Impact Factor:					
	ISRA (India) = **1.344**	**SIS** (USA) = **0.912**	**ICV** (Poland) = **6.630**
	ISI (Dubai, UAE) = **0.829**	**РИНЦ** (Russia) = **0.234**	**PIF** (India) = **1.940**
	GIF (Australia) = **0.564**	**ESJI** (KZ) = **1.042**	**IBI** (India) = **4.260**
	JIF = **1.500**	**SJIF** (Morocco) = **2.031**	

SOI: 1.1/TAS DOI: 10.15863/TAS

International Scientific Journal

Theoretical & Applied Science

p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)

Year: 2016 **Issue:** 5 **Volume:** 37

Published: 30.05.2016 **http://T-Science.org**

SECTION 23. Agriculture. Agronomy. The technique.

Bahyt Amirovich Sauir
Master of technical sciences,
Senior lecturer of the department Technology of food products, processing industries and biotechnology»
M.Kh. Dulaty Taraz State University, Kazakhstan

Galymzhan Aldabergenovich Yussupov
Master of technical sciences,
Teacher of the department «Technology of food products, processing industries and biotechnology»
M.Kh. Dulaty Taraz State University, Kazakhstan

THE INFLUENCE OF FINELY GROUND BRAN AND DRY WHEAT GLUTEN ON DOUGH AND BREAD PROPERTIES

Abstract: *In this research we explored the influence of finely ground bran and dry wheat gluten (DWG) as a factor influencing the increase of biological and nutritious value of bread. of the finest quality Wheat Flour with low raw gluten content used during the research.*

Key words: *flour, bran, gluten, bread.*

Language: *English*

Citation: Sauir BA, Yussupov GA (2016) THE INFLUENCE OF FINELY GROUND BRAN AND DRY WHEAT GLUTEN ON DOUGH AND BREAD PROPERTIES. ISJ Theoretical & Applied Science, 05 (37): 115-118.

Soi: http://s-o-i.org/1.1/TAS-05-37-21 ***Doi***: crossref http://dx.doi.org/10.15863/TAS.2016.05.37.21

Today the market products for a functional purpose are growing very fast. Population consumes insufficient amount of vitamins, mineral substances and essential amino acids. In response to this, products need to be enriched by these micronutrients.

Enrichment of bakery products can to reached both by using separate micro-nutrients, vitamins and mineral pre-mixes [1,2] as well as by adding biologically valuable natural raw materials containing natural complex's of biologically active substances, mineral elements, proteins, lipids and vitamins in the most available consuming form. During pregnancy insufficient protein intake becomes dangerous, especially in the later stages of pregnancy and during the breastfeeding period when consumption of protein increases by almost 1,5 times - from 66 to 96 grams per day. For the daily diet effective implementation of protein deficiency it is necessary to add some vegetable or animal proteins.

One of the most important tasks of bakeries is increasing the bioavailability of food. In recent years bakery products have tended to increase lysine substance as a key factor limiting the biological value of protein in grain crops. At the same time an objective is set to enrich bread with vitamins, unsaturated fatty acids as well as with ballast substances necessary for a normal metabolism. In this paper our interests are in dairy products, wheat bran, wheat germ flakes and oat [3].

In this research we explored the influence of the finely ground bran and dry wheat gluten (DWG) as a factor influencing the increase of biological and nutritious value of bread.

Wheat bran - is an important and inexpensive source of the main components of food: like protein, vitamins and minerals. To compare with second grade wheat flour (2 / g) they contain 29% more protein. Amino acid composition of bran proteins is more fulfilling. Content of first limiting amino acid lysine is 43% more, than second grade wheat flour.

Bran has a higher content of vitamins (especially B, niacin and tocopherols), and mineral substances. To compare with second grade wheat flour carbohydrates in bran are 24% less. The ratio of their proteins is better balanced - 3.5: 1 to 7: 1 in the flour at the optimum 4: 1.

Wheat bran has fewer calories and contains significant amounts of fiber. It is necessary for normal operation of the digestive tract.

Brans' disadvantage affecting their use in food is that all of these biologically active substances are enclosed in cells, which is difficult for human digestion [4].

