CHANGES IN THE QUALITY OF GRAIN, FLOUR AND BREAD BY ORGANIC FERTILIZERS

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Abstract. *Organic fertilizers positively affect the properties of the soil. Especially increases the amount of mobile nutrients in the soil. The soil structure and fertility are increased. According to research results, the quality of grain, flour and bread improved in both studied soils against the background of 10 t/ha of waste and residues +N-154 P-112 K-35 kg/ha of fertilizer. Especially on irrigated meadows, he represented a high performance. Nitrogen, protein content in grains, phosphorus and potassium nutrients increased the gluten content of protein.*

Keywords: *irrigated brown meadow, irrigated meadow, Vass winter wheat variety, grain yield, brilliance, protein, starch, gluten, yield of flour, grain size, quality characteristics of bread.*

Introduction. Wheat (trithikut) belongs to the family of cereals and is considered one of the oldest and most widespread grain crops in the world. Although there is no precise information about the origin of wheat and its first cultivation, this was in Egypt 6 thousand years before our era, and later in the Caucasus, in Ukraine. It began to be cultivated in Europe and Asia [1].

Global demand for wheat for consumption is increasing at a rate of 1.4-1.8 per cent per year worldwide. The world uses fertilizer to produce up to 80-120 c/ha of grain. In addition, the volume of grain production is high: countries such as Europe, America, China, Russia produce up to 450-800 kg of grain per person. In 1980, there were 111.7 million people in the world. t mineral fertilizers used, by the beginning of the 21st century, according to the International Institute for Applied Systems Analysis (IIASA) and the United Nations Industrial Development Organization (UNIDO), in 2020 the total amount of mineral fertilizers amounted to 220.4 million tons. [3].

Grain quality is determined by the quantity and proportions of organic compounds such as moisture, protein, starch, oil and fiber. V1 (thiamine), V2 (riboflavin), niacin, V6 (pyridoxine), iron and zinc are found in large quantities in wheat grains. However, due to the fact that all these elements are located in the meristem part of the grain pocket, most of them are lost at the mill. Quality of wheat depends primarily on its humidity and protein content [2].

Methods of research. Field experiments, phenological observations, soil and plant sampling and chemical analysis, determination of yields, variational and statistical analysis of the obtained data according to «Methods of field experience», «Methods of agrochemical analysis of soils and plants of Central Asia» and «Methods of field experiments». Technological indicators of quality of winter wheat grain by «Raw materials and materials used in cereal production technology», photosynthesis activity (intensity) in plant leaves by «Fluorescent methods of control of photosynthetic processes of transformation of solar energy», activity of enzymes in Plant organs studied «Quick method of determination of activity of peroxidase» and «Activity of polyphenolics determined according to method».

Research results and analysis. The research was conducted on irrigated burolug and irrigated meadow soils of Kyzyltepi district of Navoi region with Vass winter wheat variety in 5 variants and 3 returns [5]. These soils are the soils of the Malikchol desert area.

It has been established that indicators of grain quality vary depending on soil and climatic conditions, characteristics of the variety, quantity and ratio of applied fertilizers (Table. 1).

The first variant (H-0 P-0 K-0 kg/ha) at grain yield of 12.65 t/ha on irrigated lignite soils, grain moisture 11.5%, grain shine 52.4%, protein content 9.55. %, starch content 72.4%, gluten 15.1%, Group III, flour yield 54.6%, grain volume 546 g/l, irrigated meadow soils grain yield 13.05 t/ha, grain moisture 12.5%, grain shine 53.0%, protein content 9.70%, starch content 71.5%, adhesive content 15.53%, Group III, flour yield 56.8%, grain size 590 g/l. Second option (2 t/ha of fertilizer +N-220 P-160 K-50 kg/ha) option with grain yield of 56.66 t/ha on irrigated brown and grassy soils, grain moisture 11.9%, gloss of 59.1%. 11.80% protein content, starch 66.6%, gluten 20.8%, II group, flour yield 64.3%, grain size 622 g/l, grain yield at irrigated meadows 58.70 t/ha, grain moisture 12.0%, grain shine 60.3%, protein content 12.15%, starch content3%, gluten content 21.5%, II group, flour yield 72.8%, grain volume 638 g/l. Third option (7 t/ha of waste and residues +H-154 P-112 K-35 kg/ha), with grain yield of 59.19 t/ha on irrigated drill-meadow soils, grain moisture at 13.0%, protein content of 10.6%, Starch content 65.9%, gluten content 29.9%, Group I, flour yield 79.5%, grain size 743 g/l, protein content 14.99%, grain yield irrigated meadow soils 67.03 t/ha, grain moisture 14.5%, grain gloss 77.5%, protein content 14.99%, starch content 64.1%, gluten content 30.5%, I group, flour yield 81.0%, grain size 750 g/l Fourth (10 t/ha waste and residues +H-154 P-112 K-35 kg/ha) variant, with grain yield 64.68 t/ha, grain moisture 13.2%, grain gloss 75%, protein content 585%, starch content 65.7%, gluten 30.8%, Group I, flour yield 82.5%, grain volume 755 g/l, grain yield on irrigated meadow soils 67.27 t/ha, grain humidity 14.8%, Grain shine 82.8%, protein content 15.65%, starch content 64.6%, gluten content 32.0%, I group, flour yield 85.4%, grain size 754 g/l.

