

Nutritional Analysis of Cake Formulated with Ragi Flour and Peanut Butter

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Abstract - The present studies were conducted for formulating cake with ragi flour and peanut butter in different formulation and nutritional analysis of cake and proximate composition of raw material. Cakes were made in different formulations CO, C1, C2, and C3 means ragi flour to wheat flour combination at ratios (0:100, 15:85, 30:70, 45:55) and peanut butter to butter combination at the ratios (0:100, 10:90, 20:80, 30:70) with egg, baking powder, essence. Ragi and peanut butter is rich source of protein, fiber, minerals and peanut butter also contains unsaturated fatty acid. The cakes were evaluated for chemical analysis of cake samples showed that crude protein content increase significantly when addition of ragi and peanut butter increases it ranging from 12.13%, 12.68%, 12.92% and 13.19 and also increase the crude fiber content ranging from 1.13%, 2.03%, 3.15% and 4.13%. The ash content also increases when the addition of ragi flour and peanut increased it ranging from 1.47%, 1.54%, 1.67% and 1.87%. The chemical analysis result showed that moisture, crude fat and carbohydrate content decreases when the incorporation of ragi flour and peanut butter increases it ranging from 20.15%, 19.92%, 19.72% and 19.55 of moisture content, 30.85%, 30.13%, 29.04%, 28.16% fat content and 34.27%, 33.7%, 33.5%, 33.1% carbohydrate content respectively. The sample C3 contain high amount of crude protein, crude fiber, ash content and low amount of moisture, fat, carbohydrate content than control and other sample This cake is beneficial because of its nutritive value.

Keywords: Ragi flour, Peanut butter, Chemical composition, Formulation, cake

I. INTRODUCTION

Baking Industry is considered as one of the major segments of food processing in India. Baked products are gaining popularity because of their availability, ready to eat convenience and reasonably good shelf life (Vijaykumar *et al.*, 2013).

Cake is the form of food that is usually sweet and often baked. It supplies body building protein, fats and carbohydrates. Cake is normally prepared with refined wheat flour, sweetening agent (sugar), binding agent, egg, fat and vanaspati, liquid flavor and some form of leavening agent such as yeast or baking powder (Desai *et al.*, 2010).

Finger millet (*Eleusine coracana*) also known as ragi, nachani or nagli, is one of the important millets in India. Finger millet is extensively grown on hilly areas and southern part of India and is widely consumed in the form of dumping by vast section of people. Finger millet is a rich source of Ca (300-350 mg %), phosphorus (283 mg %) and Fe (3.9%) (S.S. Swami and S.B. Swami., 2006).

Finger millet is reported to have anti ulcerative properties and finger millet diets lowered blood glucose and cholesterol in diabetic rat models (Mathanghi SK and K. Sudha., 2012).

Peanut (*Arachis hypogaea L.*) is probably the most important oil bearing seed in the world and is rapidly becoming a valuable source of plant protein. It has 47-50% oil and 26% protein. Peanut is used not only for oil extraction but also for formulation of various fortified food products. Generally the fatty acid composition of peanut oil comprises about 10% palmitic acid and 80% oleic and linoleic acids combined, and these three acids account for 90% of the total fatty acid content in the peanut oil (Gajera *et al.*, 2010).

Peanut butter is a good source of protein and fiber, and low in fat. It is continually applied for the preparation of low calorie improved food products. The confectionery formulations contain banaspati (hydrogenated fat), which lowers the nutritional value due to presence of large amount of saturated fatty acids. The biscuits can be used as a source of desirable and essential fatty acid supplementation by utilizing part of peanut butter in place of banaspati (Sadaf *et al.*, 2013).

The importance of finger millet and peanut butter as a antioxidant properties, antiulcer property and control blood glucose level due to ragi. Peanut butter contain a healthy fat % and help to control cardiovascular risk and obesity. Finger millet and peanut butter is rich source of protein, fiber, minerals and peanut butter also contains healthy fat. The present study was conducted for improve nutritional quality of plain cake, cake prepared in different formulation and analyzed for nutritional compositions.

II. MATERIAL AND METHOD

The study was carried out in the year 2014-2015 at the department of Food Analysis and Research Laboratory of Aurangabad.

A. Procurement of raw material

All the raw material required for preparation of cake such as wheat flour, ragi flour, sugar, butter, peanut butter, egg, baking powder and vanilla essence procured from local market of Aurangabad.

B. Formulation and preparation of cake

Table 1. Formulation of cake with ragi flour and peanut butter

Treatments	Ragi flour	Wheat flour	Peanut butter	Butter
C ₀	-	100	-	100
C ₁	15	85	10	90
C ₂	30	70	20	80
C ₃	45	55	30	70

The formulations of different proportions of wheat to ragi flour and butter to peanut butter are given in Table 1. Other ingredients like sugar (100g), egg (80g), baking powder (4 g) and vanilla essence (4 ml) were added to each of these formulations. Cake was prepared by procedure suggested by (Anuradha D. Desai *et al.*, 2010) with slight modification. The raw material required for cake weighed accurately first then creaming of butter and peanut butter with sugar after that break the egg and add vanilla essence in it and beat for 15 min. The all dry ingredient wheat flour, ragi flour, baking powder add in creaming mixture and mix properly with help of mixer then pour all mixture in greased pan and bake at the temperature 160⁰ C for 25 to 30 min and cool at room temperature.

C. Analytical methods

Cakes were analyzed for proximate composition by the method AOAC (1995). The carbohydrate content was calculated from difference, using the equation: 100 – (moisture + ether extract + ash + protein + fiber) (Erica A., 2010). The calorific value (Kcal per 100g) of sample was calculated by summing up the product of multiplication of percent crude protein, crude fat and carbohydrate present in sample by 4, 9 and 4 respectively (Pinki and Pratima Awasthi, 2014).

