

Utilization of Carrot Pomace Powder for Preparation of Sweet Fried Cookies (Shankarpali) Based on Various Blends

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Abstract— The study on utilization of CPP and DSF in sweet fried cookies (*shankarpali*) was undertaken to upgrade the nutritional quality and assess the acceptability. The SFC (*shankarpali*) were prepared from composite flours by incorporating 10, 20 and 30 parts of DSF and 5, 10 and 15 parts of CPP into fine wheat flour. The SFC (*shankarpali*) were analyzed for chemical composition and sensory properties with increase in concentration of CPP, there was increase in protein, ash and crude fibre content. The crude fibre content of SFC (*shankarpali*) supplemented with 15% CPP was the highest (2.9). The SFC (*shankarpali*) supplemented with CPP upto 10% level were of acceptable sensory quality.

Keywords— Carrot pomace powder (CPP), sweet fried cookies, defatted soy flour, tray drying, sensory analysis

I. INTRODUCTION

Deep fat frying process is most common cooking process in India. Hence Indian foods are rich in fat or edible oil. The SFC (*shankarpali*) is an important Indian deep fried product made from wheat flour and generally on different festivals. The heat is transferred from oil to the product, water is evaporated and oil is absorbed. Crust formation and browning also take place giving the product an attractive golden appearance and crispy mouth feel^[6]. Snack foods are an integral part of the diet and have been, over a period of time commercially exploited on a wide scale. Soy flour both full fat and defatted have been used as ingredients in the preparation of high protein snack^[4].

Carrot (*Daucus carota L.*) is an inexpensive and highly nutritious as it contains appreciable amount of vitamin B1, B2, B6 and B12 beside being rich in carotene and fibre^[10]. In carrot juice production up to 50% of the raw material remains as pomace which is mainly disposed as feed. However, this pomace contains large amounts of valuable compounds such as carotenoids, dietary fibre. This could profitably be used to develop value added products with content of fibre without sacrificing taste or convenience, not only provide a nutritious product but also aiding in efficient utilization of carrot pomace^[4]. The pomace is quite perishable as it contains about $88 \pm 2\%$ of moisture. Drying or dehydration is the useful means to increase the shelf life of perishable food for further use^{[15], [16]}.

The soybean, (*Glycine max*) a grain legume, is one of the richest and cheapest source of plant protein that can be used to improve the diet of millions of people. Defatted soy flour at 2.5% improves water holding capacity and sheeting

process of dough^[1]. Soybean is rich in high quality proteins, contains essential amino acids, similar to those found in meat^[18]

The present study was carried out to find out the effect addition of different proportion of carrot pomace powder on nutritional composition and sensory characteristics of sweet fried cookies (*shankarpali*).

II. MATERIAL AND METHOD

A. Procurement of raw material

Good quality raw materials such as refined wheat flour, defatted soy flour, carrot variety (*pusakesar*) were procured from local market of Aurangabad which was used for making sweet fried cookies (*shankarpali*). Various chemicals and instruments used were obtained from Department of Agricultural Engineering Maharashtra Institute of Technology, Aurangabad.

B. Methods

a. Preparation of carrot pomace powder

Commercial variety of carrot is procured from local Market of Aurangabad having *pusakesar* variety was manually peeled and shredded juice were extracted and strained through muslin clothes get wet carrot pomace which was collected for further studies.

A tray dryer (Make: Department of Agricultural Engineering, Maharashtra Institution of Technology, Aurangabad, Maharashtra, India) was used for drying carrot pomace which could regulate drying temperature upto 65°C with $\pm 2^\circ\text{C}$ accuracy for 5 hour. Dried carrot pomace was grinded in food processor with grinder attachment. The material was ground to pass through sieve of 5 mm size. The pomace was stored in sealed polythene bag for further use.

b. Sample preparation

The control flour was prepared by using a 30% level of defatted soy flour into the fine wheat flour as standard^[4]. In order to formulate the recipe of composite flour for preparation of sweet fried cookies with enhanced nutritional quality, different preliminary trials were carried out followed by information sensorial evaluation of product to optimize the maximum suitable concentration of defatted soy flour and it was observed that addition of concentration of defatted soy flour up to level of 30% was not affected to the sensory quality, textural quality as well as color measurement

of final product. To enhance the nutritional quality of sweet fried cookies incorporation of carrot pomace powder was carried out by different concentration and preliminary trials was carried out. Hence, on the basis of preliminary trials, following recipes were finalized for experimentation.

c. Treatment combination

Sweet fried cookies (*shankarpali*) with defatted soy flour and carrot pomace powder was prepared with following treatments.

