

MAIN TECHNOLOGICAL INDICATORS OF SORGHUM FLOUR

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Annotation. *This article presents the results of a study conducted to examine the main factors representing the technological indicators of sorghum flour grown in the northern regions of Uzbekistan, and makes scientifically based conclusions.*

Key words. *sorghum flour, flour, volume mass, porosity, core, acidity, technological indicators.*

Introduction. Currently, sorghum is cultivated worldwide on over 50 million hectares across more than 85 countries, yielding a total of 64 million tons. The majority of this yield is used for sugar and food production, with some of it serving as feed in animal husbandry. Leading sorghum-producing countries such as India (18.5 million ha), Argentina (8.9 million ha), Cameroon (8.0 million ha), Brazil (7.3 million ha), and China (5.5 million ha) are focused on creating high-yielding, disease- and pest-resistant varieties, enhancing the sugar, protein, and other vital nutrients within the plant's stalk and grain. Developing optimal agronomic practices to maximize these components is a crucial issue in these regions.

The purpose and specific issues of the study. The objective of this study was to analyze the technological indicators of sorghum flour processed from crops grown in the Republic of Karakalpakstan and to develop scientific conclusions for its application in the food industry.

Material and methods. To produce quality, nutritious, eco-friendly, and dietary food products that meet food safety standards, the mechanical composition of sorghum flour was analyzed.

RESULTS AND DISCUSSION

The technological indicators of oatmeal are specific, the main indicators are indicated in the standard requirements. In this, its mechanical composition is taken into account as the main indicator (see Table 1).

Flour-consists of unstable, small parts, since it is an easy food for microorganisms and pests, the storage processes have some complexity. In our experiments, we conducted experiments on the study of factors that are important in the preservation of oatmeal.

The technological indicators of flour are several. In the experiments carried out by us, the main 4 important indicators were studied. These are the level of flour output from the grain, the degree of water absorption of flour, the time of flour conversion into dough and the residual amounts transferred from sieves № 35.

For experiments, the local Daulet variety, created in the conditions of Karakalpakstan, was selected as a control. In the Daulet variety of Johor, the output of flour was determined to be up to 78.02%, which was one of the highest. It is necessary to note that the highest rate in terms of the amount of flour output within the experimental varieties was recorded in the rich Sorghum variety and was

83.11%. It is necessary to pay special attention to the fact that within the varieties of the experiment, no higher indicator of control (Daulet variety) was manifested in any other variety.

Table 1

Sorghum Flour Mechanical Composition (2022-2023)

Varieties	Flour Output (%)	Water Absorption (%)	Dough Formation Time (s)	Residue on Sieve No. 35 (%)
Daulet (Control)	78,02±0,85	56,1±0,7	130,0±2,5	5,01
Uzbekistan-5	74,12±0,85	60,1±0,7	139,2±2,5	5,36
Oranjivie-160	72,64±0,85	54,1±0,7	125,3±2,5	4,82
Uzbekistan pakanasi	65,37±0,85	48,7±0,7	112,8±2,5	4,34
Korabosh	58,84±0,85	53,1±0,7	122,9±2,5	4,73
Uzbekistan-18	64,13±0,85	47,7±0,7	110,6±2,5	4,26
Sanzar	57,72±0,85	56,8±0,7	99,6±2,5	3,83
Shirin 91	68,68±0,85	63,1±0,7	89,6±2,5	3,45
Boy jukhori	83,11±0,85	61,2±0,7	141,7±2,5	5,45

There was also a relatively good result in the Uzbek – 5 Variety at 74.12%. the lowest was observed in the SANZAR variety and 57.7% flour was obtained. This is not considered an acceptable indicator for the flour industry. During the experiments, it was found that 4 varieties – Daulet, Uzbekistan -5, Oranjevoe -160 and **Boy jukhori** varieties-have a flour productivity indicator above 70% and are important raw materials for the flour industry.

