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Dependence of the quality of produced breads from several wheat flours based on addition of certain additives

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Abstract

The main technological factors on bread production are the amount of proteins, respectively the content and the quality of the gliadine and gluteline-gluten, for this reason in case it is necessary, the usage of tested additives leads to the improvement of the quality of final product. The effect of used additives, however, it is closely linked to the used wheat cultivars, as well as to the radius of the flour that will be used for the production of bread.

The additives or the redox agents represent products with chemical attributes, which through the oxidation or reduction reactions that they incite in the dough, they change the rheological qualities of it, the oxidants improve the color of the flour, rheological qualities as well as the formation of pores of bread, whereas the reducing agents react in the SS connections in dough, respectively they incite the reduction of overall molecular weight of the protein aggregates of gluten protein.

For the purpose of this paper, in addition to the flour from different wheat cultivars and main additions such are water, salt and dry yeast diego, one also used other additives such are: ascorbic acid, xylanase, lipase and top bake. One managed to produce two types of bread from all wheat cultivars using the aforementioned additives and without additives. Based on the conducted analysis, it results that the breads produced using additives express much better qualities compared to the breads produced without additives, respectively the breads produced with the additives express better qualities than the breads produced without utilization of additives in terms of radius of bread, volume of bread, color, taste, etc.

Key words: gluten, radius of bread, taste of bread, volume of bread, xylanase.

1. INTRODUCTION

Similarly to many countries, in our country as well, the consumption of various types of bread and a number of other main products could not be used without the utilization of additives. The utilization of additives in its core has four main objectives, that is, to increase the nutrition value of the bread, to increase the quality of the bread, to extend the expiration date and to improve its conservation. (Ünal, 1988).

Among the enzymes, the important ones are the proteases, xylanases and cellulases which directly or indirectly improve the strength of the gluten bonds net, thus improving the quality of the bread (Gray J.A., et. al., 2003). Xylanase plays an important role on the quality of the bread given the water absorption ability and the interaction with the gluten (Nuyens F.H. et.al, 2001). Amylases affect the volume and the sustainability of the well done bread, the volume of the produced bread is 25% larger compared to when this is not added to the dough mix, all by utilizing a maximum value of 250 ppm (equal to 1250 SKB per kg).

A small amount of ascorbic acid influences the significant increase of the strength of the dough by increasing the volume by 20% of the dough of the bread compared to that used during the control, this additive represents an acceptable one to be used in bread production, given that it is a vitamin. Despite the fact it represents a reduction agent, it displays similar attributes as with oxidants, in fact the active effect of this product is the so called acid dehidro-L-ascorbic oxidation (Sinani A., 2009).

2. MATERIALS AND METHODS WHICH WERE USED

For the purpose of this study, one took into consideration the following wheat cultivars: Luna, Lenta, Europa, Andolu and Isengrain. The cultivation was done in the village of Gramove, during 2009/2010; the milling was done in the experimental mill "Yukebas" in the lab of the flour factory "Xerxe", whereby through the milling one obtained two flour fractions, Type-500 and Type-850, with the grits residues, from the flour obtained in this manner one produced the breads with and without additives.

Using an electronic scale one measured 1 kg of flour, 15 g of salt, 15 g of dry yeast Diego, and water based on the Farinograph absorption quality on 30° C. These contents were then put in a mixer where they were mixed during 8 minutes; subsequently the mass was put in the fermentation rooms at temperature 30° C and relative humidity of 60%. Afterwards, it was given a shape to it in the form of 750 g, it was put in the second fermentation and eventually in the baking oven, 230-250° C for a duration of 25 minutes. From the oven, the bread was put on the table where it stayed during 24 hours, in order to have other analyses performed to it. In the second sample taken for analysis, one took the same amount of flour and of other parameters, salt, water, yeast as it was the case in the first sample, however, this time one added the amount of respective additives: ascorbic acid (30mg/kg flour), Xylenase HC2500 (30mg/kg flour), Lipase HC120y (5mg/kg flour) and Top Bake (3g/kg flour). The analysis of the bread, organoleptic and quality analysis were conducted in compliance with Official Methods of Analysis of the cereals, 1988.

3. RESULTS AND DISCUSSION

Initially one produced the bread using the T-500 flour, with and without additives; in table 1 one displayed the quality and organoleptic qualities of the obtained bread.

Table 1. The quality of the produced bread from Type-500 flour with and without additives

Quality Indicators of the Bread	Bread from Type-500 flour									
	Lenta		**Andolu**		**Luna**		**Europa**		**Isengrain**	
	W/O additives	W additives	W/O additives	W additives	W/O additives	W additives	W/O additives	W additives	W/O additives	W additives
Weight of the Bread (g)	503	508.8	488.7	500	500	498.2	498.3	496.3	509.5	500
The yield of the volume (cm^3)	2108	2280	1914	1885	1728	2208	1827	1755	1728	1792
Bread acidity	2.2	2.3	2.52	2.64	2.52	2.63	2.55	2.65	2.4	2.5
The color of the crust of the bread	Pale Red	Dark Red	Pale Red	Dark Red	Red	Dark Red	Pale Red	Pale Red	Pale Red	Red
Porosity according to Dalmat	7	7	7	7	8	7	8	7	7	6
Smell	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Taste	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium

Table 2. The quality of the bread produced from Type-850 with and without additives.