Table 1

Grain yield and quality indicators of winter wheat varieties.

on average for 2021-2022										
№	Annual fertilizer content, grain per kg	Harvest pain, c/ha	Grain humidity, %	Shiny grain league %	Protein content, %	Starch content, %	gluten content, %	Sticky wine group	flour issue, %	grain size, g /l
on irrigated grassland soils										
1		12,65	11,5	52,4	9,55	72,4	15,1	III	54,6	546
2	t h	56,66	11,9	59,1	11,80	66,6	20,8	II	64,3	622
3	7 t/ha of waste and residues	59,19	13,0	70,6	13,10	65,9	29,9	I	79,5	743
4	10 t/ha of waste and residues	64,68	13,2	75,5	13,85	65,7	30,8	I	82,5	755
5	15 t/ha of waste and residues	59,06	13,8	64,8	12,05	65,1	26,6	II	72,0	715

irrigated meadows										
1		13,05	12,5	53,0	9,70	71,5	15,3	III	56,8	590
2	2 t/ha of fertilizer	58,70	12,0	60,3	12,15	62,3	21,5	II	72,8	638
3	7 t/ha of waste and residues	67,03	14,5	77,5	14,99	64,1	30,5	I	81,0	750
4	10 t/ha of waste and residues	67,27	14,8	82,8	15,65	64,6	32,0	I	85,4	754
5	15 t/ha of waste and residues	61,40	13,5	68,1	14,30	63,7	27,8	II	80,9	728

The fifth variant (15 t/ha of waste and residues), with a grain yield of 59.06 t/ha, grain moisture of 13.8%, grain shine of 64.8%, protein content of 12.05%, starch 65.1%, gluten. was 26.6%, group II, grain yield 72.0%, grain size 715 g/l, grain yield in irrigated grassland soils 61.40 c/ha, grain moisture 13.5%, grain brilliance 68.1%, protein content 14.30%, starch content. 63.7%, gluten content 27.8%, II group, flour yield 80.9%, grain volume 728 g/l. Quality bread is the key to longevity. Before wheat becomes bread, flour, dough and baking are the main processes. Most importantly, the more nutrients the flour contains, the more calories will be in the bread.

At present time the results of many years of research prove that if wheat grain is of poor quality, all quality indicators of flour will be low, which worsens the appearance of bread. Therefore, the yield of quality grain or quality flour and bread depends more on the biological characteristics of the cultivated variety. When the grain is ground into flour, 99.5 per cent of the flour should be produced from 100 per cent. 10-25 per cent of the flour goes to the shell. That is why different wheat get different amounts of flour. For example: 96 per cent of Class I is eaten, 85 per cent of Class II, 78 per cent of Class II and Class III, and perhaps less than 70 per cent, because wheat flour from wheat tincture (endosperm) should be 80-90 per cent. High flour yield also affects the quality of bread. The quality of bread is influenced by fertilizers, soil and climatic conditions, agroengineering, grain purity, germination of seeds, biological, physical and chemical properties of the variety, grain processing process, amount of flour, bread coating technology. For example, if the soil is well endowed with nutrients, grain yields can be increased and, in turn, quality can be improved. Manure and nitrogen fertilizers contribute to a good accumulation of protein nitrogen in grains. To meet the standard, grain must accumulate 2-3 per cent of the nitrogen. Low accumulation of nitrogenous substances in the composition of not fully ripe (unripe) grain causes a decrease in the protein content and, in turn, a decrease in the quality of grain. If the soil is not fully provided with nutrients, especially from the period of spiking to the maturation of the yeast infection, the protein and gluten contained in it (glumin, gluten, gliadin) will be produced less. Gluten is an elastic and malleable substance that remains after washing starch in the dough with water. The size and porosity of the bread depends on the amount of gluten that holds the gases in the dough. Depending on the fertilizers applied, especially nitrogen, the taste of bread improves [4].

A two-year field experience was conducted (2021-2022) with a variety of winter wheat Vass, grown in the conditions of irrigated burolug and irrigated meadow soils [5]. According to studies, the yield of grain in the best variants was 65-68 c/ha. Yields differed on the different fertilizer backgrounds of the two soil types studied.

In addition to studying the quality of grain, we also studied the quality of flour and bread (in the laboratory of the Scientific Center of Grain Production of Uzbekistan).

