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RESEARCH ARTICLE

NUTRITIONAL AND TEXTURE ANALYSIS OF VALUE ADDED BREAD PREPARED BY USING PUMPKIN SEED FLOUR AND SOYBEAN FLOUR ENRICHED WITH DATES AND CRANBERRIES

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ABSTRACT

The use of refined flour blend with pumpkin seed flour and soybean flour respectively and encorporated with Dates and Cranberries was studied. The ingredients composition of value added bread was refined flour 300gm, blends with pumpkin seed flour 100 gm, and 50 gm dates and 50 gm cranberry respectively and another ingreduent composition of soybean flour value added bread was 200gm refined flour, 100gm soybean flour and 50 gm Dates and 50gm cranberries respectively and compared with control sample of refined flour bread. The bread loaves were produced using the straight-dough procedure and were subsequently evaluated for their nutritional composition and texture analysis. The TPA (Texture Profile Analysis) was used for the texture analysing of the bread. The hardness, corhessivness and adhessiveness property of the bread is analysed by the TPA. The result show that the both of the pumpkin seed value added bread was highly nutritional rich rather than control sample of refined flour and antioxidant, protein(4.gm), iron(11.80mg), calcium (63.94mg), ash(1.33gm), carbohydrate (76.81gm), fat(4.30mg) and fiber rich and the soy bean flour value-added bread results were fat(4.3mg), protein(12.17gm), carbohydrate (58.6mg), total ash(2.58mg), calcium(39.96), iron(25.55mg) It was concluded that both of the value added bread gave the bread with the best overall quality acceptability and both of the value added bread are being regarded valuable for the food industry.

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INTRODUCTION

Bread is more demanded staple food in the world. Bread may be described as a fermented confectionary product produced mainly from wheat flour, water, yeast and salt by a series of process involving mixing, kneading, proofing, shaping and baking (Dewettinck *et al*., 2008). Today's consumers are conscious of their diet, and many prefer eating healthy foods. Bread seems to be a good vehicle in this respect if part of the wheat flour were to be replaced with non wheat flours (Basman *et al*., 2003). Bread is one of the most important foods consumed all over the world (Mirsaeedghazi *et al*., 2008). Bread products are well accepted worldwide because of the low cost, ease of preparation, versatility, sensory attributes and nutritional properties (Fang, 2008). Refined flour bread is not nutritionaly rich and deficient in essential amino acid such as lysine and threonine (Bakke and Vickers, 2007; Dewettinck *et al*., 2008; Jideani and Onwubali, 2009). The use of white flour derived from the processing of whole wheat grain, which is aimed at improving the aesthetic value of white bread, has also led to the drastic reduction in the nutritional density and fibre content when compared to bread made from whole grain cereals (Maneju *et al*., 2011). The pumpkin (Cucurbita moschata) is an annual dicotyledonous vegetable, belonging to the Cucurbitaceae family. The pumpkin seed is generaly consideredas agro-industrial waste. It is used as a medicinal plant for prostate and bladder problems, and as an anthelmintic, galactogogue, and anti-emetic (Magdeleine *et al*., 2011). Some scientific literature highlights its importance as a source of α and β-carotene, vitamin C, dietary fiber, minerals, and phenolic compounds. These nutrimental and bioctive components are very important in providing human health benefits (Valenzuela *et al*., 2011) But due to their richness in protein, fibres, minerals, polyunsaturated fatty acids and phytosterols. Formulation of foods from low-lysine staples fortified with legumes has been proposed as a practical and sustainable approach to improving the protein nutritional value of foods for young children in developing countries (FAO/WHO, 1994; Young, 2001). High protein soy breads form a popular carrier of nutrition to vulnerable groups like

