CARPATHIAN JOURNAL OF FOOD SCIENCE AND TECHNOLOGY

Vol. I (1)
June 2009

North University of Baia Mare Publishing House

Carpathian Journal of Food Science and Technology, ISSN 2066-6845
http://stiinte.ubm.ro/multimedia/Chimie/index.html

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Publishing House: North University of Baia Mare Publishing House, http://editura.ubm.ro/

CONTENT

RESEARCH REGARDING THE CHEMICAL COMPOSITION OF POWDER MILK WITH NUTRIENTS

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Abstract

Powdered milk is a manufactured dairy product made by evaporating milk to dryness. This product has in composition powder apple, powder carrots, rice flour and corn flour, vitamins, minerals.

One purpose of drying milk is to preserve it; milk powder has a far longer self life than liquid milk and does not need to be refrigerated, due to its low moisture content. Another purpose is to reduce its bulk for economy of transportation. Milk powders contain all twenty standards amino acids and are high insoluble vitamins and minerals. The typical average amounts of major nutrients in the un reconstituted in 100 g milk are (by weight) 12,7g protein, 68,2g carbohydrates (predominantly lactose), calcium 427g , potassium g, vitamins11g, Inappropriate storage conditions (high relative humidity and high ambient temperature) can significantly degrade the nutritive value of milk powder.

Keywords: *powdered milk, dairy product, longer self life.*

1. Introduction

Dairy milk is an opaque white liquid produced by the mammary glands of mammals. It provides the primary source of nutrition for newborn mammals before they are able to digest other types of food. The early location milk is known as colostrums, and carries the mother's antibodies to the baby. It can reduce the risk of many diseases in the baby. The exact components of raw milk varies by species, but it contains significant amounts of saturated fat, protein and calcium as well as vitamin C. Cow's milk has a pH ranging from 6.4 to 6.8, making it slightly acidic. Milk is an emulsion of colloid of butterfat globules within a water-based fluid. Each fat globule is surrounded by a membrane consisting of phospholipids and proteins; these emulsifiers keep the individual globules from joining together into noticeable grains of butterfat and also protect the globules from the fat-digesting.

Activity of enzymes found in the fluid portion of the milk. In non-homogenized cow milk, the fat globules average about four micrometers across. The fat soluble vitamins A, D, E, and K are found within the milk fat portion of the milk [1].

Standardizing the Milk [2-4]: After the milk has been separated, it is then standardized which means the different components of the milk are mixed automatically until we have a consistent product. When the customer purchases a gallon of whole milk, its constituents will be exactly like every other jug of whole milk we produce. If we are making 2% or 1% milk, then only this amount of fat is added to the milk before packaging. During the standardization process, even some of the vitamins in the milk are checked to insure they meet our standards. This way the customer is assured of a wholesome, healthy product that never changes. On our case the standardizing is done with vegetable oil.

Homogenization. Globules of butter fat are suspended in the milk .They are surrounded by films of adsorbed caseinates, albuminates, and globulinates. The fat globules of milk are too large to form a permanent emulsion, so they gradually rise to the top of the milk.

If the milk or cream is put through a machine called a homogenizer, the fat globules are reduced in size. This is accomplished by using pressure and forcing the milk or cream through small openings. Homogenized milk or cream may form a stable emulsion if the fat globules are reduced enough in size. Hence, when the fat is broken into fine enough globules the cream will not rise to the top of the homogenized milk. The size of the fat globules after homogenization depends upon the temperature of the milk during homogenization and the pressure used. With increase in temperature the degree of dispersion increases rapidly from 40° to 65°C, so that the smallest fat particles are obtained at 65°. Ordinarily temperatures above 65° are not used for homogenization. The size of the fat particles also decreases with increased pressure. At this time in the milk we add the powder apple, powder carrots, rice flour and corn flour, vitamins and minerals. Turning the Condensed Milk into Milk Powder: Two types of drying are the spray nozzle and the newer atomization system. There are still many spray dryers in operation today. These dryer towers or dryers are 660 centimeters diameter.

In the top of the column are four spray nozzles that spray a fine mist of milk into 180 degrees C. swirling air. As the milk droplets fall, the swirling air quickly removes the water out of the droplets of milk until all that's left is a small particle of milk powder not much larger than a speck of dust. As it falls, the air cools it until it settles into the funnel shaped hopper in the bottom of the tower where it's removed.

2. Materials and method

The determinations were done on a product with 26% fats and on our product with 12.7% fats. At those determinations we need to mix the powder milk with an equal amount of water, so the evaporated milk becomes the equivalent of fresh milk. So for each determination we use a volume from the reconstruct milk.

a)The acidity determination.

If we want to determinate the acidity, we must have a degree with sodium hydroxide, after we put previous some drops of color shower. For this determination we need: the reconstruct milk, the sodium hydroxide, color shower and an Erlenmayer.

With this method we can establish the quantity of dry substance from the filtered liquid.

b) Humidity analysis

On this test the water is evaporated from powder milk in drying room at 120 degrees Celsius for about two hours. For this experiment we need a capsule and a drying room.

c) The solubility determination

The reconstruct milk is centrifuged about ten minutes in two graded eprubets with methylen blue. The unsolubilized particles are sett down at bottom of the eprubets. A volume of 0,1 cm^3 residue correspond to 1% unsolubilized substances from the powder milk.

d) The dispersion determination

The dispersion represents the percentage of dry substances of the powder milk, which can be dispersed in water. A quantity of powder milk with percentage of water known, is sprinkled on the water surface. After that, the mixture has to be filtered through a filter.

3. Results and discussion:

The results of experimental data are presented in Figures 1-4.

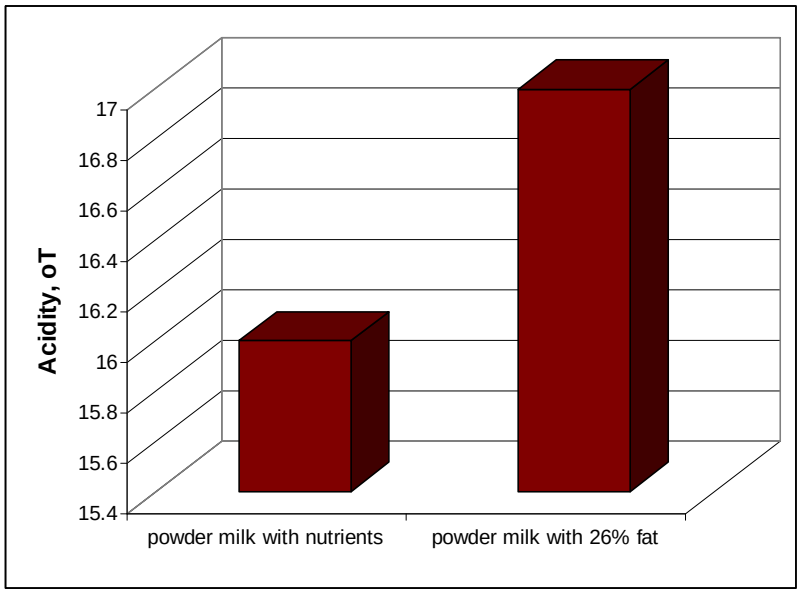

Figure 1. Comparative acidity for studied milk

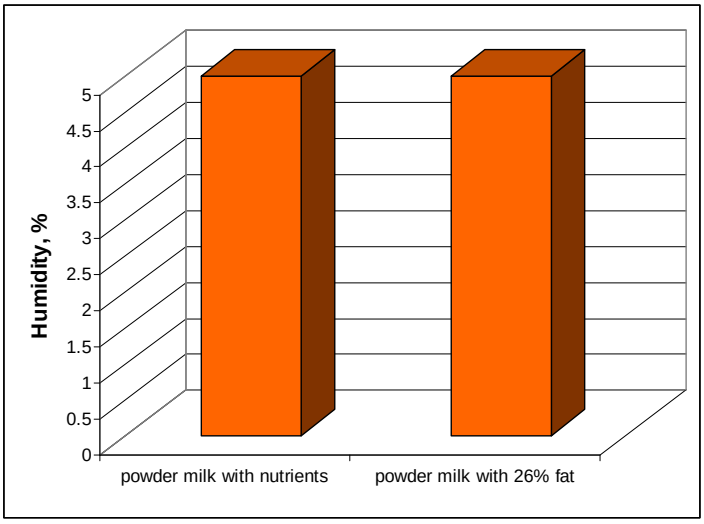

Figure 2. Humidity of two types of powder milk

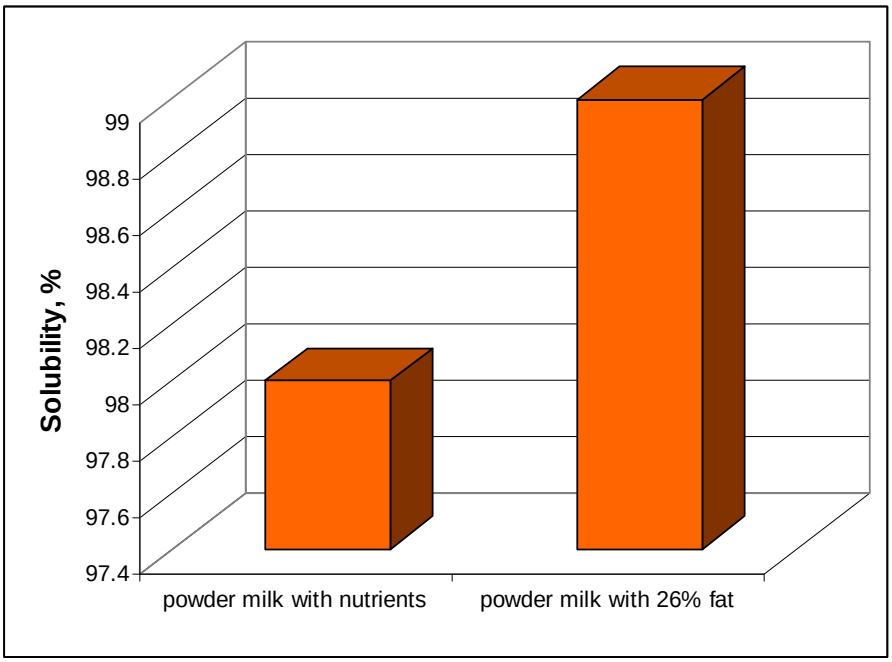

Figure 3. Solubility comparing between two types of powder milk

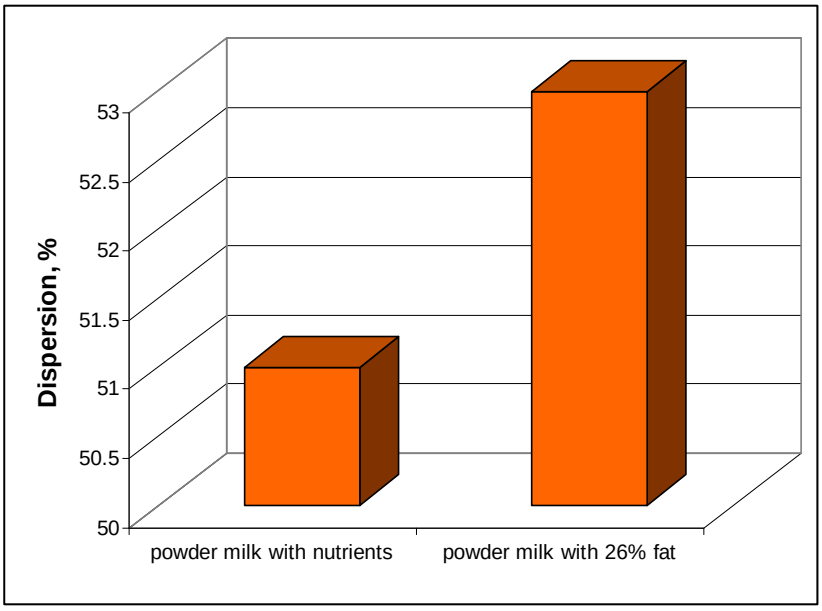

Figure 4. Comparative dispersion between two types of powder milk

The volume of sodium hydroxide used on the milk with 26% fat are 3,4 and for our product with 12,7% fat are 3,2. So from the calculation has result that the our product with nutrients and with 12,7% fat, has 16 degrees T and the product with 26% fat has 17 degrees T (Figure 1).

From the calculation has result that our powder milk with nutrients and 12,7% fat has the same percentage of water as powder milk with 26% fat. This percentage is 5% (Figure 2)

The powder milk has a solubility of 99% in comparison with powder milk with nutrients of 98% solubility with nutrients of 98% solubility (Figure 3).

The dispersion is bigger for the powder milk with 26% fat than for the powder milk with nutrients (Figure 4)

4. Conclusions

Due of tehnological differences, of the composition differences, the results of the determinations are different for each product. The acidity is coming from the milk's acids. The acidity of the powder milk with nutrients is smaller that the powder milk with 26% fat.

About the humidity we can notice that the both of products contain 5% water. In the powder milk products this is the maximum percent of humidity. The solubility of the powder milk with 26% fat is bigger that the solubility of powder milk with nutrients. This difference is due because of the compositions of powder milk with nutrients. This product has in composition powder apple, powder carrots, rice and corn flour. The dispersion is bigger in the case of powder milk with 26% fat, because this product doesn't contain any ingredients except milk.

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TECHNOLOGICAL ASPECTS RELATED TO OBTAINING OF GLUTEN-FREE BREAD

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Abstract

The objective of the study is to assess the influence of composition over the acidity, specific volume and elasticity of gluten-free dough. Three types of flours (rice, soy and buckwheat, potato starch) and xanthan gum were studied. The present study demonstrate that in cases of dough which contains buckwheat flour an intensive fermentations occur expressed in sharp increases of dough's specific volume. The xanthan gum acts as a thickening agent, it consolidates the glucidic network of the dough and reduce the elasticity. Considering the technological parameters, the dough which contains rice, soy and buckwheat flour is the most appropriate selection. A market study was performed in order to find the consumers' preferences related to organoleptic characteristics (colour, volume, porosity, elasticity, odor, taste) of gluten-free bread. The result indicates that consumers' choice did not match the technological one.

Keywords: *celiac disease, gluten-free bread*

1. Introduction

The food represents one of the most important needs of the human being. In order to obtain a good assimilation of food for an optional functioning of the organism, the supplying of all nutritive elements in a balanced proportion is required [1]. The nutritional imbalance, either over nutrition or under nutrition leads to nutritional diseases. One of these is celiac disease. Celiac disease is caused by a reaction to gliadin, a component of complex protein called gluten which is founded in wheat, barley, rye.

Due exposure to gliadin, the mall absorption of nutrients by the intestinal villi occurred and different health problems appear, both to children and adults. In case of children, next problems were reported [2-5]: • abdominal pain and diarrhea (even bloody diarrhea), and may fail to grow and gain weight; • abdominal pain with nausea and lack of appetite, anemia (not enough iron in the blood), mouth sores and allergic dermatitis (skin rash); • irritable, fretful, emotionally withdrawn or excessively dependent; • in later stages, a child may become

malnourished, with or without vomiting and diarrhea which would cause the child to have a large tummy, thin thigh muscles and flat buttocks; • teenagers may hit puberty late and be short; • hair loss; • lactose intolerance; •dermatitis herpetiformis (an itchy, blistery skin problem). Adults who begin to be ill with celiac disease might have a general feeling of poor health, with fatigue, irritability and depression, even if they have few intestinal problems. One serious illness that often occurs is osteoporosis. Also, about 5% of adults with celiac disease have anemia [6].

The only known effective treatment is a lifelong gluten-free diet. Selection of proper ingredients and establishing of work technology represented a challenge for food industry in obtaining the gluten-free product with attractive organoleptic and nutritional properties, especially for children. Today, a wide range of gluten-free products, from base products (whole bread, pasta, corn-flakes) to sweets (cakes, chocolate, etc.) [7] are presented on market.

The objective of the study is to assess the influence of different ingredients (flours and xanthan gum) over the characteristics of gluten-free dough.

2. Materials and methods

For the experiments, three types of gluten-free bread were prepared according to the proportion presented in Table 1. The technological parameters are indicated in Table 2. Flours' control were performed based on international standard methods (ash content – ICC104/1, protein content ICC106/2, total fat content - ICC 136 , carbohydrates content ICC 122/1, moisture content ICC 109/1). The technological characteristics of flours are presented in Table 3.The influence of flours' types and xanthan gum over the dough characteristics were assessed in terms of acidity, elasticity, specific volume of dough related to proof process. Acidity and specific volume of dough were performed used international and Romanian standard (ICC 145 respectively STAS 91-1983). The method used for elasticity measurements is unstandardized and is based on the uniaxial compression of a dough piece under a known force [8]. The elasticity is proportional with the ration between the compression length of dough piece and its initial length. Also, a market study was developed in order to assess the consumers' perception related to gluten-free bread.

Table 1. Recipes used in experiments

Ingredients	Recipes I (R I)	Recipes II (R II)	Recipes III (R III)
Rice flour	200 g	200 g	200 g
Potatoes starch	200 g	-	-
Soy flour	100 g	100 g	100 g
Buckwheat flour	-	200 g	200 g
Salt	7 g	7 g	7 g
Dried yeast	7 g	7 g	7 g
Olive oil	3 g	3 g	3 g
Honey	18 g	18 g	18 g
Baking soda	7 g	7 g	7 g
Water	400 g	400 g	400 g
Xanthan gum	-	-	7 g

Table 2. Technological parameters

Parameters	Time
Kneading time	20 minutes
Proffer time	40 minutes
Proof temperature	30^{o}C
Baking time	25 minutes
Baking temperature	200^{o}C

Table 3. Technological characteristic of ingredients

Flour	Carbohidrates	Proteins	Ash	Fat	Moistrure content
Rice	23.51%	2.32%	0.38%	0.83%	72.9
Soy	30.16%	36.49%	4.87%	19.94%	8.54%
Buckwheat	71.2%	12.3%	2.1%	2.3%	12.1%

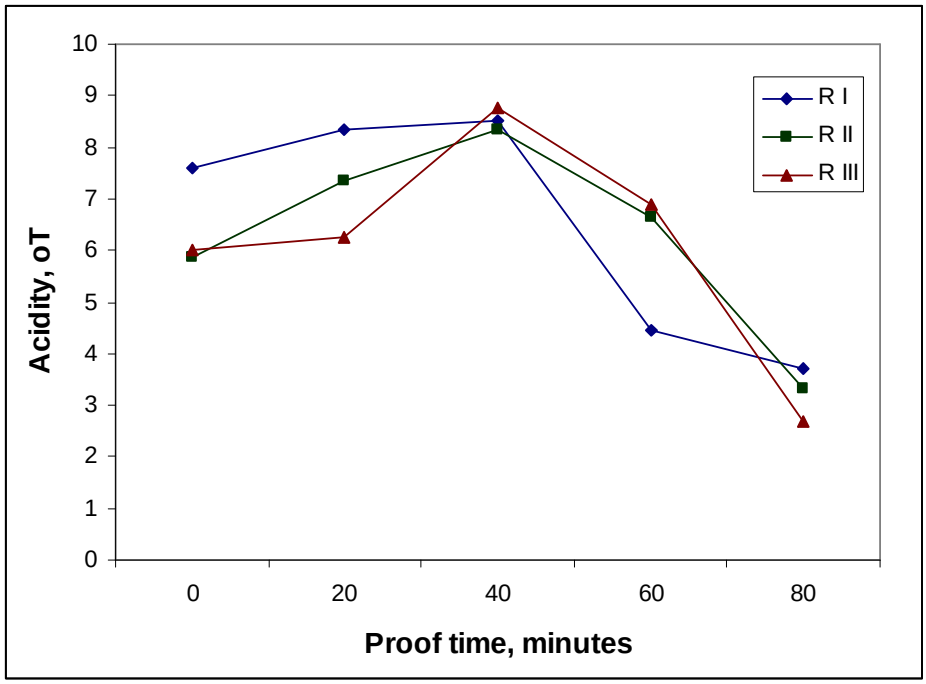

Figure 1. Variation of acidity in gluten-free dough during the proofing time

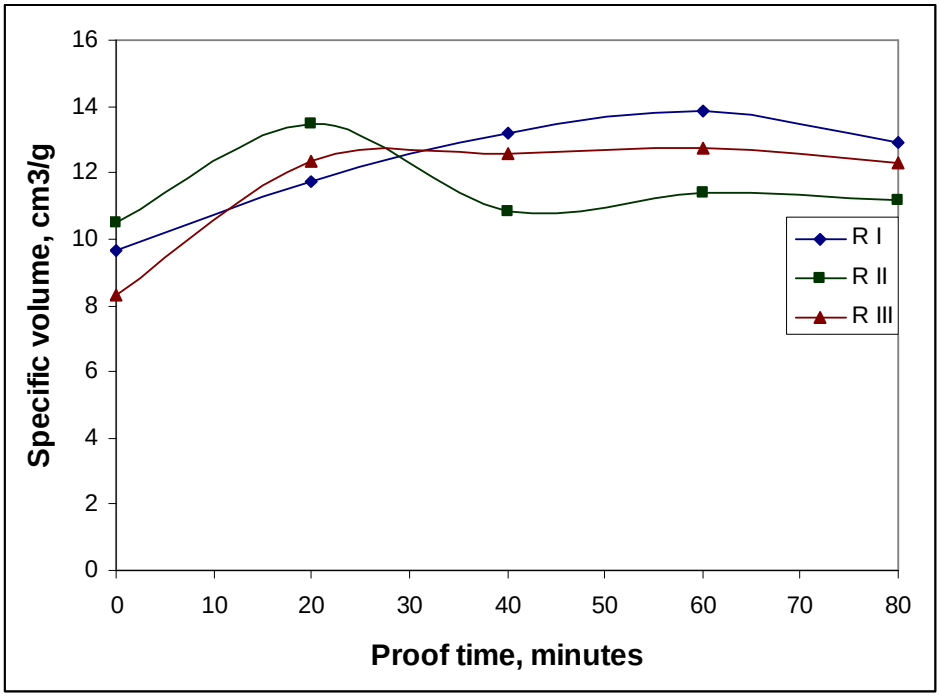

Figure 2. Variation of specific volume in gluten-free dough during the proofing time

The free-gluten breads baked according to recipes mentioned above were tasted by 30 consumers which filled a questionnaire related to different characteristic of breads: color, volume, porosity, elasticity, odor, taste.

3. Results and discussions

1.Acidity evolution of free-gluten dough is presented in Figure 1 and it indicates a nonuniform variation of acidity occured during proof time. In the doughs prepared according R I and R II constantly increases of acidity are recorded from the beginning of the process. In the dough prepared according R III stationary values of the acidity can be noticed in the first 20 minutes of the proof process. An possible explanation can be based on the presence of a xanthan gum of which thickening properties could initially inhibit the fermentation process. As a polysaccharide, the xanthan gum release in the dough, large amounts of sugars. The presence of buckwheat with high content of carbohydrates (71.2%) contributes also to increase the sugars content and to intensification of fermentation process. That could explain the sharp rise of acidity and the highest acidity value in case of dough prepared according R III: 8.75 ^{0}T comparatively with 8.5 ^{0}T in case of R I and 8.33^{0}T in case of R II.

2. Specific volume is a technological indicator used to establish the optimal time range for dough proofing. In Figure 2 is presented the variations of specific volumes of free-gluten dough versus proofing time. Analysis of Figure 2 indicates an increase of specific volumes for each type of dough but with different rates. The higher value of specific volume is recorded in case of dough prepared according R II, explained by the presence of buckwheat flour which contributes with a large proportion of carbohydrates and growing factors available for yeasts during fermentation and CO_2 producing. In case of dough prepared according to R I, the increasing rate of specific volume is not that sharp as recorded in case of RII and R III, due to absence of buckwheat flour which is expressed in a low content of sugars available for yeast fermentation. In case of dough prepared according R III, even it contains large amounts of sugars (coming from rice, soy, buckwheat flours and xanthan gum) the rise of specific volume is slower than in case of R II.

