EVALUATION OF PAN BREAD FORTIFIED WITH PEANUT FLOUR

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Abstract

Pan bread was fortified with roasted (Microwave at 5 and 7 minutes or oven at 7 minutes) defatted peanut flour at 5,10, and 15% levels. Gassing power, falling number and dough mixing properties of blends were determined. The organoleptic properties of the produced bread was also evaluated.

The results indicated that the addition of defatted peanut flour at 5% (roasted by microwave for 5 minutes), is recommened for rheological and sensory evaluation.

INTRODUCTION

Groundnuts (peanuts) are expected to play an important role in meeting the world's future needs for edible protein if they can be formulated into foods that look and taste like traditional foods (Ory and Conkerton, 1983). Rooney et al (1972) compared the baking properties of several oilseed flours and concluded that the defatted peanut flour had excellent baking properties and produced bread with good taste, texture, crumb and loaf volume. Lowhon et al (1975) successfully replaced 26% of the wheat flour in cake doughnuts with peanut flour. The peanut doughnuts were rated above or near "Satisfactory" and had the darkest external color when compared with doughnuts prepared from oilseed flour. McWatters (1982), found that peanut flour

could be successfully used at levels as high as 20% in cake type doughnuts, however, panelists detected a peanuty odor. No significant differences in the appearance, color, texture and flavor were observed. Ory and Conkerton (1983) replaced 50% of the wheat flour with peanut flour in cookies, while Chompreeda *et al.* (1988) successfully substituted wheat flour with 15% peanut flour in chines type noodles.

Functionality of proteins in bread wheat was evaluated by adding milk. Oilseed, hydrolyzed plant and wheat proteins, Suhendro *et al* (1993) mentioned that many proteins decreased dough mixing, resting time and machinability by weakening the dough structue.

The aim of this investigation was to evaluate pan bread fortified with defatted peanut flour.

MATERIALS AND METHODS

Peanut seeds variety Giza (2) were obtained from Oil Crops Research Department, Field Crops Research. Institute, Agricultural. Research. Centre, Egypt. The shelling process was carried out manually. The samples were roasted by a conventional oven at 170°C for 20 minutes and microwave for 5 and 7 minutes. The samples were blanched and the undesirable nuts were removed. The treated samples were defatted and then dried at 40°C for 30 minutes.

Crude protein, oil extract and ash contents were determined according to A.O.A.C. (1990). Total hydrolyzable carbohydrate was determined as decribed by Dubois *et al* (1956).

Blends from wheat flour (72 % extract) and defatted peanut flour were prepared in ratios of (95 : 5), (90 : 10) and (85 : 15), respectively. Gassing power, falling number and dough mixing properties of the blends were deermined according to Rubenthaler *et al* (1980) and A.A.C.C. (1983), respectively. Pen bread was produced according to the method of Feleming and Sosulski (1977). Specific volume of the produced broduced bread was determined according to A.A.C.C. (1983) and the organoleptic propeties were evaluated as described by El-farsa (1973)

RESULTS AND DISCUSSION

Data presented in Table 1 show the chemical analysis of defatted peanut flour. It is clear that roasting slightly decreased protein and total hydrolyzable carbohydrate contents. These results agree with those of Bahat and Alfred (1990). Oil extract and ash contents were not affected by roasting .

Gassing power after 90 minutes of fermentation, and falling number of blends from wheat flour and defatted peanut flour are shown in Table 2. as the untreated peanut flour increased, gas production increased. In case of blends composed of wheat flour and roasted peanut, no differences were obtained when the roasted peanut flour (microwaved for 5 minutes). was used at 5,10 and 15% levels of addition. 5% level of addition showed the same values of gassing power after 90 minutes of fermentation for all blends. At 10% and 15% levels, the untreated peanut flour showed the highest value of gassing power compared with roasted peanut. Blends of wheat flour and peanut flour roasted by microwave for 7 minutes or by oven at 170°C showed a decrease in increased. The falling mumber of the blends decreased as the untreated peanut flour increased.

As it is known, the falling number is negatively correlated with alph-amylase activity. This agree with the value of gassing power after 90 minutes of fermentation which increased with the increase of peanut flour. This could by attribvted to the fact that the untreated peanut flour has a high activity of alph-amylase enzyme which plays an important role in dough fermentation. The heating process either by overn or microwave had decreased alph-amylase activity. The effect of microwave for 7 minutes was higher in decreasing the activity of alph-amylase than with the oven at 170 °C. The falling number decreased at 5%. 10% and 15% from 344, 348 and 350 to 340, 344 and 347 when peanuts were roasted by microwave for 7 minutes and oven at 170°C for 20 minutes, respectively.

Table 3 show the results of the dough mixing properties (mixograph data) of blends from wheat flour and defatted peanut flour. As the defatted peanut flour increased in the blends, water absorbtion also increased. In each level of addition the type of roasting did not affect water absorbtion. The increase in water absorbtion could be due to the polarity of amino acids of peanut protein.

The addition of peanut flour caused an increase in the development time. This increase is belived to be due to the difference in particle size of the added peanut flour and that of wheat flour. Dough stability refers to the ability of gluten network

to resist the mechanical mixing effect. The more the dough is stable, the more the flour would be prefeved for further breadmaking. The amount of peanut flour roasted by oven or microweve had affected dough stability (Table 3). The highest stability values were attained when peanut flour was added after roasting by microwave for 5 minutes.