Qualitative characteristics of grain in the experience were analyzed on the basis of the method of sealing bread according to GOST 27669-88. Organoleptic and physico-chemical indicators were determined mainly (table. 2).

Indicators of the quality of bread, determined by the method of covering bread.
(average data for 2021-2022)

№	Fertilizer standards, kg	Organoleptic evaluation		Physico-chemical indicators		Volume yield (cm 3)		Form stable		League evaluation	
		Taste	Smell	Appearance	Mild Condition	Moisture, %	Sour League	Govak graduate league, %			
irrigated brown meadow											
1	N-0 P-0 K-0	standard	Standard	shape irregular, without mold, uneven	dark color surface with cracks, soft part dense, large porosity, uneven, thick	44,0	1,6	62,0	330	0,25	1 point bad
2	2 t/ha of fertilizer + N-220 P-	standard	Standard	shape light, slightly flat	grey with fine cracks, irregular porosit	44,7	2,0	68,0	400	0,40	3 points satisfactory lee

	160 K-50				y, slightly flexible						
3	7 t/ha of waste and residues + N-154 P-112 K-35	standard	Standard	the shape is correct, the surface has small cracks	white surface with fine cracks, porosity is smooth, medium flexibility is average	44,8	2,1	75,0	455	0,45	4 points good
4	10 t/ha of waste and residues + N-154 P-112 K-35	standard	Standard	shape flat, smooth surface, smooth	color white, uniform porosity, small, good flexibility	45,0	2,2	80,0	500	0,50	5 points fine
5	15 t/ha waste and residues	standard	Standard	Shape is correct the surface has small cracks	gray surface, average flexibility, average porosity, thick	45,0	2,2	78,0	485	0,48	4 points good
irrigated meadow											
1	N-0 P-0 K-0	standard	Standard	irregular shape, uneven surface	Color cracks dark, soft part tight, pores large,	44,6	1,7	66,0	350	0,30	2 points bad

					uneven, thick						
2	2 t/ha of fertilizer + N-220 P-160 K-50	standard	Standard	shape fracture surface is flat, fine fracture	color gray, porosity uneven, weak flexible	45,0	1,9	74,0	460	0,44	3 points satisfactory lee
3	7 t/ha of waste and residues+ N-154 P-112 K-35	standard	standard	shape is correct, surface is slightly smooth	gray color is even, porosity is uniform, flexibility is average	45,0	2,0	80,0	500	0,50	4 points good
4	10 t/ha of waste and residues + N-154 P-112 K-35	standard	Standard	shape correct, surface smooth	color white, porosity uniform, small, good flexibility	45,5	2,1	85,0	520	0,55	5 points excellent
5	15 t/ha waste and crop residues	standard	Standard	shape correct, surface smooth	color white, porosity uniform, small, good flexibility	45,2	2,0	80,0	510	0,52	5 points excellent

According to studies, the best indicator, taste and smell of control organoleptic assessment on brown grassland soils with 10 t/ha of waste and residues +N-154 P-112 K-35 kg/ha fertilizer irrigated in the background; the shape appears correct, the surface has small cracks; Mild state white, low density, uniform porosity, medium, Medium flexibility , thin-walled; 45.0% humidity; 2.2 degree acidity; 80.0% porosity; 500 cm3 output; 0.50 degree stability; 5 points (excellent) - taste and smell normal on organoleptic assessment in the same control variant on irrigated grazing soils; the appearance is straight, moldy, the surface is a little smooth, the porosity is a little flat;

the mild part is gray, medium density, uniform porosity, average flexibility, thin-walled; humidity 45.5%; acidity 2.1 degree; porosity 85.0%; output 515 cc; shape stability 0.55; rating 5 points (excellent).

Conclusion. According to the results, these grain yields and qualitative indicators are better than the control option, the fourth (10 t/ha of waste and the residual +H-154 P-112 K-35 kg/ha) fertilizer. Background above in both studied soil conditions. Especially in irrigated grassland soils, grain quality indicators were higher in options, but significantly higher than in irrigated grassland soils. It is difficult to imagine our daily life without bread. From wheat make different kinds of bread. The shape, smell, appearance and taste of bread will be different. After the wheat has passed through the mill the flour and bran (husk) are separated. The quality of the flour also depends on the mill. Mainly depends on grain cultivation and even more on wheat content. Against the background of the same fertilizer organoleptic evaluation of bread, physical and chemical indicators, volume yield, stability of shape and price - relationship with the nutrition of winter wheat, that is, grain composition, which in turn affected the composition of flour and bread. 10 10 t/ha of manure and residues +N-154 P-112 K-35 kg/ha fertilizer background showed the best results on both studied soils. It has been found to be particularly dominant on irrigated grazing soils.

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