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The Influence of the Waters of Our Country in Breadmaking

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Abstract: Flour and water are basic components in dough formation process. The water quality affects the whole breadmaking process and the quality and retention period of bakery products. It is known that for breadmaking, potable water should be used. Quality of water affects the whole breadmaking process and the quality and retention period of bakery products (crumb porosity, crust soft, shiny and aesthetically pleasing). Thus, the water affects the consistency and temperature of dough; water dissolve salt and sugar products; in fermentation process, the water helps stimulate the activity of yeast (due to the minerals content); Medium Hard water produces better quality bread than any type of water. Soft water weakens the gluten during mixing and fermentation. Alkaline water is the most harmful, because it doesn't only weaken the gluten, but retards fermentation. In this study are evaluated four types of water of the country, which are: Spring water, Lajthiza, Tepelena dhe Kristal. Evaluated three factors that must be considered in relation to water quality, such as: taste, content of chemicals and mineral content. Identification of an unusual taste or bad smell in water can change the taste of the final product. Often, when quality is not within the required standards and used not adequately, water can be a determining factor for obtaining a desired dough and final product characteristics.

Keywords: Water quality, Alkaline water, Dough, Breadmaking

Introduction

The purpose of this study is that by recognizing the qualitative properties of some water resources and our country's flour physico-chemical parameters determined during the baking to the final product.

There are evaluated three factors that must be considered in relation to water quality, which are: taste, content of chemicals and mineral content.

Identification of an unusual taste or odor in the water can change the taste of the final product. Chlorine is considered as a chemical ingredient that has significant effects on the quality of pulp, especially in fermentation activity. Yeast, being a natural microorganism, is sensitive to chlorine. Also a high level of chlorine affects the function of flour, and in particular the enzymes. Mineral content of the water determines the hardness and softness of the water, where strong water contains a large amount of minerals, while soft water contains a very limited amount of minerals.

The water for drinking should be considered to have a constant temperature ranging from 6 to 12 ° C, there should be no abnormal taste or odor. Also there should be no color and should be fine. Clarity of water is an indication of lack of insoluble substances, however this feature is very relative because they are very few waters that have not hover substances .

Materials and Methods

In this study were obtained in the study of four types of groundwater in the country, which are: Spring water, Lajthiza, Tepelenë and Trebeshina. Chemical analysis carried out have enabled the identification of contamination with fecal origin, those organic and inorganic type, such information is obtained by performing analysis for determining organic substances, ammonia, chlorine (organic pollution in action), nitrites and nitrates and inorganic elements that may be present due to the infiltration of emissions that come from the surrounding industrial areas.

A water with power 5° is classified as sweet, 5-20° common strength and with power over 30° very strong. Normal boundaries of strength are 30 ° F for total power and 12 ° F to it permanently. Since the dough should have a pH value around 5-6, when it is used for the preparation of alkaline water, dough have a pH higher than 8, with fewer gas production and lower acidity and a higher duration maturity due to the lower activity of the yeast, diastasis and lactic bacteria. Alkaline water has a negative effect on gluten to form and its plasticity: it is therefore necessary to use water with a slight acidity.

The use of chlorinated water is noticed that provokes a reduction of the fermentation time and improves the quality of bread, particularly if used weak flour. Influence of chlorine can change if it is found or as combined chlorine residual in the water sterilization treatment.

Impact of Water on Quality of Baked Products

A sweet water affects the creation of a sticky dough, a phenomenon that can be avoided by adding dough improvers or a larger amount of salt, while monokalcik phosphate is typically used as "correction" of water for the production of bread or food for the yeast. The addition of Mg and Ca salts causes an increase in the severity of dough. This phenomenon finds explanation in the reaction that occurs between gluten proteins with Ca and Mg ions, forming cross links. Another indicator of the analytical water, which retains its importance by bread making technological side, is pH since for an optimal development of its value dough should be between 5-6. The use of alkaline water (pH> 7.5) enables the production of a dough with pH higher than 6, causing a poor manufacturing gas and a longer baking time due to reduced activity of the yeast, and diastazës lactic bacteria. Alkaline water has a negative effect on gluten to form and its plasticity: it is therefore necessary to use water with a slight acidity.