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pregnant and nursing mothers, young and school children in reducing the incidence of malnutrition and at the same time encourage the farmers to grow more soybeans due to the increased utilization (Islam *et al*., 2007). Soybean is one of the most important oil and protein crops of the world (Islam *et al*., 2007). Soybeans contain 30 to 45% protein with a good source of all indispensable amino acids (Serrem *et al*., 2011). The protein content of soybean is about 2 times of other pulses, 4 times of wheat, 6 times of rice grain, 4 times of egg and 12 times of milk. Soybean has 3% lecithin, which is helpful for brain development. It is also rich in calcium, phosphorous and Vitamins A, B, C and D, it has been referred to as "the protein hope of the future" (Islam *et al*., 2007). Moreover, isoflavones contained in soybeans are effective cancer-preventive agents for lowering risks of various cancers (El Gharras, 2009). Evidence also points to the beneficial effects of soy isoflavones in the prevention of cardiovascular disease (El Gharras, 2009). Their potential health benefits of soy-isoflavones include prevention of osteoporosis via phytoestrogen effects of isoflavones, and prevention of neovascularization in ocular conditions (Zhu *et al*., 2005). A value-added bread, that combine many nutritional benefits of refined flour supplemented with soya beans has been beneficial for those suffering from protein-energy-malnutrition, diabetes and obesity.

Dates *Phoenix dactylifera* is a flowering plant species in the palm family Arecaceae, cultivated for its edible sweet fruit. Dates provide a wide range of essential nutrients, and are a very good source of dietary potassium. The sugar content of ripe dates is about 80%. Dates are rich in iron, vitamin A, vitamin C, vitamin E, and some antioxidants such as tannins, flavonoids, and phenolic antioxidants that prevent the macular degeneration and prevent from cancer (prostate cancer, colon cancer). The health benefit of dates includes relief from constipation, intestinal disorders, heart problems, anemia, sexual dysfunction, diarrhea, abdominal cancer, and many other conditions. Dates are good for gaining weight also. Bread prepared by using dry cranberry increase the nutritional quality of the bread. Raw cranberries have moderate levels of vitamin c, dietary fiber and the essential dietary minerals, manganese and proanthocyanidin antioxidants, essential for the protect from urinary tract infection UTI, Protect from tooth cavity. Cranberry juice has been recognized for a long time as efficacious in the treatment of urinary tract infections and oxidative effects (Schmidt and Sobota, 1998). Proanthocyanidins or condensed tannins present in blue berries have been identified as compounds responsible for preventing urinary tract infections caused by E. coli.

MATERIALS AND METHODS

Area of study

The sample preparation was conducted on lab of Food Science and Technology, School for Home Science. The nutritional composition of the food product was conducted on the lab of R-frac in Lucknow and the texture analysis of the bread was conducted on the lab of Centre of Food Science and Technology Department of Allahabad University, Allahabad.

Raw Materials

Refined flour, pumpkin seed flour, soybean flour, cranberry, dates, milk powder, sugar, yeast, vanilla essence, oil and milk. According to shown on table-1.

Preparation of composite flours

The composite flour was prepared by using certain proportions of refined flour and Soybean flours and pumpkin seed flour respectively incorporated with dates and cranberries. According to the recipe as shown in table -2.

Bread making-

The bread is prepared by using straight dough method. The raw material was weighed. The raw ingredients such as flours, yeast, milk, water, vanilla essence and sugar was mixed accordingly and then kneaded for 12 min into consistent dough and the resulting dough was molded and placed in a pre-oiled baking bowl. After that the dough was proofed for 45 to 60 min at 35°C and 85% relative humidity and baked in oven for 20-35 min. at 220°C.

Chemical composition analysis of the bread

The wheat flour, soybean flour and bread were chemically analyzed to determine carbohydrate. Content, protein content, fat content, crude fiber and ash according to AOAC (2002) methods.

Texture Analysis

The chewiness, hardness, adhesiveness and the cohesiveness property of the bread was determined by TPA (Texture Profile Analysis) method.

