Short Communication

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Nutritional and Technological Evaluation of Wheat Bread Supplemented with Peanut and Soybean Flours

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Wheat breads supplemented with different oilseed flours were evaluated for nutritive value and for acceptability by sensoric subjective analysis. It was found that protein content of bread increased from 11.2 to 22.30% with supplementation of soybean and 11.2 to 21.50% with peanut flours. Variation in other nutrients was also observed. Sensoric evaluation revealed highest acceptability rating for soybean flour (7.3-6.8) based bread followed by peanut flour (7.2-6.4).

Protein malnutrition is wide spread among the people of low-income groups in developing countries including Pakistan. Wheat is the staple diet of people of Pakistan. The protein content of wheat is low and deficient in certain essential amino acids, such as lysine and threonine (Richar 1989). Oilseed flours are an economical source of protein as well as certain minerals and vitamins essential to human nutrition. The nutritional value of oilseed flours are suggested by the ability of vegetarians to maintain good health on carefully selected diet and by the fact that severe protein malnutition can be cured by an appropriate mixture of cereal and oilseed without any source of animal protein (Salami 1982). The present research work was initiated to replace 20, 25 and 30% wheat flour with the equivalent amount of soybean and peanut flours to improve the nutritive value of wheat bread.

Wheat (Fakhr-e-Sarhad) variety was processed into flour. Flours from soybean (Bragg) and peanut (Kark cultivars) were prepared by an improved procedure of this laboratory as reported earlier (Jan *et al* 1996). Wheat bread fortified with 20,25 and 30% oilseeds flours was prepared using standard home conditions. The breads were prepared from very basic ingredients (wheat flour, oilseed flour and water), which were cooked at high temperature on a flat iron plate oven on an open flame. Proximate analysis for potential nutrients was performed in triplicate in accordance with AOAC (1994). Moisture was determined in a drying oven at 105°C. Determination of fat was carried out by soxhlet extraction using petroleum ether (b.p. 40-60°C) and protein (% N x 6,25) by microkjedahl method. Ash (mineral matter) was determined by heating the sample at 550°C and fiber content was determined by digestion with acid and alkai using Fiber Tech System -M (Tecator). Total carbohydrates were determined by difference.

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The fresh breads were cooled to room temperature and presented to panel of 10 judges, who are asked to evaluate each bread for colour, flavour, texture taste and overall acceptability. The hedonic scale method of Elizabeth (1977) was ucsed for this purpose.

The nutrient quality of wheat bread fortified with 20,25 and 30% oilseed flours was evaluated chemically and the results are shown in Table 1. As compared to control bread the protein was increased by 66.1, 82.0, 99.1% in breads containing 20,25 and 30% soybean flour and 50.2, 75.0, 91.9% in breads containing 20,25 and 30% peanut flour. Potential nutrients also showed an increase with supplementation. The increase was maximum with the highest supplementation (30%). Jan *et al* (2000) also reported an increase in the protein, fat, ash and fiber contents of chapaties supplementd with 5,10% soybean, peanut, sunflower and rapeseed flours. Mathews *et al* (1980) observed that a 25% replacement of wheat flour with peanut flour reduced mixing time and improved bread quality. Bhat and Vivian (1980) determined that peanut and soybean flours used at 10 and 20% whole-wheat flour replacement levels chapaties, which are nutritionlly superior and acceptable in sensory quality characteristics as those made from 100% whole-wheat flour. Arshad *et al* (1989) investigated that 10%-enriched bread with soybean flour had high content of protein (15.0%) as compared to control bread

Table 1

Proximate composition of fortified wheat bread with oilseed flours ($g100g^{-1}$)

Fortification of wheat flour with oilseed flours (%)	Moisture (%)	Protein (%)	Change (%)	Fat (%)	Ash (%)	Fiber (%)	N-free extract (%)
Soybean	34.10±	18.60±	66.1	2.80±	3.1±	1.60±	39.2±
20	0.01	0.01		0.01	0.01	0.02	0.01
25	34.60±	20.45±	82.0	2.79±	3.5±	1.71±	36.1±
	0.01	0.01		0.01	0.01	0.01	0.01
30	34.90±	22.30±	99.1	2.80±	3.7±	1.72±	34.5±
	0.02	0.02		0.01	0.01	0.01	0.02
Peanut							
20	35.20±	17.72±	58.2	2.70±	3.5±	1.70±	39.0±
	0.01	0.02		0.02	0.01	0.01	0.01
25	35.70±	19.60±	75.0	2.85±	3.8±	1.70±	36.1±
	0.02	0.01		0.02	0.01	0.02	0.01
30	36.19±	21.50±	91.9	2.95±	3.9±	1.65±	33.3±
	0.01	0.01		0.01	0.02	0.02	0.02
Wheat flour (control) 0/100	32.19± 0.01	11.20± 0.02	-	2.45± 0.01	2.10± 0.01	1.44± 0.01	50.1± 0.01

Values are the average of 3-separate determination; ± Denote standard deviation

Table 2
Organoleptic evaluation of wheat bread supplemented with soybean and peanut flours

Bread characteristic	Supplemented level used (%)						
		Soybean flour (%)			Peanut flour (%)		
	Control	20	25	30	20	25	30
Colour	8.6	7.9	7.7	7.1	7.8	7.6	6.9
Taste	8.3	7.6	7.0	7.1	7.4	7.4	6.9
Texture	8.7	7.8	7.9	7.2	7.7	7.7	7.2
Flavour	8.2	7.8	7.5	6.9	7.6	7.6	7.0
Overall acceptablity	8.8	7.3	7.0	6.8	7.2	7.2	6.4
Mean standard deviation	8.5	7.5	7.4	7.0	7.5	7.5	6.8

Average score of 10 judges; Rating scale: 0-1 unacceptable, 2-3 poor; 4-6 fair, 7-8 good, 9-10 excellent.

(13.0%). Khalil *et al* (1983) investigated that 10,20,30% enriched bread with peanut flour had high content of protein (16.1, 20.5 and 25.0%) as compared to control bread (12.5%). The organoleptic ratings for fortified bread for each organoleptic test are shown in Table 2. All bread samples were tested according to a 10-point scale (1977). The charactristics evaluated were colour, taste, texture, flavour and overall acceptability. The results revealed that acceptability scores were highest for bread prepared with soybean (7.3,7.0, 6.8) followed by peanut (7.2, 6.9, 6.4) while the acceptability score for bread made from 100% wheat flour was 8.8. These results suggest that 20 and 25% soybean and peanut flours can be incorporated into wheat flour without any adverse effect on the acceptability of the bread. The texture and chewing quality of 20-25% soybean and peanut breads were comparable to that of control. Further addition of soybean and peanut flours adversely affected these qualities. Based on these observation, it is recommended that in order to prepare an acceptable bread with higher nutritive value, wheat flour should be supplemented with 20-25% soybean and peanut flours.

Key words: Wheat bread, Nutritional value, Oilseed flours, Evaluation

Reference

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