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The qualities of the type 500 flours from import for bread production

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Abstract. The quality of baking products is dependent on wheat respectively flour. During the grinding process there are produced many types of flour which can be divided into different types according to the mineral content. The typical flour for making bread is from the type 500 flour so its quality has a special place in the industry of bread production.

From the results that we have gotten we can see that the humidity level of the flour is in between the allowed boundaries at $13.238 \pm 1.08\%$, the acidity degree is also in between the allowed boundaries at $1.765 \pm 0.087\%$, the mineral matter content is characteristic to the type 500 flour at 0.48 ± 0.02 of which we have iron at $40.49 \pm 14.67\%$. The proteins as a key factor to the baking technology are at a lower content at $11.016 \pm 0.33\%$ but the content of wet gluten is at an average of $25.675 \pm 0.47\%$, also the sediment value as a factor on bread quality is at an average of $35.85 \pm 1.5 \text{cm}^3$.

Keywords: type 500 flour, proteins, mineral matters, wet gluten.

INTRODUCTION

With the ever increasing nutritional needs, related to the food chain, nowadays the cereals play an important role as a food, whereby over 50% of daily energy is obtained from cereals. The latter represent the main source of carbohydrates, of fibers, of vitamin B, mineral salts, such as potassium, iron, phosphorus and calcium. The content of the vitamins and minerals is higher when the wheat is used wholly. The proteins are represented in a small biological value due to the lack of essential amino acids and they have a poor content of fat [1].

The wheat is the most widespread crop in the world. With the bread which is obtained from the flour of wheat one feeds around 70% of the world population, given that, based on the caloric content, the bread obtained from wheat is much higher in calories than that obtained from other cereals. Therefore, one kilogram of wheat bread contains 2000-2500 calories, whereas the rye bread contains only 1800 calories [2].

In the past, in Kosovo, the wheat was cultivated in around 100 000 ha, or 30-35% of the entire surface with cereals, whereas nowadays in 70 000 ha. The wheat yield in 1980 was 3000 kg/ha, in 2001 with over 3000 kg/ha and it was mostly cultivated in Kosovo Plain, in the fields of Drenica, in Llap, Anamorava and in Dukagjin. In 1980 one produced over 250 000 tons of wheat and it met the needs of population of Kosovo with 65% of wheat. Nowadays one produces less, whereas the needs have increased with the increase of number of population, so the wheat is imported from other countries. In recent years the import was as follows: year 2009 – 87.989 tons, year 2010 – 92.430 tons, year 2011 – 95.286 tons, year 2012 – 97.232 tons [3].

Based on the data on import in the market of Kosovo, Serbia takes the first place where one imports the wheat from. The values of the imported wheat from Serbia are higher compared to the values from other countries where Kosovo imports the wheat from. Only in year 2011, as a

result of the reciprocity measures, the percentage of the imported wheat from Serbia was almost halved, whereas in the following years, this percentage was continuously increased. After Serbia, the other countries where Kosovo imports its wheat from are Hungary, Bulgaria, Croatia and Russia [4].

As its main content of the bread, the flour plays a vital role in the confectionary products and its production from the milling represents one of the first and most important industrial operations [5]. Therefore, based on the fact that the process of milling is a complicated and costly process, a part of the producers and the traders import flour instead of wheat.

The baking qualities of the flour are conditioned by the amount and quality of the proteins in the grain [6], the high content of the proteins has a very favorable effect regarding the volume and form of bread [7].