The use of chlorinated water is noticed that provokes a reduction of the fermentation time and improves the quality of bread, particularly if used weak flour. Influence of chlorine can change if it is found or as combined chlorine residual in the water sterilization treatment.

Results and Analysis

To study the impact of natural water quality of our country in bakery products are studied physico-chemical parameters of wheat cultivars (Table 1), Farinograph physical parameters (Table 2), as well as extensograph physical parameters. The results obtained from the present study are presented as follows:

Table 1. Physico-chemical parameters of wheat cultivars

Cultivars	Humidity (%)	Proteins (%)	Hectolitre weight	Sediment	Hardness
Lushnje	11.8	13.1	79	46	45
Russian	12.3	13.8	80	47	54

Table 2 - Physical parameters of farinograph

Cultivars	Water absorbation (%)	Development time (min)	Stability (min)	Softness (PE)	Maximum (PE)
Lushnje	61.2	4.2	6.4	88	512
Russian	57.5	2.8	10.3	54	514

Table 3. Extensograph physical parameters of Russian dhe Lushnja cultivars

Cultivars	**Russian**	**Lushnja**	**Russian**	**Lushnja**	**Russian**	**Lushnja**
Time	14.37	12.35	15.30	13.21	16.12	13.9
Arrival time of dough	44	45	89	89.2	136	134
Resistance in traction	273	207	305	208	295	233
Elasticity	202	174	186	160	183	162
Maksimum	422	296	475	295	496	316
Energy	120	69	114	62	112	64
Index number	1.34	1.17	1.64	1.34	1.62	1.46

Production of bread, and harmonization of two cultivars of wheat cultivar respectively 60% Russian cultivar and 40% Lushnja cultivar:

To analyze the impact of physico-chemical factors of water in bread product under consideration waters are as follows: Spring, Lajthiza, Tepelena dhe Trebeshina We highlight that the methods used are in accordance with European standard 80/778 albanian standard STASH 3904:1997 (VKM 145,1998) for the water quality consumped by humans. Using our waters analyzed for the production of bread were taken following conclusions (Table 4):

Table 4. Characteristics of waters under study

Characristics	**Spring Water**	**Lajthiza Water**	**Tepelena Water**	**Trebeshina Water**
Temperature at source	8.5 ^{0}C	8.9 ^{o}C	9.3^{0}C	11.4^{0}C
The dry residue in 180 ^{0}C	38.54 mg/l	89 mg/l	126,0 mg/	35.12 mg/l
Total hardness	11.9	19.24	12.4	16.2
pH in source	5.97	8,0	8.34	10.1
Magnesium Mg 2+	24.3 mg/l	36.0 mg/l	0,86 mg/l	7.4 mg/l
Calcium Ca 2 +	1.7 mg/l	1.19 mg/l	50.0 mg/l	7.32 mg/l
Sodium Na^+	1.4 mg/l	1.12 mg/l	1,60 mg/l	25 mg/l
Chloride Cl^-	5.0 mg/l	7.16 mg/l	3.25 mg/l	< 40 mg/l
Nitrate NO_3^-	0.16 mg/l	1.3 mg/l	0 mg/l	1.3 mg/l
Bicarbonate HCO_3^-	124.7 mg/l	55 mg/l	147.3 mg/l	183 mg/l
Potassium K^+	< 1 mg/l	0.63 mg/l	0,34 mg/l	0.58 mg/l
Fluor F^-	0,02 mg/l	0,04 mg/l	0,04 mg/l	0,05 mg/l

Physical and chemical characteristics that bread baked in different types of water is shown in the table as follows (Table 5):