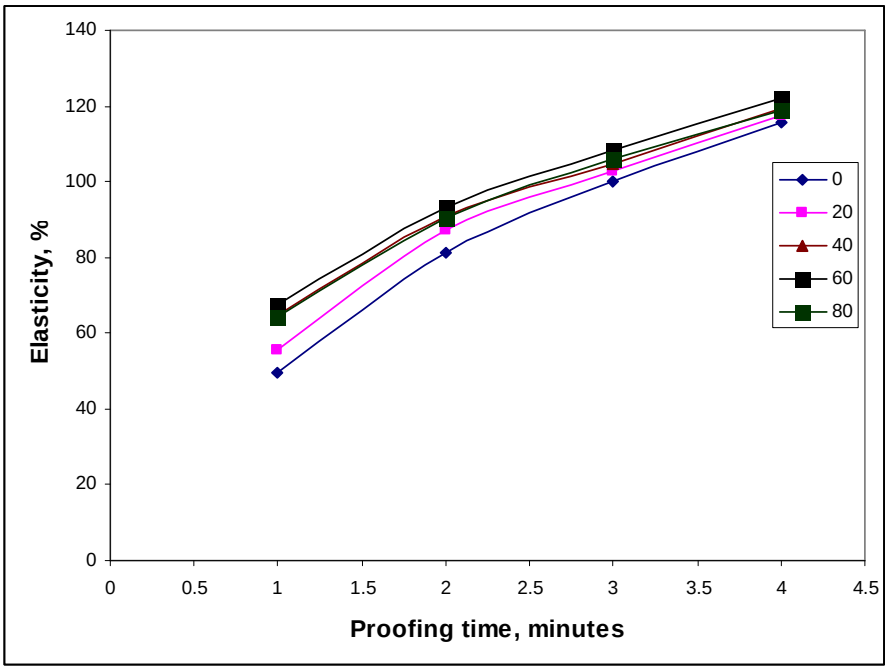

Figure 3. Variation of elasticity for the dough prepared according to R I

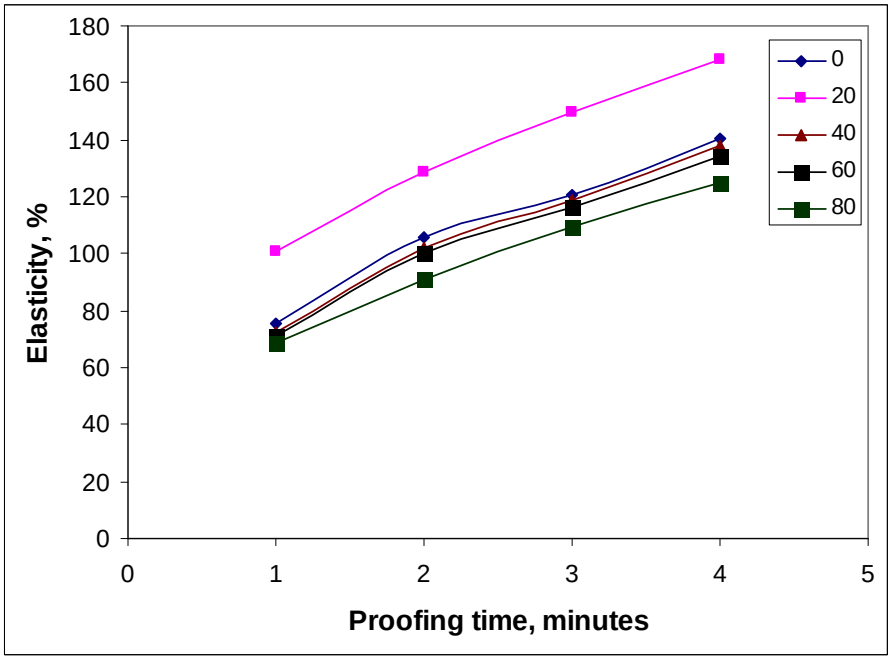

Figure 4. Variation of elasticity for the dough prepared according to R II

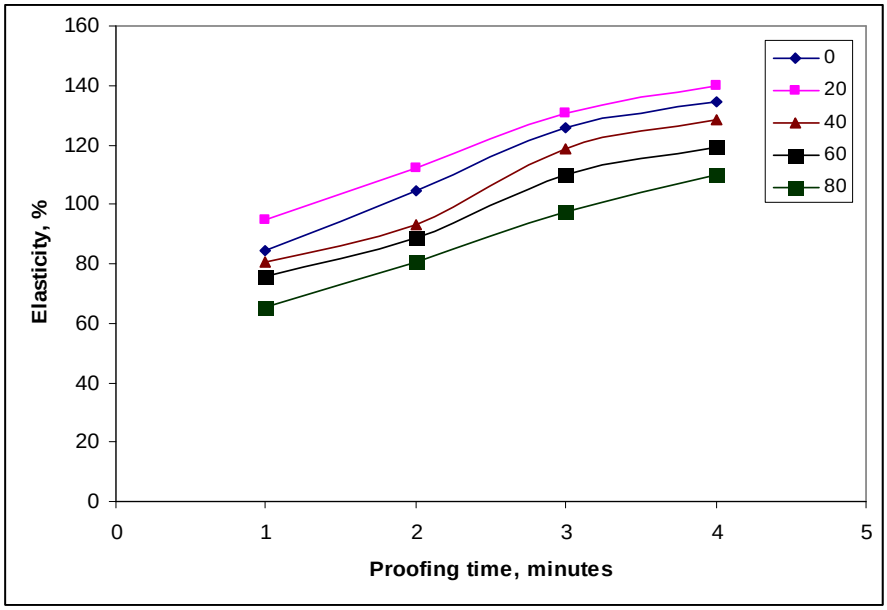

Figure 5. Variation of elasticity for the dough prepared according to R III

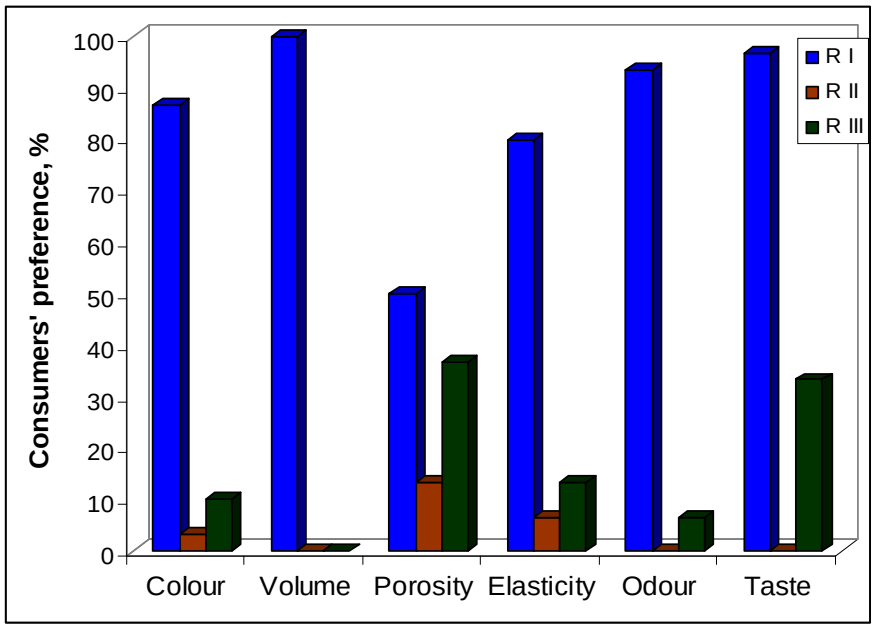

Figure 6. The results of market study

Due thickening properties of xanthan gum, the glucidic network is getting strenght and the spatial extension under the pressure of CO_2 is defavorized. The pressure exerted by the CO_2 resulted from fermentation processes decreases the mechanical resistence of the glucidic networks presented in the free-gluten doughs. Macroscopic, that is expressed in lowering of specific volumes proportionally with the intensity of fermentation processes.

The deepest decrease can be noticed in case of dough prepared according to R II. In case of R I whit smallest content of sugars, the increasing of specific volume is slower. According to Figure 2, the optimal time range for dough proofing is 20 minutes for doughs prepared according R II and R III and 60 minutes for the dough prepared according to R I.

3.Elasticity variations during the proofing process are presented in Figures 3-5.

As the Figure 3 indicates, developing proofing process in time range 0-60 minutes conducts to a low but constantly increase of dough's elasticity, the maximum value being reached after 60 minutes. In case of prolongation of proofing time a lowering of elasticity can be noticed.

Thus, after 60 minutes of the process developing, under an applied force of 2 N, the elasticity raises by 1.1 times (from 81.4% to 93.2%), and after another 20 minutes that decreases by 1.03 times (from 93.02% to 90.2%). Low content of growing factors (comparing with the others two recipes) can explain a slow fermentation expressed in low porosity and finally in a low elasticity. The evolution of dough's elasticity during the proofing time range (Figure 3) is in concordance with the evolution of specific volume (Figure 2), which presents a slow but constantly increasing during the 0- 60 minutes time range and a slow decrease after prolongation.

In case of dough prepared according to R II, a significant increase of the elasticity after 20 minutes of proofing can be noticed, followed by a sharp decrease once the proofing time range is prolonged. As example, under an applied force of 2 N, the dough's elasticity increases by 1.2 times in the firsts 20 minutes of proof (from 105.28% to 128.7%) and decrease by 1.2 times after another 20 minutes (from 128.7% to 102.1%). Also, we can notice that, after 20 minutes of proofing, the values of elasticity are lower even than the initial elasticity's value of the dough.

A possible explanation can be related by the high content of sugars and growing factors from the dough's composition, which intensifies the fermentation and producing of large volume of CO_2 in a short time. Under its pressure, the glucidic network is deteriorated, the gas is loosing and decreasing of elasticity is produced. A very good correlation between variation of elasticity (Figure 4) and specific volume (Figure 2) can be observed. Also, the specific volume increases rapidly in the first 20 minutes of proofing and decrease under the initial value during prolongation of proofing time range.

In case of dough prepared according to R III, we also notice a similar behaviour related to elasticity during the proofing time range, as in case of R II we had. In this case, the elasticity increase rate is slower and more uniform. After 20 minutes of proofing, under an applied forces of 2 N, the elasticity increses by 1.07 times (from 104% to 112.3%) comparing with 1.2 times in case of R II. Prolongation of proofing time decreases the elasticity by 1.2 times (from 112.3% to 92.8%) similarly with 1.2 times in case of R II. The similar evolution of dough's elasticity can be observed as in case of specific volume (Figure 2).

As specific issue, a significant difference between the elasticity's curves comparatively with those of R I and R II. It could be explained by the existence of xanthan gum in the composition of dough. Strenghtening of glucidic network due the thickening properties of xanthan gum allow a more accuracy response of dough under the pressure force.

4. The market study

The results of the market study were statistically processed and are presented in Figure 6.

All the consumers' preferences, in terms of colour, volume, porosity, elasticity, odour and taste, are oriented to the bread prepared according of R I. The difference between the first choice (R I) and the second one (R II) is significantly.

4.Conclusions

Based on experimental data we can conclude the follows:

●In case of gluten-free dough prepared according the R I, the optimal proofing time is 60 minutes, which allows obtaining of specific volume of 13.6 cm^3/g. In case of dough prepared according of R II and R III, the maximum specific volume is 13.9 cm^3/g respectively 12.2 cm^3/g in about 20 minutes proofing time range.

●Proofing time range increases the elasticity, during 0-60 minutes in case of R I and during 0-20 minutes in case of R II and R III. Prolongation of proofing time over the mentioned time range decreases the elasticity.

●The xanthan gum acts as a thickening agent. It consolidates the glucidic network and thus reduces the specific volume and elasticity of dough.

●Considering only the technological aspects mentioned above, the best results are coming from the dough prepared according to R II (highest specific volume and elasticity).

●Despite of the technological study which recommends the bread prepared according of R II, the consumers choose the bread prepared according to R I.

Therefore, the selection of a food product that will be produced, should considers both technological aspects and consumers' preferences.

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RESEARCH REGARDING HYDROLYSIS AND OXIDATION PROCESSES IN COW AND BUFFALO BUTTER DURING REFRIGERATION

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Abstract

Physico-chemical characteristics and freshness indicators of cow and buffalo butter during refrigeration (2 ... 4^{o}C) storage were studied. Changes in freshness parameters and alterative processes installation, when butter becomes improperly for consumption were studied, inducing acidity, peroxide value (PV), iodine value (IV) and the presence of epyhidrinic aldehyde. There was an increase of titrable acidity during storage, cow butter hydrolysis was installed after 15 days and for buffalo butter after 10 days. Hydrolysis processes are installed more quickly in terms of refrigeration than oxidative processes, being intensified by a higher water content in product and by hydrolitic enzymes presence.

Keywords*: cow butter, buffalo butter, hydrolysis, refrigeration*

1.INTRODUCTION

Milk fat is one of the most complex fats found in nature [1]. This complexity stems from the extreme diversity of its fatty acids (FA) (e.g., chain length, degree of unsaturation and branching) and more than 400 of these have identified recently [2]. Milk fat also contains thousands of triacylglycerol (TAG) species. Some authors [3] quantified more than 200 individual molecular species of even-numbered TAG alone.

Its nutritive value is high and is based on fat content. Digestibility of butter is 97% for fat and 94% for dry plasma, represents an important source of vitamin E.

Hydrolysis and oxidation occurring in animal fats during their storage have resulted in the depreciation of their quality and their exclusion from the diet.

Hydrolysis is the type of alteration which is finalized with the release of the two primary components: fatty acids and glycerine. The first factor which requires hydrolysis is the water content of fat, the other factor being hydrolitic specific enzymes [4,5].

Lipid oxidation includes fatty acid oxidation and generates compounds that affect food quality and even nutrition and food safety. Oxidative rancidity or autooxidation cannot be stopped by lowering the temperature of storage since it is a chemical reaction with low activation energy.

In the peroxidation of unsaturated fatty acids, lipid hydroperoxides form during the propagation phase. These compounds are unstable and decompose rapidly, giving rise to a range of new free radicals and other non-radical compounds, including alkoxyl and alkyls radicals, aldehydes, ketones, as well as variety of carboxyl compounds that form a complex mixture of secondary lipid oxidation products [6-10].

Research motivation is the determination of physicochemical indicators of fresh cow and buffalo butter, and the moment when occur changes in the organoleptic and physicochemical parametres of butter stored under refrigeration, following hydrolysis and oxidation, making it unsuitable for human consumption.

2. Materials and methods

a) Samples

Cow butter with a content of 65% fat and 25% water and buffalo butter with a content of 80% fat and 16% water were collected immediately after obtaining and stored under refrigeration (2 ... 4^{o}C), following the installation of alterative processes (hydrolysis and oxidation).

b) Titrable acidity

Determination of acidity is the basic criterion for assessing the installation and intensity of hydrolysis. The method consists in neutralizing acidity with sodium hydroxide 0.1 N, using phenophtaleine, as an indicator. Acidity was expressed in oleic acid grams to 100 grams sample (SR EN 14082, 1998, 2003).

c) Iodine value

Iodine value was determined using Hanus method (SR EN 14082, 2003). Approximately, 0.5 g sample (dissolved in 15 ml CCl_4) was mixed with 25 ml Hanus solution (IBr) to halogenate the double bonds. After storing the mixture in dark for 30 min., excess IBr was reduced to free I_2 in the presence of 20 ml of KI (100 g/l) and 100 ml distilled water. Free I_2 was measured by titration with 24.9 g/l $Na_2S_2O_3 \cdot 5H_2O$ using starch (1.0 g/100 ml) as an indicator. IV was calculated as g I_2/100 g sample.

d) Spectrophotometric determination of peroxide value (PV)

Peroxide value was determined using UV - VIS T60U spectrophotometer (England): operating temperature 5 – 45^{o}C; field wavelength 190 - 1100 nm; wave length accuracy 0.1 nm (ISO 3976, 2006). This protocol was based on the spectrophotometric determination of ferric ions (Fe^{3+}) derived from the oxidation of ferrous ions (Fe^{2+}) by hydroperoxides, in the presence of ammonium thiocyanate (NH_4SCN). Thiocyanate ions (SCN^-) react with Fe^{3+} ions to give a red-violet chromogen that can be determined spectrophotometrically, the absorbance of each solution was read at 500 nm.To quantify PV, a calibration curve (absorbance at 500 nm vs. Fe^{3+} expressed in μg) was constructed and peroxide value was expressed as meq O_2/kg sample.

e) Kreis reaction

By Kreis reaction we identify aldehydes results in advanced stages of fat oxidation. Epyhidrinic aldehyde, formed during advanced oxidation of fats, released in an acid environment, reacts with phluoroglucine, giving a colored compound. Color intensity is proportional to the quantity of epyhidrinic aldehyde, and so with the oxidation process (SR EN 14082, 1998, 2003).

3. Results and discussion

To watch the acid hydrolysis were determined the following values of titrable acidity of cow butter stored under refrigeration (2 ... 4^{o}C), determinations were made at 5 days intervals: for fresh butter acidity was 0.9% (g oleic acid); for butter to 5 days refrigeration 1%; for butter to 10 days refrigeration 1.2%; for butter to 15 days refrigeration 1.6%, and for butter to 20 days refrigeration 2.1%.

Results showed that for cow butter with 25% water content, hydrolysis was triggered early and developed rapidly, after 5 days of refirgeration was registered a moderate increase of acidity, and this enhanced during storage. It was found that advanced hydrolysis process appeared after 15 days under refrigeration, acidity exceeded 2% (g oleic acid), the maximum permitted value, because were released saturated fatty acids which are volatile, there were changes in color (yellow), taste (sour, rancidity), odor (butyric), and butter become improper for consumption.

For buffalo butter were determined the following values of titrable acidity, determinations were made at 5 days

intervals: for fresh buffalo butter acidity was 1.1% (g oleic acid); for butter to 5 days refrigeration 1.4%; for butter to 10 days refrigeration 1.8% and for butter to 15 days refrigeration 2.2%. Results showed that for buffalo butter, hydrolysis developed rapidly. It was noticed that advanced hydrolysis process appeared after 10 days under refrigeration, acidity exceeded 2% (g oleic acid), the maximum permitted value, because were released saturated fatty acids which are volatile, there were changes in color, taste, odor and butter become improper for consumption.

In assessing the degree of freshness and intensity of oxidation process for chilled butter were determined iodine index, peroxide index as an indicator of incipient oxidation [11] and the presence of epyhidrinic aldehyde as an indicator for advanced oxidation [12], determinations were performed at 5 days intervals.

Were determined the following values of iodine index for cow butter: for fresh cow butter 35 g I_2/100 g sample, butter to 5 days refrigeration 33.8; butter to 10 days refrigeration 32.1; butter to 15 days refrigeration 30 and butter to 20 days refrigeration 27.6 (Figure 1). For buffalo butter were determined the following values of iodine index: for fresh buffalo butter 36 g I_2/100 g sample, butter to 5 days refrigeration 34.9; butter to 10 days refrigeration 33.6 and butter to 15 days refrigeration 31.7 (Figure 2).

In the first days iodine index values felt slightly, in the last days the decrease was more pronounced, in line with the propagation phase of lipid oxidation that formed the largest quantity of hydroperoxides.

During the refrigeration storage there was a fall of iodine index values, because with the beginning of oxidation processes decreased the degree of unsaturation due to unsaturated fatty acids oxidation [13].

For fresh cow butter the peroxide value was determined to be 0.6 meq O_2/kg and for buffalo butter 0.8 meq O_2/kg and then followed an upward slope. In the first 5 days of storage under refrigeration there was a slow increase of the peroxide index, which corresponded to the initiation phase of oxidation [11], followed by a sharp increase corresponding to propagation phase in which were formed the largest amount of hydroperoxides as primary compounds of oxidation (Figure3, Figure 4).

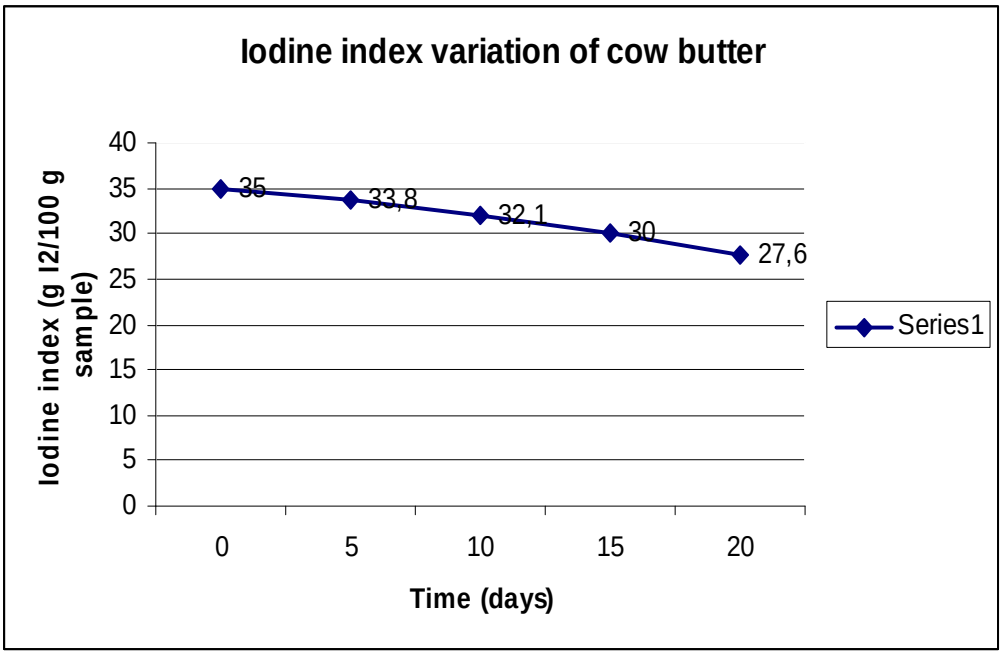

Figure 1 Iodine index variation of cow butter

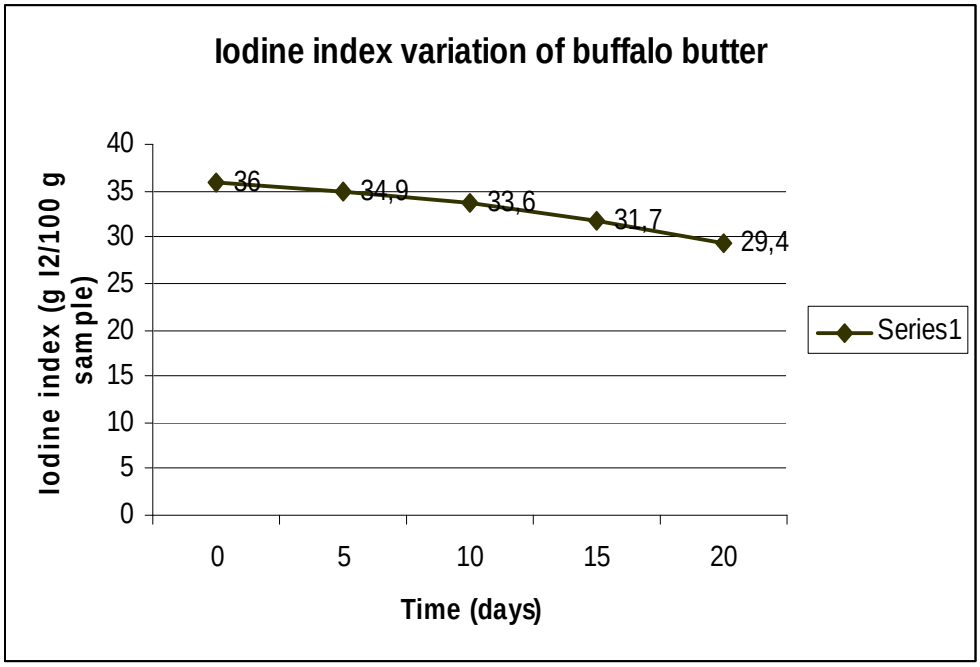

Figure 2. Iodine index variation of buffalo butter

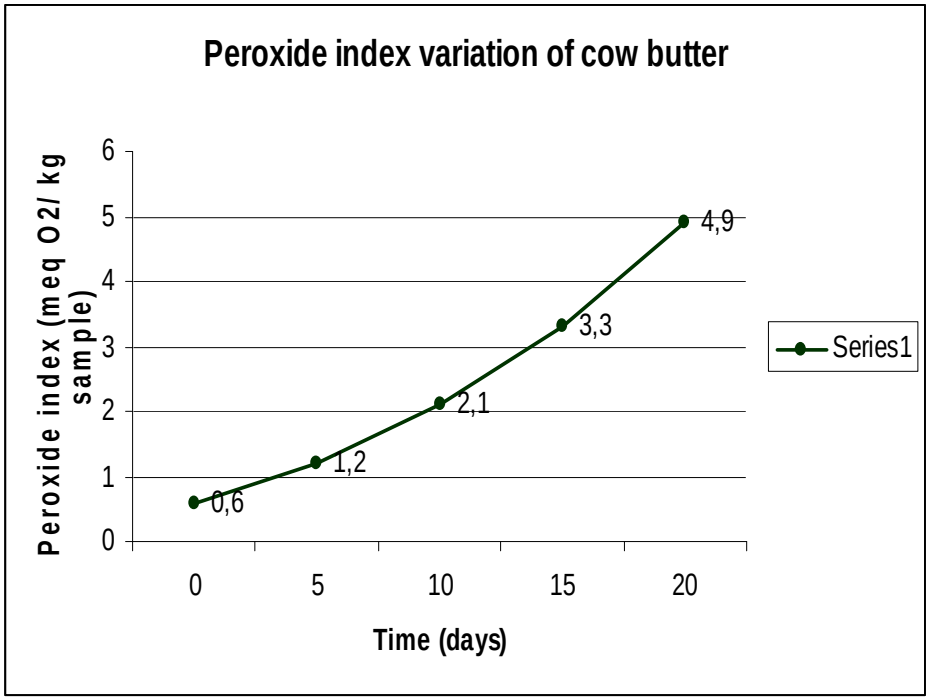

Figure 3. Peroxide index variation of cow butter

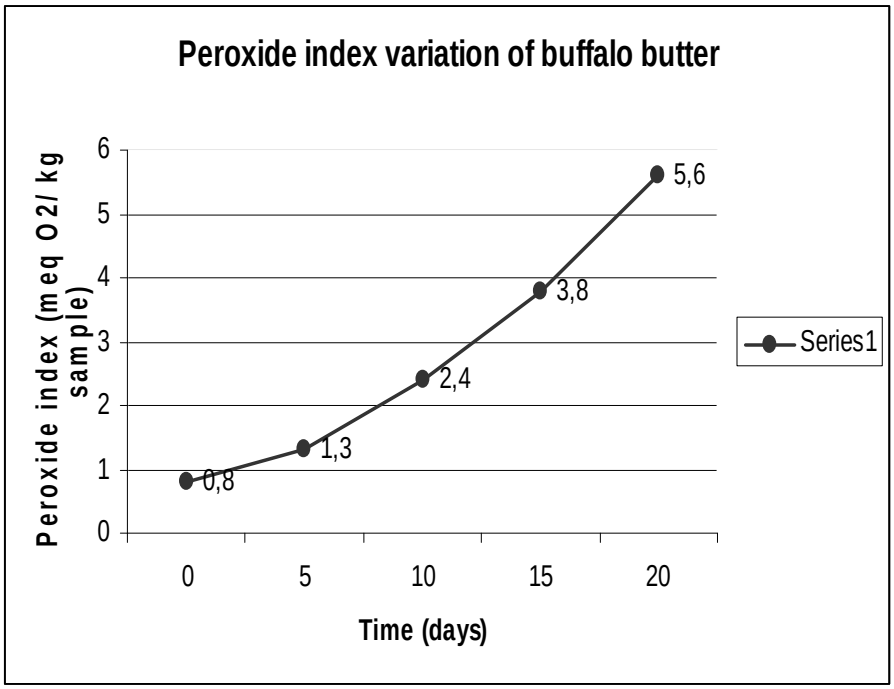

Figure 4. Peroxide index variation of buffalo butter

4. Conclusions

The timing of changes occurring in hydrolysis and oxidation processes of cow and buffalo butter has particular importance in assessing the quality and its validity. In frozen butter altering processes take place more slowly than in that stored under refrigeration. Results showed that butter is likely to acid hydrolysis due to the high water content (25%, 16%), which favors glycerides hydrolysis translated by increasing of titrable acidity until it exceeds 2%, and it is resistant to oxidation due to low composition in unsaturated fatty acids.

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RESEARCH REGARDING CAMEMBERT CHEES CHARACTERISTICS

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Abstract

Camembert is a soft, creamy French cheese. Camembert cheese gets its characteristic flavor from many naturally occurring chemical substances, including ammonia, succinic acid and salt.

This research involved the determination of some physical - chemical characteristics of the Camembert cheese. We made the following determinations: the determination of the dry substance and of the humidity, the determination of the chlorides and the determination of the ash.

Keywords: *Camembert cheese, dry substance, humidity, chlorides, ash*

1.Introduction

Camembert is one of the most famous cheeses in France, although the cheese dates back only to the 18th century. Camembert is named after a Norman village where there is a statue of its creator (Marie Harel). In 1855, the cheese was presented to Napoleon, introduced as from the village of Camembert. He enjoyed it very much and from that moment Camembert became known everywhere by this name.

Camembert is made from unpasteurised or pasteurised cow's milk and is ripened by the moulds *Penicillium candida* and *Penicillium camemberti* for at least three weeks. At the beginning of its ripening, Camembert is crumbly and soft and gets creamier over time (usually 2-3 weeks). An affinage of 21 days is legally required. It is produced in small rounds, about 350 grams (around 12 oz) in weight, which are then typically wrapped in paper and packaged in thin wooden boxes.Camembert has a delicate salty taste. A good cheese is matured to the heart of the cheese. Its paste should have a clear yellow appearance [1-3].

2. Materials and methods

a) The analysis of the dry substance and of the humidity of the cheese (Figure 1).

The dry substance content in milk was determined through the evaporation of the water existing in the milk sample, using the drying oven with a 102 °C temperature, until the sample had a constant mass.

$$S.U.\% = \frac{m_2 - m_0}{m_1 - m_0}100 \quad (1)$$

where:

m_0 – the capsule's weight, in grams, g;

m_1 – the capsule's and product's weight before drying, in g;

m_2 – the capsule's and product's weight after drying, in g .

b)The determination of the chlorides by the Volhard method (Figure 2)

The chlorides existing in an acidulated solution with nitric acid (HNO_3), precipitates when is in contact with silver nitrate ($AgNO_3$). The silver nitrate reacts with Cl^- ions and the remaning part is neutralized with potassium or ammonium sulphuric cyanide, in the presence of ferric alum as an indicatory.

