

Development and Nutrient Analysis of Pumpkin Seed Flour incorporated Value Added Products

S. Manoprathishta* and V. Krishnaprabha

Department of Nutrition and Dietetics, PSG College of Arts and Science, Coimbatore – 641014, Tamil Nadu, India; Prabhavijay2007@gmail.com

Abstract

Pumpkin seeds are rich in bioactive compounds. The purpose of the study was proper utilization of roasted pumpkin seeds flour in three bakery products namely cookies, cake and crackers. The control and test samples were analyzed for their sensory attributes. Highly accepted samples were subjected to nutrient analysis along with the control sample. All the products at 25% of incorporation were the most accepted except the crackers which was highly accepted at 50% level of incorporation. The analysis states that the energy, carbohydrate, fat, fibre, iron and magnesium content were higher in the crackers. The protein content was higher in the cookies. The antioxidant activity was found as 86.29%, 87.83% and 93.15% for the formulated cookies, cake and crackers respectively. The protein, fat, fiber, ash, energy, iron and magnesium content of all the supplemented products were significantly higher as compared to the control samples. Microbial count of the formulated products was analyzed and was in safer limits. Value added products using Pumpkin Seed Flour can be supplemented to the children to eliminate malnutrition and anaemia.

Keywords: Cake Cracker, Cookie, Nutrients, Pumpkin Seed, Sensory Properties

1. Introduction

Pumpkin seeds are also known as pepitas can be hulled or semi-hulled. These seeds are incorporated in snacks after roasting and salting in baking industry¹. Pumpkin seeds are rich in medicinal and nutritive components and contain high level of fat. These seeds are excellent source of protein and also have pharmacological activity such as anti-diabetic, antifungal, antibacterial, anti-inflammation activities and anti-oxidant effects. The pumpkin seeds are utilized for the cure of different diseases, as herbal remedies or combined with medicines and used for medical treatment². Germination and fermentation could reduce anti-nutritional materials and affect pharmacological activities of pumpkin seeds.

The incorporation of pumpkin seeds in the bakery products is considered the best way because of its high

nutritional properties. Thus this study is designed to evaluate the acceptability of the products formulated from replacing Wheat Flour and Refined Wheat Flour at different proportions in value added products for its sensory attributes and the best variation was analyzed for its nutrients.

2. Materials and Methods

Pumpkin seeds, Wheat Flour, Refined Wheat Flour, sugar, butter, egg and vanilla essence were obtained from the local market of Coimbatore.

2.1 Processing Methods

2.1.1 Preparation of Pumpkin Seed Flour (PSF)

The pumpkin was bought from a local market and

*Author for correspondence

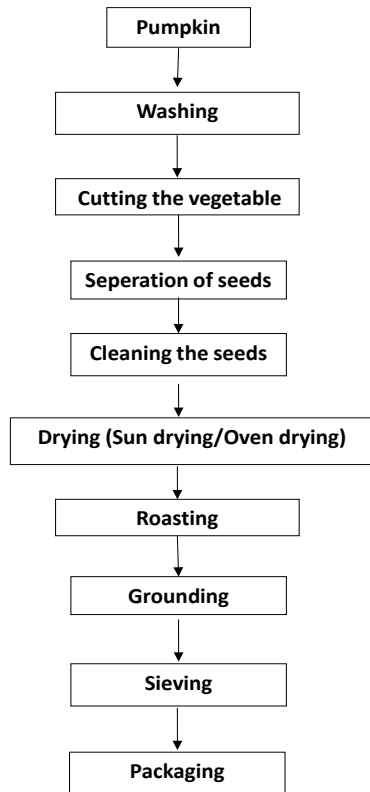


Figure 1. Flow chart of Pumpkin Seed Flour preparation.

cleaned properly. The seeds were removed without fibres from the fruit and washed thoroughly, which are allowed to dry. The drying can be done through sun drying for 2 days or oven drying at 200F for 30 minutes. Dried seeds were further roasted in low flame and then grounded to fine powder. This Pumpkin Seed Flour was sifted through a sieve and stored in air tight containers at dry place.

2.1.2 Experimental Plan (Cookies)

The experimental plan used for the present research is given in Table 1. Figure 1 shows the flow chart for the preparation of Pumpkin Seed Flour.

Figure 2 shows the flow chart for the preparation of Pumpkin Seed Flour incorporated cookies whereas Table 1 shows the proportions at which Pumpkin Seed Flour replaces the Wheat Flour for the cookies preparation.