RESULTS AND DISCUSSION

Chemical composition of raw materials

The raw materials, i.e., refined flour and soybean flour, pumpkin seed flour value-added bread were analyzed for proximate composition and the data are presented in Table-1. Refined flour bread contained 12.46% moisture, 11.58% protein, 0.58% crude fiber, 1.18% crude fat and 0.85% ash. Owing to the extraction of bran and germ from whole wheat flour, it contains lesser amount of protein, fiber, fat and ash. Soybean flour was richer in crude protein, crude fiber, crude fat and ash as compared to wheat flour. Average protein content in the soybean flour was 39.20%, crude fiber 6.4%, crude fat 10.10% and ash 2.53%. Pumpkin seed flour value added bread was

Chemical composition of bread

Nutritional value of the developed functional bread are assessed in the Food Analysis Laboratory with different specific equipments for each nutritional parameters like protein, iron, carbohydrate, Total energy, fat, moisture content.

Functional bread nutritive value

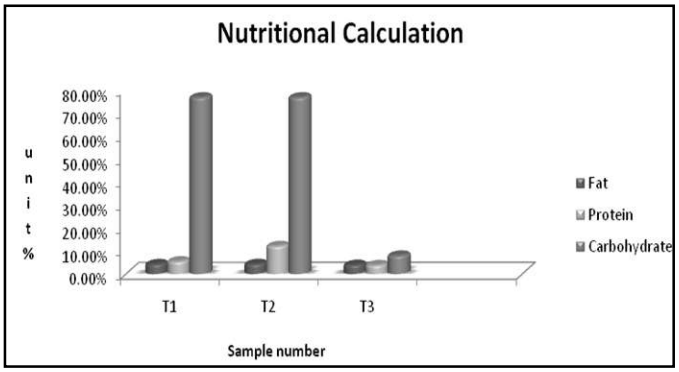

Figure 1. Graphical representation for nutritional composition of sample T1, T2, T3

- From above graph 4.3.2 the nutrient contents are present in comparing way, from three different samples.
- The Fat content in Pumpkin seed bread is 4.30 gm, 4.37 gm fat contains in soybean flour and 4 gm fat contains in refined flour bread.
- Pumpkin seed flour contains 5.50 gm, soybean flour contains 12.17%, and refined flour contains 3.86 gm protein.
- Moisture content in functional bread is 19.09% and in white bread 39.0%.

From the above three graphical representation it is concluded that the amount of protein and fat and carbohydrate has increased in the soybean flour bread, and other values also increased in soybean flour bread.

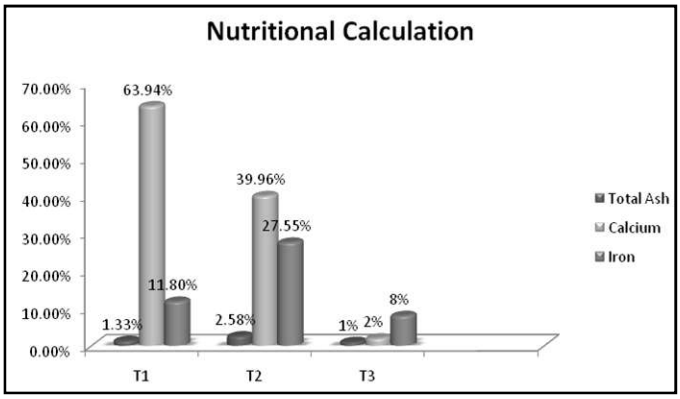

Fig. 2. Graphical representation for nutritional calculation of sample T1, T2, T3

- From above graph 4.3.2 the nutrient contents are present in comparing way, from three different samples.
- The Fat content in Pumpkin seed bread is 4.30 gm, 4.37 gm fat contains in soybean flour and 4 gm fat contains in refined flour bread.
- Pumpkin seed flour contains 5.50 gm, soybean flour contains 12.17%, and refined flour contains 3.86 gm protein.
- Moisture content in functional bread is 19.09% and in white bread 39.0%.

From the above three graphical representation it is concluded that the amount of protein and fat and carbohydrate has increased in the soybean flour bread, and other values also increased in soybean flour bread.