Quality Indicators of the Bread	Bread from Type-850 flour									
	Lenta		**Andolu**		**Luna**		**Europa**		**Isengrain**	
	W/O additives	W additives	W/O additives	W additives	W/O additives	W additives	W/O additives	W additives	W/O additives	W additives
Weight of the Bread (g)	501.9	504.7	494.2	498.9	497.7	497.8	499.1	505.9	493.2	503.2
The yield of the volume (cm^3)	1980	2380	1980	1792	1985	2035	1950	1950	1943	2077
Bread acidity	2.5	2.65	2.48	2.62	2.5	2.66	2.5	2.68	2.40	2.55
The color of the crust of the bread	Dark red	Dark red	Dark red	Dark red	Dark red	Dark red	Dark red	Dark red	Dark red	Dark red
Porosity according to Dalmat	7	7	8	8	7	8	8	8	7	8
Smell	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
Taste	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium

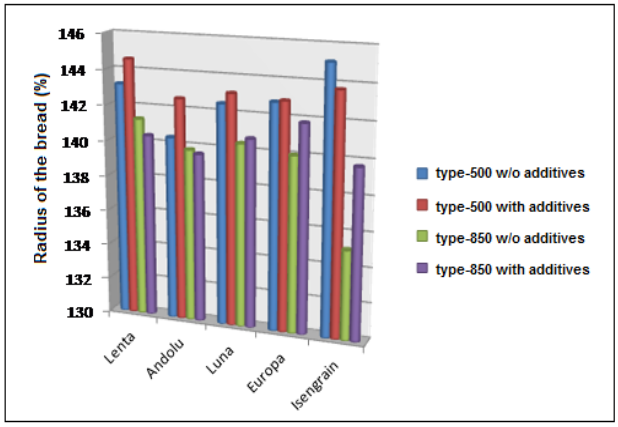
Photo 1. The depiction of the bread produced from Type-500 with and without additives

Based on the table, one can observe that the weight of the produced bread with additives is heavier than the weight of the bread produced without additives, with the exception of the bread obtained from cultivar Insengrain, which displayed a heavier weight with the bread produced without utilization of additives. All the bread produced with additives display a better yield of the volume in the bread produced without additives; however, in general the higher yield of the bread is to be observed with flour from cultivar Lenta. The acidity of the bread is within normal parameters and it does not differ significantly between bread produced with/without, despite the fact that bread produced with additives display a higher point. The porosity according to Dalmat in terms of majority of the breads, it is the same. The other organoleptic attributes such are the crust of the bread, the smell and the taste are more less the same, they only change is in terms of the color of the crust, which can be seen best in photo 1.

Also in table 2, the bread produced from utilization of the Type-850 with the use of additives displays a heavier weight and higher yields of volume, with the exception for the bread from Andolu with additives, which displays a lower volume yield (1792 cm^3) compared to the Andolu bread produced without additives (1980 cm^3). However, one needs to take into account the fact that the bread from cultivar Lenta has a higher weight and volume yield compared to other samples. All the produced bread displays a normal acidity. All the breads display a dark red color, whereas regarding the porosity according to Dalmat, it proves that it is almost the same; they have a specific smell and taste to the other breads of Type-850.

If one compares the bread produced from Type-500 and Type-850 flour, one can observe that the yield of the bread produced using Type-850 flour is higher than that of the bread produced from Type-500 flour, with or without additives. A small amount of bread did get a mark for excellent volume (the bread produced with Type-850 and Type-500 from cultivar Lenta with additives 2380 cm3, 2280 cm3), whereas the majority of other bread, notwithstanding the type of flour or cultivar, display a better volume with an excellent or medium mark, only the bread obtained from Type-500 from Evropa cultivar, with or without additives displays a sufficient mark and the bread obtained from Type-500 of cultivar Luna without additives, reaches only a bad mark (Pomeranz, Y. 1988). The acidity of the bread is within normal parameters, however the bread produced with Type-850 display a higher acidity, which is normal. The color of the bread crusts produced using Type-500 is of pale red color, with the exception of several breads produced with additives, whereas all the produced bread with flour Type-850 display a darker red color (Payne P.I. 1987).

All the breads produced from Type-500 flour with additives, in general they display a higher radius than those without additives, with the exception the bread from cultivar Insengrain without additives, which displays a higher radius than the bread produced with additives, which can be seen in graph 1. The same phenomenon is to be observed with the flours type-850, by using 20 ppm α-amylase, hence the breads with additives display a larger radius compared to those without additives (ATKINS, J.H.C. 1971). However, if one compares the radius of the bread obtained from flour Type-500 and Type-850 we will observe a higher radius with the bread produced from flour Type-500.



Graph 1. The Radius of the bread produced from flour Type-500 and Type-850 with and without additives

4. CONCLUSION

Based on the obtained results from the produced bread and their organoleptic qualities, one can conclude that:

- Of the bread produced using flour Type-500, the bread of cultivar Lenta with additives has a higher volume (144.6 % and 2280 cm^3), in addition in has a better color and porosity according to Dalmat, as well as smell and a very good taste. In addition, the bread from flour Type-500 without additives of cultivar Luna and Isengrain display similar qualities, despite being slightly weaker in terms of quality.
- Of the bread produced using flour Type-850, the better qualities are observed with the bread produced using additives with the cultivar Lenta, given that it displayed a very good weight, radius and volume (504.7 g, 141.3% and 2380 cm^3) as well as very good color, smell and taste.
- Of the bread produced with flour Type-500 with or without additives, they have a higher radius than the bread produced with Type-850.
- As a conclusion, the bread of cultivar Lenta with flour Type-500 and Type-850 and in general with additives, they display better qualities than other bread.

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