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DETERMINATION OF PHYSICOCHEMICAL AND RHEOLOGICAL PROPERTIES OF FLOUR DERIVED FROM IMPORTED BREAD WHEAT CULTIVARS IN TURKEY

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ABSTRACT

This research; It was carried out to determine the rheological properties of the dough obtained from the cultivars as well as the physicochemical analyzes of the materials obtained from the cultivars of bread wheat originating from Russian (Krasnodar), Kazakh (Orenburgskaya-10) and Hungarian (Zitnica) origin. As for materials research imported in the years 2014-2016, Krasnodar (Russian origin), Orenburgskaya-10 (Kazakh origin) and Zitnica (Hungarian origin) were performed 30 replications of 90 samples per year of bread wheat cultivars. Significant differences were observed between the cultivars in terms of the parameters examined. In the study; rheological (alveograf) such as energy (cm^2), p/l ratio, ie value (elasticity index) (%) and Zeleny sedimentation (ml), protein (%), hectoliter weight (kg), wet gluten (g), gluten index as physicochemical properties were examined. As the Orenburgskaya-10 (Kazakh) cultivar had the highest values in terms of gluten index (97.15%), p/ l ratio (2.1), Ie (64.2), hectoliter weight (80.25 kg) and energy (425.30 cm^2). Zeleny sedimentation (65 ml), protein contents (14.6%) were in the Zitnica (Hungarian). Wet gluten (29.75 g) parameter was in Krasnodar (Russia). Orenburgskaya-10 (Kazakh), Krasnodar (Russia), Zitnica (Hungarian) cultivars in terms of energy respectively; 425.3-264.6 10^{-4}, 396.6-159.6 10^{-4}, 367.5-152.2 10^{-4}. In the direction of three years results, If Orenburgskaya-10 (Kazakh) cultivar of bread wheat is imported in our country, the quality will be further increased according to the other cultivars.

Keywords: Cultivar, Elasticity, Energy, Index, Origin, Quality.

I. INTRODUCTION

People needed by the daily food requirement of a substantial portion of wheat in crop plants that are performed cultivation to meet the 215.5 million hectares of cultivation area and 671.5 million tons the first in acreage between the cereals, ranks third after maize and rice production [1]. Approximately 84% of the wheat cultivated area of wheat produced 7.8 million hectares of land in our country is made up of 82% of the production of bread wheat and significant fluctuations are seen in annual production [2]. Our country's population has increased by about 10% since the beginning of the year 2000, reaching 76.7 million [2]. While a significant portion of human daily calorie needs is met by bread and other wheat products, a significant portion of the daily average protein requirement per person is still met by grains, especially wheat. The production of wheat, which is extremely important for human nutrition, has to be increased in proportion to the population increase. Since wheat cultivation areas in our country have reached the last border and even production is being carried out even in areas that are not suitable for cultivation, it is essential to increase the yield from the unit area [3]. Otherwise; Wheat production and grain yields in the world and in our country are likely to affect the consumer in the negative direction by increasing prices of other foodstuffs that have been planted or undercooked when any decrease is observed for various reasons. For this reason, it is of strategic importance to be sufficient in terms of wheat production for each country and to have enough wheat products in their stocks. The yield in wheat is affected considerably by adaptation to the region, from the genotype and purity of the variety used. The high yield potential of genotype has led to a significant increase in productivity [4]. Researchers reported that wheat yields could be increased by up to 30% in dry agricultural systems with an appropriate variety and quality of seed [5]. For this reason, it is important to determine the high-quality varieties in the target environment conditions. Wheat quality carries a broad meaning depending on the application. In case the product can not be

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found suitable for the purpose of use, the solution is sought for the use of wheat imports or additives. In this study, it was aimed to determine the varieties of imported wheat varieties which gave the highest values in terms of quality parameters. In this respect, especially when the industrialists respond to the different demands of the consumer, importing of the different types with poor quality will be stopped and the national economy will be contributed.