Table 4 show the organoleptic properties of bread produced from blends of wheat flour and defatted peanut flour. The blends containing 5% defatted peanut flour gave the highest values of overall acceptability than those having 10% or 15%. The overall acceptability of bread made from wheat flour gave score 40, while at 5% level of untreated or roasted by microwave for 5 or 7 minutes, or by oven, the scores of overall acceptability were 43, 41, 40 and 42, respectively. Specific volume of the produced bread gave the same trand as overall acceptability.

From the above mentioned results and view of the findings of Mansour *et al* (1994) that roasting peanut by microwave for 5 minutes had high protein digestibility than roasted by microwave for 7 minutes or by oven at 170 ^{o}C for 20 minutes, 5% defatted peanut flour roasted by microwave for 5 minutes could by recommended for pan bread production.

Table 1.Chemical analysis of defatted peanut flour (on dry wt. bases)

Treatment (roasting by)	Protein	Total hydrolyzable carbohydrate	Oil extract	Ash content
Control	36.08	35.20	1.86	5.995
Microwave 5 min.	35.94	34.74	1.82	5.910
Microwave 7 min.	35.87	33.15	1.80	5.872
Oven (170^{o}C /20 min)	35.12	33.95	1.83	5.660

Table 2 . Gassing power after 90 minutes of fermentation and falling number of blends from wheat flour and defatted peanut flour.

Treatment (roasting by)	Gassing units (G.U.)			Falling number (Sec.)		
	Peanut flour			Peanut flour		
	5%	10%	15%	5%	10%	15%
Control	38	45	49	320	315	308
Microwave 5 min.	38	39	39	432	345	349
Microwave 7 min.	38	35	30	344	348	350
Oven (170°C /20 min)	38	35	30	340	344	347
Wheat flour		48			339	

Table 3 . Rheological properties of blends from wheat flour and defatted peanut flour.

Blends	Water absorption %	Dough development (min.)	Dough Stability (min.)	Max. peak height (cm.)
WF (Wheat flour)	54.0	4.5	9.4	5.5
WF+5% PF (untreated)	56.0	5.0	8.9	5.1
WF+5% PF (Microwaved 5 min.)	58.9	5.5	10	5.3
WF+5% PF (Microwaved 7 min.)	58.9	5.5	8.4	5.3
Oven (170 °C/20 min.)	58.9	5.25	9.3	5.2
WF+5% PF (untreated)	56.0	4.75	8.3	5.1
WF+5% PF (Microwaved 5 min.)	58.9	5.5	10.5	5.3
WF+5% PF (Microwaved 7 min.)	58.9	5.0	9.5	5.3
Oven (170 °C/20 min.)	58.9	5.75	9.6	5.3
WF+5% PF (untreated)	56.0	4.75	8.0	5.3
WF+5% PF (Microwaved 5 min.)	61.7	6.0	10.5	5.4
WF+5% PF (Microwaved 7 min.)	61.7	5.75	8.3	5.4
Oven (170 °C/20 min.)	61.7	5.75	8.5	5.4

WF = Wheat flour
PF = Peanut flour

Table 4 . Sensory evaluation of pan bread produced from blends of wheat flour and defatted peanut flour.

Blends		Crust Color	Crumb color	Texture	Taste	Odor	Overall accept.	Specific Volume
Wheat flour%	peanut flour%							
		10	10	10	10	10	10	--
100		7	9	8	8	8	40	5
Untreated								
95	5	8	8	9	9	9	43	6
90	10	9	7	7	7.5	7	37.5	4.5
85	15	9	6	6	6.5	6	33.5	3.5
Microwave 5 min.								
95	5	8	8	8.5	8.5	8	41	5
90	10	7	7	8	7	7	36	4
85	15	6.5	6	7.5	6.5	6	32.5	3
Microwave 7 min.								
95	5	8	8	8	8	8	40	4.5
90	10	7	7	7	7	7	35	3.5
85	15	6	6	6	6	6	30	3
Oven (170°C/20 min.)								
95	5	8	8	9	9	8	42	5
90	10	7	7	8	8	7	37	4
85	15	6.5	5.5	7	7	6	32	3

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تقييم الخبز الافرنجى المدعم بدقيق الفول السودانى

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أجريت هذه الدراسة لتقييم الخبز الافرنجى المدعم بدقيق الفول السودانى والذى أضيف بنسبة ٥ ، ١٠ ، ١٥٪. ولقد اجرى تحميص للفول السودانى بواسطة الفرن العادى ١٧٠م / ٢٠ ق وبواسطة الميكروويف لمدة ٥ ، ٧ دقائق وتم تقشير الفول السودانى المحمص ونزع القشرة الحمراء يدويا ثم تم طحنة واستخلاص الزيت منه وتم استخدامه كدقيق منزوع الزيت .

إختبرت الخلطات لقوة الغازات المتولدة – ورقم السقوط والصفات الريولوجية للعجيخة. كما تم تصنيع الخبز الافرنجى وتقييم الناتج حسيا. واظهرت النتائج أن إضافة ٥٪ دقيق فول سودانى منزوع الدهن (ناتج من تحميص الميكروويف لمدة ٥ ق) قد أدى إلى الحصول على مواصفات عجيبنة وقيم تقييم حسى مرتفعة .