Table 1 Different Combination of Wheat Flour And Defatted Soya Flour

Sr. No.	Treatments	Quantity*
1	T ₀	100% WF
2	T ₁	90% FWF + 10% DSF
3	T ₂	80% FWF + 20% DSF
4	T ₃	70% FWF + 30% DSF

*FWF= Fine Wheat flour *DSF= Defatted Soya flour

After deciding the defatted soya flour concentration, do the same process to calculate the carrot pomace powder concentration suitable for product. Sweet fried cookies (*shankarpali*) fortified with soybean flour and carrot pomace powder was prepared with following treatments.

Table 2 Different Combination of Wheat Flour and Carrot Pomace Powder Flour

Sr. No.	Treatments	Quantity	Quantity of CPP
1	T ₀	70% (FWF)	-
2	T ₁	65% (FWF+30% DSF)	5%
3	T ₂	60% (FWF+30% DSF)	10%
4	T ₃	55% (FWF+30% DSF)	15%

*FWF= Fine Wheat flour

*DSF= Defatted soy flour

*CPP= Carrot pomace powder

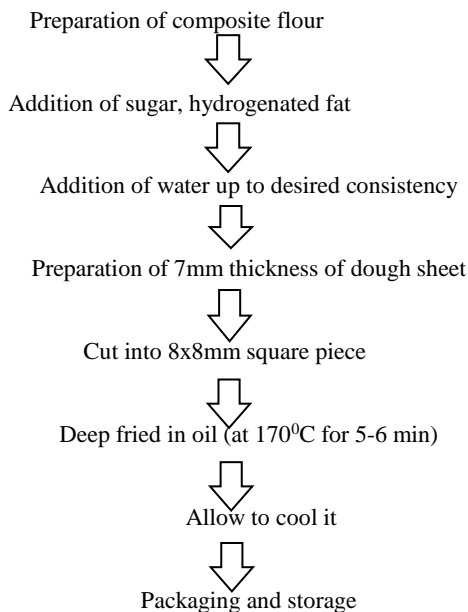


Fig. 1 Flow chart for preparation of sweet fried cookies (*shankarpali*)

III. EXPERIMENTS AND RESULTS

The experiments were conducted for “Utilization of carrot pomace powder for preparation of sweet fried cookies (*shankarpali*) based on various blends”. The present investigation was under taken to evaluate the quality as well as acceptability of utilization of carrot pomace powder into sweet fried cookies (*shankarpali*)

The results obtained during the present investigation are presented and discussed under suitable heading. The results were discussed in the view of relevant scientific literature available in the country and elsewhere:

A. Chemical analysis of raw material

Chemical composition of raw material: Wheat flour, defatted soy flour and carrot pomace powder.

Table 3 Nutritional Value of Raw Material: Fine Wheat Flour, Defatted Soy Flour and Carrot Pomace Powder

Sr. No.	Parameters	Fine wheat flour	Defatted soy flour	Carrot pomace powder
1.	Moisture (%)	11.80±0.1	11.60±0.1	9.10±0.1
2.	Protien (%)	10.96±0.05	51.04±1.4	3.5±0.1
3.	Ash (%)	0.07±0.15	0.8±0.1	7.7±0.1
4.	Crude fat (%)	1.46±0.05	4.98±0.3	0.56±0.5
5.	Crude fiber (%)	1.52±0.01	3.01±0.11	18.57±0.1
6.	Carbohydrate (%)	84.52±99.8	79.61±99.31	64.93±99.60

*Each value is average of three determinations.

It is observed from table-1 that higher moisture content was observed in fine wheat flour is 11.80 percent followed by carrot pomace powder is 8.24 percent and defatted soya flour is 11.60. The highest fat content was noticed in defatted soya flour 4.98 percent followed by fine wheat flour 1.46 percent whereas lowest fat content was found in carrot pomace powder 0.56 percent. The protien content varied with large extent. The highest protien content was recorded for defatted soya flour 51.04 percent followed by fine wheat flour 10.96 percent and carrot pomace powder 3.5 percent. It is clearly seen from table 1 that the highest ash content was observed in carrot pomace powder 7.7 percent followed by defatted soya flour 0.8 percent, whereas lowest ash content was found in fine wheat flour 0.70 percent. Further it was found that there was a large variation in crude fibre content of raw material. The highest crude fibre was noticed in carrot pomace powder 18.5 percent, whereas lowest amount of crude fibre was noticed in defatted soya flour 2.98 percent and fine wheat flour 1.57 percent.