II. MATERIAL-METHOD

Wheat samples tempered according to the research by the *AACC method 26-95* 14% moisture basis, and is ground in a roller mill. Total nitrogen (N) contents of the ground wheat samples were determined by Kjeldahl method *(AACC Method 46-10)*, converted to protein using 5.7 factor and calculated on 14% moisture basis *(AACC, 2000)*. Zeleny sedimentation values of wheat samples were determined using a sedimentation tester according to *AACC 56-61.02*. The rheological properties of the dough were determined by alveographer according to *AACC 54-30.02*. *SPSS* program was used in the analysis of the samples. *Duncan* multiple comparison test was applied.

III. FINDINGS-DISCUSSION

There is a significant effect of genetic factors on the quality of bread wheat varieties as well as environmental conditions [6,12,13].

Among the imported bread wheat varieties with important quality parameters, the Zitnica variety showed the highest value in Zeleny sedimentation value whereas the Orenburgskaya-10 variety showed the highest value in terms of gluten index parameter (Table 1). Krasnodar, Zitnica, Orenburgkaya-10 varieties in terms of wet gluten amount respectively; 29.75, 28.13, 27.12 g, respectively. In terms of protein amount, the Zitnica variety came to the forefront in comparison with the other varieties. Orenburgskaya-10 type is the highest value in terms of gluten index which is an important feature in terms of the visco-elastic structure of the dough [7,14,15,16,18,20]. Wheat is also important in terms of grain yield and grain yield during milling. For high flour yield to have a low dandruff ratio, high hectoliter weight is a desirable parameter. Hectolitre weights Orenburgskaya-10, Zitnica and Krasnodar varieties, respectively; 80.3, 79.7, 79.2 kg/hl. The maximum value was obtained from the Orenburgskaya-10 range in terms of dough extinction and p / l ratio (Table 1). Researchers reported that the bread wheat variety varied between 73.0-83.7 kg/hl and the protein content varied between 8.2- 13.9% [8,17]. The same researchers reported that Zeleny sedimentation value varied between 24.2-38.3 ml. The data of imported bread wheat varieties and researchers are similar. The high levels of protein and Zeleny sedimentation are due to the performance of the varieties in different environmental conditions. The ratio of p / l to 1 is higher than 1, which is an important parameter in terms of dough resistance [9,10,11,19,21,22].

Table 1. Physicochemical and Rheological Properties of Some Imported Bread Wheat Varieties

Parameters	*Krasnodar*		*Orenburgskaya-10*		*Zitnica*	
Z. Sedimentation (ml) / (SEM)	*58.00c**	*(0.0008)*	*61.00b*	*(0.0004)*	*65.00a*	*(0.0007)*
Protein (%) / (SEM)	*14.10ab***	*(0.0005)*	*13.20b*	*(0.0006)*	*14.60a*	*(0.0002)*
Hectolitre (kg/hl) / (SEM)	*79.20b**	*(0.0008)*	*80.30a*	*(0.0007)*	*79.70ab*	*(0.0005)*
Wet Gluten / (SEM)	*29.75a***	*(0.0001)*	*27.12b*	*(0.0005)*	*28.13ab*	*(0.0009)*
Gluten Index / (SEM)	*93.13b***	*(0.0007)*	*97.15a*	*(0.0004)*	*89.17c*	*(0.0009)*
Energy (max) / (SEM)	*396.60b***	*(0.0002)*	*425.30a*	*(0.0005)*	*367.50c*	*(0.0006)*
p/l / (SEM)	*1.70b**	*(0.0005)*	*2.10a*	*(0.0003)*	*1.90ab*	*(0.0007)*
Ie / (SEM)	*56.10b***	*(0.0001)*	*64.20a*	*(0.0006)*	*59.50ab*	*(0.0004)*
Mean	*113.2*		*8.77*		*90.7*	

*SEM: Standart Error Mean. *,**; It is important at 5% and 1%, respectively.*

IV. RESULT

Various quality features such as Zeleny sedimentation, protein content, hectoliter weight, wet gluten, gluten index, energy, p / l ratio, elasticity index have been investigated and important results have been obtained in different kinds of imports in our country.

In line with the results obtained; Orenburgskaya-10 variety according to the quality parameters examined in the imported bread wheat, has come to the fore in terms of many quality parameters (gluten index, p / l, ie, hectoliter weight). The choice of the highest quality parameters during wheat import can contribute to the national economy.

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