


The Influence of Environmental Factors on The Technological Qualities of Wheat Cultivars			Food & Agriculture
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Abstract			
<p>The wheat represents the most widely used grain in the World, also in Balkans it represents the main food product which is mostly used for the production of bread, pasta and many other products. Based on the technological qualities of wheat flour, however, it depends the use of wheat's; for the purpose of technological qualities a great role is played by the locality where the wheat is cultivated. In this particular paper one analyzed four domestic cultivars which were cultivated in two different sites, regarding the physical and chemical as well as rheology qualities, one observed great deal of differences from the same cultivar but which is cultivated in different locations. The most prominent difference is observed with the flour of cultivar Evropa, whereby the wheat from Macedonia exhibits far worse technological qualities compared to that of Kosovo.</p>			

1. Introduction

In the region of Balkans, majority of the wheat cultivars that are cultivated are of domestic provenience, given that they are more suitably adapted to the agro climatic conditions. Most of the wheat cultivars that originate from the region represent soft wheat's (*Triticum aestivum L*) which represent more suitable cultivars for bread production; the latter represents a product which is consumed more than all other products.

There are many factors that influence the technological qualities of the wheat cultivars, however the environmental factors are some of the most important factors, in that regard the location (site) of cultivation of wheat is very important.

According to Jevtic., 1986 the grain of wheat contains approximately 4-7% albumins out of overall content of proteins, globulin 20%, gliadine 20-40% and gluteline 25%. The technological qualities of the flour depend on the content of gliadine and gluteline which form part of gluten.

The bread making qualities of the wheat depend on the content and quality of proteins in the grain (Lasztity, 2003), meaning that the high content of proteins, respectively the amount and quality of gluten has a very positive effect on the volume and shape of bread (Pomeranz, 1988).

As a part of this study paper at hand, one studied the qualitative attributes of some wheat cultivars from the Balkans which were cultivated in two different sites which were quite different one from the other concerning the environmental conditions.

2. Materials and methods

In preparing this paper, one utilized as a working material the four wheat cultivars which were: Pobeda, Evropa, Alltana and Renesanca. The cultivars were cultivated in two different sites: Republic of Kosovo is under influence of continental climate, with the lowest temperature in January (-0.9°C), and the highest in July and August (20.9°C), whereas the annual temperature ranges from 9°C in Podujeva until 12°C in Prizren, the annual amount of rain is around 600 mm. The farmland of good quality are represented by around 44% of overall land area, the most prominent region is that of Gjilani with its renown fields in Vitia, and Republic of Macedonia which are used for cultivation of grains, which is under the influence of continental and Mediterranean climate with average annual temperature of 11.5°C (the warmest month of the year is July with average temperature of 22°C , and the coldest month is January with average temperature of -3°C), the annual amount of precipitations is around 742 mm. Around 50% of overall area represents farmland, the rest are grazing meadows and forests, the most prominent part of farmland is the deep valley of Pellagonia, which represents the “granary” of Macedonia.

As a result of milling we obtained flours with radiuses that are similar to type 500 flour.

In the study one included the qualitative analysis of the grains, including physical-chemical analysis such are: the humidity, the ash, proteins, moist gluten, fat and starch, as well as rheology analysis of the dough which were performed with Brabender farinograph and estensograph equipment. All the analyses are performed in compliance with the regulation in force, respectively with the Regulation on the Official Methods of Analysis of the cereals, December 1988. The results are processed in Microsoft Excel 2007.

3. Results and discussions

All the flours contain the optimum amount of humidity, the ash depends on the flours, but its more prominent in the flour of cultivar Evropa, the flour obtained from the latter and cultivated in Macedonia expresses a larger amount of ash.

Flour obtained from cultivar Evropa and Macedonia exhibit a lower content of moist gluten, whereas a higher content of moist gluten is exhibited by the flour obtained from cultivar Alltani, from Macedonia, too. The amount of the proteins in all types of cultivars is close to the optimum amount. The lipoid is in the range of 0.96 ± 0.10 for the flour obtained from cultivar Alltana from Macedonia, 1.05 ± 0.161 for the flour of cultivar Renesanca from Kosovo. The content of amindon ranges from 67.54 ± 0.23 for flour obtained from cultivar Pobeda from Macedonia, 70.86 ± 1.2 for the flour obtained from cultivar Renesanca from Kosovo.

Table 1. Physical and chemical attributes of the flours obtained from several wheat cultivars cultivated in different areas of Balkan

Physical and Chemical Attributes		Moisture (%)	Ash (%)	Moist Gluten (%)	Proteins (%)	Lipids (%)	Amidon (%)
Evropa	<i>K</i>	12.6 ±0.11	0.61±0.085	23.6±0.134	13.22±0.20	1.02±0.09	68.38±0.97
	<i>M</i>	13.2±0.25	0.55±0.012	20.3±0.15	12.95±0.35	0.96±0.12	69.03±0.95
Pobeda	<i>K</i>	12.5±0.15	0.62±0.070	24.8±0.172	13.84±0.187	1.03±0.103	67.91±1.14
	<i>M</i>	13.5±0.10	0.61±0.025	25.4±0.25	13.90±0.25	0.99±0.134	67.54±0.23
Renesanca	<i>K</i>	12.7±0.12	0.56±0.063	24.9±0.165	13.43±0.192	1.05±0.161	70.86±1.2
	<i>M</i>	13.7±0.20	0.57±0.015	24.1±0.20	13.38±0.60	1.02±0.121	68.8±0.512
Alltana	<i>K</i>	12.8±0.10	0.56±0.094	27.1±0.195	13.87±0.145	0.97±0.112	0.96±0.10
	<i>M</i>	12.9±0.25	0.56±0.072	28.6±0.05	13.91±0.12	69.18±1.24	70.85±1.68

In table 2 one can find the results obtained from the farinogram graphs where we can observe better water absorption attributes of cultivar Altana, whereas worse of the flour obtained from cultivar Renesanca. Nevertheless flour obtained from cultivar Evropa and Renesanca cultivated in Macedonia exhibit lower water absorption attributes than the same cultivars that were cultivated in Kosovo.