B. Nutritional value analysis of sweet fried cookies (shankarpali) with different levels of carrot pomace powder

- The result for the analyzed sweet fried cookies show that there is a good increase in nutrient value from control sample to T3 sample. There is good increase in the content of fibre
- It can be clearly seen from table-4 the moisture content in the supplemented sweet fried cookies ranged from 3.1 percent to 3.8 percent significantly higher than that of control sample.
- Slightly difference was observed in protein and fat content as control sample having protien content 21.80 which is decreasing T1 is 20.71, T2 is 20.32 and T3 is 19.89 percentage, according to^[8] there was a decrease in protien content in the biscuit sample with increase in carrot pomace powder because carrot pomace powder has a lower amount of protien content compare to wheat flour.
- Fat content is also increased from control sample 33.22 percent to T3 34.18 percent.
- The crude fibre content increased significantly and it ranged from 0.27 percent to 2.9 percent. The increase in crude fibre content in final product might be due to the higher content of crude fibre in carrot pomace powder than fine wheat flour by^[10].
- TABLE 4 NUTRITIONAL VALUE OF PURI BLENDED WITH DIFFERENT PEARL MILLET FLOUR

Sr. No.	Parameters	T ₀	T ₁	T ₂	T ₃
1.	Moisture (%)	3.1	3.4	3.6	3.8
2.	Protien (%)	20.80	22.3	24.32	27.4
3.	Crude fat (%)	33.22	36.45	35.30	34.18
4.	Ash (%)	2.88	3.12	3.98	4.01
5.	Crude fiber (%)	0.27	2.2	2.6	2.9
6.	Carbohydrate (%)	66.30	62.34	60.12	59.04

C. Sensory analysis of sweet fried cookies (shankarpali)

The following table shows that sensory score of sweet fried cookies (*shankarpali*) Overall acceptability was defined by sensory evaluation which was performed by ten number of semi- trained panelist. The accepted level of defatted soy flour incorporated sweet fried cookies (*shankarpali*) was 30%. Data about the sensory evaluation for appearance, colour, flavor, crispiness and overall acceptability of sweet fried cookies are summarized in Table 5

The sweet fried cookies (*shankarpali*) from different levels of carrot pomace powder and control sample were subjected to sensory evaluation for colour, taste, texture, crispiness, and overall acceptability. Result pertaining to sensory evaluation of sweet fried cookies are presented in Table 4.6 and expressed by taking mean and standard deviation. The values were compared with sweet fried cookies from fine wheat flour (control sample). The result showed that T2 (10% carrot pomace powder substitution) improved the sensory characteristics i.e. colour, taste, texture, crispiness, and overall acceptability of the sweet fried cookies. While T1 and T3 (with 5% and 15% level of carrot pomace powder

respectively) was least accepted by the judges. Sample T2 was selected with highest sensory scores (8.3).

• TABLE 5 SENSORY CHARACTERISTICS OF SWEET FRIED COOKIES (SHANKARPALI)

Group	Treatments	Color	Crispiness	Flavor	Taste	Overall acceptability
Control	T ₀	7.8	8.8	8.2	8.3	8.4
FineWheat flour : Defatted soy	T ₁	7.7	7.5	7.6	7.6	7.4
	T ₂	8.5	8.3	8.2	8.0	8.3
flour:Carrotpomace powder	T ₃	7.3	7.0	6.9	7.1	7.3

IV. CONCLUSION

Thus in the light of scientific data of the present investigation it may be concluded that the sweet fried cookies (*shankarpali*) prepared from the composite (fine wheat flour; defatted soy flour; carrot pomace powder) samples, which were analyzed for their physicochemical and sensory acceptability. The sample T2 prepared from composite flour (fine wheat flour; defatted soya flour; carrot pomace powder;) in the ratios of (60:30:10) was found to be more acceptable with respect to mentioned quality parameters

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