The appearance of red coloured precipitate marks the end of the titration.

$$NaCl\ g\ ‰ = (10 - V)\cdot 0{,}00585\cdot 100 \quad (2)$$

where:

10 – volume of solution from the titration balloon, ml;

V – volume of potassium or ammonium sulphuric cyanide, utilized for the titration, ml;

0,00585 – equivalent in NaCl g of 1 ml $AgNO_3$ N/10.

c) The determination of the ash (Figure 3)

After the water was evaporated through the warming process in the drying oven at 102°C, the dry residue was carbonized and after that incinerated at 550°C.

The ash content was determinate in this way:

$$\text{Total ash} = \frac{m_1}{m}\cdot 100 \quad (3)$$

where:

m1 – the weight of the ash, g

m – sample weight, g

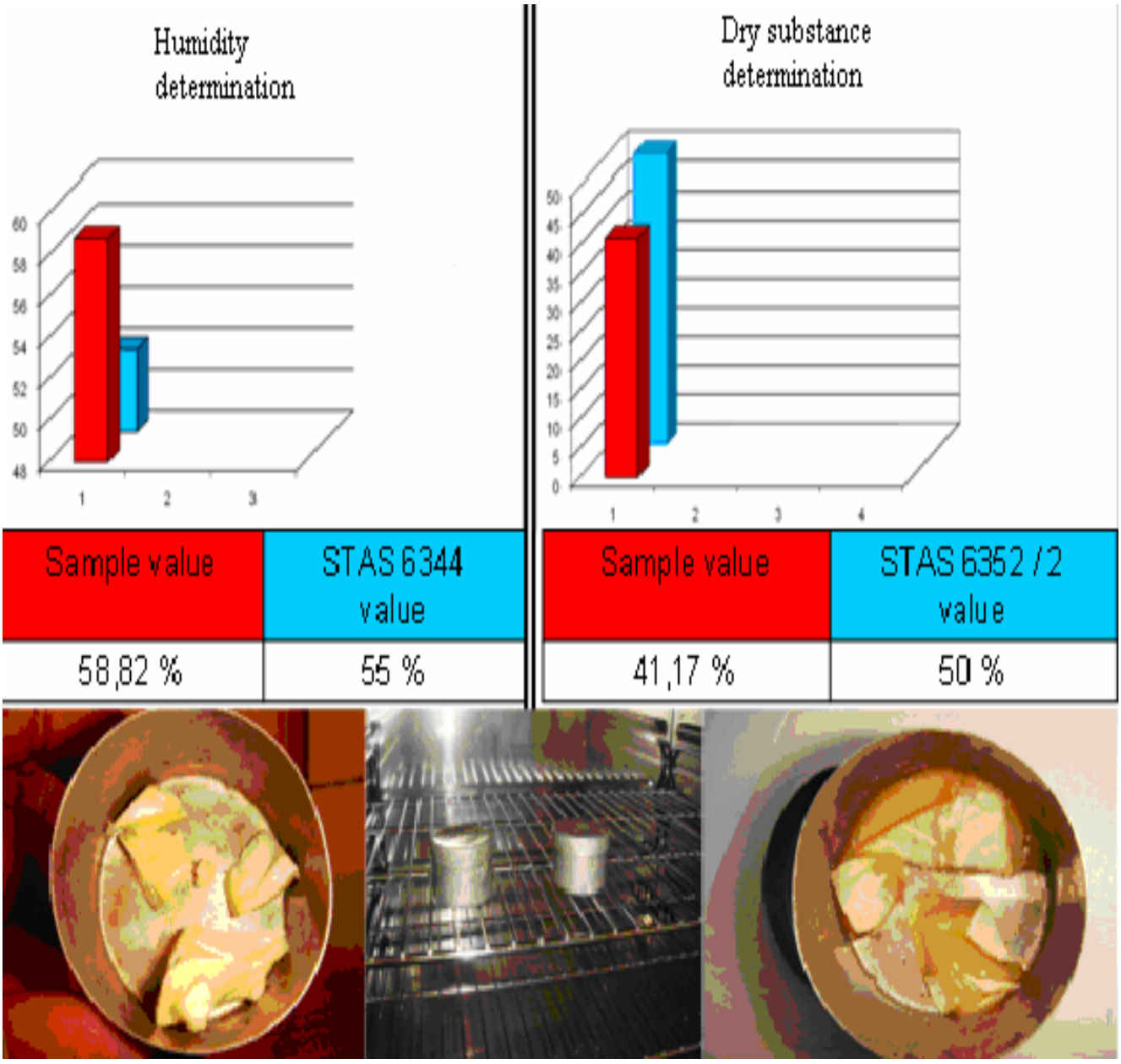


Figure 1. The contents of humidity and dry substances in Camembert Chees

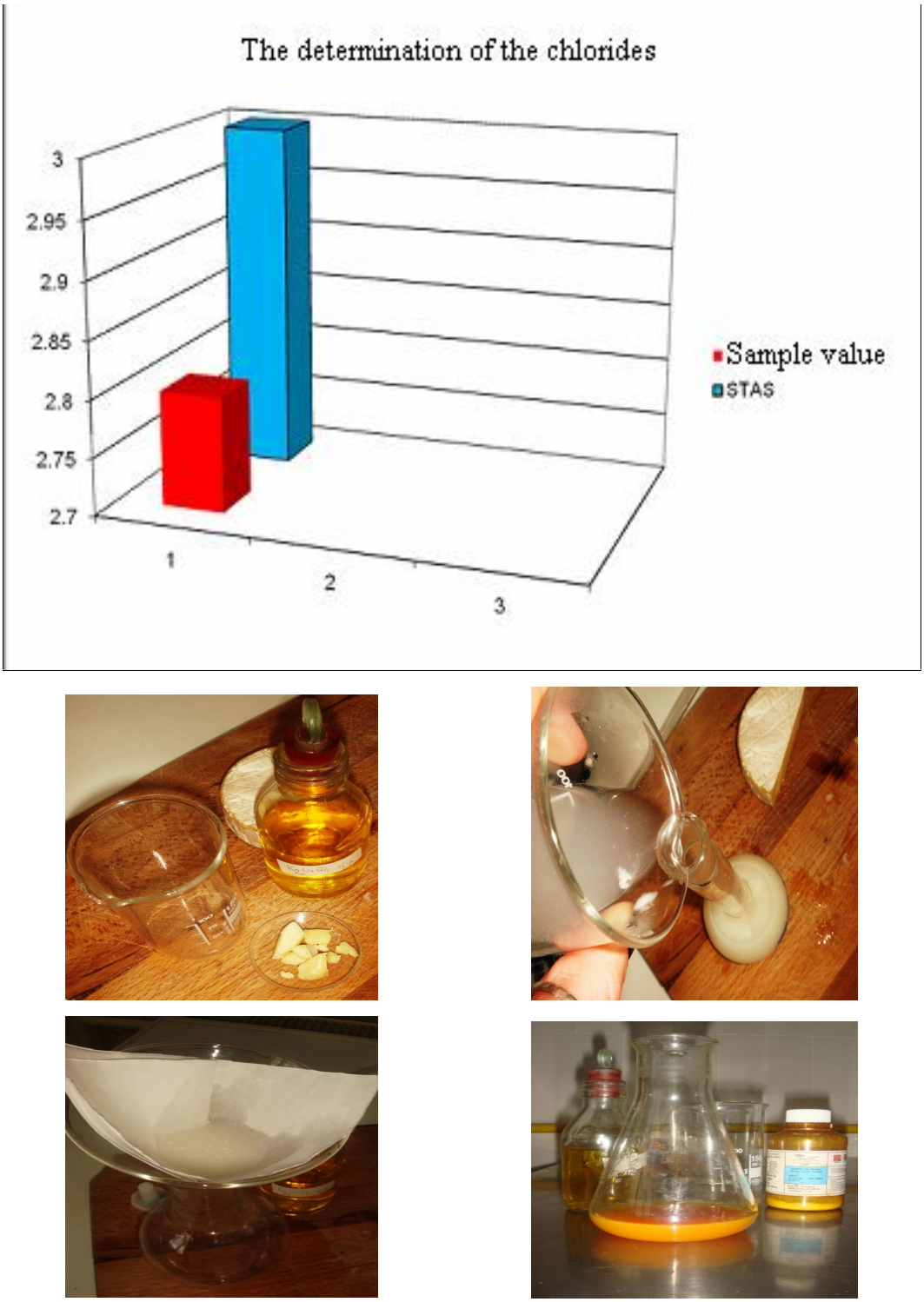
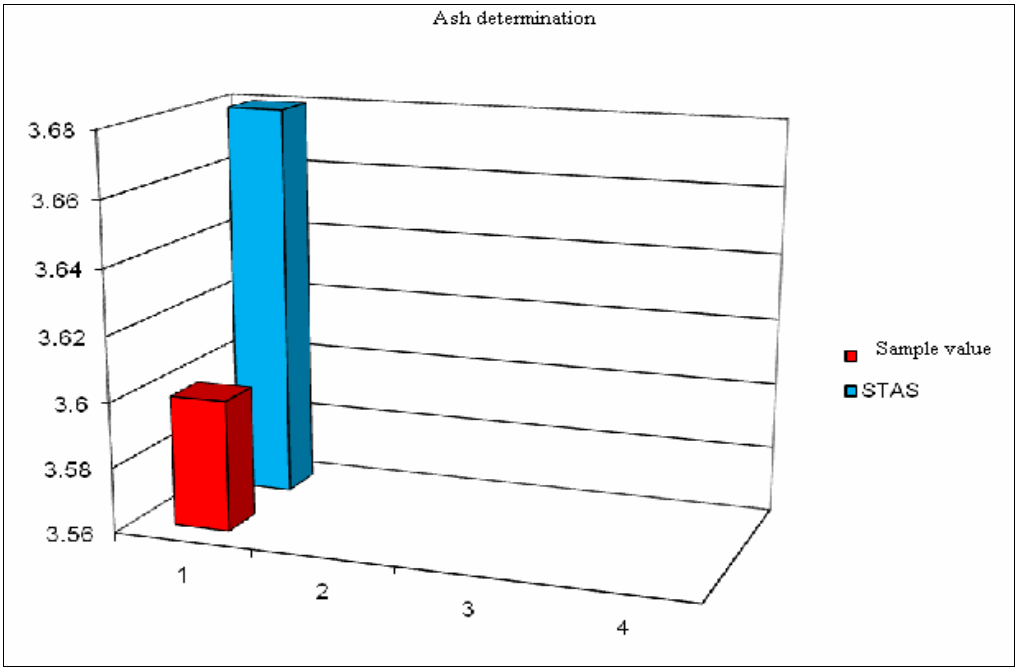


Figure 2. The concentration of chloride in Camembert Cheese



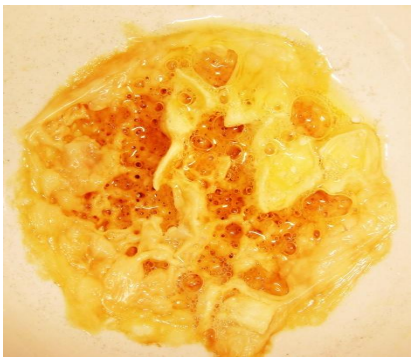


Figure 3. Analysis of ash content

3.Conclusions

The dry substance of the milk is constituit of fat, proteic substance, lactose and mineral salts. The determination of the dry substance and of the humidity showed that the content of the dry substance was 41,17 %, a value lower than 50 % which is the maximum value admited by the standards and the content of the humidity was 58,82 %, a value higher than that of the minimum of the standard.

The quantity of chlorides from the milk changes depending on the functional integrity of the mammary gland. For a normal milk, which is provided by healthy animals, the chloride values are between 0, 7 – 1, 8 ‰, having an average value of 1, 2 ‰. In any case of mammary gland swell modification, the lactose as a product of synthesis diminishes and this leads to a changing of the osmotic equilibrium at the mammary gland level and for it's maintaining the chloride intervenes through a higher quantity. After the chlorides determination we obtained a normal value compared to the standard value, which is 2, 8 ‰.

This value is higher than 1,8 g ‰ because in the production of the Camembert cheese we added a quantity of salt, in conformity with the technological value.

The value that we obtained for the ash quantity was 3,60 % and this value was very close to the value of the standard, 3,68 %.

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CONSUMER'S HEALTH PROTECTION THROUGH INSTITUTING NEW REGULATIONS ON IODISED SALT. GROUNDS FOR INCREASED PROTECTION IN CERTAIN PARTS OF THE MARAMURES REGION

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Abstract

The article presents the effects of the iodine deficiency on the alimentation, focusing on the problems of endemic goitre and hypothyroidism of different degrees, as a the result of this deficiency. The article also presents the prophylaxis of these nosological entities by the obligatory character of the iodisation of the salt for human consumption, a prophylactic method that in Romania is regulated by the law. As regards the Maramures county, the particularities of this region are presented as well as the social impact of the iodine deficiency hypothyroidism, an aspect that is demonstrated by the relatively increased incidence of the new cases of invalidity pensioners caused by this disorder as well as the large proportion of invalidity pensioners in the general prevalence.

Key words: *iodine deficiency, prophylaxis, salt regulations, iodised salt, endemic goitre, cretinism, hypothyroidism, invalidity, consumer protection*

1.The regulatory framework in this field

The Order No. 586 from 05/06/2002 on the universal salt iodisation used in households, food of animals and in the food industry, published in the Official Journal 407/12/06.2002, republished in the Official Journal 150/10.03.2009 regulates the conditions regarding the universal salt iodisation used in households, food of animals and in the food industry, in order to prevent the disorders caused by the iodine deficiency.

The universal salt iodisation represents the process of introducing iodine in salt for all kinds of consumers: human, animal, food industry. The salt for alimentary use is a crystalline product composed primarily of sodium chloride which is obtained through

extraction from the natural underground deposits from sea water, according to Codex Standard, and the iodised salt is the salt mixed with potassium iodate or potassium iodide, for human consumption, animal consumption and use in the food industry.

The disorders caused by iodine deficiency are the pathological states that arise as a result of the thyroid dysfunction that is caused by an insufficient intake of iodine to the human body; the prevention of disorders caused by iodine deficiency can be achieved through a series of measures that aim at covering the human body's need of iodine, the consumption of iodised salt being the most accessible means of achieving this aim.

The principle instituted by Article 3 of the order is that in Romania, only iodised salt shall be used for human consumption. For the food of the animals and in the food industry the use of iodised salt is optional, except for the making of bread and bakery products.

In correlation with this principle, on the territory of Romania, the sale of non-iodised salt in retail for personal use as well as for public and collective use in alimentation is prohibited. Notwithstanding this general interdiction, non-iodised salt can only be sold by the Plafar chain of stores, natural products stores and pharmacies, in the section of products for the purchase of which a prescription is not required and it must be sold in packets that do not exceed 0,5 kilograms.

The order also regulates:

a). The quality and security conditions of the salt that shall be iodised must be in accordance with SR 13 360/1996. The content of NaCl in the salt to be iodised shall not be below 97%. A kilogram of iodised salt must contain 30 mg/kg of iodine, respectively 50,6 mg/kg of potassium iodate or 39,2mg/kg potassium iodide. It is admitted a minimum limit of 25 mg/kg of iodine , respectively 42 mg of potassium iodate or 32,5 mg of potassium iodide, as for the maximum limit, 40 mg/kg of iodine , respectively 67,2 mg/kg potassium iodate or 52 mg/kg of potassium iodide;

b). The method used for iodising salt – the quality and security, the iodine concentration, the control methods applied in the iodisation process and the preservation of the iodine concentration until the salt is consumed that are established in this order must meet all the conditions provided by the regulations in force. The production processes – purification, recrystallization, iodisation, the packaging

and labelling processes as well as the transport, depositing and selling activities must take place under strict observance of the hygiene legislation in force on food safety, avoiding any risk of contamination.

The violation of the mentioned interdictions and regulation represents an offence and is sanctioned with civil penalty. Together with the applying the civil penalty, the fact-finder can order the following complementary sanctions: confiscation of the non-iodised salt that was traded or used in making bread and bakery products, as well as for public alimentary purposes, including the suspension of the economic agent.

2. Iodide deficiency disorders – a public health problem – general aspects

The importance of iodine for our health results from the major role that this microelement has in the composition of the thyroid hormones. In this context, the iodine becomes an element whose concentrations are monitorised in the water and food, which represent natural sources of iodine for the body, blood and other biological fluids, determinations made through bio-chemical tests for the evaluation of the state of health as well as for monitoring the iodine nutrition status.

The seriousness of the disorders caused by the insufficient intake of iodine, their increased incidence as well as the fact that an adequate intake of iodine can prevent up to a certain extent the appearance of these diseases, imposed at an international level the unification of efforts of numerous institutions (OMS, ICCIDD, UNICEF) which, with the participation of the national authorities, implement public health programmes to limit the effects of this deficiency on the health status.

The iodine deficiency is a major public health problem for the population of the world, especially for the pregnant women and for the children, this being one of the major causes of mental disorder that appears in childhood, but which can successfully be prevented even from prenatal period.

The main responsible factor for the iodine deficiency is represented by the reduced alimentary intake of this microelement and it is very common within the populations that live in geographical areas where the soil contains a small amount of iodine, as a result of the past glaciations or of the high level of rainfall that washed away the iodine in the soil, and it is also common in volcanic regions, being associated with the existence of the non-ferrous metals rock deposits.

The identification of the geographical distribution of the iodine deficiency disorders prevalence at global level represents an important stage in the prophylaxis programme.

In Romania, the iodine deficiency was identified on both sides of The Carpathian Mountains, in Maramures and in the Transylanian Plateau as well as in the north of Moldavia. Although the city of Bucharest is not located in a geographical area with a iodine deficiency in the soil, and the food consumed by its inhabitants comes from all over the country and also from other countries, a iodine deficiency is registered at the sensitive population, that is the pregnant women and the children.

3.Epidemiological data on the iodine deficiency disorders – the global situation

There are known as areas with iodine deficiency the mountainous regions in Europe, the Middle East, the north of the Indian subcontinent, wide mountainous regions in China, the region of The Andes mountains in South America and small areas in Africa. The great arc of the Himalayas that begins in the west of Pakistan and crosses India, Nepal, Bhutan, Bangladesh, Thailand, Birmany, Vietnam and Indonesia represents one of the largest endemic regions of the world.

The low gradient of iodine in the soil determines a iodine deficiency in all forms of life (animals, plants) that live in the respective habitat, including the human population that feeds on agricultural products obtained in these areas.

The present global situation on the health status affected by the iodine deficiency that results in a considerable social impact can be schematically presented as follows:

● the disorders of iodine deficiency affect over 740 million persons, respectively 13% of the world population while other 30% are exposed to this risk.

●in 130 countries these disorders constitute an extremely serious public health problem, the iodine deficiency affecting especially the pre-school children, pregnant women as well as those who have a low income.

●the iodine deficiency can cause a 15 points fall in IQ;

●almost 50 million people suffer from different degrees of damage of the central nervous system caused by iodine deficiency;

4. The situation in Romania

In one of the first studies on endemic goitre, Prof. PhD Stefan Milcu affirmed that this is

a public health problem because it has a great geographical expansion that affects a very large number of individuals, decreases the biological potential as well as the work and intellectual capacities, and the severe forms compromise the genome (68).

The first attempt of study of the geographical distribution of the clinical expression of teh iodine deficiency was published by Liviu Campeanu in 1924 (233). Daniel Danielopolu undertook numerous epidemiological, clinical and etiopatogenic investigations with complex teams in Bukovina, Apuseni mountains and the Sibiu region between 1931 and 1937 and the results were published in a monograph in 1937.

In 1947 endemic goitre was discovered at 5000 children in the Jiu Valley aged between 7 and 14. By extrapolation, appreciating the average frequency of 60% and the 90% frequency in the outbreak of infection, it was considered that 8-10% of Romania's population was affected at the beginning of the XXth century.

The frequency of the endemic goitre modified after the prophylaxis implementation that begun in 1949-1950. In two decades of iodised salt and potassium iodide tablets prophylaxis, the cases of oligosymptomatic goitre and endocrynopathy decreased and the cretinism and other neuropathies disappeared.

This situation determined the suspension of the prophylaxis which lead to new cases of goitre at children and young people.

The frequency of the thyropathic endemic dystrophy in Romania is similar to the one known world-wide, having a dominant distribution in the sub-mountainous areas, on all sides of the Carpathian Mountains. The general frequency was around 50-60% before the implementation of the iodised salt prophylaxis (1949-1950). After two decades of prophylaxis, in most of the areas the severe cases were eliminated.

To the endemic goitre in the sub-mountainous areas added a similar but insufficiently known endemic originated from the plain area.

The study that was carried out at national level between 2000 and 2001 on children aged 6-16, and adults, through which there were analysed 7,358 urine samples, showed that 64,25 of the population has a moderate iodine deficiency.

5. The endemic goitre and the diseases caused by the iodine deficiency (IDD)

The endemic goitre, respectively the thyroid hypertrophy with intrathyroid dystrophic changes is a manifestation of the iodine deficiency and it affects over 5% of the population that lives in the geographical areas with insufficient amount of iodine in the water and food.

The endemic goitre represents one of the most frequent endocrine diseases and it is a major public health problem. According to estimation from 1983, in the world there are approximately 329 million cases of endemic goitre and it is assumed that this evaluation represents a underestimation of the incidence of the endemic goitre.

The seriousness of the endemic goitre by iodine deficiency is in strict correlation with the presence of iodide in urine.

Only five European countries, in which the presence of iodine in the urine is over 130 micrograms/litre, eradicated the endemic goitre. Those countries are Finland, Norway, Sweden, Switzerland and Austria. In Romania, 30 counties are declared „endemic" because of the clinically manifest moderate iodine deficiency (moderate IDD): Alba, Argeş, Bacău, Bistrița-Năsăud, Buzău, Braşov, Botoşani, Cluj, Dâmbovița, Gorj, Harghita, Hunedoara, laşi, **Maramureş**, Mehedinți, Neamț, Prahova, Satu-Mare, Sălaj, Sibiu, Suceava, Vaslui, Vâlcea, Vrancea, Caraş-Severin, Covasna, Mureş, Dolj, Olt and Bucharest.

In fact, the goitre represents an adaptation of the thyroid gland whose follicles go through a process of morphological hypertrophy while trying to collect the small amounts of iodine in the water and food, in the areas affected by a decrease in the concentration of iodine. This effect can also be manifested in the context of other diseases of the thyroid gland, like Hashimoto's Thyroiditis, which is an autoimmune disease.

The endemic goitre id the extreme manifestation of the iodine deficiency which appears at an adult age and it is rare in Romania. However, a high frequency is registered by the hypothyroidism, encountered in different stages of evolution, in endemic areas with a much higher frequency than that of the areas which have not been declared endemic, despite the sale of iodised salt.

Hypothyroidism is a pathological state caused by the insufficient production of thyroid hormones by the thyroid gland fact that determines a deficit of thyroid

hormones (triodothyronine and tiroxine) and affects the entire human body.

Hypothyroidism is mostly predominant at adult age and it affects mainly women. The ratio between the affected men and women is of 1 to 6-7. Besides the hypothyroidism by iodine deficiency and Hashimoto's thyroiditis there is also a quite frequent iatrogenic hypothyroidism that appears as an effect of the theraphy with inhibitors on thyroid hormones or of the post ablation of the thyroid gland in the clinical context of hypothyroidism.

a) Clinical picture (Table 1)

The endemic goitre manifests through thyroid hyperthrophy, initially oligosymptomatic, subsequently, in the endocrynopate stage with hypothyroidism or hyperthyroidism, and in the descendent, neuropate stage appears the endemic cretinism (St. Milcu). The geographical iodine deficiency does not exclusively manifest through goitre but also through other various clinical aspects. The oligosymptomatic form of endemic goitre was classified by the OMS in four degrees. In the endemic areas, the diffuse goitre is predominant with children and the nodular goitre is predominant with the elderly adults. At children the nodular goitre appears especially in the areas with severe iodine deficiency. In the case of nodular endemic goitres, degenerative lesions can appear or functionally autonomous lesions (independent of TSH), the latter can become in time toxic nodular goitre.

b) Pathological anatomy (Table 2)

Thyroid hypertrophy caused by iodine deficiency is a dystrophy, morphologically characterized by coexistent various lesions, represented by hypo-functional follicles (with much colloid), hyper-functional follicles (high epithelium and little colloid), autonomous follicles (function independently of TSH), confluent follicles (colloidal lakes) or fibrosated, calcified. In time the fibrosis zones determine a polilobular nodular aspect of the thyroid gland.

c) The positive diagnosis

The positive diagnosis can be applied at individual level and at endemic level. The severity of endemic goitre can be estimated by determining three parameters: the prevalence of goitre; the presence of iodide in urine at school age children.

Table 1. The spectrum of iodine deficiency disorders (IDD)

Age-Stage	The type of disorder
The fetal period	Miscarriage, Increased perinatal mortality, Endemic cretinism – the neurological and the mixedematos forms
New-borns	Oligosymptomatic goitre, clinical manifest hypothyroidism and sub-clinical hypothyroidism
Childhood and adolescence	Oligosymptomatic goitre, Juvenile hypothyroidism, Influence on physical and intellectual development
Adults	Oligosymptomatic goitre, Juvenile hypothyroidism, goitre with compression phenomena, hypothyroidism, endemic mental retardation, decline in fertility

Table 2. The OMS classification of oligosymptomatic iodine deficiency goitre

Degree1	The enlarged thyroid is palpated but it is visible only for deglutition with the head in extension (small goitre).
Degree 2	The enlarged thyroid is observable in the normal position of the head, it does not go beyond the internal edge of the Sternocleidomastoidian muscle(average goitre).
Degree 3	The enlarged thyroid goes beyond the edge of the Sternocleidomastoidian muscle but it does not deform the lateral side of the neck and it remains in the cervical area (large goitre)
Degree 4	The enlarged thyroid goes beyond the cervical area laterally or inthoracic (voluminous goitre)

d) Differentiated diagnosis

Endemic goitre by iodine deficiency with euthyroidy or with hyperthyroidy must be differentiated from autoimmune goitre (Autoimmune thyroid, Graves-Basedow disease), tumoral mechanism (thyroid carcinomas and adenomas), viral mechanisms (subacute thyroiditis), genetic diseases (mutations of the TSH receptor genes)

e) Endemic goitre prophylaxis and endemic cretinism prophylaxis

Iodine supplementation in the areas with endemic goitre represents an efficient modern prophylactic method because:

● the iodine deficiency is the main etiological factor;

● eliminating the iodine deficiency determines the elimination of goitre;

● the iodine prophylaxis programmes are not expensive; consequently, the cost of iodising salt was estimated at 0,3-3 Eurocents /person/year.

The methods for correction of the iodine deficiency are: the iodised salt (the most used prophylactic method), the potassium iodide tablets, the iodised oil by injection, the iodised oil *per os*, iodisation of drinking water, of bread and of the food of domestic animals. Less than 0,5 of the global iodine production (app. 15.000 tons/year) is necessary for the prophylaxis of endemic goitre.

The minimum necessary dose of iodine that ensures an adequate synthesis of thyroid hormones is of 50 mg/day. Endemic goitre manifests a small, moderate or severe iodine deficiency, whereas endemic cretinism always indicates a severe iodine deficiency.