The aim of the work was to develop a process for the preparation of tin bread from first grade flour (1 / g) with the addition of dry wheat gluten (DWG) and fine bran.

To improve the digestibility of bran, we conducted thin grinding on a mill, with a particle size

of less than 320 microns. We investigated the effect of additives in dry wheat gluten (DWG) and fine bran on baking properties of first grade wheat flour (1/g), technological dough properties, physico-chemical and organoleptic characteristics of the finished product (Table. 1). Bran was used instead of 10%, 15%, 20% and 25% first grade flour (1 / g). Dry wheat gluten (DWG) was added in an amount of 1% and 2%. For control we take first grade wheat flour (1/g) and bread prepared without additives. We used a sponge method to prepare the dough. During the dough mixing, for the samples we added bran and dry wheat gluten.

We used 1/g wheat flour, with low content of wet gluten - 26%. To improve the quality of wet gluten flour we added dry wheat gluten in an amount of 2%. At a dosage of dry wheat gluten (DWG) baking properties of flour vary greatly (table 1). When we add 2% of dry wheat gluten for our flour samples, they increase from 27,5% to 30%. Hydration capacity of the flour is increasing. Extensibility of gluten is showed from 120 mm to 145 mm. Compressibility index is shown from 60 to 74 on a instrument gluten deformation meter (GDM).

Materials and methods. For our research we used samples of flour with low wet gluten - 26%, finely ground bran, dry wheat gluten (DWG), pressed yeast, salt. The quality of bakery wheat flour meet the requirements GOST R (State Standard), 52189-2003 [5]. Pressed yeast GOST 171-81 [6]. Determination of the amount and quality of gluten - GOST 13586.1-68 [7]. Autolytic activity is determined by the number of drop on the device DNF-3 (The device for determining the number of fall) - GOST 27676-88 [8]. Determination of fiber content - by method of Krushner and Ganeka. [9]. Protease activity was determined by sample viscosity - GOST 33-66 [10]. Titratable acidity of semi-finished products is defined by titration of mash 0,1n by solution of NaOH with addition of indicator (1% spirits solution of phenolphthalein) until the transformation to a pink colour which does not fade within one minute. Control bread was consistent to GOST 27669-88 [11]. We used general methods to analysis bread. Determination of the organoleptic characteristics of bread - GOST 5667-65 [12]. Determination of bread moisture - GOST 21094-74 [13]. Determination of bread acidity - GOST 5669-96 [14].

Table 1 showed the data of finely ground bran with dose 10% - 25% and 2% dry wheat gluten (DWG).

Table 1

Data of finely ground bran with dose 10% - 25% and 2% dry wheat gluten (DWG).

Indicators	Check sample	Test samples with a dosage of finely ground bran and DWG			
		10% bran 2% DWG	15% bran 2% DWG	20% bran 2% DWG	25% bran 2% DWG
1/g Flour					
Amount of wet gluten	26.0	30,0	29,0	28,6	27,5
Hydration capacity, %	70	72	71	70	69
compressibility index, u instrument GDM - 1	60	65	72	74	63
Extensibility over the line, mm	120	130	145	140	125
Indistinctness ball dough, mm	65	57	60	60	65
Sponge					
Moisture, %	50	49	49	50	50
Temperature, °C	30-32	30-32	30-32	30-32	30-32
The duration of fermentation, час	5	3	3	3	3
Acidity, grad	4	4	4	4	4,2
Dough					
Acidity, grad					
Primary	-	-	-	-	-
Final	3,0	3,2	3,2	3,4	3,4
Shape Retention, mm	98	105	103	103	100
Gas-retaining ability, ml CO_2 for 100 gm flour	310	360	350	340	320
The duration of proofing, min	55	45	50	50	52
Bread					
Acidity, grad	3,0	3 , 0	3.2	3,4	3,6

Porosity, %	64	69	68	69	69
Moisture, %	47,0	46.0	46,0	46,0	46,5
Specific volume, cm³ for 100 gm bread	250	280	275	270	260
Penetration index, u. Instrument					
Ngeneral	43,0	44,0	44,0	43,5	43,0
Nof plasticity	36,0	38,2	38.0	36,2	36,2
Nof resiliency	7,6	8,4	8,2	7,9	7,6

By adding fine bran it is possible to increase the amount of roughage, macro and micro elements and vitamins of B groups, tocopherols and unsaturated fatty acids and at the same time increases in the nutritional and biological value of bread and the content of fiber promotes for good digestion.