2.2.3 Plan (Cake)

The experimental plan used for the preparation of Pumpkin Seed Flour incorporated cake is given in Table 1 and Figure 1 shows the preparation of Pumpkin Seed Flour preparation and Figure 3 shows the flow chart for the preparation of cake.

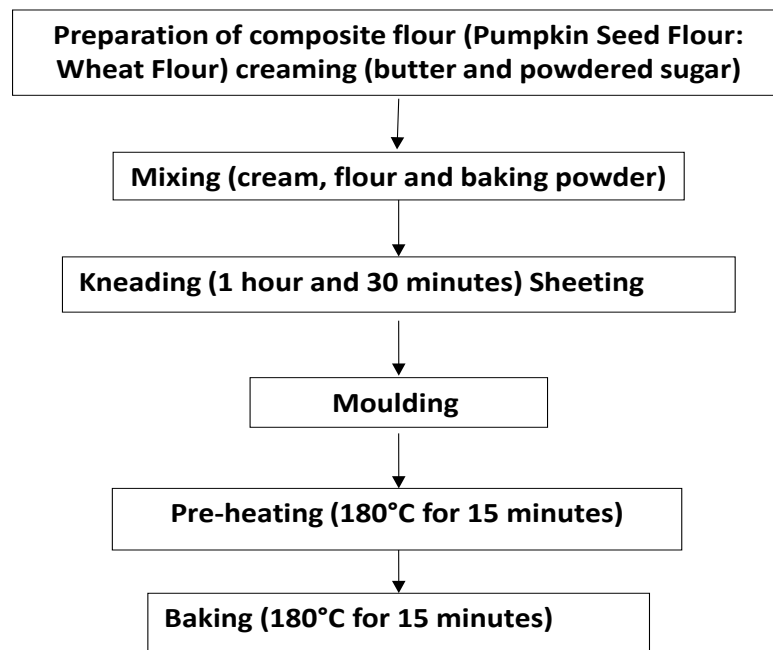
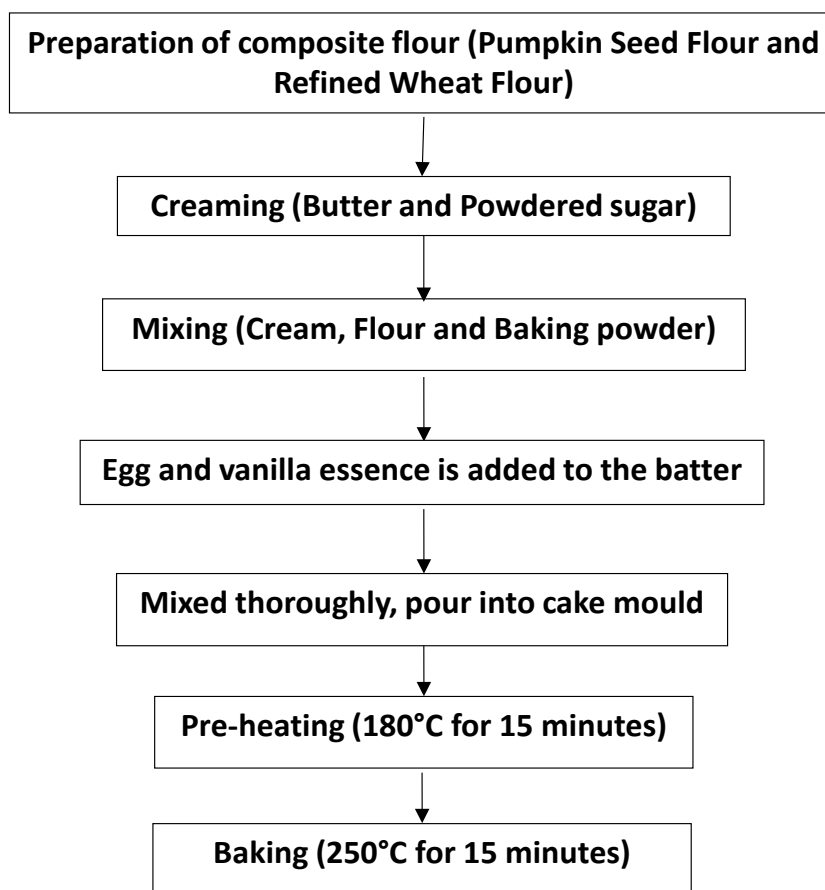


Figure 2. Flow chart for the preparation of pumpkin seed incorporated cookies.