It is not always enough to eliminate the iodine deficiency alone; sometimes other etiological factors need correction too, namely:

●water can bear factors that cause goitre (b bacterial pollution, sulphuretted hydrocarbons);

● the milk can represent a vegetal bearer of factors that cause goitre (trioglicozides, goitrin) that come from the plants the animals eat.

The prophylaxis program eliminates iodine deficiency endemic goitre, but they do not eliminate other types of goitre. In the respective area there can also exist other cases of goitre (autoimmune, tumoral, viral, mutations of the TSH receptor genes, etc.). it must be made evident that Hashimoto thyroiditis is more frequent in the areas with

no iodine deficiency. Also, the presence of goitres of other causes, some of which have a high prevalence, must not be confused with iodine deficiency endemic goitre.

The iodine prophylaxis program is not an exclusively medical issue as there is also a series of socio-economic, administrative and geographical factors involved, on which depends the success of this program.

The national programs for monitoring the intake of iodine and the iodine level in the salt include:

- Setting-up an IDD committee responsible for the monitoring and evaluation programs.
- Carrying out a periodical quality control of the iodine concentration at the locations where iodised salt is produced, by using titration methods.
- Setting-up of independent laboratories capable of carrying out iodine titration and the analysis of iodine in urine.
- Setting-up control points for the periodical monitoring of iodised salt in stores and households.
- Organizing polls to discover and track goitre, to periodically measure the iodine in urine and to adjust the level of iodised salt and other iodine substances, based on the results of the monitoring and especially on the levels of iodine in urine.
- Altering the health services in the case of encountering more cases of hyperthyroidism.

In Romania, due to the mountainous relief, the endemic goitre is spread over more than two thirds of the country (30 counties are declared endemic).

Iodine prophylaxis at national level was initiated in our country in 1957 by the Endocrinology Institute (by St. M. Milcu). General prophylaxis (with iodised salt) was associated with individual prophylaxis (with potassium iodide tablets) and it was implemented to certain categories of population with high risk (pre-school children, school children, pregnant and nursing women).

The national endemic goitre prophylaxis program is taking place in the present too, under the coordination of the Health Ministry and of the C.I.Parhon Endocrinology Institute and is regulated by the legislation in force; the Health Ministry and the Institute for mother and child protection (IMCP) also carry out a program for national screening of the congenital cretinism.

The iodised salt represents the simplest and cheapest prophylactic method whose efficiency was proved in a great number of countries during the 7 decades it has been used.

The salt iodisation can be achieved with potassium iodide (KI) or with potassium iodate (KIO3). If the potassium iodide is a election compound, the potassium iodate has the advantage of being more stable, being proffered in areas with higher humidity as the humidity lowers the potassium iodide and consequently its effects.

In the countries that carried out universal salt iodisation it was observed the spectacular reduction of IDD. When iodised salt is exclusively used in alimentation, it is recommended a ratio of 20 mg of iodine for a kilogram of salt.

Iodised salt produced in the country as well as from import is distributed in the entire country. The salt law in Romania regulates the production and distribution of iodised salt (20 mg of iodine per 1 kg of salt). Other European states lack a similar regulation in the field of exclusive commercialization of iodised salt.

Salt iodisation is inefficient in some regions where there are multiple sources of salt or where there are difficulties in distributing iodised salt, caused by the isolation of the localities. This is why the population in these areas use mostly non-iodised salt.

d.1)Potassium iodide

The compounds available in Romania are the local tablets of 1 mg potassium iodide and iodide 100 or 200 microg. It is recommended a tablet of 1mg per week for children aged 6 to 14 and 2 tablets of 1 mg per week for children aged 14 to 18. Pregnant and nursing women are recommended 2 tablets of 1 mg per week or a tube of 200 microg. Iodide per day. A disadvantage of this method is the temporary interruptions during the vacations that amount to 3 months a year.

d.2.) The iodised oil (Lipiodole) tablets administered *per os*. It can be used in situations in which other methods for iodine supplementation cannot be used and has the advantage of a long period of action.

The dosage:

a). adults (age 16-45)and children over 5: 3 tablets in single dose for 1 year protection (570 mg of iodine) or 2 tablets in single dose for 6 months protection (380 mg of iodine),

or 1 tablet for 3 months protection (190 mg of iodine);

b). pregnant women and children aged 1-5: 2 tablets in single dose for 1 year protection(380 mg of iodine) or 1 tablet for 6 months protection (190 mg of iodine);

c). children under 1: 1 tablet for 1 year protection (190 mg of iodine);

Iodine Prophylaxis must be continuous; an interruption of few years in different regions of the world lead to the return of the goitre prevalence at the levels it had before the introduction of iodine prophylaxis.

The main complication of iodine prophylaxis is hyperthyroidism induced by iodine; it is a rare complication that appears especially in the first 3 years of iodine prophylaxis and affects most frequently elderly persons with nodular goitres. In the case of children who benefit the most from iodine prophylaxis, hyperthyroidism induced by iodine does not normally manifest.

6. The situation in Maramues County

Maramures, a county situated in the north-western part of the country, is an administrative - territorial unit with a surface of 6215 square kilometres that includes the southern part – the voievodal Maramures, as well as other regions of historical and ethnographical individuality: the Lapus, the Chioar, a part of the Codru region, the Somes valley and the mining region of Baia Mare (the “Fisculas”).

43% of the county surface has a mountainous relief, the hills and plateaus cover 30%, all these form of relief are part of the Eastern Carpathian Mountains and are mostly volcanic mountains.

This explains the relative abundance of non-ferrous metals that lead to the appearance of traditional processing activities, the main population agglomerations being situated around the mentioned rock deposits.

In the 1960s, the Department of Hygiene within IMF Cluj-Napoca carried out a study on the Ilba-Handal area where they discovered a high prevalence of endemic goitre cases among the adult population, as well as a relatively big number of cases of cretinism at children. This was the first time when the reduced quantity of iodine in the water of volcanic regions where there are no ferrous metals deposits was connected to the endemic goitre and cretinism.

Afterwards, this fact was also discovered in the other mining areas in the county: the Baia Mare - Baia Sprie area, Cavnic area and Baia Borsa area, but the proportion of

the iodine deficiency effect was smaller than in the first area, probably because the last three areas were urban and they had easier access to iodised salt. In those years, unrefined non-iodised salt was also commercialized, especially in the rural areas and it was proffered by the population who lived in these areas because it was cheaper.

It was also observed that the persons who moved to these areas from other parts of the country because of the labour migration in the 1960s towards the mining regions, after a period of 1-3 years manifested symptoms of iodine deficiency hypothyroidism.

As a result of the implementation of the mandatory endemic goitre prophylaxis by the compulsory iodisation of the salt for alimentary use, the prevalence of the adult endemic goitre cases and juvenile cretinism decreased considerably in the studied areas.

Nowadays, due to the regulated prophylactic measures even in Maramures the incidence of adult endemic goitre cases and iodine deficiency juvenile cretinism cases is rare.

However, in the four mentioned areas there can still be found a relatively high prevalence of hypothyroidism caused mostly by iodine deficiency. These cases of hypothyroidism have a less boisterous clinical expression depending on the visceralization of the disorder and on the complications caused by other systems of the human body, especially the cardiovascular system and the nervous system. In fact, the patients go to the doctor because of these complications, although they are caused by iodine deficiency hypothyroidism. It also results that women are affected more than men, the sex ratio being of 20 to 1. Cardiovascular disorders have two maim aspects: Chronic dismetabolic cardiomyopathy and the modification of the blood pressure values, that can manifest as high blood pressure as well as low blood pressure.

As psychical manifestations, the patients can have numerous symptoms that can evolve in time from simple slow ideation to apathy or serious behaviour disorders; from states of continuous sleepiness to insomnia; from transitory memory disorders to amnesia.

From a neurological point of view, it can be observed an increase of the reaction time to different stimuli, the patients having a state of apathy, being often aboulic, "showing abnormal inability to act or make decision".

The nutrition is also affected, the female patients look overweight, but it is a false obesity as the gain in weight is determined mostly by the fluid imbibition of the tissues.

a) The social impact of the disorders by iodine deficiency hypothyroidism at the adult persons in Maramures area.

Iodine deficiency hypothyroidism has a relatively high prevalence among the endocrynological disorders with invalidity potential, mostly because of the cardiovascular, metabolic and neuro-psychical complications it determines. Also, the reversibility of the phenomena is difficult with all the substitution treatment, because the female patient remains in the same environment, where after the end of the treatment is exposed to the same factors.

Between 2002 and 2008, the Maramures County Office of Medical Expertise and Rehabilitation of the Work Capacity registered a relatively big number of invalidity retired persons who had an endocrine or metabolism disorder as main cause for their invalidity.

This fact is obvious for the incidence of new cases as well as for general prevalence (Tables 3-8). The study was carried out between 2002 and 2008, after the enforcement of the Law 19 from 2000 that regulates pensions and other social service rights.

The discrepancies that can be observed between the sum of the incidence of new cases registered since a given time in the past and the general prevalence of the disorder during the same period of time compared to the general prevalence of the following year can be explained through the dynamics of these indicators that are influenced by a series of factors like:

- Ceasing to keep evidence of the persons who do not meet the age limitation conditions or who have passed away.
- Modification of the main cause of invalidity due to a more detailed investigation of the health status which lead to a more exact determination of the main invalidity diagnosis.
- Modification of the statistical reporting system of the activity of the Bucharest National Institute of Medical Expertise and Rehabilitation of the Work Capacity that professionally supervises the activity of the entire network of Medical Expertise and Rehabilitation of the Work Capacity in Romania.

Table 3. The incidence of new cases of endocrine, nutrition and metabolic disorders

Year	Endocrine disorders
2002	383
2003	274
2004	310
2005	212
2006	293
2007	202
2008	263

Table 4. Prevalence of cases of endocrine, nutrition and metabolic disorders

Year	Endocrine disorders
2002	1586
2003	2284
2004	2545
2005	2580
2006	2736
2007	2764
2008	2837

Table 5. Comparison between the incidence of new cases of hypothyroidism and the incidence of new cases of other endocrine disorders.

Year	Other endocrine disorders	Hypothyroidism
2002	62	321
2003	29	245
2004	43	267
2005	39	173
2006	62	231
2007	35	167
2008	52	211

Table 6. Comparison between the prevalence of cases of hypothyroidism and the prevalence of other endocrine disorders.

Year	Other endocrine disorders	Hypothyroidism
2002	321	1265
2003	485	1799
2004	637	1908
2005	585	1995
2006	635	2101
2007	672	2092
2008	745	2176

Table 7. The incidence of new cases of hypothyroidism classified on degrees of invalidity

Year	Degree I	Degree II	Degree III	Total
2002	1	211	109	173
2003	2	163	80	321
2004	0	188	79	245
2005	0	113	60	267
2006	1	124	107	231
2007	1	101	65	167
2008	0	135	76	211

Table 8. The prevalence of iodine deficiency hypothyroidism between 2002-2008

Year	Degree I	Degree II	Degree III	total
2002	22	765	478	1265
2003	39	908	852	1799
2004	37	1085	786	1908
2005	48	1097	850	1995
2006	51	1109	941	2101
2007	47	1206	839	2092
2008	57	1211	908	2176

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THE STUDY OF CHANGES IN ORGANOLEPTIC AND PHYSICO-CHEMICAL PARAMETERS OF SINBIOTIC YOGURT DURING STORAGE

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Abstract

The obtained products (clasic and sinbiotic yogurt) were analyzed under the following aspects: organoleptic characteristics: clot appearance, aroma and taste and physicochemical characteristics: acidity, pH, fat, dry matter. At the end of the analyzed period classic yogurt had an acidity of 164 ° T, with 9 °T more than in the first day so the rate of acidity increase was 0.4 °T/day during refrigeration.

Acidity of sinbiotic yogurt evolved faster than that of classic yogurt, due to addition of lactic bacteria specific cultures which hydrolysis lactose to lactic acid. Both products, classic and sinbiotic yogurt had a preservation period of 21 days in witch organoleptic characteristics were classified as normal issues. With addition of inulin was observed an accentuation of sweet taste.

Keywords: *sinbiotic yogurt, organoleptic and physico-chemical parameters, refrigeration, storage*

1. Introduction

In general, foods are characterized by safety quality, which implies all contaminants absence, physical, chemical or microbiological. Moreover, it is important for probiotic dairy products, as they are addressed to a large group of population, some segments of it being very vulnerable (children, elderly). Lactic fermentation using certain strains of lactobacillus (Figure 1) and bifidobacteria cause nutritional properties increas, facilitating the digestion and intestinal functions regulation. It was demonstrated that the fermentation with lactic bacteria selective species has many favorable consequences for human health, which were emphasized in the literature [1]. Probiotic is a food supplement with living organisms that beneficial influence the host by improving the intestinal microbial balance [2]. The use of antimicrobial

compounds from natural sources is seen as a mean of improving the safety and stability of food at the same time with the maintenance of the natural character, high quality and a healthy product.

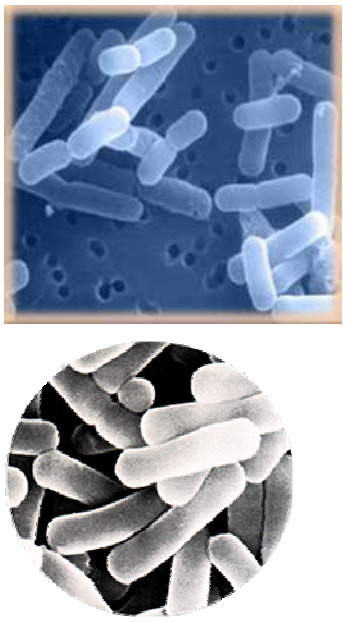

Figure 1. Lactobacillus Acidophilus

The ability of probiotic bacteria to ferment oligosaccharides is an important characteristic both in terms of probiotic microbial population development and of improving the functional character of food they contain. The main characteristic of oligosaccharides, that makes to have an important function in the metabolism, is the availability to pass unmetabolised through the intestine, exerting an influence on the colon microflora.

If certain carbohydrates, such as oligosaccharides, are fermented only by some specific strains of bifidobacteria or lactobacillus, then diets containing these compounds, can influence the selection of probiotic bacteria strains. Nondigestive food ingredients which beneficial influence the host by selective stimulation of growth and activity of some species in the colon, were defined as prebiotics.

A specific group of oligosaccharides, fructooligosaccharides, have an interest on their prebiotic. These compounds which are known under various trade names, can be obtained from natural sources such as inulin - Raftilose, Raftiline, Frutafit, Frutasun, or synthesized from sucrose - Nutraflora. Products containing both probiotics and prebiotics are called sinbiotics. In this experiment was used Raftilose (FOS) compound, produced by partial enzymatic hydrolysis of native inulin.

Brunner, Huzan and Spillmann (1993) [3] have emphasized the factors that influence bifidobacteria survival (*Bf. bifidum, Bf. Breve, Bf. Longum*) in fermented milk stored for 28 days at 4 and 8^{o}C: pH, dissolved oxygen, acidity and the number of live cells. pH has major influence on survival. At temperatures of 4 and 8^{o}C, survival duration was 16.6 respectively

15.3 days at 4.9 pH, 6.6 respectively 6 days at 4.5 pH and 1.5 respectively 1.2 days at 4.1 pH [3]. Rada (1997) [4] found a positive effect of *Kluyveromices marxianus* yeast, which significantly extends the duration of bifidobacteria survival in milk at 4^{o}C. Mantere (1995) [5] showed that besides lactic bacteria and bifidobacteria, propionic bacteria have probiotic effects, due to propionic acid production, bacteriocins and B_{12} vitamin, growth stimulation of other beneficial bacteria and ability to survive during stomach digestion.

Research motivation is the determination of physico-chemical parameters during refrigeration storage (2...4^{o}) of yogurt obtained by classical method and yogurt fermented with lactic bacteria cultures and addition of inulin.

2. Material and methods

a) Samples

We obtained 2 types of yogurt from unheated milk, one obtained by classical method and the second obtained by milk inoculation with lactic bacteria cultures (specific classical bacteria) and inulin that promotes the development of lactic bacteria. The second type was called yogurt with high inocuity.

b) Titrable acidity

Determination of acidity is the basic criterion for assessing the installation and intensity of hydrolysis. The method consists in neutralizing acidity with sodium hydroxide 0.1 N, using phenophtaleine, as an indicator. Acidity was expressed in ^{o}T (SR EN 14082, 1998, 2003).

c) Determination of fat content

In milk butirometre we placed 10 mL of sulfuric acid, 5 mL of acid milk product and with the same pipette 6 mL of distilled water and 1 mL izoamilic alcohol. The butirometre was cleaned with cotton, was put the rubber stopper and was homogenize. After homogenization, butirometre was centrifugated for 5 minutes at 1000 - 1200 rpm, then put on water bath at temperature of 65 °C, and then was read the fat content.

3. Results and discussion

The obtained products were analyzed under the following aspects: organoleptic characteristics: clot appearance, aroma and taste (a panel of external judges were selected beforehand and trained for the sensorial tests, Duo-Trio and Pairs comparison tests were applied accordingly, as reported elsewhere;

physicochemical characteristics: acidity, pH, fat, dry matter (Romanian Standard SR EN 14082, 2003).

Organoleptic parameters of fresh classic yogurt, immediately after obtaining were:

- clot appearance: strong, porcelain
- flavor: specific of lactic fermentation
- taste: nice, low tartish

For determining the period of validity has pursued the preservation of classical yogurt kept under refrigeration (2-4°C) for a 29 days period, during which was followed acidity variation.

At the end of the analyzed period classic yogurt had an acidity of 165°T, with 10°T more than in the first day so the rate of acidity increase was 0.34°T/day during refrigeration (Figure 2) and presented the following organoleptic characteristics:

- clot appearance: with removal of whey
- flavor: specific of lactic fermentation
- taste: tartish strong, bitter

The preservation period of classic yogurt was a period of 21 days, during this period acidity ranged in normal limits.

Organoleptic parameters of fresh sinbiotic yogurt, immediately after obtaining were:

- clot appearance: compact, fine, creamy
- flavor: pleasant of lactic fermentation
- taste: specific of yogurt, low tartish, well expressed

For determining the period of validity has pursued the preservation of sinbiotic yogurt kept under refrigeration (2 - 4°C) for a 29 days period, during which was followed acidity variation.

At the end of the analyzed period, sinbiotic yogurt had an acidity of 176°T, with 16°T more than in the first day so the rate of acidity increase was 0.55°T/day during refrigeration (Figure 2) and presented the following organoleptic characteristics:

- clot appearance: with removal of whey
- flavor: specific of lactic fermentation
- taste: tartish strong, bitter

The preservation period of sinbiotic yogurt was also a period of 21 days, during this period acidity ranged in normal limits but its evolution was more pronounced than in the case of classic yogurt.

The content of dry matter and ash was higher in sinbiotic yogurt than in classic yogurt due to the addition of inulin (Figure 3).

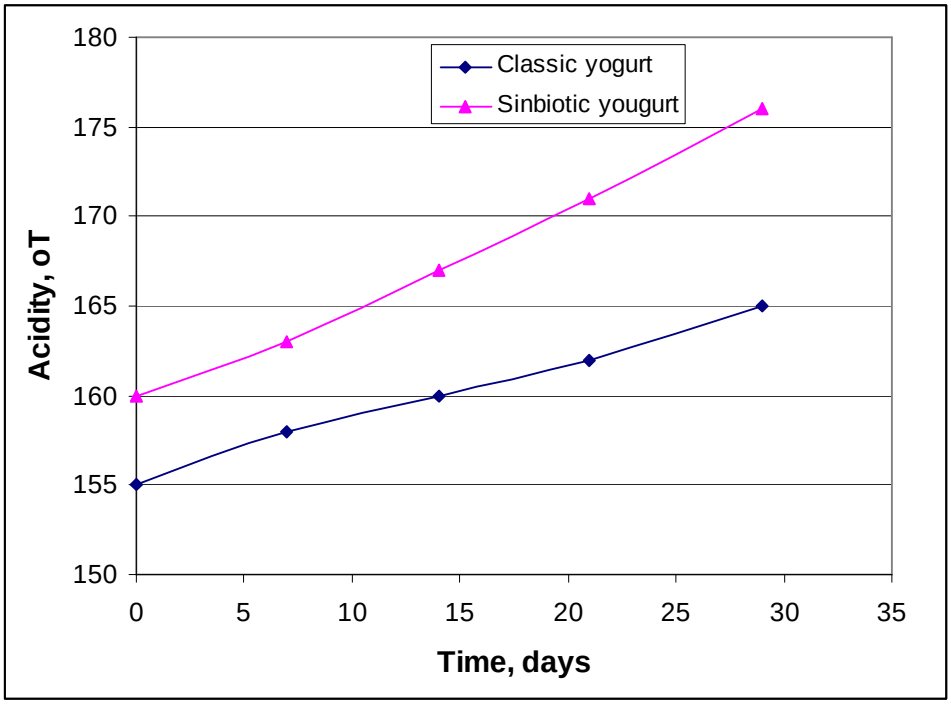

Figure 2. Comparation of acidity in clasic and sinbiotic yogurts

Figure 3. Dry matter and ash variation in clasic and sinbiotic yogurts

4. Conclusions

Acidity of sinbiotic yogurt evolved faster than that of classic yogurt, because the addition of lactic bacteria specific cultures which hydrolysis lactose to lactic acid. Both products, classic and sinbiotic yogurt had a preservation period of 21 days in witch organoleptic characteristics were classified as normal issues and can be translate that the increase of acidity in sinbiotic yogurt has antimicrobial activity on pathogens. With addition of inulin was observed an accentuation of sweet taste.

At the end of the analyzed period classic yogurt had an acidity of 165°T, with 10°T more than in the first day so the rate of acidity increase was 0.34°T/day during refrigeration and sinbiotic yogurt had an acidity of 176°T, with 16°T more than in the first day so the rate of acidity increase was 0.55°T/day during refrigeration storage.

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RESEARCH REGARDING THE CHEMICAL COMPOSITION AT VINEGAR TYPES

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Abstract

In this article are presented some physico-chemical applied vinegar, to see some chemical properties of vinegar such as total acidity, volatile and fixed, by colorimetric determination of iron content in the vinegar, the extract and residue determination dry.

Keywords : *vinegar types, fixed acidity, volatile acidity, total extract*

1.Introduction

Vinegary product is produced by aerobic fermentation of wine or alcohol under the effect of yeast Mycoderma acetate, which oxidizes ethanol to acetic acid. Is a vinegary acid that unwanted bacteria can not survive. It is formed from an organic reaction, when an alcoholic beverage made from fruit or grain is exposed to air. Depending on which alcohol is obtained, vinegar has a color and a specific flavor.

Initially, turned sour was considered a disease of the wine and the result of vinegary wine was consumed only degraded people from poorer social classes. Moreover, no distinction is made between wine and vinegar. Must and wine were consumed by oneself and sour wine, in French "vin aigre", was drink of slaves, the slaves and soldiers

Vinegary is a food produced by fermentation of acetic hydro-alcoholic liquids (wine, cider, beer, etc.) with acetic bacteria in the presence of oxygen and air at a temperature suitable species. Acetic fermentation can be achieved through a slow process (type Orleans) or through rapid (processes using column filled submersible type or method).

Traditional vinegar, wine, and now joins the list of spices for seasoning, vinegar cider, rice vinegar, apple vinegar,

the honey and even vinegary beer. In addition, methods are different peoples kitchens flavored vinegars, petaled roses with cumin, with tarhon with lăcrămioare. These varieties give a unique taste not only salatelor or foods, but even some sweets or soft drinks [1-3].

2. Materials and method

The chemical analysis of vinegar are used as samples for analysis following substances: wine vinegar, apple vinegar and wine.

On the 3 types of samples evidence we performed following analysis: total acidity, fixed acidity, volatile acidity determination by a colorimetric iron content in the vinegar, the extract, and determination of dry residue.

a)Total acidity consists in determining, by neutralizing acids in a fixed quantity of vinegar, with an alkaline solution of NaOH with known titre.

b) Fixed acidity determination is based on neutralizing acids remaining after boiling the sample for analysis from a fixed quantity of vinegar, with an alkaline solution of NaOH with known titre.

c) Volatile acidity is determined by calculation, as the difference between total acidity and fixed.

d) C*olorimetric method was used to analyze the iron content in the fermentation of vinegar* and the one obtained by distillation. The method is based on turned in red of potassium thiocyanate in the presence of ferric salts. The color is more intense as the vinegary contain higher proportions of Fe^{3+}.

e) Determination extract is based on evaporating in the vinegar sample analyzed at a temperature of boiling water and weighing the residue obtained.

f) Determination of dry residue consists of filtering the sample analyzed vinegar, drying it and weighing the residue thus obtained.

3. Results and Discussion

The variations of acidity in vinegar samples are presented in Figure 1. The acidity of the

wine vinegar is more than a apple vinegar, apple vinegar and has a total acidity than wine because vinegary has a larger quantity of acetic acid in its composition. The fixed acidity of wine vinegar is more than a mere vinegar, apple vinegar and has a fixed acidity than wine because vinegary has a larger quantity of acetic acid in its composition. The volatile acidity of wine vinegar is more than a mere vinegar and apple vinegar is a volatile acidity than wine because vinegary has a larger quantity of acetic acid in its composition.

The variation of iron content in vinegar samples is presented in Figure 2. The colorimetric determination by the Fe content was observed that wine contains a larger amount of Fe than wine vinegar and apple.

Figures 3 and 4 presents the content of extract and dry residue in studied vinegar samples. It is noted that the wine has the highest amount of extract and vinegary apple lowest amount of extract. Also, the wine samples contains the largest amount of residue dry and vinegary apple has the smallest amount of residue very close to 0.

4. Conclusion

Vinegary today proves its virtues in terms of health, the only contraindication for use with a person suffering from diseases of the stomach. For the healthy, moderate consumption of vinegar, especially a vinegar quality can only be beneficial.

Vinegar is used as a spice in food, preservative and antiseptic in the process of preserving food, and contemporary research has shown that vinegary balsamic contains many antioxidants that protect against cancer, is a natural substance that suppress appetite, reduce cholesterol "bad" in body, helps to calm down and prevent the effects of osteoporosis, which contains amino acids slow the aging process and reduce the headaches cool. Vinegary "battle" with cardiovascular disease at the same time, consumption of balsamic vinegar enhances digestive dysfunction, hurry metabolism. Vinegary apple, for food and medicine are widely used because it contains almost all minerals in fruit K, P, Mg, Fe, Si, especially potassium, helping to maintain osmotic balance acido-alkaline in the body.