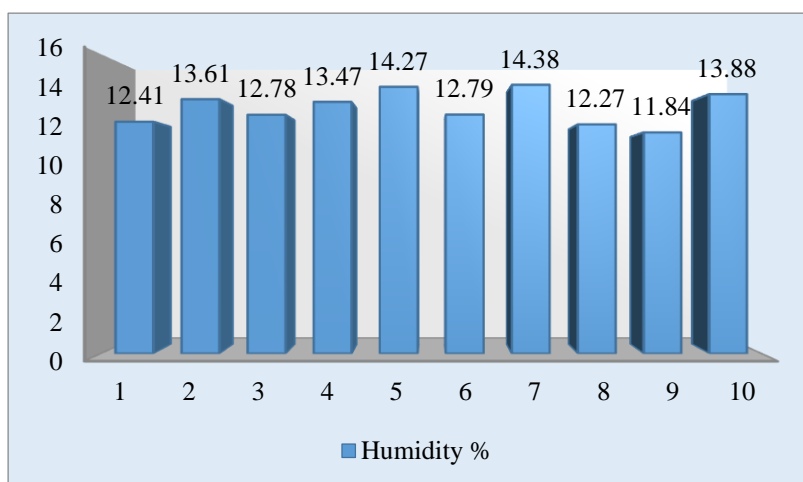
So, this study will present in a more detailed manner the technological and nutritional attributes of the imported flour, respectively of the type 500 flour which is common flour for production of bread, a produce that is consumed at each ration in Kosovo.

MATERIALS AND METHODS

All the imported flour type 500 samples are taken at the border crossings of Republic of Kosovo. While the physical and chemical analysis were conducted in the Agricultural Institute of Kosovo based on the regulation on the physical and chemical method for cereals, milling and confectionary products, pasta and frozen doughs [8], which is based on the standard methods. The humidity is determined with standard method with drying at 105°C, mineral content with incineration at 900°C, the acidity scale with initiation of solvent 0.1M NaOH, the value of the sediment according to the Zeleny method and the proteins are determined with the Kjeldahl method [9]. The study is performed during the import of type 500 flour in 2015.

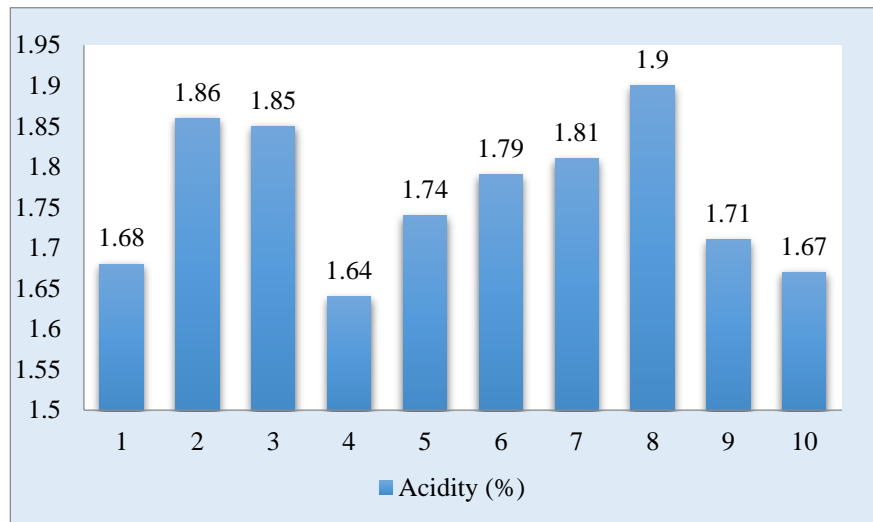
RESULTS AND DISCUSSION

From graph 1 one observes that the humidity of the type 500 flours is in accordance with the regulation, where the analyses for the whole year 2015 indicate the humidity within the normal limits, with an average and standard deviation of 13.23 ± 1.08 %.