Table 1. Different proportions of Pumpkin Seed Flour and Wheat Flour or Refined Wheat Flour for cookies, cake and crackers

Variation	Cookies		Cake		Crackers	
	WF(%)	PSF(%)	RWF(%)	PSF(%)	WF(%)	PSF(%)
C	100	-	100	-	100	-
V1	75	25	75	25	75	25
V2	50	50	50	50	50	50
V3	25	75	25	75	25	75

PSF - Pumpkin Seed Flour, WF - Wheat Flour, RWF - Refined Wheat Flour.

**Figure 3.** Flow chart for the preparation of pumpkin seed incorporated cake.

2.2.4 Plan (Crackers)

The experimental plan for Pumpkin Seed Flour

incorporated Crackers is given in Table 1. Figure 1 show the preparation of Pumpkin Seed Flour whereas Figure

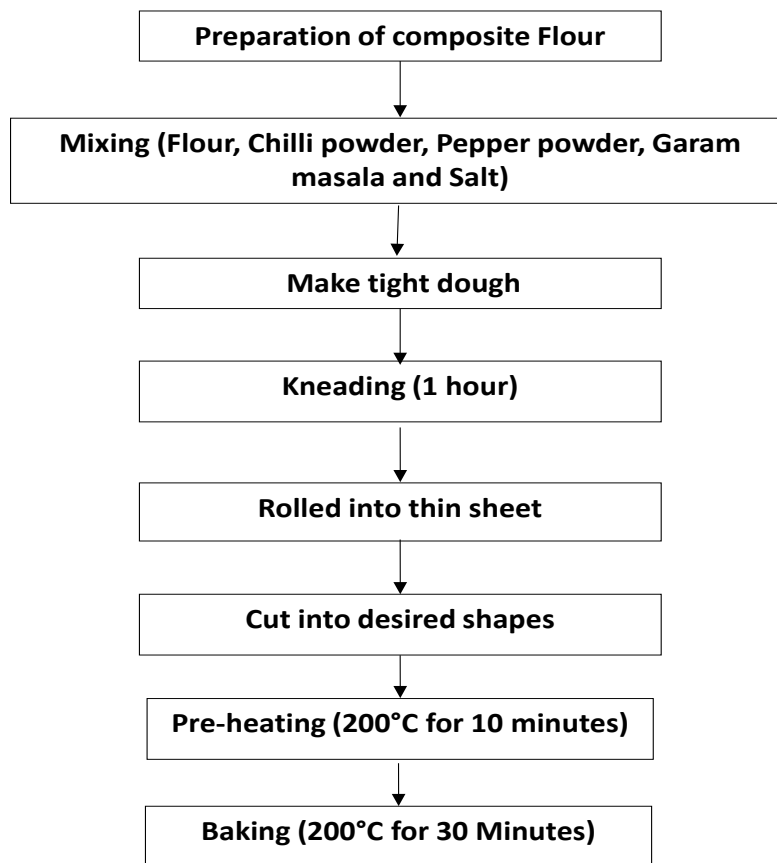


Figure 4. Flow chart for the preparation of pumpkin seed incorporated crackers.

4 shows the flow chart for the preparation of Pumpkin Seed Flour incorporated crackers. Table 2 shows the different proportion at which the Pumpkin Seed Flour replaces Wheat Flour for the crackers.

3. Results and Discussion

3.1 Sensory Evaluation

Organoleptic evaluation of the formulated value added products with the incorporation of Pumpkin Seed Flour were done and compared with control products which contain only Wheat Flour or Refined Wheat Flour.

The results obtained showed that the products containing 25% of Pumpkin Seed Flour had the highest acceptance except the crackers which was highly accepted at 50% level of incorporation in all the attributes

namely appearance, colour, texture, flavor and taste. The nutritional qualities of the formulated products were enhanced due to the incorporation of Pumpkin Seed Flour. Table 2 depicts that the Variation I of the cookies and cakes having 25% of the incorporation and in crackers, 50% of incorporation of Pumpkin Seed Flour scored high.

The tabulated values shows that the mean score obtained for the cookies and cake were higher in the variation I (25% of incorporation) when compared to the other variations whereas in crackers, variation II had highest mean scores.