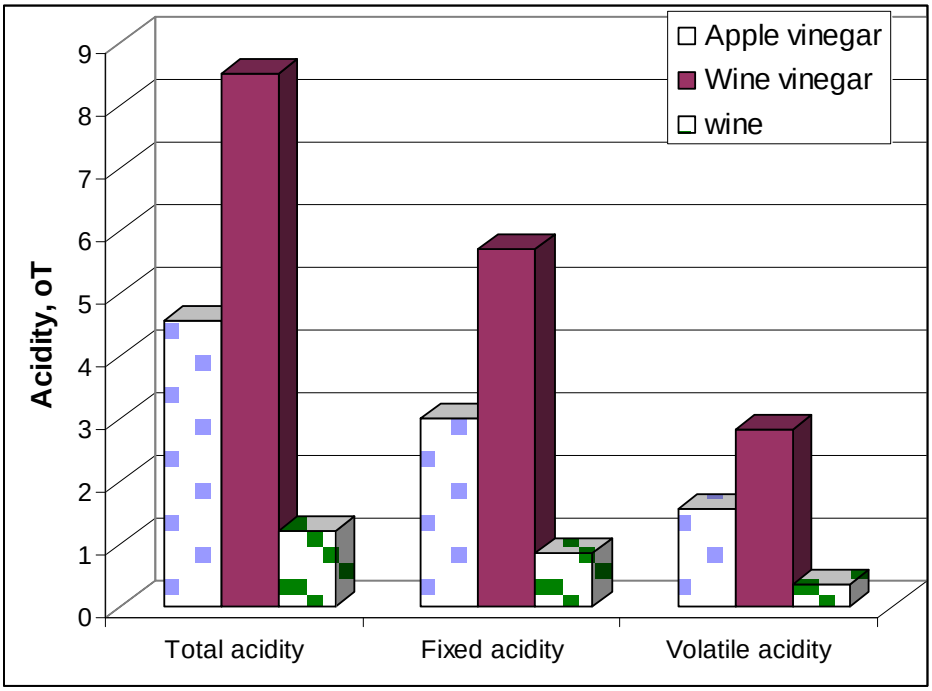

Figure 1. The variation of acidity in studied vinegar samples

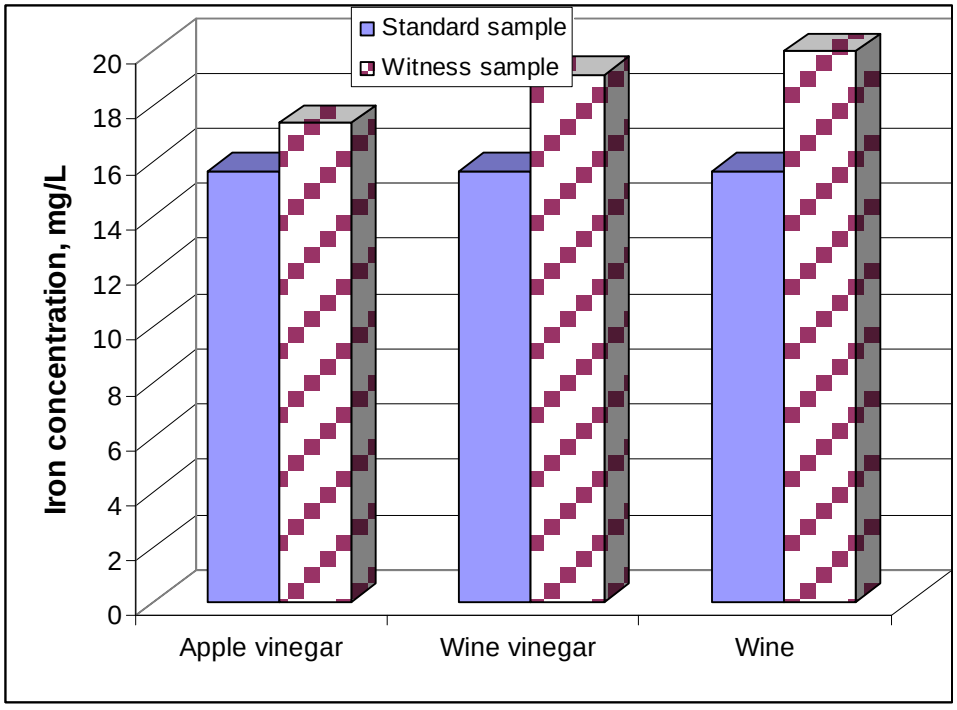

Figure 2. The concentration of iron in vinegar studied samples

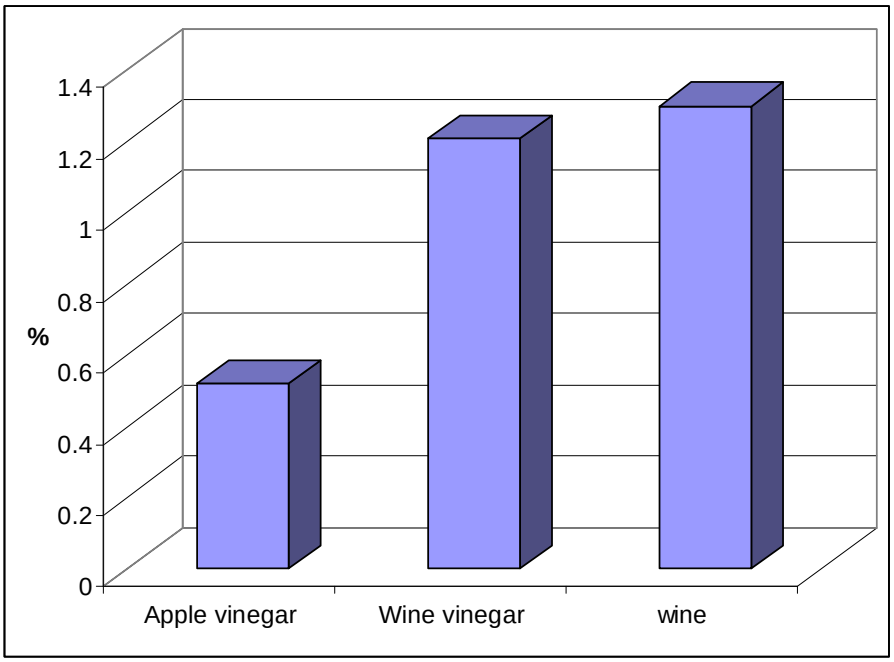

Figure 3. The content of extract in vinegar samples

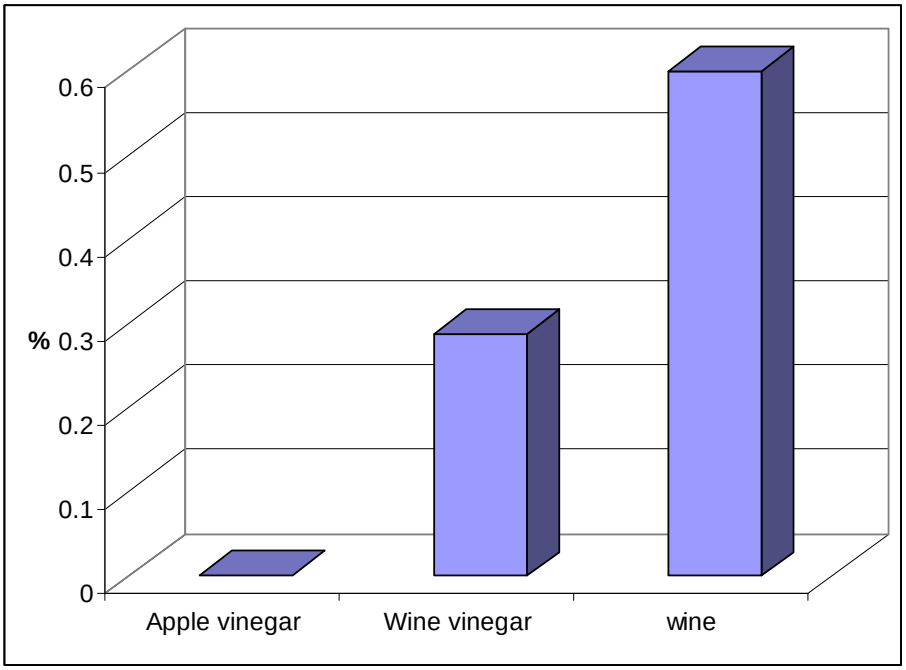

Figure 4. The content of dry residue in vinegar samples

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MONITORING OF HONEY'S SOME QUALITY PARAMETERS

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Abstract

The present work proposes to study a possible correlation between some quality's parameters of honey and pollution level with heavy metals of the origin areas. In this end, 21 samples of different honey types (Linden tree, Acacia, Multifloral) were collected and analyzed in terms of: acidity, coefficient of diastase activity and concentration of heavy metals. Experimental data did not indicate a direct correlation between the acidity of honey samples and pollution level of the origin areas honey, but indicate a high acidity of multifloral honey comparatively with monofloral one. Also, the Acacia honey proves to be more acidic than the Linden Tree. No direct correlation between the coefficient of diastase activity and the pollution level can be established. Regarding the concentrations of heavy metals significant exceeds of MAL in cases of Pb and Zn have been recorded both in monofloral and multifloral honey coming from Baia Mare and also exceeds of Cu and Cd in monofloral honey. The multifloral honey samples coming from Cavnic area exceeds of MAL in cases of Cd and Pb. No exceeds of heavy metals concentrations were recorded in honey samples coming from non polluted areas.

Keywords: *honey, heavy metals, acidity, coefficient of diastase activity*

1. Introduction

Over six millenniums of written history mentions honey as precious food drugs. Mostly of people considers honey as the healthiest natural food without know that the environment-plants-bees-honey food chain is strongly influenced by the environment quality [1,2].

The objective of the study is monitoring of some quality's parameters in honey. In this end, samples of monofloral and polifloral honey were collected from 21 polluted and non-polluted areas (Tabla 1) and analyzed considering the acidity, coefficient of diastazic activity and contents of heavy metals.

Table 1. Description of honey samples

Area/District	Type of honey	Pollution level of origin area	Sample's code
Fantanele/MM	Multifloral	Non polluted	S1
Rohia/MM	Multifloral	Non polluted	S2
Tg. Lapus/MM	Multifloral	Non polluted	S3
Carpinis/MM	Multifloral	Non polluted	S4
Oncesti/MM	Multifloral	Non polluted	S5
Fanate 1 /MM	Monofloral Linden Tree (*Tilia tomentosa)*	Non polluted	S6
Fanate 2 /MM	Multifloral	Non polluted	S7
Satu Nou de Jos/MM	Multifloral	Polluted	S8
Cavnic 1/MM	Monofloral Linden Tree (*Tilia tomentosa)*	Polluted	S9
Cavnic 2/MM	Monofloral Acacia (*Robinia pseudoacacia*)	Polluted	S10
Cavnic 3/MM	Multifloral	Polluted	S11
Feresti/MM	Multifloral	Non polluted	S12
Asuaj/MM	Multifloral	Non polluted	S13
Fersig/MM	Multifloral	Non polluted	S14
Busag/MM	Multifloral	Non polluted	S15
Baia Mare 1/MM	Multifloral	Strongly polluted	S16
Baia Mare 2/MM	Monofloral Linden Tree (*Tilia tomentosa)*	Strongly polluted	S17
Baia Mare 3/MM	Monofloral Acacia (*Robinia pseudoacacia*)	Strongly polluted	S18
Sighetul Marmatiei 1/MM	Multifloral	Non polluted	S19
Sighetul Marmatiei 2/MM	Monofloral Linden Tree (*Tilia tomentosa)*	Non polluted	S120
Sighetul Marmatiei 3/MM	Monofloral Acacia (*Robinia pseudoacacia*)	Non polluted	S21

2. Materials and methods

a) Acidity of honey samples were measured according to STAS 784/3-89. The method is based on titration of water honey solution with 0.1N solution of NaOH in the presence of fenoftaleina up to light pink coloration.

Figure 1. The effect of α-amylaze's activity in studied honey samples

b) Coefficient of diastase activity indicates the intensity of α-amylase activity presented in the honey. It is defined as volume (cm^3) of 1% starch solution transformed in dextrins during 1 hour, under temperature of 45^oC by the α-amylase from 1 g of honey (in the presence of Cl^- as activator of enzyme) (STAS 784/3-98). The starch is decomposed under the enzyme action as resulting in discoloration of solution from blue to intermediates colors (violet, pink, no color) proportionally with the amount of decomposed starch and implicitly with the intensity that the enzyme actions (Figure 1).

c) Analysis of heavy metals' contents in honey were performed according to SR EN 14082/2003. It is based by calcinations up to ashes of honey samples, acidic dissolution of ash and analyzed the contents of heavy metals by atomic absorption spectrofotometric method. For each sample the content of heavy metals has been measured by three times and the result was presented as average. The equipment used in analysis was a Perkin Elmer AAS 800. Honey samples coming from non-polluted and polluted areas were selected for analysis.

3. Results and discussions

a) The acidity of honey samples are indicated in Figure 2.

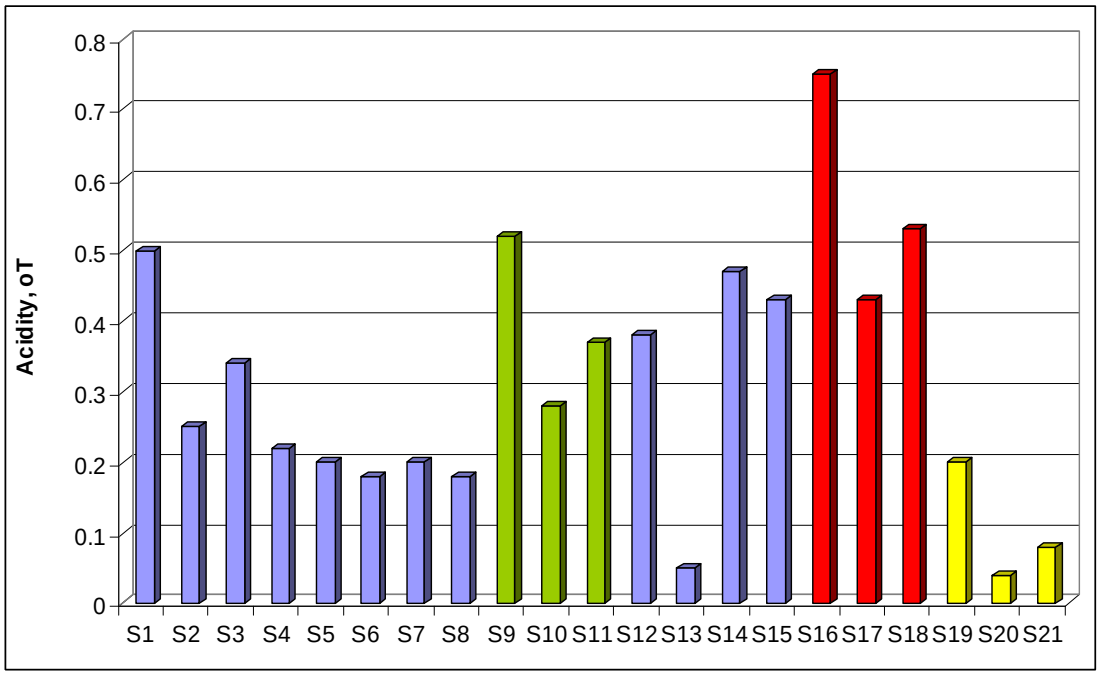


Figure 2. Acidity of honey samples

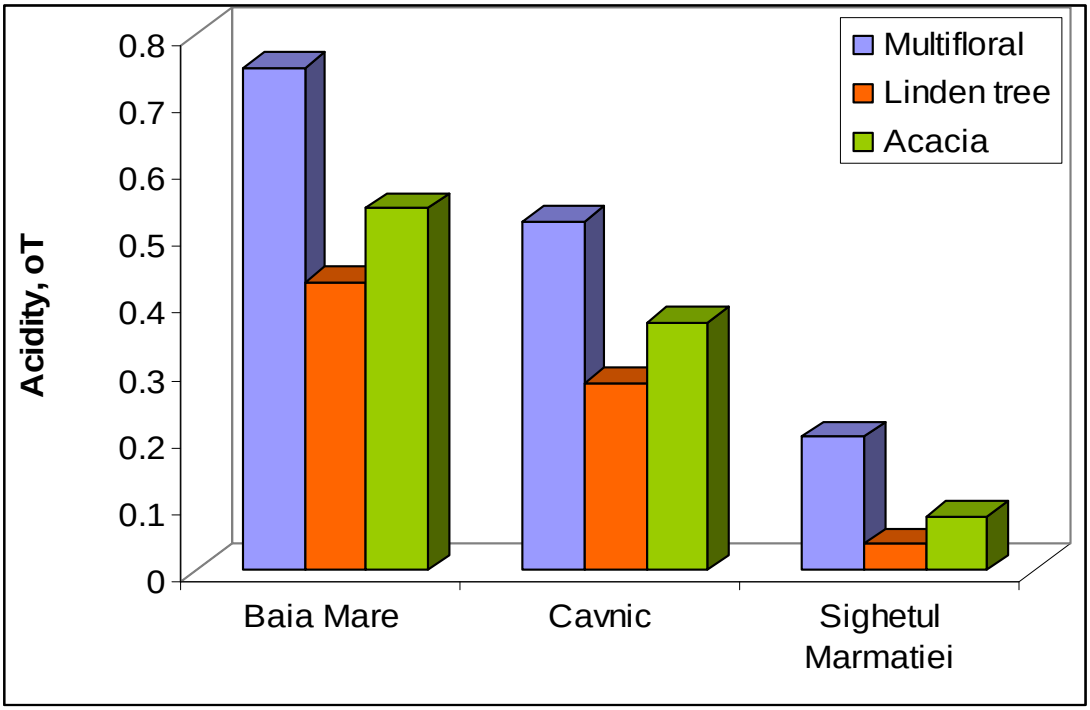


Figure 3. Acidities' level correlated with type of honey

Analysis of Figure 2 indicates:

1. The lowest value of acidity appears in S20 (0.02^{o}T) but closely values can be noticed in S13 (0.5^{o}T) and S21 (0.08^{o}T). Maximum value of acidity is recorded in S16 (0.75^{o}T), difference in acidity being 37.5 times higher than the minimal value (S 20). A high value of acidity can be noticed in S 9 (0.52 ^{o}T) and S 1(0.5^{o}T). At first sight, we can conclude that the samples coming from non-polluted areas (S 20, S 13) are less acidic comparatively with those coming from strongly polluted areas (S 16, S19). The hypothesis is not supported by a uniform correlation between pollution level of area in the acidity level. High acidities appear in S1, S3 and S12 coming from non-polluted areas. An accuracy appreciation related to honey's acidity should considers the soil acidity on the milliner flowers growth-up, the content of sugar in honey, the thermal treatment applied for honey conditioning and also the freshness of samples.

2. The source of honey influences significantly the acidity level. As the Figure 3 indicates, the acidity of multifloral honey is higher than in the monofloral ones, and is not depend by the origin area.

Example:

●*Baia Mare area– strongly polluted area*

Acidity of polifloral honey = 0.75^{o}T

Acidity of Linden Tree honey = 0.43^{o}T

Acidity of Acacia honey = 0.53^{o}T

which represents an acidity lower by 1.74 times in case of Linden Tree honey and by 1.41 times in case of Acacia honey.

●*Sighetul Marmatiei area – non-polluted area*

Acidity polifloral honey = 0.2^{o}T

Acidity of Linden Tree honey = 0.04^{o}T

Acidity of Acacia honey = 0.08^{o}T

which represents an acidity lower by 5 times in case of Linden Tree honey and by 2.5 times in case of Acacia honey.

Also, the acidity differencies between honey types are higher in cas of non-polluted area comparatively with those coming from polluted areas, by 5 and respectively 2.5 times comparativelyl with 1.74 and 1.41 times.

High level of sugars presents in polifloral honey comparatively with the monofloral honey justifies the acidity difference between types of honey.

3. The Acacia honey is characterized by a higher acidity level compared with the Linden Tree honey, as Figure 3 indicates.

Example:

●*Baia Mare area:*

Acidity of Acacia honey = 0.53^{o}T

Acidity of Linden Tree honey = 0.43^{o}T

which represents an acidity lower by 1.23 times.

● *Cavnic area:*

Acidity of Acacia honey = 0.37^{o}T

Acidity of Linden Tree honey = 0.28^{o}T

which represents an acidity lower by 1.32 times.

●Sighetul Marmatiei:

Acidity of Acacia honey = 0.08^{o}T

Acidity of Linden Tree honey = 0.04^{o}T

which represents an acidity lower by 2 times.

The high level of sugars in Acacia honey is justified by the fact that this type of honey is produced early in May and its sugars average content (41.73% fructose, 34% glucoze and 10% zacharose) is higher than in Linden Tree honey (32.28% fructose, 37.27% glucoze) [3].

The high difference between the acidity levels of monofloral honey coming from non-polluted areas can be noticed.

b) Coefficients of diastazic activity in studied honey samples are indicated in Figure 4. As it indicates the diastazic activity's coefficient has no regular variation. The highest valuest of coefficient can be noticed both in nonpolluted (S 1, S 5, S 21) and strongly polluted areas (S16, S 17, S18). Al so high values are recorded in polluted areas. Moreover, the lowest values of coefficient appears in nonpolluted (S3, S 4, S 14) and polluted areas (S 9). That indicates that in the samples the α-amylase is missing or it has a very low activity. The activity of enzimes, such as α-amylase, is influenced by processing temperature of honey rather than the pollution level of the area. Further detailed investigation should be done in order to connect the correlation between pollution of honey with heavy metals and coefficient of diastazic activity.

c) The heavy metals presence in the analyzed honey samples is indicated in Figures 5 and compared with the maximum admitted limits (MAL) [4]. Analysis of Figure 5 indicates an exceed of maximul admitted limits (MAL) in case of Pb and Zn both from monofloral and polifloral honey coming from Baia Mare area.

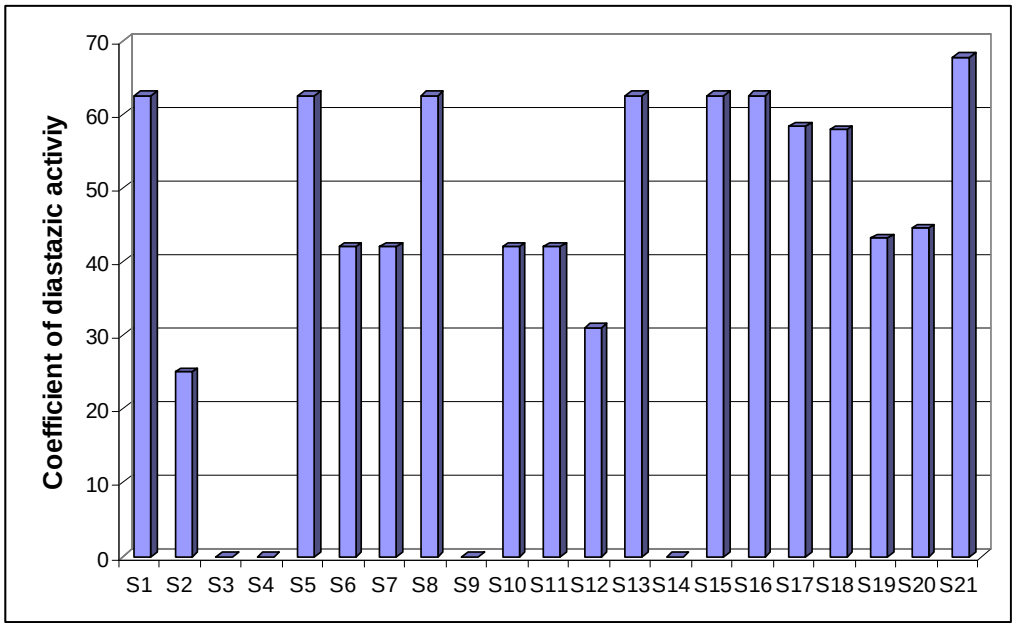
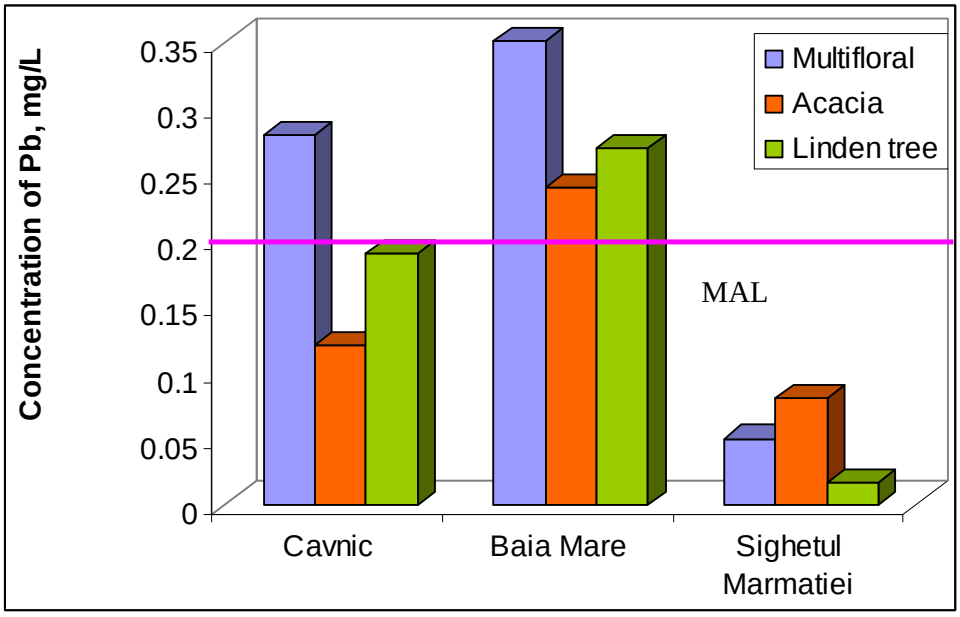
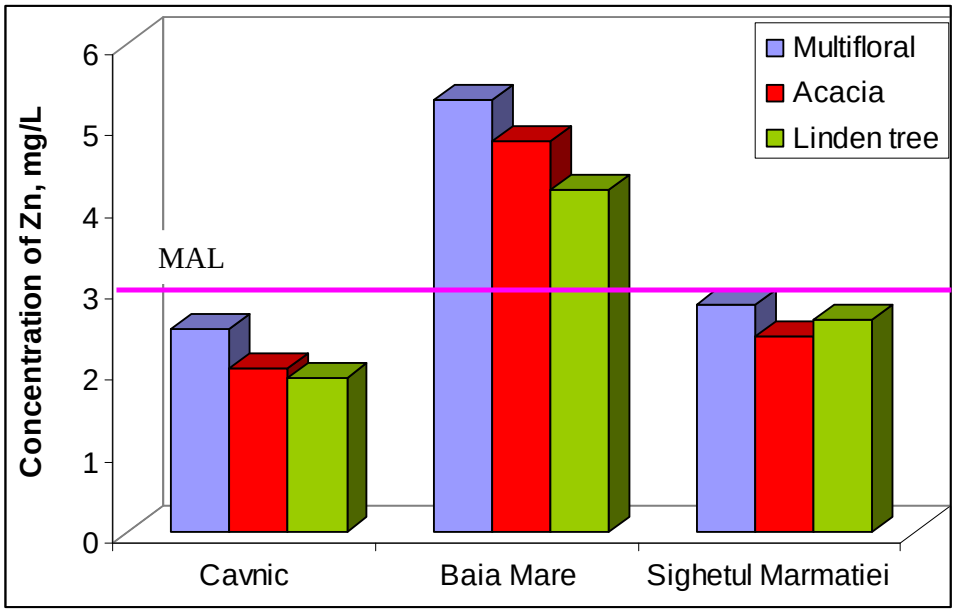