The dough was prepared by a sponge method. To compare with control samples (50%) the sponge samples moisture was 49-50%. The temperature in control and sponge samples was (30-32^{0}C) same. Fermentation process decreased from 5 hours to 2 hours, because of DWG. In both samples acidity was the same. Fine bran was added when mixing the dough. It showed some changes in physical properties in quality of dough. Shape retention of prototypes was from 100 to 105 mm and control samples was 98 mm. Gas-retention of the dough increased and showed 320-360 ml CO_2 for 100 g flour, in control samples CO_2 was 310 ml for 100 g flour. Acid accumulation in control samples was - 3,0 grad and in prototypes was 3,2-3,4 grad. By adding the finely ground bran and dry wheat gluten the duration of proofing decreased for 5-10 minutes.

Table 1 showed the effect of additives fine bran and dry wheat gluten for physical and chemical indicators of the finished product. Penetration data showed that the compressibility and elasticity of the crumb was high in prototypes than control samples. Porosity in control samples show 64% and in prototypes from 68% to 69%, i.e. 4-5% high than control samples. Also it shows high shape retention in prototypes. The specific volume of bread in control samples was 250 cm^3 for 100 g flour and in prototypes was 260-280 cm^3 for 100 g flour.

Sensory evaluation of finished products was increased in prototypes. Porosity and elasticity of the crumb exceeded the standard indicators.

Recipe of 1/g wheat flour bread with optimal dry wheat gluten (DWG) dose was - 2% and fine bran 15-20%. All data in 2 table.

Table 2

Preparation recipe of 1/g wheat flour bread with 2% dry wheat and 15-20% of fine bran.

Raw materials	15% bran / 2% DWG	20% bran / 2% DWG
1. 1/g What flour, kg	83	78
2. DWG, kg	2	2
3. Comminuted bran, kg	15	20
4. Pressed yeast, kg	1	1
5. Salt, kg	1,3	1,3
Total raw materials:	102,3	102,3

Conclusions: Findings shows for increasing biological and the nutritional value of bread from 1/g wheat flour it is better to use fine bran and dry wheat gluten (DWG) with dose 15 -20% and 2% fine bran. It increases biological and nutritional value of the finished product. Content of fine bran in bread contributes to better assimilation by the human body, as bran contains a significant amount of fiber. Fiber has an important role in the digestive process.

References:

1. Shatnuk LN (2005) "Obogawenie hlebobulochnyh izdelii", Journal "Bakery", №2 2005.
2. Shishkov IU, Rogov AA (2004) "Poluchenie hleba so svoistvami produktov funkcional'nogo naznacheniya" Journal "Bakery Russia", № 2 2004.

3. Petrash IP, Yroshenko PA (1985) "Novye sorta hlebobulochnyh izdelii dieticheskogo naznacheniya", Journal "Bakery and confectionery industry", №11, 1985.
4. Roiter IM, Tarasenko LU (1989) "Vliyanie dobavok tonkodispersionnyh otrubei na svoistva i kachestvo hleba", Journal "Bakery and confectionery industry", №6, 1989.
5. (2003) GOST R 52189-2003 Wheat flour. General specifications.
6. (1981) GOST 171-81 Pressed baking yeast. Specifications.
7. (1968) GOST 13586.1-68 Grain. Methods for determining the quantity and quality of gluten in wheat.
8. (1988) GOST 27676-88 Grain and its products. Determination method of falling number.
9. (2016) Determination of fiber content - by method of Krushner and Ganeka
10. (1966) GOST 33-66 Petroleum products. Methods for the determination of kinematic viscosity.
11. (1988) GOST 27669-88 Wheat Flour. Method of test baking bread in laboratory.
12. (1965) GOST 5667-65 Bread and bakery products. sampling methods, methods for determination of organoleptic characteristics and mass product.
13. (1974) GOST 21094-74 Bread and bakery products. Method for moisture determination.
14. (1996) GOST 5669-96 Bakery products. Method for porosity determination.