Table 1. Nutritional calculation of wheat bread

Nutrients	Amount
Calories	12
Calories from fat	22
Total fat	2.48 gm
Saturated Fat	0.366 gm
Poly Unsaturated Fat	1.352 gm
Mono Unsaturated Fat	0.533 gm
Cholesterol	0 mg
Sodium	159 mg
Potassium	144 mg
Total Carbohydrate	23.64 gm
Dietary fiber	2.8 gm
Sugar	1.77 gm
Protein	3.86 mg
Vitamin A	0
Vitamin C	0
Calcium	2%
Iron	8%

Source- National institute of nutrition, Hyderabad

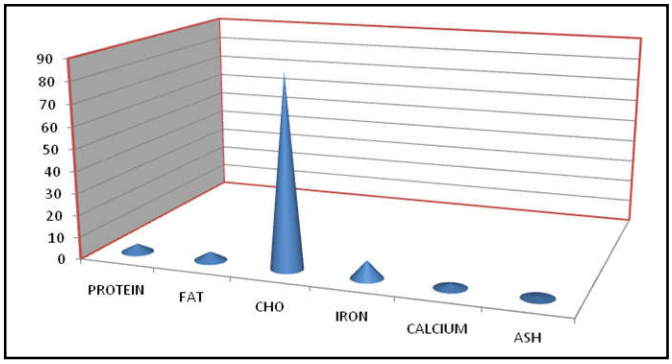

Fig. 3. Graphical representation of nutritional profile of control sample T3

Table 2. Nutritional composition of pumpkin seed value-added bread

S. No.	Parameter	Unit	Result	Test method
1	Fat	%	4.30	AOAC
2	Protein	%	5.50	AOAC 978.04
3	Cho	%	76.81	SP:7874-1975
4	Total ash	%	1.33	IS:7874-1975
5	Calcium	Mg/100g	63.94	SP:18(P-1)1980
6	Iron	Mg/100	11.80	SP:18(P-1)1980

Source- R-FRAC, Lko

Table 5. Nutritional composition for value added bread of soybean flour (T2)

S. No.	Parameter	Unit	Result	Test method
1	Fat	%	4.37	AOAC
2	Protein	%	12.17	AOAC 978.04
3	Cho	%	58.6	SP:7874-1975
4	Total ash	%	2.58	IS:7874-1975
5	Calcium	Mg/100g	39.96	SP:18(P-1)1980
6	Iron	Mg/100	27.55	SP:18(P-1)1980

Source- R-FRAC, Lko

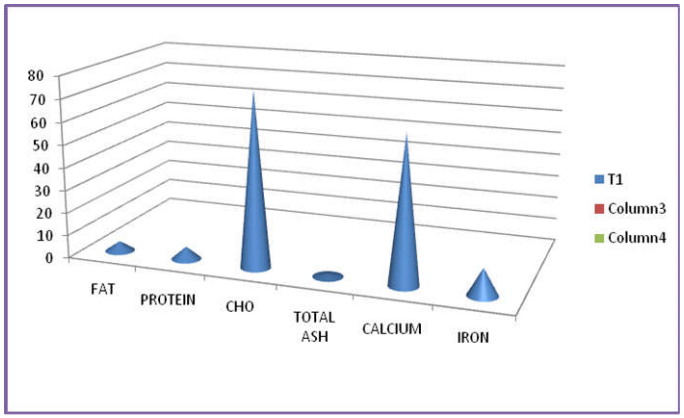

Fig. 4. Graphical representation of value added pumpkin seed flour bread (sample no. T1)