3.2 Physico-chemical Composition of Value Added Products containing PSF

In the present study, less significant difference was found

Table 2. Organoleptic scores of the formulated value added products

Formulated Products	% PSF and WF ORRWF	Attributes			
		Appearance	Texture	Taste	Overall Acceptability
Cookies	Control	4.24 ± 0.44	4.72 ± 0.46	4.8 ± 0.41	4.8 ± 0.41
	Variation-I	4.68 ± 0.56	4.52 ± 0.59	4.48 ± 0.59	4.52 ± 0.59
Cake	Control	5	4.84 ± 0.47	4.76 ± 0.52	4.8 ± 0.50
	Variation-I	4.96 ± 0.20	4.96 ± 0.20	4.92 ± 0.28	5
Crackers	Control	5	4.84 ± 0.47	4.76 ± 0.52	4.80 ± 0.50
	Variation-II	4.76 ± 0.44	4.84 ± 0.37	4.80 ± 0.85	4.84 ± 0.47

PSF - Pumpkin Seed Flour, WF - Wheat Flour, RWF - Refined Wheat Flour

Note: Values are denoted as Mean ± S.D (n = 25).

Table 3. Physico-chemical composition of value added products containing PSF

S. No.	Parameter	Cookies		Cake		Crackers	
		Control	Variation I	Control	Variation I	Control	Variation II
1.	Moisture	1.2	1.0	20.1	20.8	1.5	1.8
2.	Ash	0.6	0.8	0.2	0.4	1.0	1.1

in the moisture content whereas ash content had great increase in the variations when compared to control. The moisture content of the control and variation I of the formulated cookies were 1.2 and 1.0 g per 100 g respectively. Control and variation I cakes were found to have 20.1 and 20.8 g per 100 g whereas crackers having moisture content of the control and variation II are 1.5 and 1.8 respectively. The slight change in the moisture content was observed as indicated in Table 3 on incorporation.

3.3 Nutrient Composition of Value Added Products containing PSF

The energy content of cookies, cake and crackers increased due to the addition of PSF. Further the energy and carbohydrate value of variation II of crackers was maximum compared to control and variation I irrespective of the product prepared. It was evident that PSF addition increased the protein, fat, fibre, iron and magnesium content compared to the control. As it contains more fibre it absorbs more water and increases bulk in the diet.

Table 4. Nutrient composition of value added products containing PSF

S. No	Parameter	Cookies		Cake		Crackers	
		Control	Variation I	Control	Variation I	Control	VariationII
1.	Energy (kcal)	455.1	478	412.1	444.1	486.5	508.7
2.	Carbohydrate (g)	60.5	58.3	57.2	59.8	61.8	62.5
3.	Protein (g)	11.2	13.5	8.4	9.6	6.5	8.2
4.	Fat (g)	18.7	21.2	16.7	18.5	23.7	25.1
5.	Fibre (g)	1.8	3.1	0.2	0.7	3.5	4.3
6.	Iron (mg)	1.2	4.5	0.1	0.4	5.0	7.2
7.	Magnesium (mg)	0.2	6.0	0.1	1.1	1.5	1.8

The nutrient content of the formulated products is given in Table 4.

3.4 Antioxidant Activity in the Pumpkin Seed Incorporated Value Added Products

The results obtained from the analysis of antioxidant activity

by DPPH method is presented in the Table 5.

According to Table 5 the antioxidant activity of all the products was above 85% irrespective of cookies, crackers and cake. However, crackers sample had higher activity than cookies and cake sample, since it had maximum replacement of Pumpkin Seed Flour.

Table 5. Antioxidant activity in pumpkin seed incorporated products

Parameters	Value
Antioxidant activity of	
Cookies (V1)	86.29%
Cake (V1)	87.83%
Crackers (V2)	93.15%

4. Summary and Conclusion

Malnutrition is a serious health issue in developing countries like India. The value addition of food products is an important step to prevent specific nutritional deficiencies. The formulation of value added products gives good quality products, maximizes the bioavailability of essential nutrients and it gives technical and scientific challenges for the nutritionists. Several locally available foods which are nutritious are underutilized. One such food item is pumpkin seeds which are locally available in India and the seeds have a higher nutrient content. This study was undertaken to enhance the nutritional characteristics of value added products with the incorporation of Pumpkin Seed Flour. It can be recommended to food industries to incorporate Pumpkin

Seeds Flour in their products to improve the nutritional value. Further research is required to study the complete potential of Pumpkin Seed Flour.

5. Reference

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