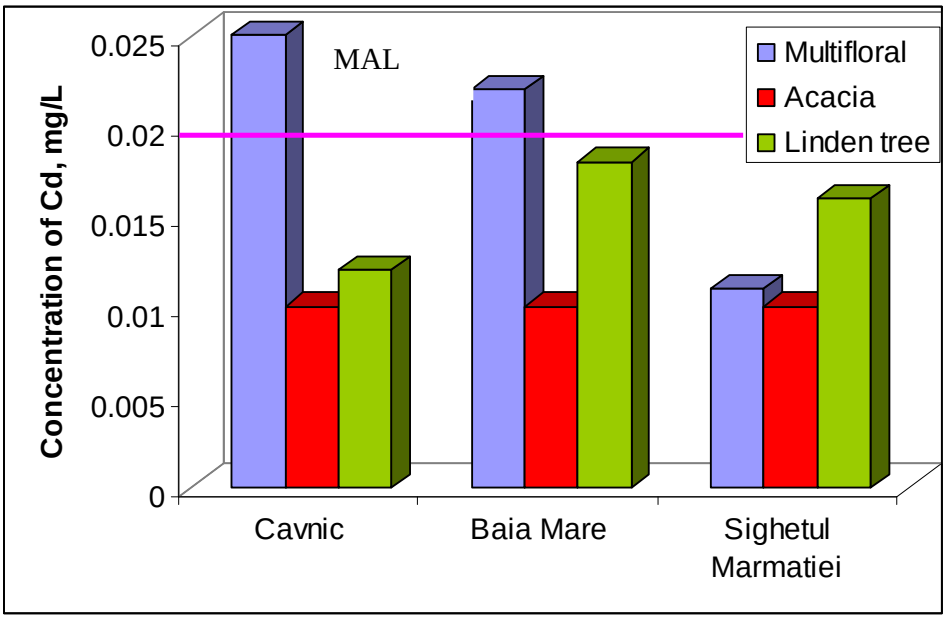
Figure 4. Variation of coefficient of diastazic activity in the honey samples



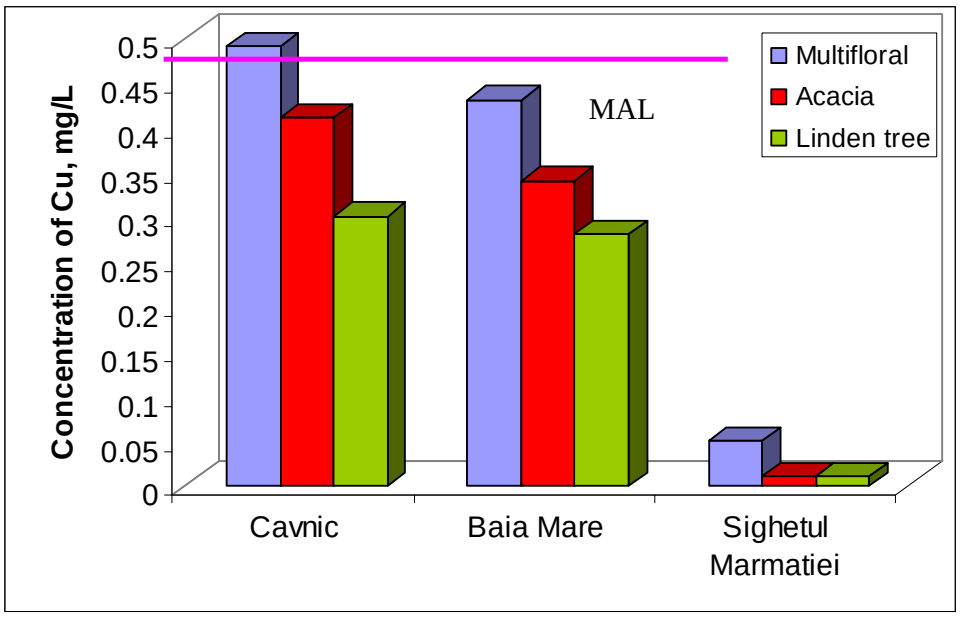
A - Pb


Concentration of Zn, mg/L
0
1
2
3
4
5
6
MAL
Multifloral
Acacia
Linden tree
Cavnic
Baia Mare
Sighetul Marmatiei

B - Zn

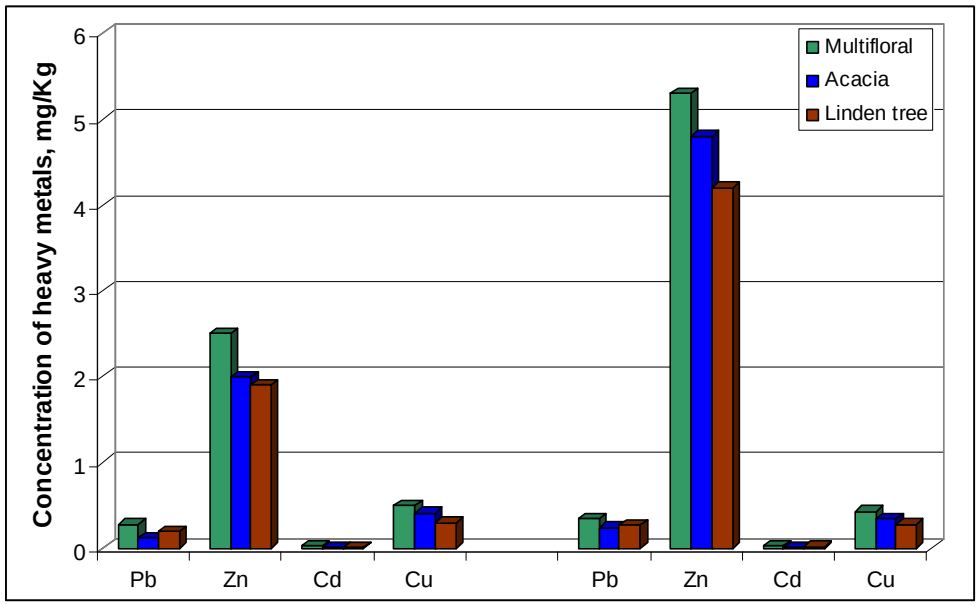

Concentration of Cd, mg/L
0
0.005
0.01
0.015
0.02
0.025
MAL
Multifloral
Acacia
Linden tree
Cavnic
Baia Mare
Sighetul Marmatiei

C - Cd



D - Cu

Figure 5. Concentrations of heavy metals in the honey samples



Cavnic *Baia Mare*

Figure 6. Comparative analysis of heavy metals concentrations related to the poolutin level in origin's areas honey samples

In case of Pb, the exceed is by 1.75 times in case of multifloral honey, by 1.2 times in case of Acacia honey and by 1.35 times in case of Linden Tree honey. The Zn maximum admitted level is exceeds by

1.76 times in case of polifloral honey, by 1.6 times in case of Acacia honey and by 1.4 times in case of Linden Tree honey. The honey samples coming from Baia Mare exceeds maximum admitted limits for Cd by 1.1 times. No exceed of Cu admitted concentration is indicated.

Maximum admitted limits of Cd is recorded in case of polifloral honey samples coming from Cavnic area by 1.1 times and for Pb by 1.25 times.

No exceeds of studied heavy metals were recorded in honey samples coming from Sighetul Marmatiei area, even ths high values for Zn resulted.

The hive's distance from the polluted area is significantly reflected in the contamination level of bee's products. As the Figure 6 indicates, in the samples coming from Baia Mare area (considered more polluted than Cavnic) the concentration of studied heavy metals is higher.

Also, a high tendency for Zn accumulation in honey is noticed both in samples coming from polluted areas (Figure 6) and non polluted area (Figure 5).

In cases of Pb and Cd the accumulation tendency's are much lower**.**

4.Conclusions

Further detailed work should be done to emphasize with accuraccy the pollution level of studied areas and traceability of contaminants along of environment-plant-bee-hive products chain. More parameters should be considers: wather, thermal treatment, pollution level of soil.

5.References

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4. Standard UE (implicit RO), European Honey Directive of the European Honey Commission

RESEARCH CONCERNING INSTALATION OF ALTERATIVE PROCESSES IN COW AND BUFFALO BUTTER DURING FREEZING STORAGE

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Abstract

Physicochemical characteristics and freshness indicators of cow and buffalo butter during freezing (-15 ... -18^{o}C) storage were studied. Changes in freshness parameters and alterative processes installation, when butter becomes improperly for consumption were studied, inducing acidity, peroxide value (PV), iodine value (IV) and the presence of epyhidrinic aldehyde. There was an increase of titrable acidity during storage, cow butter hydrolysis was installed after 35 days and after 30 days for buffalo butter. Hydrolysis processes are installed more quickly in terms of freezing than oxidative processes, being intensified by a higher water content in product and by hydrolitic enzymes presence.

Keywords: *cow butter, buffalo butter, hydrolysis, freezing*

1.Introduction

Milk fat is one of the most complex fats found in nature [1]. This complexity stems from the extreme diversity of its fatty acids (FA) (e.g., chain length, degree of unsaturation and branching) and more than 400 of these have identified recently [2]. Milk fat also contains thousands of triacylglycerol (TAG) species.

Gresti, Bugaut, Maniongui, and Bezard (1993) quantified more than 200 individual molecular species of even-numbered TAG alone.

Its nutritive value is high and is based on fat content. Digestibility of butter is 97% for fat and 94% for dry plasma, represents an important source of vitamin E.

Hydrolysis and oxidation occurring in animal fats during their storage have resulted in the depreciation of their quality and their exclusion from the diet.

Hydrolysis is the type of alteration which is finalized with the release of the two primary components: fatty acids and glycerine. The first factor which requires hydrolysis is the water content of fat, the other factor being hydrolitic specific enzymes [3].

Lipid oxidation includes fatty acid oxidation and generates compounds that affect food quality and even nutrition and food safety. Oxidative rancidity or autooxidation cannot be stopped by lowering the temperature of storage since it is a chemical reaction with low activation energy.

In the peroxidation of unsaturated fatty acids, lipid hydroperoxides form during the propagation phase. These compounds are unstable and decompose rapidly, giving rise to a range of new free radicals and other non-radical compounds, including alkoxyl and alkyls radicals, aldehydes, ketones, as well as variety of carboxyl compounds that form a complex mixture of secondary lipid oxidation products [4-7].

Research motivation is the determination of physicochemical indicators of fresh cow and buffalo butter, and the moment when occur changes in the organoleptic and physicochemical parametres of butter stored under refrigeration, following hydrolysis and oxidation, making it unsuitable for human consumption.

2. Materials and methods

a) Samples

Cow butter with a content of 70% fat and 25% water and buffalo butter with a content of 80% fat and 16% water were collected immediately after obtaining and stored under freezing (-15 ... -18^{o}C), following the installation of alterative processes (hydrolysis and oxidation).

b) Titrable acidity

Determination of acidity is the basic criterion for assessing the installation and intensity of hydrolysis. The method consists in neutralizing acidity with sodium hydroxide 0.1 N, using phenophtaleine, as an indicator. Acidity was expressed in oleic acid grams to 100 grams sample (SR EN 14082, 1998, 2003).

c) Iodine value

Iodine value was determined using Hanus method (SR EN 14082, 2003).

Approximately, 0.5 g sample (dissolved in 15 ml CCl_4) was mixed with 25 ml Hanus solution (IBr) to halogenate the double bonds. After storing the mixture in dark for 30 min., excess IBr was reduced to free I_2 in the presence of 20 ml of KI (100 g/l) and 100 ml distilled water. Free I_2 was measured by titration with 24.9 g/l $Na_2S_2O_3 \cdot 5H_2O$ using starch (1.0 g/100 ml) as an indicator. IV was calculated as g I_2/100 g sample.

d) Spectrophotometric determination of peroxide value (PV)

Peroxide value was determined using UV - VIS T60U spectrophotometer (England): operating temperature 5 – 45^oC; field wavelength 190 - 1100 nm; wave length accuracy 0.1 nm (ISO 3976, 2006). This protocol was based on the spectrophotometric determination of ferric ions (Fe^{3+}) derived from the oxidation of ferrous ions (Fe^{2+}) by hydroperoxides, in the presence of ammonium thiocyanate (NH_4SCN). Thiocyanate ions (SCN^-) react with Fe^{3+} ions to give a red-violet chromogen that can be determined spectrophotometrically, the absorbance of each solution was read at 500 nm.

To quantify PV, a calibration curve (absorbance at 500 nm vs. Fe^{3+} expressed in μg) was constructed and peroxide value was expressed as meq O_2/kg sample.

e)Kreis reaction

By Kreis reaction we identify aldehydes results in advanced stages of fat oxidation. Epyhidrinic aldehyde, formed during advanced oxidation of fats, released in an acid environment, reacts with phluoroglucine, giving a colored compound. Color intensity is proportional to the quantity of epyhidrinic aldehyde, and so with the oxidation process (SR EN 14082, 1998, 2003).

3. Results and discussion

To watch the acid hydrolysis were determined the following values of titrable acidity of cow butter stored under freezing (-15 ... -18^oC): for fresh butter acidity was 0.9% (g oleic acid); for butter to 15 days freezing 1.3%; for butter to 30 days freezing 1.6%; for butter to 35 days freezing 1.9%, and for butter to 40 days freezing 2.2%.

Results showed that for cow butter with 25% water content, hydrolysis was triggered early and developed rapidly, after 15 days of freezing was registered a moderate increase of acidity, and this enhanced during storage. It was found that advanced hydrolysis process appeared after 35 days under freezing, acidity exceeded 2% (g oleic acid), the maximum permitted value, because were released saturated fatty acids from triglycerides which are volatile, there were changes in color (yellow), taste (sour, rancidity), odor (butyric), and butter become improper for consumption.

For buffalo butter were determined the following values of titrable acidity: for fresh buffalo butter acidity was 1.1% (g oleic acid); for butter to 15 days freezing 1.4%; for butter to 30 days freezing 1.8% and for butter to 35 days freezing 2.3%. Results showed that for buffalo butter, hydrolysis developed rapidly. It was noticed that advanced hydrolysis process appeared after 30 days under freezing, acidity exceeded 2% (g oleic acid), the maximum permitted value, because were released saturated fatty acids which are volatile, there were changes in color, taste, odor and butter become improper for consumption.

In assessing the degree of freshness and intensity of oxidation process for chilled butter were determined iodine index, peroxide index as an indicator of incipient oxidation [8]and the presence of epyhidrinic aldehyde as an indicator for advanced oxidation [9].

Were determined the following values of iodine index for cow butter: for fresh cow butter 35 g I_2/100 g sample, butter to 15 days freezing 34.2; butter to 30 days refrigeration 32.1; butter to 35 days refrigeration 29.7 and butter to 40 days refrigeration 28.1 (Figure 1).

For buffalo butter were determined the following values of iodine index: for fresh buffalo butter 36 g I_2/100 g sample, butter to 15 days freezing 33.6; butter to 30 days freezing 31.9 and butter to 35 days refrigeration 28.3 (Figure 2).

In the first days iodine index values felt slightly, in the last days the decrease was more pronounced, in line with the propagation phase of lipid oxidation that formed the largest quantity of hydroperoxides. During the refrigeration storage there was a fall of iodine index values, because with the beginning of oxidation processes decreased the degree of unsaturation due to unsaturated fatty acids oxidation [10]. For fresh cow butter the peroxide value was determined to be

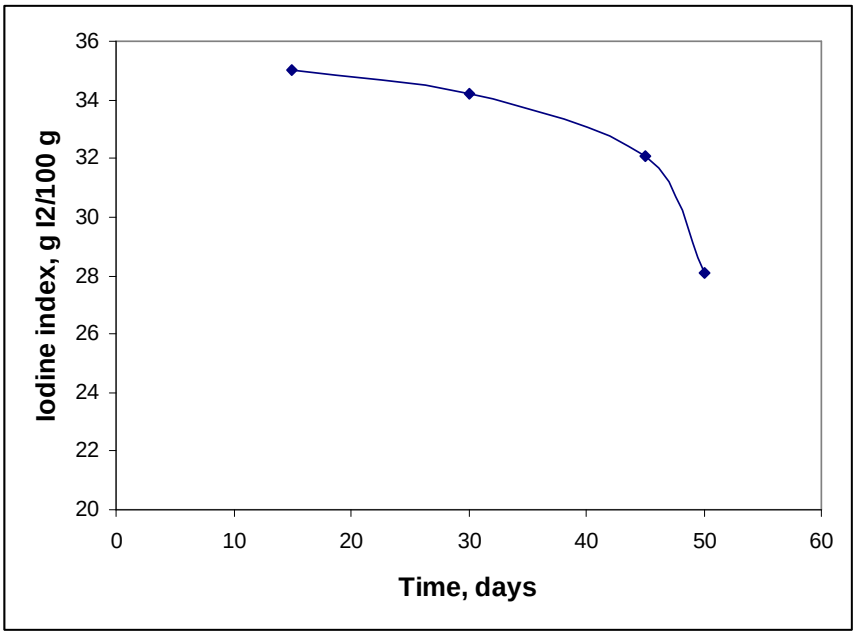

Figure 1. Iodine index variation of cow butter

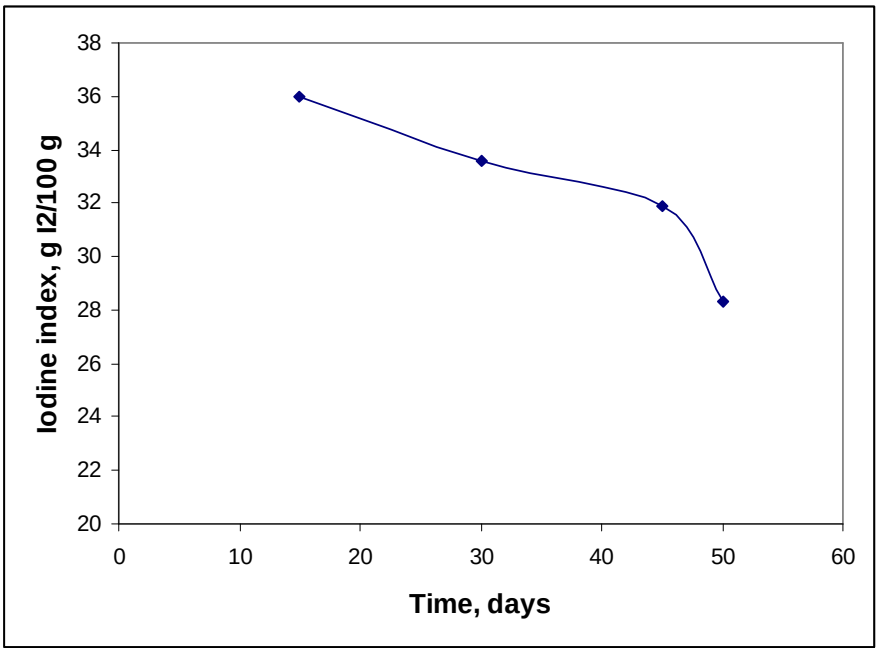

Figure 2. Iodine index variation of buffalo butter

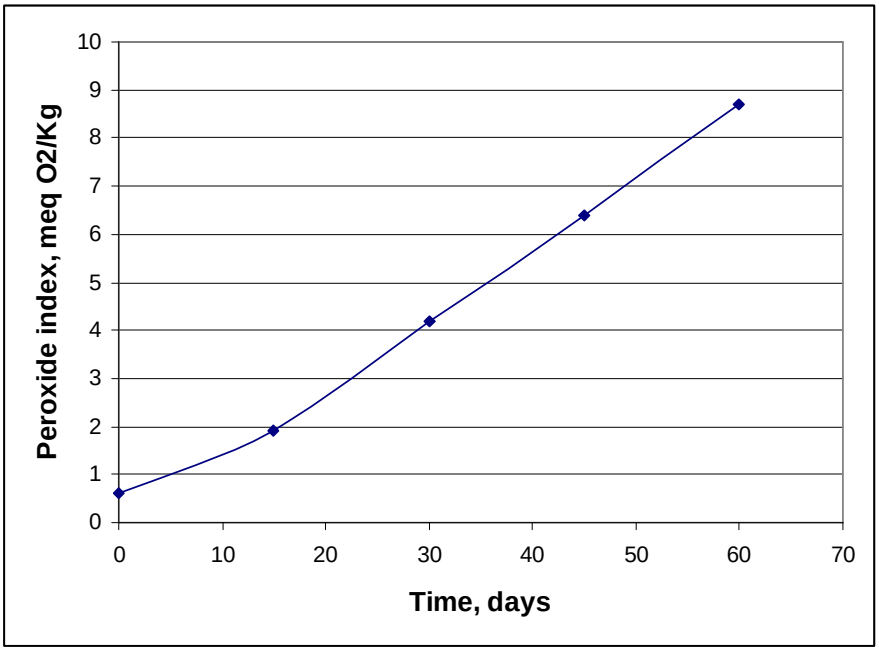

Figure 3. Peroxide index variation of cow butter

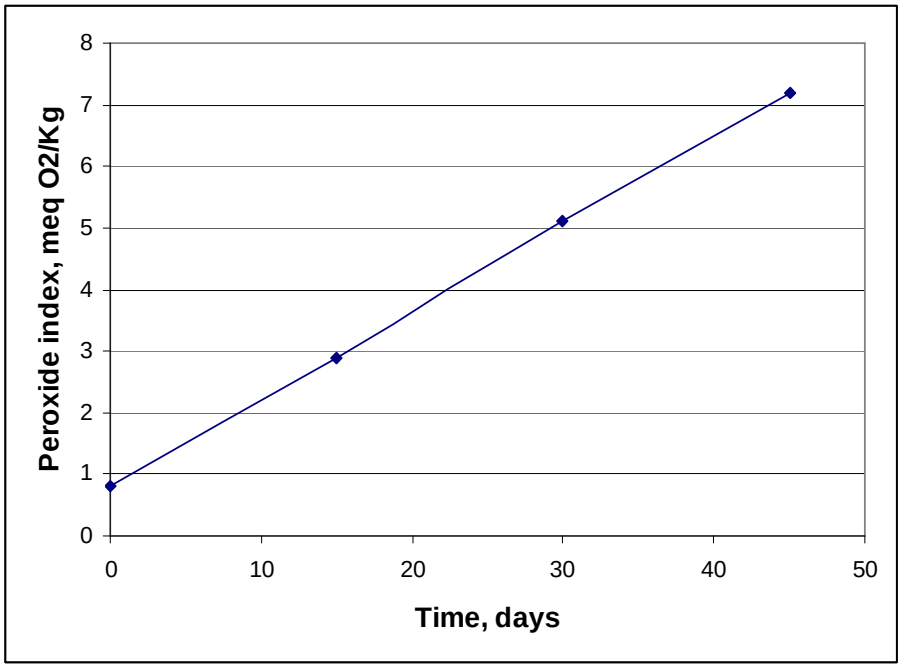

Figure 4. Peroxide index variation of buffalo butter

0.6 meq O_2/kg and for buffalo butter 0.8 meq O_2/kg and then followed an upward slope. In the first 15 days of storage under freezing there was a slow increase of the peroxide index, which corresponded to the initiation phase of oxidation (Naz et al., 2005), followed by a sharp increase corresponding to propagation phase in which were formed the largest amount of hydroperoxides as primary compounds of oxidation (Figure 3, Figure 4).

4. Conclusions

The time of changes occurring in hydrolysis and oxidation processes of cow and buffalo butter has particular importance in assessing the quality and its validity. In frozen butter altering processes take place more slowly than in that stored under refrigeration. Hydrolysis process was installed more quickly in terms of freezing than oxidative processes, being intensified by a higher water content in product and by lipases presence.

Results showed that butter is likely to acid hydrolysis due to the high water content (25%, 16%), which favors glycerides hydrolysis translated by increasing of titrable acidity until it exceeds 2%, and it

is resistant to oxidation due to low composition in unsaturated fatty acids.

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DETERMINATION OF PHYSICO-CHEMICAL PARAMETERS FOR BREAD WITH ADDED FAT

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Abstract

Were made two recipes for bread, with 3% added butter and sunflower oil for 0.5 kg flour for witch were studied the correlations between physico-chemical parameters: acidity, porosity, volume. It was noted that acidity evolution was more pronounced for dough with butter, because butter has a higher acidity than oil due to the presence of free saturated fatty acids, at 60 min. fermentation acidity for dough with butter enriched at 2.5 degree of acidity. The higher acidity of bread ridden with butter is due to the presence of saturated fatty acids that the addition of butter brings to the initial acidity. It was noted that the addition of butter improved bread's porosity in a greater measure than the addition of sunflower oil. It was concluded that the addition of butter improves the dough volume. Amount of fat below 5% of flour mass are not influencing the process of fermentation, act favorably on the quality of products. The products have more volume, fine and more uniform porosity, peel more elastic and less brittle, crumb with improved elasticity to the products without fat.

Keywords: *bread, butter, sunflower oil, physico-chemical parameters*

1.Introduction

Bread is one of the basic food of human, being indispensable in the daily nutrition, due both nutrient properties and content of heat producing substances up close in age to us bread was the based diet [1].

It accompanied soup or tea in the morning, the main menu at lunch or dinner as otherwise any hot food. High value of the bread in the diet has its origins in the strong growth of the population of XVI century. Bread is more than a food.

In Christianity the „bread of life" is a symbol of God. This finds its expression in the dinner when bread unites people with divinity. Beginning of the XXI century is marked by rapid growth of bread consumption. Diversification of consumption is increasing due to the emergence of hundreds of varieties of bread [2,3].

Along with increased production of bread, increased consumer need, requiring food quality to become better and more varied

assortments. As additives to improve the quality of bakery products, were recently produced a series of food substances and new technologies adopted in many countries. These benefits include fats. Fat is a valuable addition, by the use of which improves the quality of bread. By adding the fat, the dough becomes more pliable, the volume of obtained bread is higher and the peel is mellow [2].

The aim of the paper was to establish correlations between physico-chemical parameters for the 2 types of bread, with added butter and sunflower oil [4-6].

2. Materials and methods

a) Samples

Were made two recipes for bread, with 3% added butter and sunflower oil for 0.5 kg of flour for witch were studied the correlations between physico-chemical parameters.

b) Titrable acidity

Determination of acidity is the basic criterion for assessingbread quality. The method consists in neutralizing acidity with sodium hydroxide 0.1N, using phenophtaleine, as an indicator. Acidity was expressed in mL NaOH 0.1N used for titration (SR EN 14082, 1998, 2003). Acidity was determinated at various intervals of dough fermentation (intervals of 15 minutes) and for the 2 types of bread.

c) Bread porosity

Method consists in calculating crumb porosity compared to volume of disloqued liquid. From the middle of bread for analysis was cut with a sharp knife two cubes of 3 cm side. One of the cubes was cut from the middle of the slice and the other from a distance of 1 by 2 cm from the shell when this is burned. The crumb cubes were bothered to compact spherical clots. In a graduated cylinder of 250 mL, with divisions of 0.5 mL, in which were puted 150 mL oil, were inserted the two clots and was noteed the fluid volume after immersion(SR EN 14082, 1998, 2003).

d) Moisture content of dough at different intervals of fermentation

Was followed the evolution of eliminated water from dough during fermentation at 30 ° C at intervals of 15 minutes for 2 h. The dough samples were weighed at each interval.

e) Determination of specific volume of dough at various intervals of fermentation

The method is based on measuring the amount of poppy seeds disloqued by a known mass of bakery product (SR EN 14082, 1998, 2003).