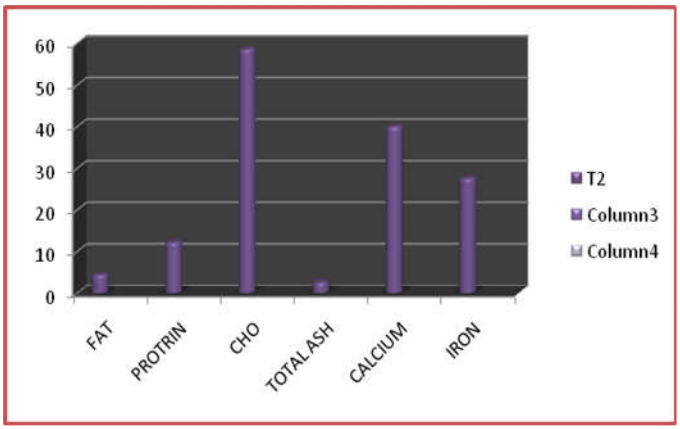

Fig.13. Graphical representation of value added soybean flour bread

Table 6. Hardness parameter for both sample T1 and T2

S. No.	Test parameter	Test method used	Result (unit)
1	HARDNESS	TEXTURE ANALYSER	6298.8g
2	HARDNESS	TEXTURE ANALYSER	1240.2g

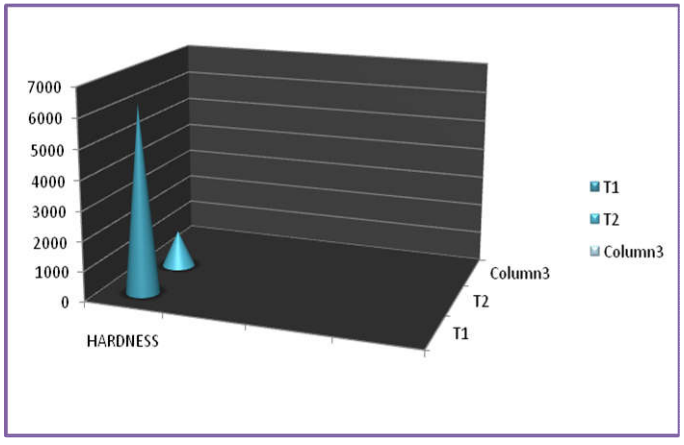

Fig. 7. Graphical representations for texture analysis of hardness

- The above graph represents the hardness is more in the sample T1(pumpkin seed flour value added bread) than the sample T2(soybean flour value-added bread).

Table 4. Adhesiveness for both sample T1 and T2

S. No.	Test parameter	Test method used	Result(unit)
1	Adhesiveness	Texture analyser	Nill
2	Adhesiveness	Texture analyser	Nill

Table 5. For texture analysis of chewness

S. No.	Test parameter	Test method used	Result(unit)
1	Chewiness	Texture analyser	1326.8
2	Chewiness	Texture analyser	549.7

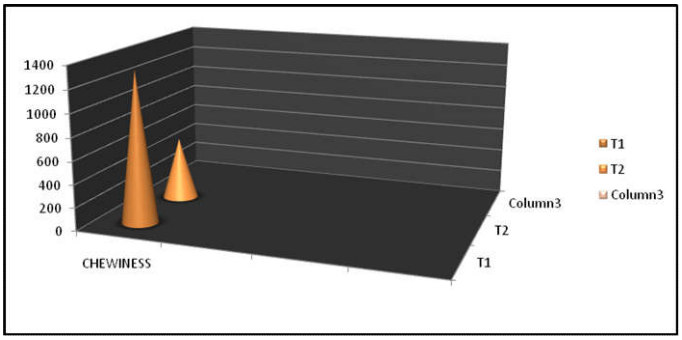

Fig.8. Graphical representations for chewiness

- The above graph shows that the chewiness property of the pumpkin seed flour is more than the soybean flour value-added bread.

Conclusion

The study has shown that the wheat flour supplemented bread with pumpkin seed flour and soybean flour along with dates and cranberries produced with increased protein, calcium, iron, carbohydrate and ash contents that was nutritionally superior to control bread. The texture of the bread is also good as white wheat bread.

Acknowledgement

The present study was done in the supervision and the under guidance of mine advisor Prof. Suneeta Mishra, Dean and Head, Deptt. Of Food Science and Technology, BBA University, LKO. The nutritional evaluation were done in R-FRAC, LKO and the texture analysis were done in Centre for Food Science and Technology, Allahabad University, Allahabad.

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