Graph 1. The humidity of the type 500 flour from import during 2015

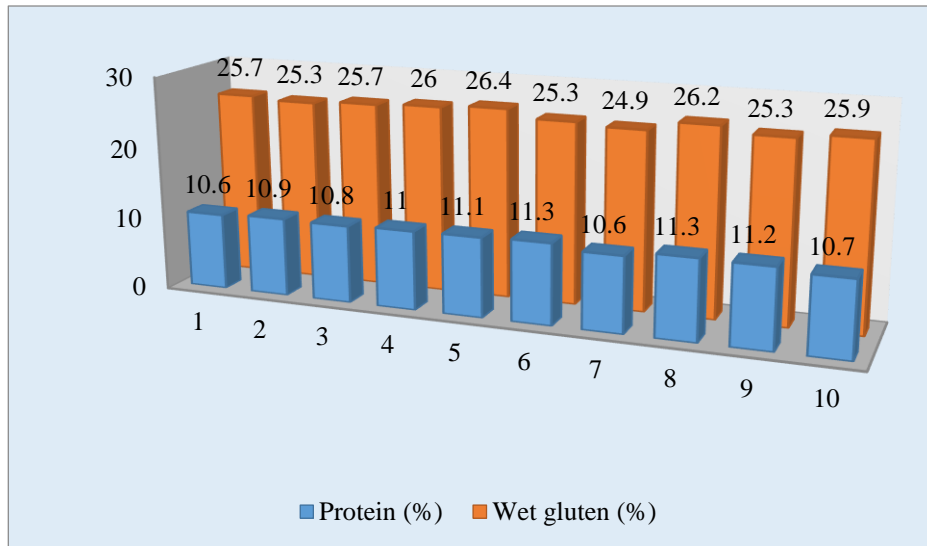
In graph 2 it is indicated the acidity of the type 500 flours whereby one can easily observe that in all the performed analysis during the months of the year, one could observe small amount of acidity, respectively acidity within the normal limits which is required by the regulation in force for the type 500 flour which stipulates acidity up to 3.0%, whereas in the analysis conducted in 2015 the average of the acidity was $1.765 \pm 0.089\%$.



Graph 2. Acidity of the imported type 500 flour during 2015

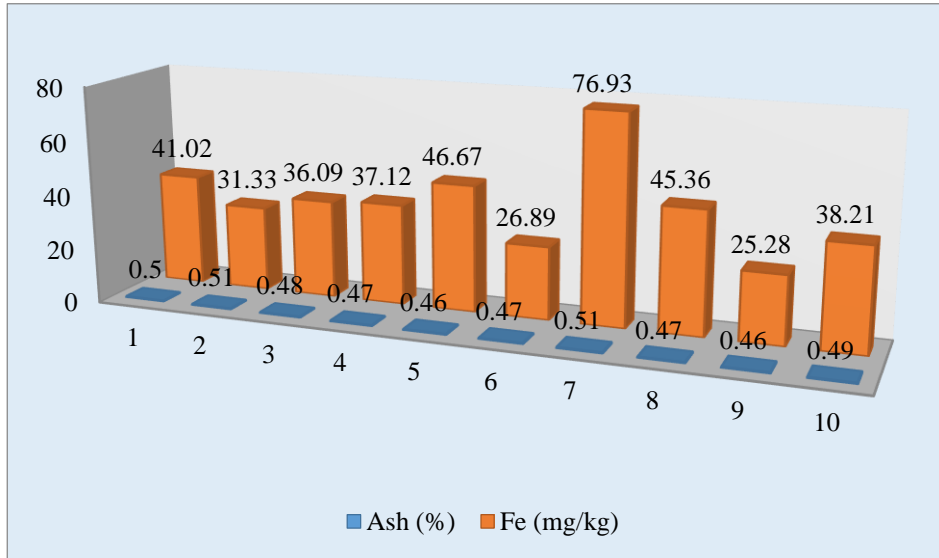
Generally the bread making performance of wheat flour is governed by the quantity and quality of its proteins. Flours of high protein content often yield bread with good quality. However flours with the same protein content do not necessarily produce breads of similar quality [10]. Martin, Zeleznak and Hosenev (1991) have been shown that generally the consumer acceptability of bread depends in part on its mechanical properties such as firming and staling. It was suggested that starch retro gradation, is also implicated in staling [11]. Gluten and its interactions with starch may have a role in the staling process [12, 13]. A variety of tests may be used to assess changes in the cellular structure of bread during the staling process. Some measurement of mechanical properties is employed in shelf-life studies for assessing the product quality changes.