III. RESULT AND DISCUSSION

A. *Proximate composition*: Proximate composition of wheat flour, finger millet flour, peanut butter used for the preparation of cake is given below:

Table 2. Proximate composition of raw material

Particulars	Wheat flour (%)	Finger millet flour (%)	Peanut butter (%)
Moisture	11.47	11.67	1.86
Ash	1.26	1.74	1.82
Crude Protein	10.18	7.64	24.78
Crude fat	1.11	1.25	44.69
Crude fiber	0.86	3.60	5.92
Carbohydrate	75.12	74.1	20.93

Table 3. Chemical composition of formulated cake

Parameters	Control (C ₀)	Sample (C ₁)	Sample(C ₂)	Sample (C ₃)
Moisture (%)	20.15	19.92	19.72	19.55
Ash (%)	1.47	1.54	1.67	1.87
Crude protein (%)	12.13	12.68	12.92	13.19
Crude fat (%)	30.85	33.13	29.04	28.16
Crude fiber (%)	1.13	2.03	3.15	4.13
Carbohydrate (%)	34.27	33.7	33.5	33.1
Calories (Kcal/100gm)	462.73	456.69	447.04	429.6

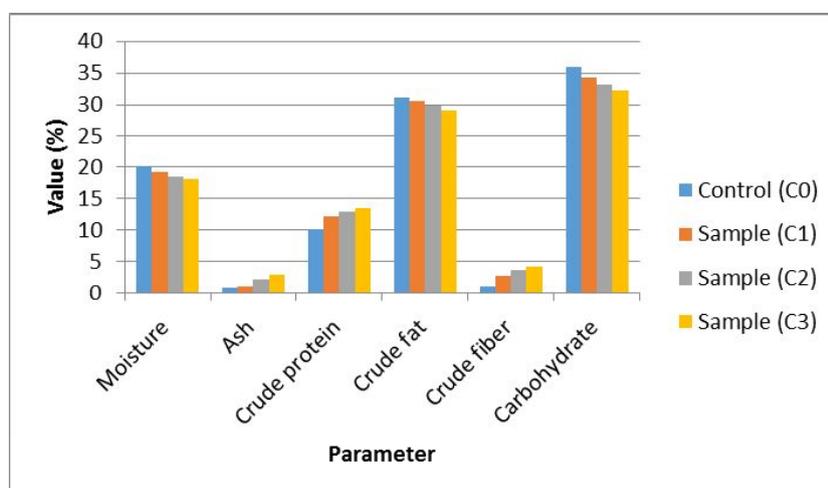


Fig 1. Nutritional evaluation of cake formulated with ragi flour and peanut butter

The moisture content of cakes decreased with increased the finger millet flour and peanut butter content in the cakes from 20.15%, 19.92%, 19.72% and 19.55%. The cake sample contain 45% finger millet flour and 30% peanut butter had the lowest in moisture content (19.55%) and cake only prepared with wheat flour and butter high in moisture content (20.15%) (Anuradha, Desai, 2009).

The ash content of cake sample prepared with ragi flour and peanut butter was increased when the incorporation of ragi flour and peanut butter increases 1.47%, 1.54%, 1.67% and 1.87%. The C₃ cake sample contain 45% finger millet flour and 30% peanut butter had higher in ash content (1.87%) and cake only prepared with wheat flour and butter low in ash content (1.47%).

The crude protein content of cake increased when the incorporation of ragi peanut butter increased from 12.13%, 12.68%, 12.92%, 13.19%. Cake sample contain 45% finger millet flour and 30% peanut butter had higher protein (13.19%) and cake sample prepared without ragi flour and peanut butter had low in protein (12.13%) (Sadaf J., 2013).

The crude fat content decreased when the incorporation of peanut butter increased (30.85%, 30.13%, 29.04%, 28.16%). The cake sample contain 45% finger millet flour and 30% peanut butter contain low amount of fat (28.16). The cake sample contain 0% peanut butter had high fat contain (30.85%) (Sadaf J., 2009).

The crude fiber content of cake increased with the increase the incorporation of ragi flour and peanut butter (1.13%, 2.03%, 3.15%, 4.13%). Cake with 45% finger millet flour and 30% peanut butter contain high amount of crude fiber (4.13%). The cake sample prepared without ragi flour and peanut butter contain low amount of crude fiber (1.13%) (Anuradha, Desai, 2009).

The carbohydrate content decreased with increased the peanut butter and finger millet flour in cake sample (34.27%, 33.7%, 33.5%, 33.1%). The cake sample contain 45% ragi flour and 30% peanut butter contain low amount of carbohydrate (33.1) and cake prepared without ragi flour and peanut butter contain high amount of carbohydrate (34.27) (Sadaf J., 2009).

Calories value decreased when the incorporation of ragi flour and peanut butter. Control sample without ragi flour and peanut butter had high calorific value (462.73) and sample containing high amount ragi flour and peanut butter contain had low calorific value (429.6).

IV. CONCLUSION

The cake prepared with the formulation of ragi flour with wheat flour and peanut butter with butter were rich in protein, crude fiber, minerals and provide antioxidant properties, antiulcer property and control blood glucose level due to ragi. Peanut butter lowers the fat and increases the healthy fat % and help to control cardiovascular risk and obesity. Result of this study showed that when the incorporation of ragi flour and peanut butter increase protein content, crude fiber content and ash content and decrease the fat, moisture and carbohydrate content. The C₃ sample of 45% ragi flour and 30% peanut butter contain higher amount of protein, fiber and ash content and low amount of moisture, fat and carbohydrate content. C₀ sample contain low amount of protein, fiber and ash content and high amount of moisture, fat and carbohydrate content.

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