In general the flour obtained from wheat cultivated in Kosovo exhibits a better dough development and stability compared to those cultivated in Macedonia.

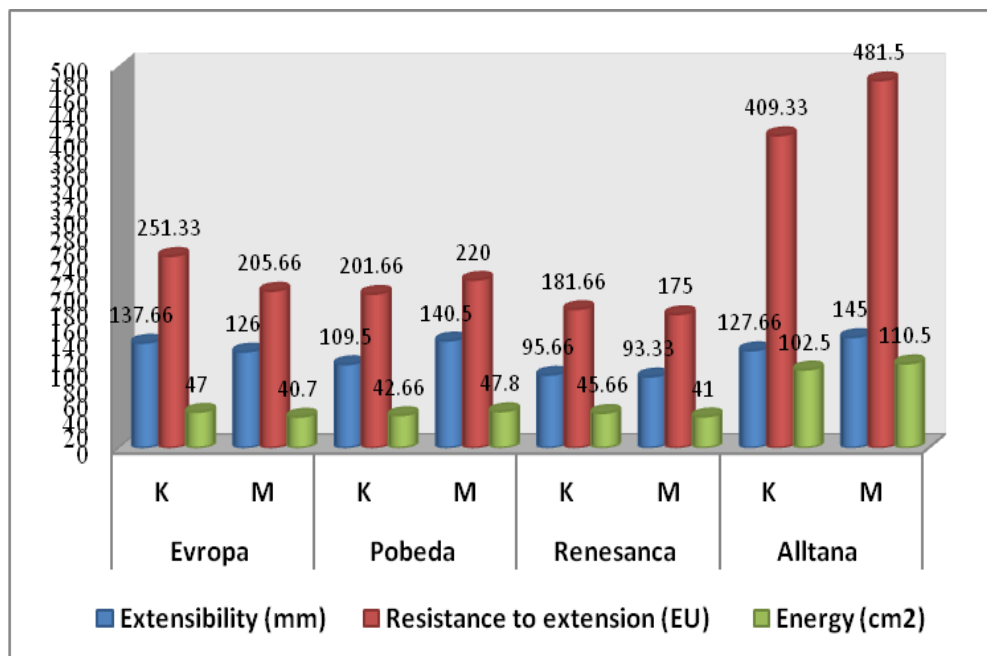
The flour of cultivar Alltana exhibits a much better degree of softening compared to the flour obtained from all other wheat cultivars regardless the place of cultivation, however flour obtained from Alltana and Pobeda from Macedonia exhibit a better degree of softening compared to the same cultivars cultivated in Kosovo.

Table 2. Rheological attributes obtained from dough farinograph of the used wheat cultivars

Farinograph attributes	Evropa		Pobeda		Renesanca		Alltana	
	<i>K</i>	<i>M</i>	<i>K</i>	<i>M</i>	<i>K</i>	<i>M</i>	<i>K</i>	<i>M</i>
Water absorption (%)	55.5	55.0	55.83	60.3	53.03	51.1	61.0	61.5
Dough development (min)	2.35	1.5	1.73	1.75	2.6	2.5	2.0	2.0
Stability (min)	2.66	1.0	2.0	2.0	2.6	2.6	2.25	2.5
Degree of softening (FU)	177.0	190.0	104.33	90.0	152.0	157.33	45.0	25.0

From graph 1 we can observe the rheological parameters obtained from dough extensogram of cultivars Evropa and Renesanca cultivated in Kosovo, the latter exhibit better extensographic attributes compared to the same cultivars cultivated in Macedonia, that is they have a better extension, resistance and energy. The dough obtained from cultivar Pobeda cultivated in Macedonia exhibits better extensographic attributes compared to the dough of the same cultivars cultivated in Kosovo, whereas the dough of cultivar Alltana regardless of the site of cultivation

exhibits similar extensographic attributes, which are much better than the values of other cultivars, which renders this cultivar much more useable for the production of pasta.



Graph 1. Rheological attributes obtained from dough extensograph of the used wheat cultivars

4. Conclusion

From the obtained results we can observe that among the flour of the same cultivars cultivated in different sites, there is a difference in terms of physical, chemical and rheological attributes. That is, the flour and dough obtained from Alltana cultivar regardless the site of cultivation exhibits better physical, chemical and rheological attributes compared to all other flour and dough obtained from other cultivars, whereas flour from cultivar Evropa cultivated in Macedonia exhibits much lower attributes compared to the flour obtained from the same cultivar in Kosovo and all other flour from other cultivars. The other types of flour differ slightly from one another regarding the site of cultivation.

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