3. Results and discussion

Was determined acidity evolution for the 2 types of dough (with butter and sunflower oil), the determinations were made at 15 minutes intervals until the dough was ready for baking. Were determined the following values of acidity for dough with butter: at moment 0 acidity was 1.9 degrees of acidity, for dough to 15 minutes fermentation 2 degrees of acidity, to 30 min. fermentation 2.1 degrees of acidity, to 45 min. fermentation 2.3 degrees of acidity and to 60 min. fermentation 2.5 degrees of acidity (Figure 1).

It was noted that acidity evolution was more pronounced for dough with butter, because butter has a higher acidity than oil due to the presence of free saturated fatty acids, at 60 min. fermentation acidity for dough with butter enriched at 2.5 degree of acidity.

The higher acidity of bread ridden with butter is due to the presence of saturated fatty acids witch the addition of butter bring to the initial acidity. It was noted that the addition of butter improved bread's porosity in a greater measure than the addition of sunflower oil (Figure 2).

The addition of butter improves the dough volume as indicate in Figure 3 and Figure 4.

4. Conclusions

It was noted that acidity evolution was more pronounced for dough with butter, because butter has a higher acidity than oil due to the presence of free saturated fatty acids, at 60 min. fermentation acidity for dough with butter enriched at 2.5 degree of acidity.

The higher acidity of bread ridden with butter is due to the presence of saturated fatty acids that the addition of butter brings to the initial acidity. It was noted that the addition of butter improved bread's porosity in a greater measure than the addition of sunflower oil. It was concluded that the addition of butter improves the dough volume, so butter can be considered the best fat food for bakery.

Because its content in dyacetil and acetoin, aroma substances which are formed in bread, butter communicate to products pleasant taste and aroma. Amount of fat below 5% of flour mass are not influencing the process of fermentation, act favorably on the quality of products.

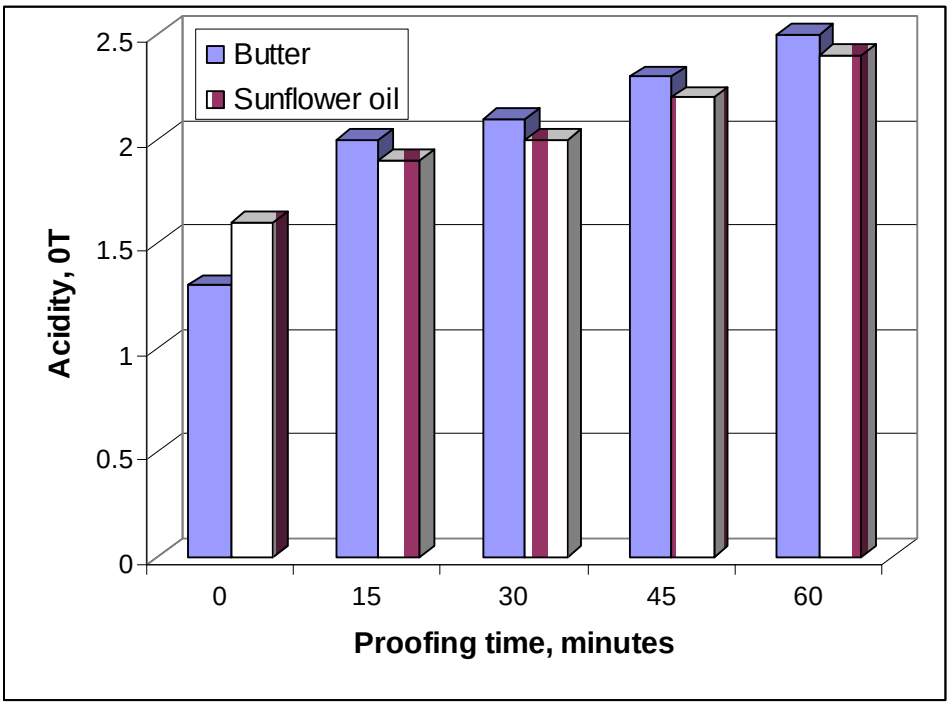

Figure 1. Acidity evolution for dough enriched with fat

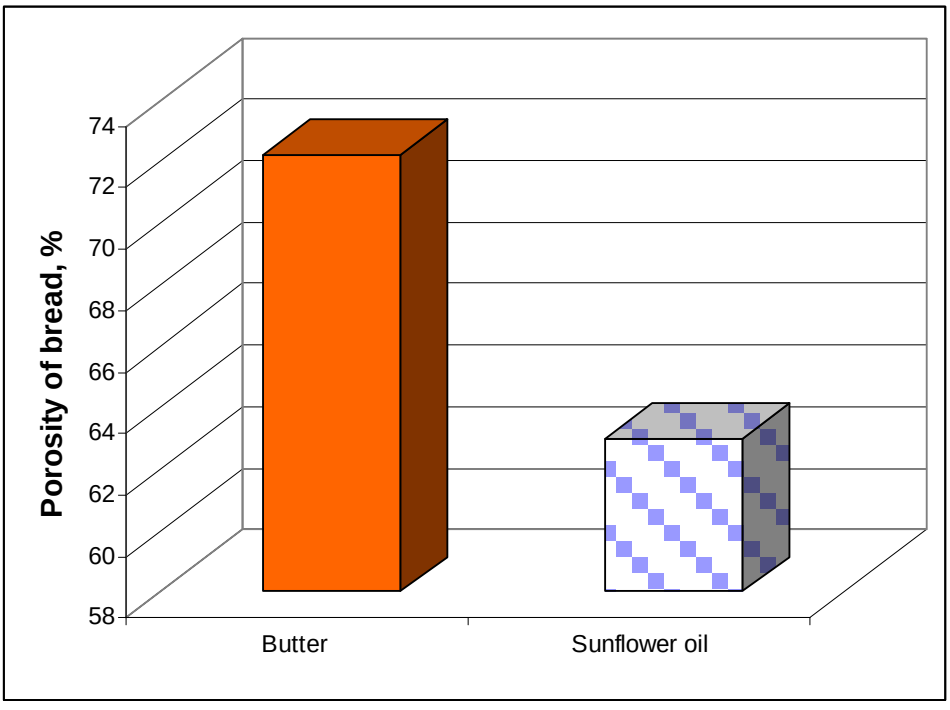

Figure 2. Comparative analysis of breads' porosities

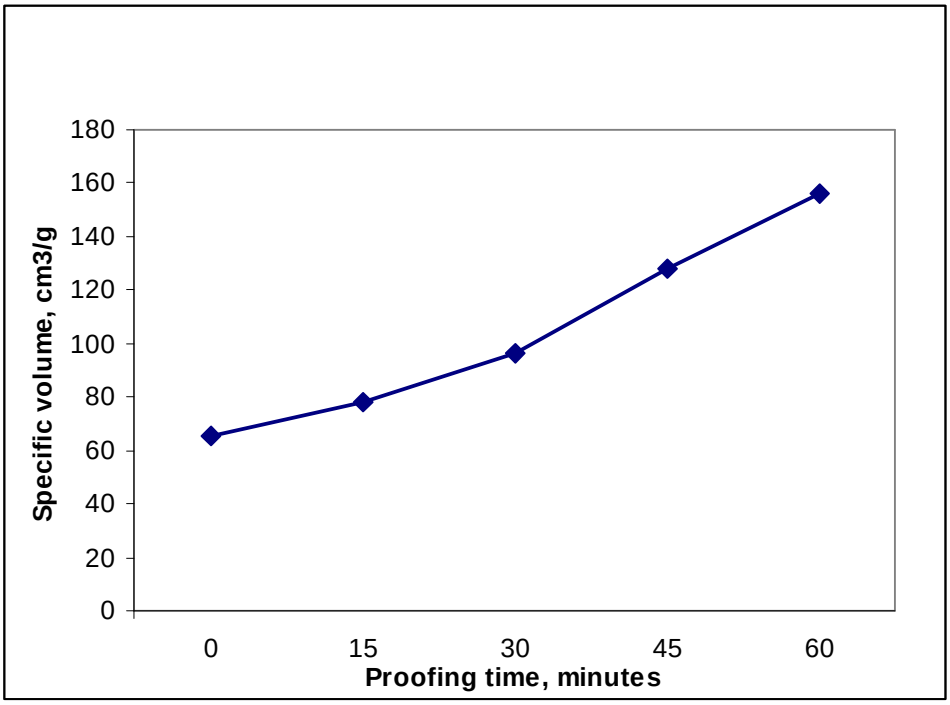

Figure 3. Volume evolution for dough enriched with butter

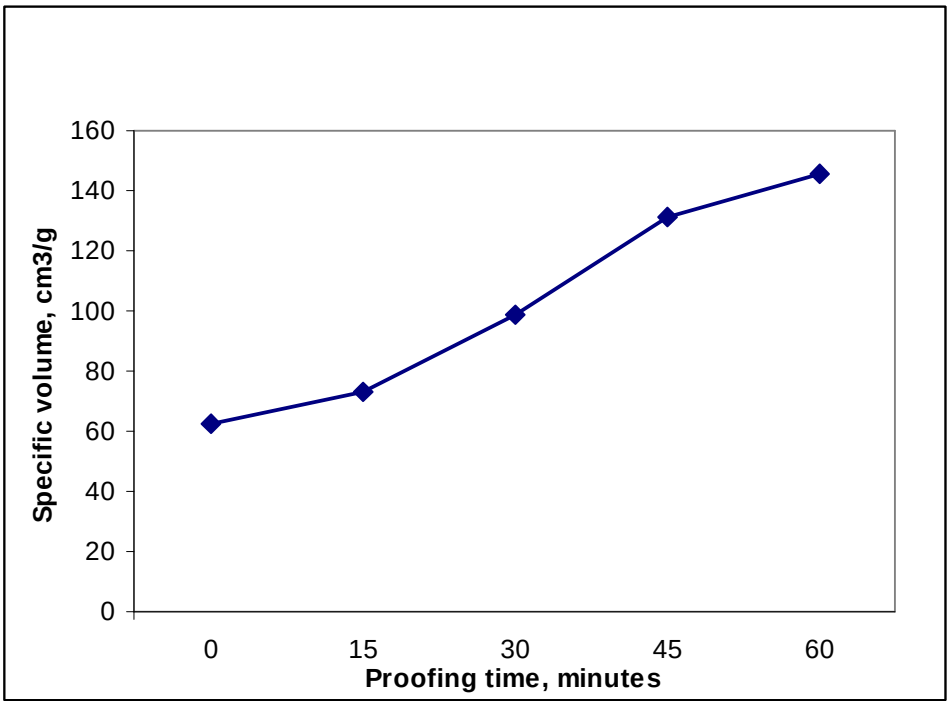

Figure 4. Volume evolution for dough enriched with sunflower oil

The products have more volume, fine and more uniform porosity, peel more elastic and less brittle, crumb with improved elasticity to the products without fat. Fats increase the preservation period during storage, the freshness of bread and improve the bread flavor.

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THE BUTTER CREAM. PHYSICAL - CHEMICAL ANALYSIS

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Abstract

In the presentation of this article I insisted on the determination of the physical-chemical properties. ***

Keywords: *butter cream, physical-chemical properties, determinations*

1.Introduction

The food production industry changed through two decades because of the development and implementation of new technologies with the purpose of satisfaction the consumers needs.

The milk industry contains a vast product diversification, including the butter cream. The butter cream is creamy and is prepared from butter, powder milk, sour cream, these are the three prime materials, different in structure from which we must obtain an unitary and compact product, with a specific white-yellow color and a tasty aroma.

Through adding salt and thickening substances we influence the taste and the final product aspect [1-3].

2. Materials and methods

a) Determination of humidity

The water evaporation from the experiment takes place through it's warming in to the drying oven at 102°C until a constant weight. The water content is calculated with the formula:

$$\text{water } \% = \frac{m_1 - m_2}{m_1 - m_0} \cdot 100 \qquad (1)$$

where :

m_0 – the empty capsule weight, g

m_1 – the capsule weight + the weight of the product took for analysis, g

m_2 – the capsule weight + the residual weight after drying, g

b)The analysis of dry substance

The content of dry substance is calculated according to the equation:

$$\% \text{ d.s.} = 100 - A \qquad (2)$$

where:

A - the water content, %

c)The analysis of ash

After the water evaporated from the experiment, trough the warming process in the drying oven at 102°C, the dry residue was carbonized and after that incinerated at 550°C. The ash content was calculated according to formula:

$$\text{Total ash} = \frac{m_1}{m} \cdot 100 \qquad (3)$$

where:

m1 – the weight of the ash, g

m – sample weight, g.

d)The determination of the NaCl content – through argent metric titration method

The chlorides are extracted from the experiment with hot water (70-80°C), and the chlorine ions are titrated with a $AgNO_3$ solution, in the presence of K_2CrO_4, as a pointer, till the change of the color in brown-red.

The NaCl content is calculated according to equation:

$$\% \text{ NaCl} = \frac{0,005845 \cdot V}{m} \cdot 100 \qquad (4)$$

where:

V – the volume of $AgNO_3$, 0.1 normal solution used in the titration, ml

m – the weight of the product took for analysis, g

0.005845 – the NaCl quantity corresponding at $1cm^3$ $AgNO_3$ 0.1 normal in grams

e) The determination of the iodine index

The iodine index represents the halogen quantity, expressed in grams of iodine, added at 100 grams of fat. The fat dissolved in chloroform reacts with iodine monobromide. The added iodine quantity is determinate indirectly through the titration with $Na_2S_2O_3$ of the freed iodine from the added potassium iodide until the discoloration. To analyze the results we need a comparison experiment witch does not content any fat.

$$\% \text{ Iodine} = \frac{0,01269 \cdot (V - V_1)}{m} \cdot 100 \qquad (5)$$

where:

V – volume of $Na_2S_2O_3$ solution 0.1 normal used to the titration in the comparison experiment, ml

V_1 – the volume of $Na_2S_2O_3$ solution 0.1 normal used to titrate the analyzed experiment, ml

m – the weight of the used fat, g

0.01269 – the iodine quantity in grams corresponding with $1cm^3$ solution $Na_2S_2O_3$ 0,1 normal.

3. Results and discussion

Figures 1-5 indicate the obtained experimental data comparatively with the admitted values provided by the STAS.

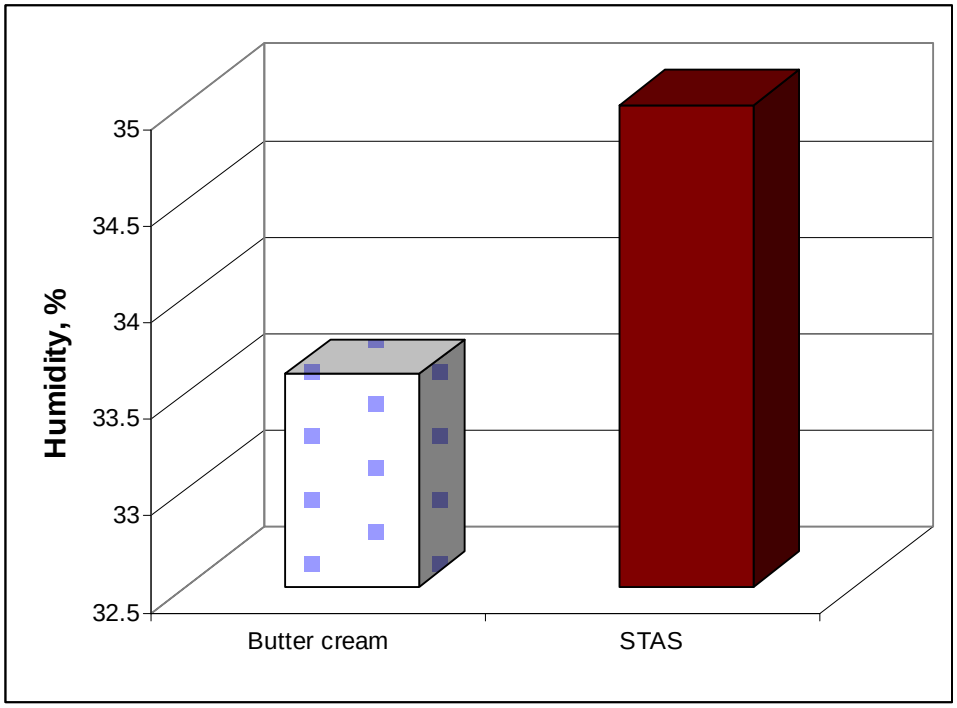

Figure 1. Humidity content of butter cream comparatively with STAS value (maximum admitted limit)

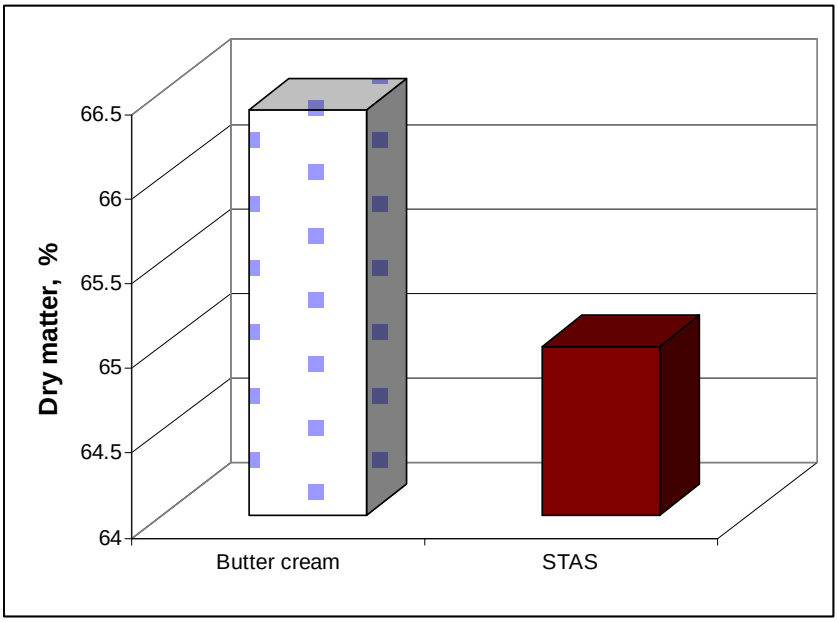

Figure 2. Dry matter content of butter cream comparatively with STAS value (minimum limit)

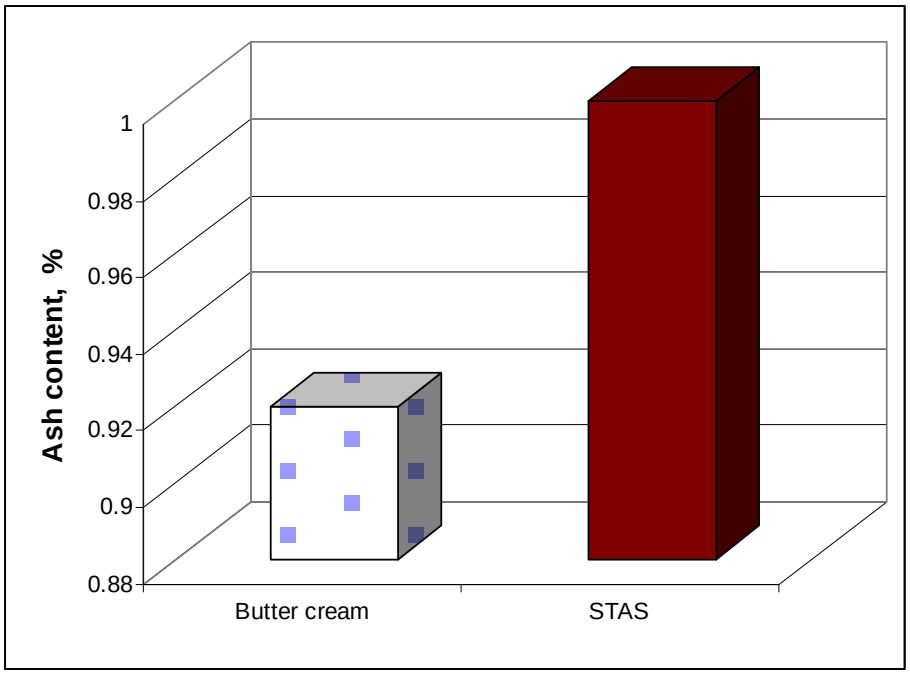

Figure 3. Ash content of butter cream comparatively with STAS value (maximum admitted limit)

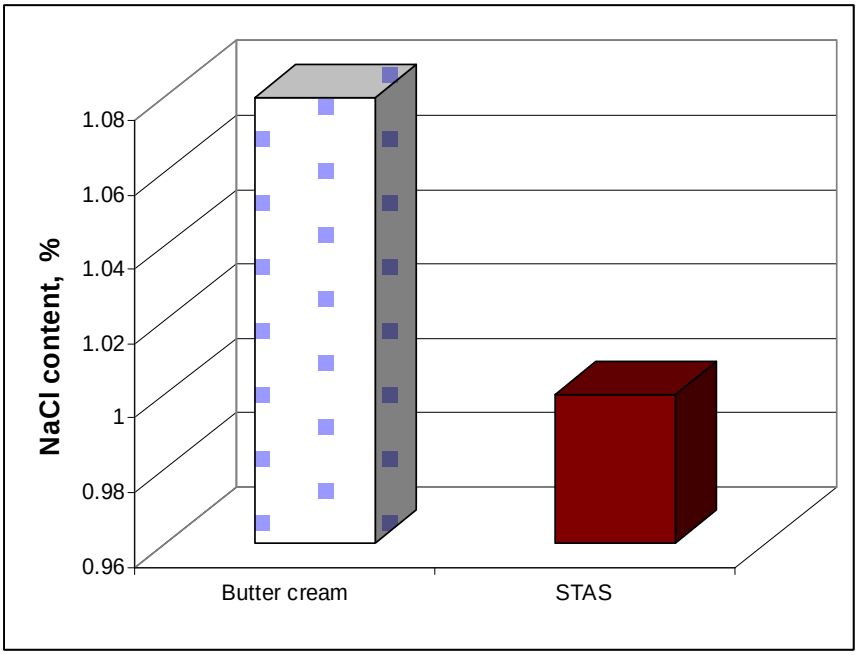

Figure 4. NaCl content of butter cream comparatively with STAS value (maximum admitted limit)

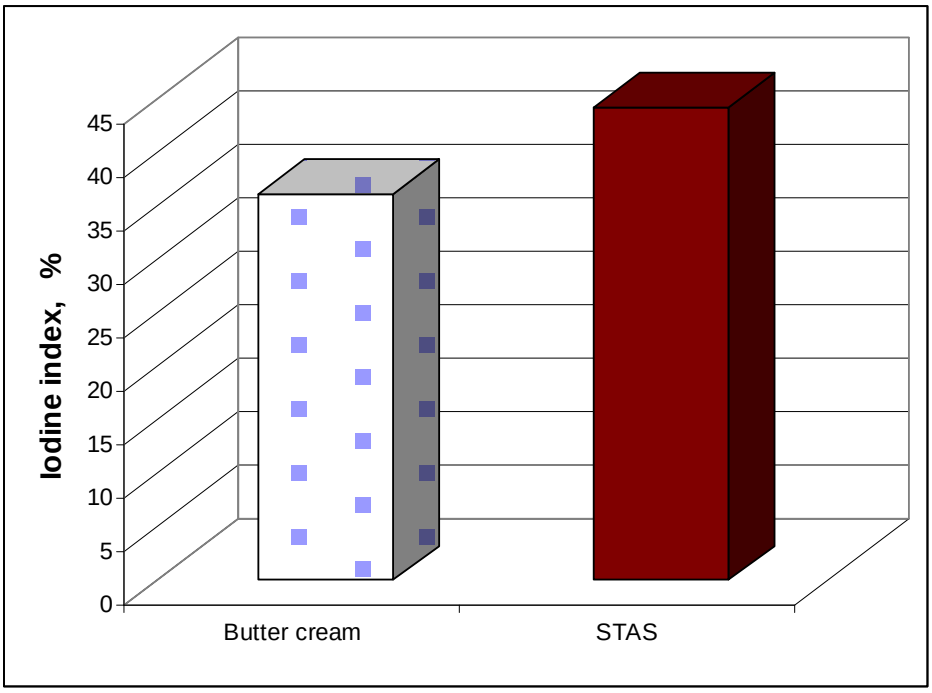

Figure 5. Iodine index of butter cream comparatively with STAS value (maximum admitted limit)

4. Conclusions

At the experimental part, I used only the values from STAS and after the analyses done on the butter cream I realized that:

●The water content is more than the dry content of the product, because the most part of the composition is the sour cream;

●The NaCl content is 1.075 % because of the salt addition;

●The iodine index is higher, because of the softer consistence, which indicates a higher percent of fat acids.

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RESEARCH REGARDING THE FETEASCA REGALA WINE COMPOSITION

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Abstract

Wine is an alchoholic beverage typically made of fermented grape juice. The natural chemical balance of grapes is such that they can ferment without the addition of sugars, acids, enzymes or other nutrients. Wine is produced by fermenting crushed grapes using various types of yeast. Yeast consumes the sugars found in the grapes and converts them into alcohol. Different varieties of grapes and strains of yeasts are used depending on the type of wine being produced.

Wine has a rich history dating back to around 6000 BC and is thought to have originated in areas now within the borders of Georgia and Iran. Wine probably appeared in Europe at about 4500 BC in what is now Bulgaria and Greece, and was very common in ancient Greece and Rome. Wine has also played an important role in religion throughout history.

Keywords : *wine, grapes, dry extract, total acidity, volatile acidity*

1.Introduction

Grapes, are generously endowed with acidity, the class of compounds which causes the sour taste of wine. We taste acidity at the sides of our tongues. It gives a tingling, almost tactile, sensation. This makes sense since we know that acids are highly reactive compounds. Upon sampling an acidic liquid, a common reflex action is to smack our lips.

Certain wines because they are made with grape varieties that naturally have high acid levels almost always give this sensation. Generally the cooler the climate that the grapes are grown in, the more acidic the final wine. Another factor to take into consideration is that in many countries such as the United States and Australia it is common practice to add acid artificially to wine in order to modify and shape wine taste.

This practice is less widespread in Europe and is a reason why European wines are more varied in style than American wines. There are several different acid compounds in wine. The most important is *tartaric acid.* Grapes are one of the few fruits to have large amounts of this acid in their chemical composition. This is a strong acid which has a clean, pure taste. Another is malic acid. Though chemically less strong an acid, *malic acid* has a stronger and coarser taste. We have all bit into an underripe apple and winced at the attack of malic acid on our taste buds. Wines made from less than fully ripe grapes can have give this coarse, acidic sensation. Acidity has an important role in the structure of a wine's taste. Without a generous amount of acidity, most wines would simply not taste good. Acidity not only adds a refreshing quality to wine taste, it balances the rich taste of alcohol and the sweet taste of unfermented fruit sugars. European researchers have discovered that even 10 years after bottling, wine still holds the chemical signature of the forest from which the barrel used to age it was made. The approach could be used to detect wine fraud in the future, say the team. The chemical composition of wine depends on a complex mixture of factors including how and where the grapes are grown, how the wine is made and the aging process used. The volatile and polyphenolic compounds involved in the taste, smell and therapeutic effects of wine have been well studied - but have generally only been considered one chemical at a time. Due to wine's complexity, an approach that looks at many compounds at once could provide new insights into its chemical composition. Add to this the fact that some of the compounds will undergo chemical reactions while the wine is in the bottle, and the result is a hugely complex chemical combination [1-3].

