DIFFERENTIATION OF SELECTED SOFT WHEAT VARIETIES BASED ON WET AND DRY GLUTEN INDICATORS

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Abstract. *This study investigates genotype-environment interactions affecting quantitative traits of soft wheat (Triticum aestivum L.) accessions with diverse genetic backgrounds cultivated under the specific soil and climatic conditions of the Khorezm region. Using ten accessions from Central Asian and Kyrgyz germplasm collections, patterns of wet and dry gluten formation-key indicators of grain quality-were evaluated over three growing seasons. The results reveal significant varietal differences and varying degrees of stability in gluten content across years.*

Keywords: *soft wheat, wet gluten, dry gluten, gliadin, glutenin, elasticity, genotype, bread-making quality, stability, technological analysis*

Gluten is a complex protein fraction present in wheat, rye, and barley grains. It consists primarily of two protein groups-gliadins and glutenins [2,9]. Gluten is responsible for imparting elasticity, extensibility, and cohesiveness to dough, properties that enable it to retain gas during fermentation and maintain structure during baking. For this reason, gluten is considered one of the principal determinants of bread and other baked product quality [4,5].

Wet gluten largely determines the functional characteristics of dough. Its most important attributes are elasticity and extensibility, reflecting the

dough's ability to stretch and subsequently recover its shape [1]. High elasticity and extensibility contribute to good loaf volume and a porous crumb structure. Wet gluten also has the capacity to absorb and retain water during dough formation, influencing both dough mass and product moisture content [7].

Dry gluten, in contrast, reflects the absolute mass of gluten protein in grain. It provides a direct estimate of total gluten content and is closely associated with overall protein concentration [10]. Higher dry gluten levels generally indicate stronger dough properties and improved baking performance [6].

Results and discussion. The findings from 2023 demonstrated clear differences among varieties. Regarding wet gluten content (%), Vostorg recorded the highest value (31.1±1.8%), corresponding to its elevated protein content (14.98%) and confirming its suitability for high-quality flour production. Other varieties with comparatively high wet gluten included Nikifor/Kroshka

Table 1

№	Varieti	Wet gluten (%), years				Dry gluten (g), years			
		202	2024	2025	Mean ±SEM)	2023	2024	2025	Mean ±SEM (CV,
1	Durdon	28.5	31.3±1	30.4	30.06±	8.2±0.6	9.3±0.	7.38±0.9	8.29±0.9
2	Vostor	31.1	31.8±1	30.2	31.03±	9.4±0.7	9.8±0.	7.38±0.6	8.86±0.6
3	Starshi	28.9	28.7±0	27.6	28.4±0.	6.4±0.4	8.9±0.	5.83±0.8	7.04±0.8
4	Kamol	28.7	29.8±1	24.7	27.73±	5.4±1.1	8.8±0.	6.92±1.2	7.04±1.2

5	Sila	27.6	29.3±1	28.8	28.56±	7.1±0.6	8.6±0.	6.09±0.7	7.26±0.7
6	Ayvina	28.4	29.4±0	25.2	27.66±	4.8±1.1	9.7±0.	5.97±0.6	6.82±0.6
7	Nikifora	29.4	30.9±1	28.4	29.56±	8.12±0.	10.1±	6.04±1.0	8.08±1.0
8	Kasiet	27.1	29.1±1	25.1	27.1±1.	5.4±1.2	9.6±0.	5.1±0.6	6.7±0.6
9	Adyr	27.9	29.6±1	28.1	28.53±	5.6±1.2	8.7±1.	7.43±0.8	7.24±0.8
0	lada	8.7 ±0. 8	0.7±1. 5	6.8± 1.6	8.73±1. 1	.1±0.7	.1±0.6	7 .25±0.8	7.48 ±0.8
Average indicator		8.6 ±1. 3	0.03±1 .2	7.5± 1.7	8.74±0. 8	.65±1.3	.26±1. 1	6 .53±0.6	7.48 ±0.6

(29.4±1.8%), Starshina (28.9±1.2%), and Vlada (28.7±0.8%). The lowest values were observed in Sila (27.6±0.7%) and Kasiet (27.1±0.7%).

In terms of dry gluten (g), Vostorg again demonstrated the highest value (9.4±0.7 g), followed by Durdona (8.2±0.6 g). These results indicate strong protein accumulation and favorable bread-making potential [3,8]. The lowest dry gluten content was recorded in Ayvina (4.8±1.1 g) and Kamol (5.4±1.1 g), likely associated with their relatively lower protein content (e.g., Kamol - 13.44%).

In 2024, the overall mean wet gluten content reached 30.03±1.2%, exceeding the averages of 2023 (28.6±1.3%) and 2025 (27.5±1.7%). This suggests that environmental conditions in 2024 were particularly favorable for grain quality formation. The highest wet gluten values were recorded in

Vostorg (31.8±1.7%) and Durdona (31.3±1.7%), while Sila (29.3±1.2%) and Kasiet (29.1±1.4%) also demonstrated strong performance. Starshina (28.7±0.6%) showed comparatively lower values.

For dry gluten in 2024, Nikifor/Kroshka achieved the highest result (10.1±0.9 g). Similar values were observed in Vostorg (9.8±0.8 g), Ayvina (9.7±0.8 g), Vlada (9.1±0.6 g), and Adyr (8.7-9.7 g). These findings indicate substantial genotype-specific responses to environmental conditions.

In 2025, varietal differences remained evident, though an overall decline in dry gluten content was observed across most accessions. For wet gluten, Durdona (30.4±1.3%), Vostorg (30.2±1.0%), and Sila (28.8±0.2%) maintained relatively high values. In contrast, Kamol (24.7±1.4%) and Ayvina (25.2±1.4%) showed notable reductions, suggesting greater sensitivity to environmental stress.

Dry gluten values in 2025 decreased significantly in nearly all varieties, likely due to unfavorable agro-climatic conditions affecting protein accumulation. Nevertheless, Vostorg (7.38±0.6 g), Adyr (7.43±0.8 g), and Durdona (7.38±0.9 g) retained comparatively higher levels, while Kasiet (5.1±0.6 g) and Starshina (5.83±0.8 g) recorded the lowest values.

Across the three-year period, Vostorg (31.03±0.4%) and Durdona (30.06±0.7%) demonstrated the highest mean wet gluten content, confirming their strong and stable baking quality potential. The lowest mean wet gluten values were observed in Kasiet (27.1±1.1%) and Ayvina (27.66±1.2%).

A similar trend was evident for dry gluten. The overall mean was 7.48±0.6 g, with the highest values recorded in Vostorg (8.86±0.6 g) and Durdona (8.29±0.9 g). Kasiet showed the lowest average dry gluten content (6.7±0.6 g).

Overall, the analysis indicates that Vostorg and Durdona consistently exhibited high and stable wet and dry gluten content throughout the three-year period. In contrast, varieties such as Kamol and Kasiet showed lower and more variable gluten levels, suggesting greater sensitivity to environmental conditions.

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