Table 5. Physical and chemical characteristics of bread samples

Water used	**Bread volume (cm)**	**Quantity (kg/cm^3)**	**Crumb moisture (%)**	**Crumb porosity (%)**	**Rate test (1-10)**
Sample 1	13	0,405	41,0	74	8,8
Sample 2	12.5	0,371	42	76.5	9,2
Sample 3	11	0,378	42.8	73	7,0
Sample 4	10	0,379	40	73.6	8,7

Photos of bread samples are shown in the photos as follows (figure 2)

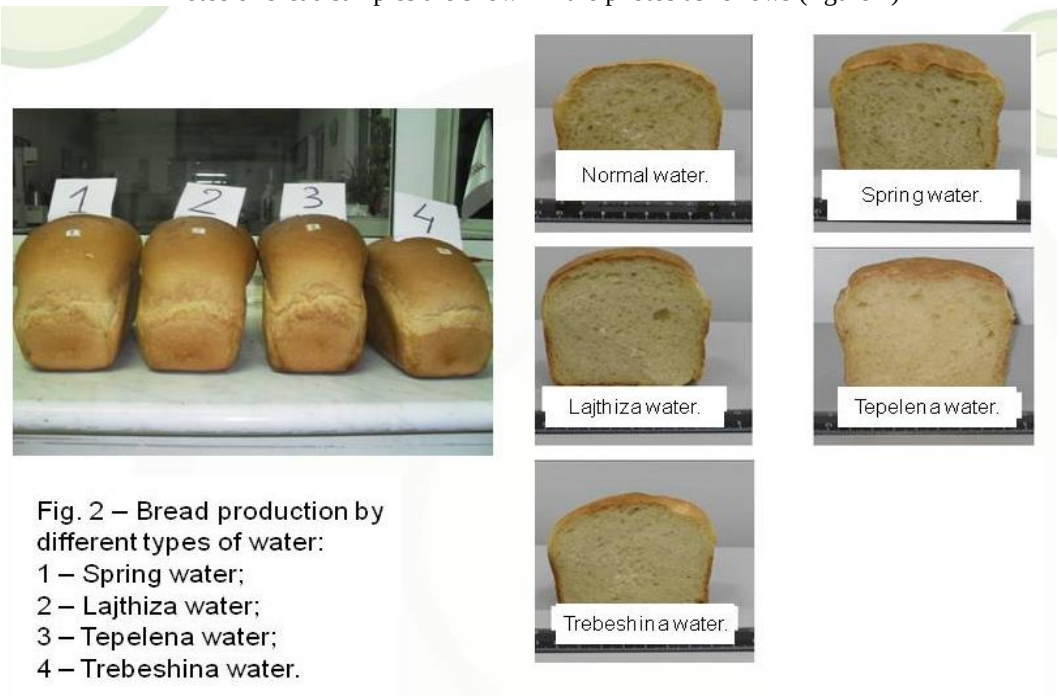

Fig. 2 – Bread production by different types of water:
1 – Spring water;
2 – Lajthiza water;
3 – Tepelena water;
4 – Trebeshina water.

Conclusions

Our study has shown that water with pH 7-8.1 (Lajthiza water) successfully used for producing good quality bakery products, where here and reactivation affects optimal yeast in dough.

By the study it resulted that water resources Trebeshina, with pH 9,0-9,8 dhe ORP 80.6 mV, enable the production of a dough that causes poor gas production and a longer baking time due to reduced activity of the yeast, diastasis and lactic bacteria. Alkaline water has a negative effect on gluten to shape and its plasticity, therefore it is necessary to use water with a slight acidity.

The migration of water through the stages of dough depends directly on ingredients containing low molecular weight. Thus, sugars and oligosaccharides, salts, lipid and surfactants, as in any aqueous colloidal system, the role of each relates to their position in the lipotropic series, varies by the type of water. Assessing the content of salts, Sprig and Lajthiza water has salts content in the optimal amount for a good quality of bread.

The addition of calcium salts, where the content has lower Lajthiza water, has caused an increase in the severity of dough and poor quality of bread with Trebeshina water content. This phenomenon is reflected by the reaction that occurs between gluten proteins with calcium ions, forming cross links.

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