Yana bir Imam kursatkich bu - unning suv singdirishi darazhasyn shrganish bu-tazhribalar olib borilydi. Unning suv singdirish darajasi consists of starching ivishig boglik. At high temperatures, berylganate starch berylganate has a cooling property. Also, the difference in this indicator in the cross-section of varieties will directly depend on the amount of starch in the composition. The water

absorption rate of flour in the Daulet variety was 56.1%. The highest grade on this indicator was recorded in the Shirin 91 variety and was 63.06%. It also showed that in the **Boy jukhori** variety 61.15 %, in the Uzbekistan – 5 variety 60.08% degrees are determined and significantly higher than in control. The lowest level was recorded in the Uzbekiston pakanasi (48.67%) and Uzbekiston – 18 (47.74%) varieties. In other varieties in the experiment, the above indicators were in the range.

One of the most important indicators for flour is the time it takes for flour to become a dough. This figure was 130 seconds in the Daulet variety, which was selected for control. Most of the time compared to the control was recorded in Uzbekistan – 5 and rich Sorghum varieties, spending 139.2 and 141.7 seconds, respectively. The shortest duration was recorded in the Shirin-91 variety, and in 89.6 seconds the flour became a dough.

Experiments were also carried out on the fineness of the flours of sorghum varieties and the amount of residue transferred from the sieves. For control, experiments were carried out to determine the amount of residue passed through a sieve with the number flour №35 (35 fibers passed 1 cm long), made from the selected Daulet variety. When the flour made from this variety was sifted, a residue of 5.01% remained in the sieve.

Table 2

The effect of oatmeal on the shelf life

Duration of maturation, hours	Water absorption of flour(mixing), %	Protein, %	Fats, %	Ash content, %	Raw cutlet quantity, %	Starch content, %
0	45,6 (Control)	10,74	2,92	1,24	2,5	62,9
12	48,8	10,09	2,75	1,16	2,3	59,1
24	51,5	10,49	2,58	1,09	2,2	55,6
48	58,7	11,80	3,21	1,36	2,7	69,1
72	58,1	11,09	3,02	1,28	2,5	65,0
96	57,3	10,43	2,84	1,20	2,4	61,1

Of the varieties under experiment, the most tender flour was 68.68% ti, obtained in the Shirin-91 variety. It turned out that the residue in the sieve is 3.45%. At the same time, the output of flours made from the Sanzar variety was obtained by 57.72% cha flour, leaving a residue of 3.85% when sifted. While it was found that up to 83.11% of the output of flour made from the Boy jukhori variety grain of Johor and up to 74.12% of the output of flour made from the Uzbekistan – 5 variety were obtained, it turned out that when the prepared flour was sifted, more residues remained than controlled, and this residue was 5.45 and 5.36%, respectively. All remaining varieties were observed to have a residual content of less than 5%.

As a result of the correct selection of the storage mode during the storage of flour (low humidity level), the development of microorganisms is obtained. The first changes during storage begin with the appearance of mold lilies. As a result, the properties of starch in flour change, creating an unpleasant odor. The flour storage process consists of two stages: the maturation process after the flour is ready and the long-term storage process. It is not recommended to use freshly prepared flour

directly into production. Because, after the grain is milled, biochemical processes continue in the flour.

According to the results of our experiments, research has been carried out to determine the effect of oatmeal on shelf life. As a control, quality indicators in the position of the mill at the time of its release were selected. After that, the quality indicators were analyzed, leaving them open for flour to be made for certain periods.

At the time when the corn grain was processed and the flour received, the water absorption of the flour was equal to 45.6%. This increased to 48.8% when ethylated for 12 hours, 51.5% when ethylated for 24 hours, and 58.7% when ethylated for 48 hours. This was followed by a decline after the continuation of the merger. In particular, it was found that 72 hours of ethylated flour had a water absorption rate of 58.1%, while 96 hours of ethylated water contained 57.3%.

In conclusion, it was the controlled Daulet variety, rich oats and varieties of Uzbekistan-5 that were considered suitable for the preparation of flour according to technological and organoleptic indicators. When oatmeal is matured and then packaged for 48 hours, its water absorption property increases to 14%.

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