Based on the above mentioned and the results indicated in graph 3, one can observe that the content of the proteins during whole 2015 is low with an average $11.01 \pm 0.3\%$ which will influence on the attributes of the bread. Whereas the content of the wet gluten as the main protein instrumental in the technological attributes of the flour is close to average with $25.67 \pm 0.4\%$.



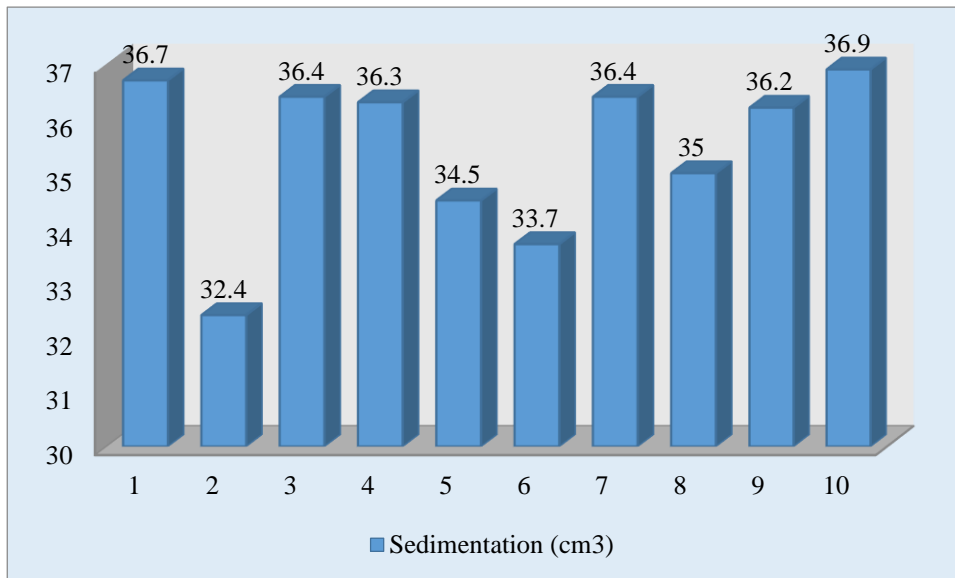
Graph 3. Proteins and wet gluten in the imported type 500 flour during 2015

In graph 4 one presented the mineral content and iron as the main nutritional ingredient at the analyzed flours. From the presented results one can observe that the mineral content for 2015 is $0.48 \pm 0.02\%$ which is characteristic of the type 500 flours, whereby according to the regulation type 500 flour should contain 0.45 -0.55% mineral content. The content of the iron as nutritional ingredient is 40.49 ± 14.6 mg/kg, which is more than that required by regulation minimum.



Graph 4. The content of minerals and iron in imported type 500 flour during 2015

In graph 5 one presented the results of the sedimentation of the type 500 flour according to the Zeleny method, whereby the results indicate that one deals with flour with medium sedimentation attributes, respectively with the flour that falls under the second qualitative scale based on the sediment of $35.45 \pm 1.5 \text{ cm}^3$.



Graph 5. Sedimentation of the imported type 500 flour during 2015

CONCLUSION

From the obtained results and the discussions that were presented, one can conclude that the imported type 500 flour during 2015 had the humidity and acidity at the limits of normal ingredients, mineral material which adapts to the type 500 flour with $0.48 \pm 0.02\%$, the iron as a representative of minerals lies within normal average range as it is the case with sediment, however the content of the proteins as the direct representative of the technological attributes of the flours is at the lower levels with only $11.01 \pm 0.3\%$ and the content of moist gluten of $25.67 \pm 0.4\%$ which indicates that one dealt with a bread that indicated poor sensory attributes, bread which would not be attractive to consumers or for which one should use additives.

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