Acid (mg/100 g)	4.57
11	β -Carotene (μ g/100g)	48.12
12	Potassium (mg/100g)	2630
13	Dietary Fiber (%)	18.6

Conclusion

In the present research work as mentioned above, the physico-chemical characteristics of fig fruits were determined and the fig powder was prepared by cabinet drying method and analyzed for physico-chemical parameters. Thus, it was concluded that, fresh fig fruits were found to be a very rich source of potassium, total sugars and an appreciable source of fiber. Fig powder was a rich source of fiber, sugar and potassium. In future, there will be scope for utilization of fig powder in the various value added products viz. icecream, milk shake, burfi and toffee.

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