2. Materials and methods

The paper emphasizes the chemical composition of white dry wine. To compare the results, the methods has been used on white dry wine Feteasca regala but from two different vineyard: from Jidvei and from Husi.

a)The determination of dry extract.

The dry extract means the entire of substances that are not volatiles. Dry extract is determined on evaporation. The dry extract is obtaining by setting wine to the drying room and it’s the difference between

weight of porcelain capsule with wine and weight of empty porcelain capsule.

b) The determination of total acidity of white dry wine. Dry white wine balance relies solely on the balance of acid and alcohol. The most important acid in wine is tartaric acid. Grapes have large amounts of this acid in their chemical composition. Another determinated acid is the sulphuric acid. This acids in wine depends of many factors including: how and where the grapes are grown, the technology of obtaining wine and the aging process used. In this experiment, white dry wine is having a degree with NaOH in present of red of fenol till the wine is becoming orange.

c) The free and total bioxid of sulphur detected in white dry wine.

Free bioxid of sulphur meens the real bioxid of sulphur (SO_2) and that in sulphurous acid (H_2SO_3) or in a combinated form like acid sulphites and neutral sulphites.The total bioxid of sulphur reprezent the free bioxid of sulphur and bioxid of sulphur in combination with aldoze, cetoze, acetaldehyde.

In this experiment, white dry wine with starch, H_2SO_4 is having degree with iodine solution till it's getting a blue color, which is maintaining minimum 10 secundes. The bioxid of sulphur combinated with saccharoses and acetaldehyde, is deliver with NaOH and than with sulphuros acid, and in final is having a degree with iodine in present of starch.

d) The determination of reducter sugar by iodometric method.

It's reduceing at warm an alcaline solution by reducter sugar from the analizig sample, and the copperous oxide resultated from the reaction is having a degree with thiosulphate of sodium.

3.Results and discussion

In Figures 1-4 are presented the obtained experimental data.

The quantity of dry extract for Feteasca regala from Jidvei vineyard is more ample than the quantity of dry extract for Feteasca regala from Husi vineyard. This difference is given by the different tipes of technologys of obtaining wine, or by the defferent quality of grapes.From the graph it's observe that the difference it's very small.

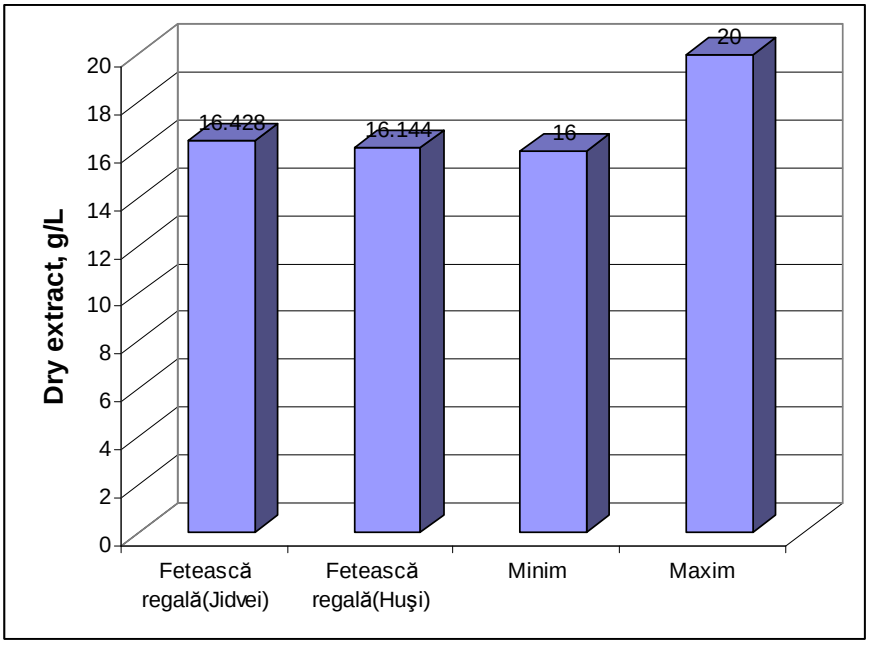

Figure 1. The content of dry extract in studied wines

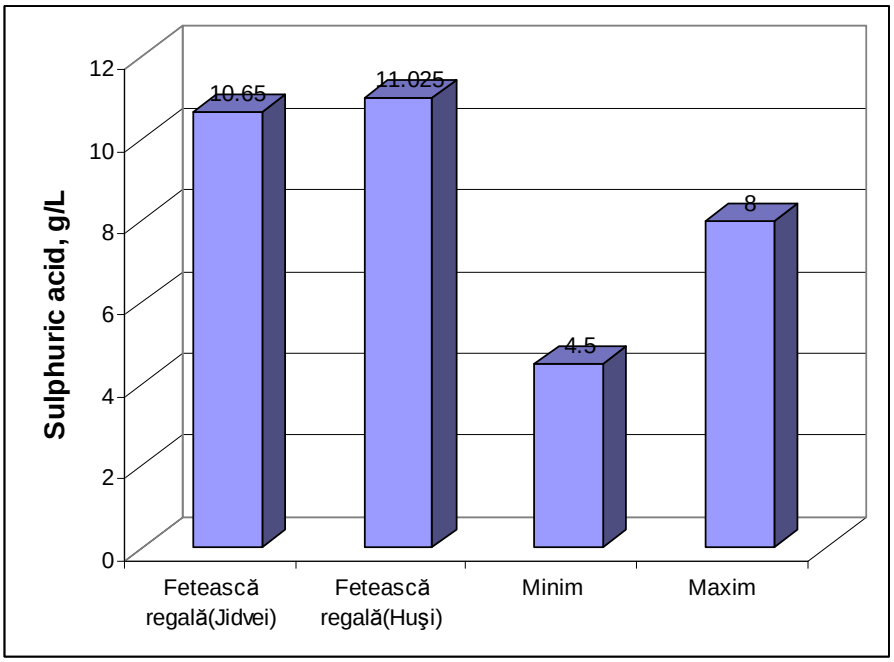

Figure 2. The acidity of studied wines, expressed in sulphuric acid content

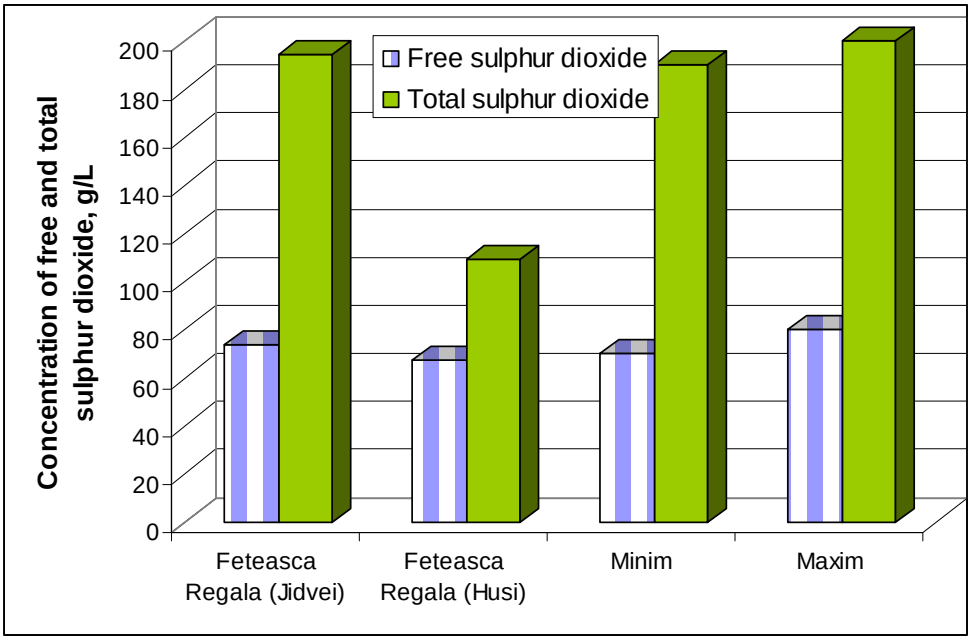

Figure 3. The contents of free and total sulphur dioxide

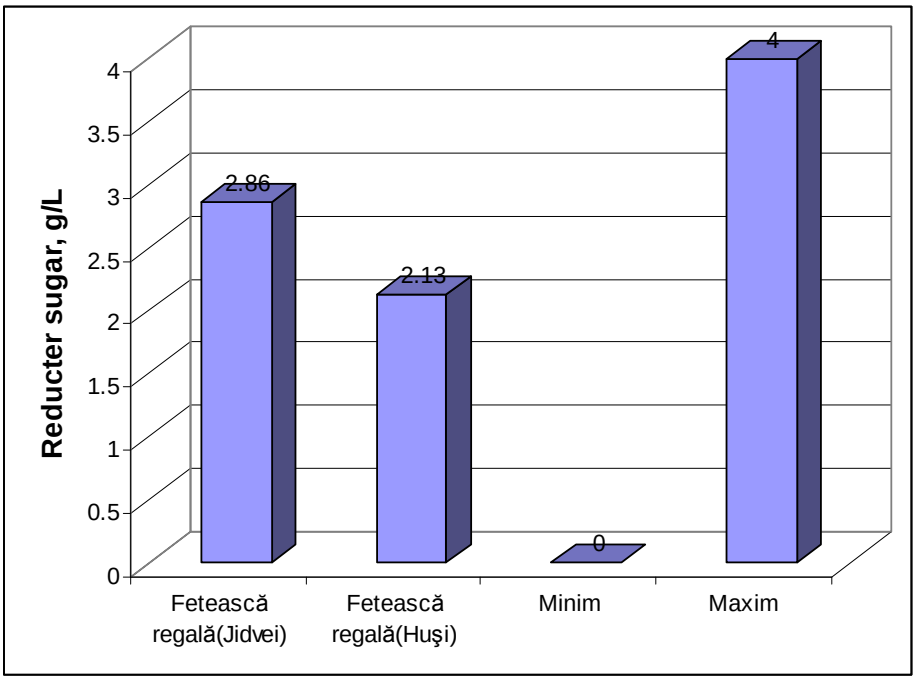

Figure 4. The content of reducter sugars in wines

From the graphs it's observe that the total acidity in sulphur acid for white dry wine Feteasca regala from Husi is mire ample than the total acidity for white dry wine Feteasca regala from Jidvei vineyard. Again, the differences are very small, and the results are fitting in the interval rendered by the branch of science. The quantity accepted for the white dry wine in total bioxid of sulphur is 190-200 mg/l.The free bioxid of sulphur and the total bioxid of sulphur are fitting in the interval rendered by the branch of science , but bowth are ample for white dry wine Feteasca regala from Jidvei vineyard than white dry wine Feteasca regala from Husi vineyard. The free bioxid of sulphur and the total bioxid of sulphur for white dry wine Feteasca regala from Husi vineyard have little values, because in this zone, in process of winemaking it's not using so much bioxid of sulphur in the operation of clering the new wine. In the dry white wine the quantity of reducter sugar it's zero or maximum 4 g/l. The results obtained from te experiment are fitting in the interval rndered by branch of science, but the quantity of reducter sugar for white dry wine Feteasca regala from Husi vineyard it's a smaller value than the quantity of reducter sugar for white dry wine Feteasca regala from Jidvei vineyard.

4. Conclusions

After the laboratory experiments result that the tipe of white dry wine Feteasca regala, unimportant the vineuard source, the chemical composition is fitting in the intervals rendered by branch of science. The differences that exist between thouse two tipes of wine are: ● white dry wine Feteasca regala from Husi vineyard has a ample quantity in mineral substances hat the white dry wine Feteasca regala from Jidvei vineyard. Also, it has ample quantity of acidity in sulphur acid and tartaric acid. ●white dry wine Feteasca regala from Jidvei vineyard has ample values than the white dry wine Feteasca regala from Husi vineyard in: dry extarct, free and total bixid of sulphur, and reducter sugar. It's has to make clear that the obtained values differ in very small limits.

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RESEARCH REGARDING THE CHEMICAL COMPOSITION OF MILK CHOCOLATE

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Abstract

This article presents the technology of manufacture of chocolate, determinations that are required to check the quality, materials and methods used in the analysis and, last but not least, the findings.

Keywords : *chocolate compound, ash, fat , chocolate umidity*

1.Introduction

Chocolate is a sugar who is likely to melt in your mouth, revealing its fine taste and aroma. These qualities–degree dispersion, smell and onctuosity–are the result of physical and biochemical processes occurring during processing of the raw materials: cocoa mass, milk powder, sugar, some additives (flavoring).

Cocoa mass has liquefaction properties. At room temperature there are desperate sound systems which are fluid by heating. In such systems, the dispersion phase of the melting is cocoa butter and the disperse phase is represented by solid particles from cocoa beans and powder sugar.

Chocolate products are much appreciated because of the taste, the agreeable flavor and the nutritional levels they consist of.

2. Materials and methods

a) Determining the water content (moisture)

Food in general, consists of water and solid materials in proportions that may vary from one another. Water, through its presence in the food determines the quality and influences the stability of the product.

The method: Determining mass loss by heating in the drying stove at a temperature of 103 ± 2 ° C until constant mass, a mixture

comprising the sample for analysis, calcined sand and alcohol.

b) Determine the total ash and ash insoluble in HCl 10%.

The ash is a very important feature for food in general, but especially in those of plant origin. Ash expresses the percentage of mineral and mineral impurities from a product.

Determination of ash is normally carried out by burning the sample under conditions laid down by the slow method 550 - 650 ° C (reference method) and fast method to 900 - 920 ° C.

The method: residue determination results by burning the sample to be analyzed.

c) Determining the fat content

Method for quantification of fat is based on their property to dissolve the volatile organic solvents.

The method: repeated extraction with ethyl ether or petroleum ether fatty substances in the sample to be analyzed, followed by determination of fat extracted from a measured volume of petroleum, by removing the solvent and weighing the residue obtained fat.

3. Results and discussion

a) Determining the water content (moisture)

The humidity of analized products is presented in Figure 1. Maximum humidity in documents is 2.3%. It is noted that humidity compound chocolate (the intermediate product is more than a tablet of chocolate cream and a milk tablet). This is because chocolate compound has not been subjected to all processes and treatments, as with the other two.

b) Determine the total ash and ash insoluble in HCl 10%

In Figure 2 are presented the levels of total ash and insoluble ash in HCl. Total ash according to standard is a maximum of 2%. It can be seen that products falling within the ashes of the tablet of milk chocolate are lower than the percentage of ash tablet with cream and chocolate compound. The total content of ash insoluble in hydrochloric acid 10% standard maximum is 0.2.%

c) Determining the fat content

From the Figure 3 it can be seen that milk chocolate tablet meeting the fat, has a higher fat percentage than the cream tablet, which contains less fat than the other chocolate bars.

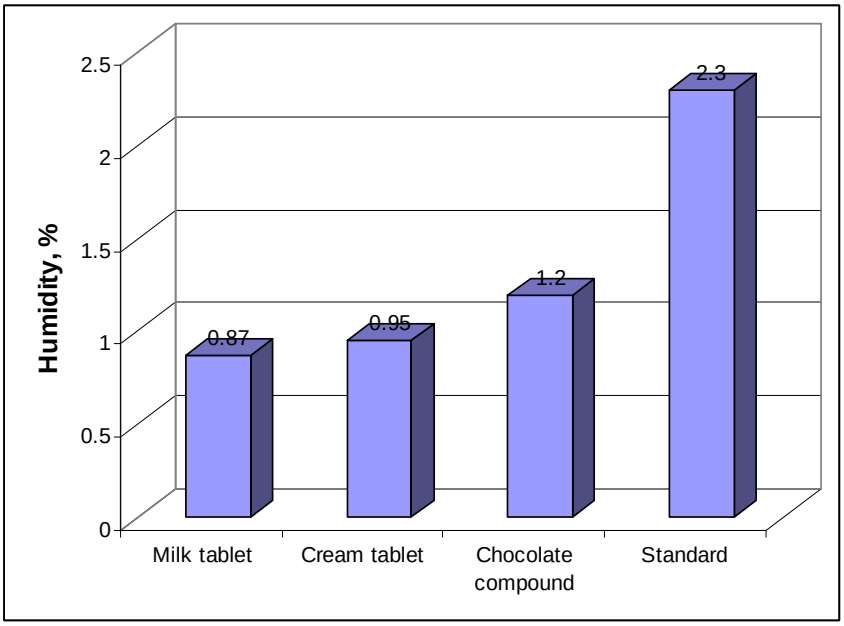

Figure 1. Comparative analysis of humidity in studied chocolates

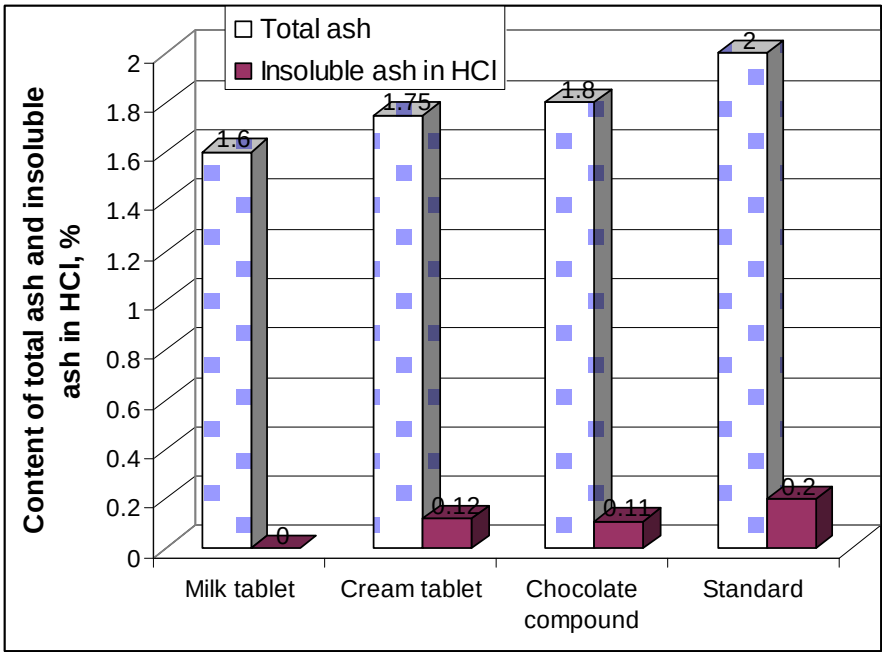

Figure 2. The levels of total ash and insoluble ash in HCl in studied chocolates

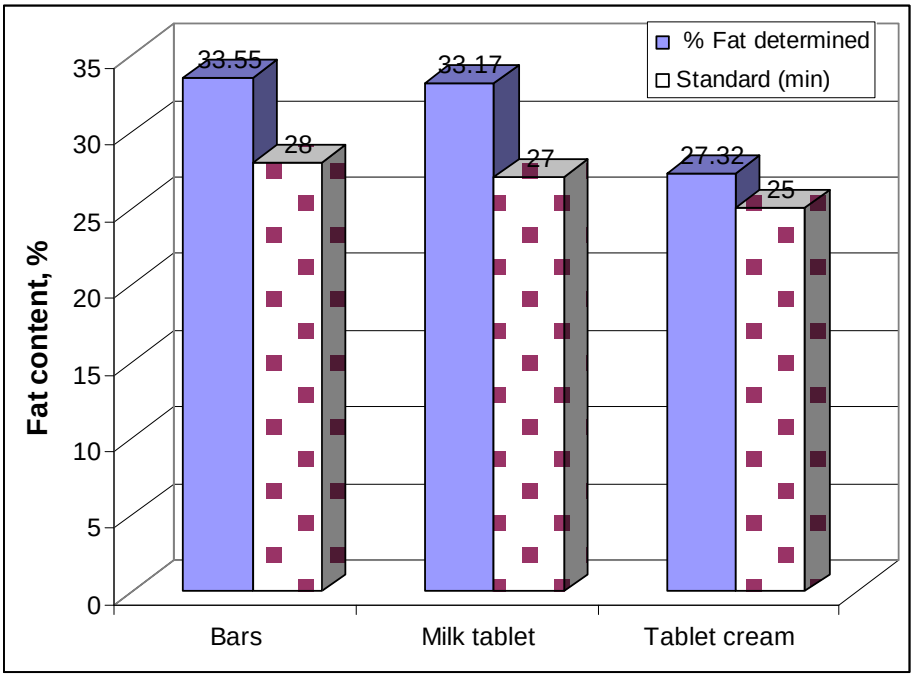

Figure 3. Comparatively presentation of fat content in studied chocolates

4. Conclusions

The following tests reveal that the analysis is included in the standards.

Most myths about chocolate say that it fattens but researchers have shown the benefits of the consumption of chocolate.

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THE TECHNOLOGY OF MAKING BUTTER

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Abstract

This work paper has the purpose to mark out the physico-chemical and sensitive characteristics as taste, smell, aspect or consistency of the butter.

Butter is a dairy product made by churning fresh or fermented cream or milk. It is generally used as a spread and a condiment, as well as in cooking applications such as baking, sauce making, and frying. Butter consists of butterfat, water and milk proteins.

Keywords: *butter, technology, analyses, reagent, fat*

1.Introduction

Most frequently made from cows' milk, butter can also be manufactured from other mammals as: sheep, buffalo and yaks. Salt, flavorings and preservatives are sometimes added to milk

Butter is an emulsion which remains a solid when refrigerated, but soften to a spread able consistency at room temperature and melts to a thin liquid consistency at 32-35ºC(90-95ºF.The density of butter is 911kg/m^3.

It generally has a pale yellow to nearly white. Its color is dependent. on the animal's feed and is commonly manipulated

with colorings in the commercial manufacturing process.

For the physic-chemical and sensitive analyses it was used 4 types of butter: 83%fat, 80% fat, 65% fat and 60%fat.

The butter it's usually made from sour cream, which has to have the characteristics presented in Table 1:

Table 1. Milk chemical composition

Components	Concentration	
	g/100g	relative
fat	30	-
protein	2.7	-
lactose	3	-
water	64	91.4

Butter is produced by agitating cream, which damages these membranes and allows the milk fats to conjoin, separating from the other parts of the cream. Variations in the production method will create butters with different consistencies, mostly due to the butterfat composition in the finished product. Butter contains fat in three separate forms: free butterfat, butterfat crystals, and undamaged fat globules. In the finished product, different proportions of these forms result in different consistencies within the butter; butters with many crystals are harder than butters dominated by free fats.

2. Materials and methods

a) Determination of water in butter

For determinate the quantity of water from butter it was used the following method:

- In a weighing vial with 12 g sand, I put 10 g butter which is very good homogenized with the sand.
- Then it's drying at the vacuum drying oven at 100-102ºC, until we get a constant weigh

For calculate the water from butter I used the next formula:

$$\text{Water content \%} = (m_1+m_2)-m \quad (1)$$

where:

m_1-the empty vial weight m_2-sample weight of butter

m_3-sample weight obtained

b) The determination of butter acidity

The butter and fat phase of butter acidity is exprimated in Kettstrofer (ºK) or acidity grades

(ºA)and it means the quantity of NaOH 0.1 N that neutralized 10 g butter.

Method: In a Erlenmyer ballon of 50 ml we put 10 g of butter, 20 ml mixture alchol – ether, 3 dots of Phenolphthalein 2%. We titrate this mixture with NaOH 0.1N until it appears a pink colour. The acidity level is calculated according to formula:

Acidity=0.082x Vx100/m (2)

where:

V-NaOH 0.1 N used at titration, ml

m-weight of butter , g

c) The determination of NaCl in butter

Method: In a 50 ml Erlenmyer ballon, we put 5 g butter, 100 ml hot distilled water.We let to stay in repose and once in a while we stir it.After a refrigeration at 55-60ºC we put 2 ml solution of $K_2Cr_2O_4$.We titrate the mixture with solution of $AgNO_3$ untill we get a red, red-brown colour of the mixture that can persist 30 seconds. The next equation was used for calculation:

%NaCl=0.00585xVx100/m (3)

where:

V-$AgNO_3$ used at titration, ml

m-weight of butter used, g

d) The freshness of butter by Kreiss reaction

Method: The fat separated from butter is treated in a acid environment wirh phluoroglucine. If appears a pink to red colour of the mixture, it indicates the presence of the epihidrique aldehyde and means that the butter is in the first phase of degradation.

3. Results and discussion

These analyses were made on 4 tipes of butter and in 2 cases: on normal butter and degradate butter. In Figures 1-3 are presented the experimental data.

From the Figure 1 we can see that the concentration in water grows with the decrease of the fat. So, the butter with 60% fat has a big quantity of water and the butter with 83% fat has the most few quantity of water.

From Figure 2 we can deduce that the butter that has the biggest acidity is the butter with 60% and this butter is degrading the most quikly.

From Figure 3 we can see that in the butter with 60% fat is more NaCl then in the butter with 83% fat.

The freshness of butter by Kreiss reaction

At this analyze we used normal butter and a butter that was kept in wrong conditions for 2 weeks. From this analyses we could see that for the normal butter didn’t appear any color because wash a fresh butter, but for the butter that was kept in bad conditions we could see that appeared for each type of butter a red color that showed us that the butter was rancid.

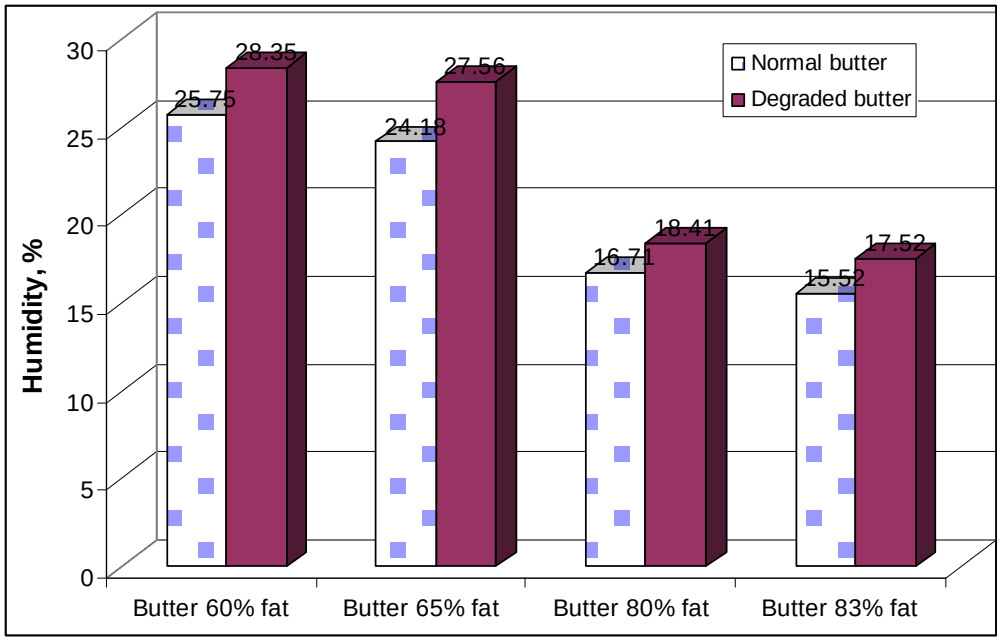

Figura 1. Comparative analysis of humidity in studied butter samples

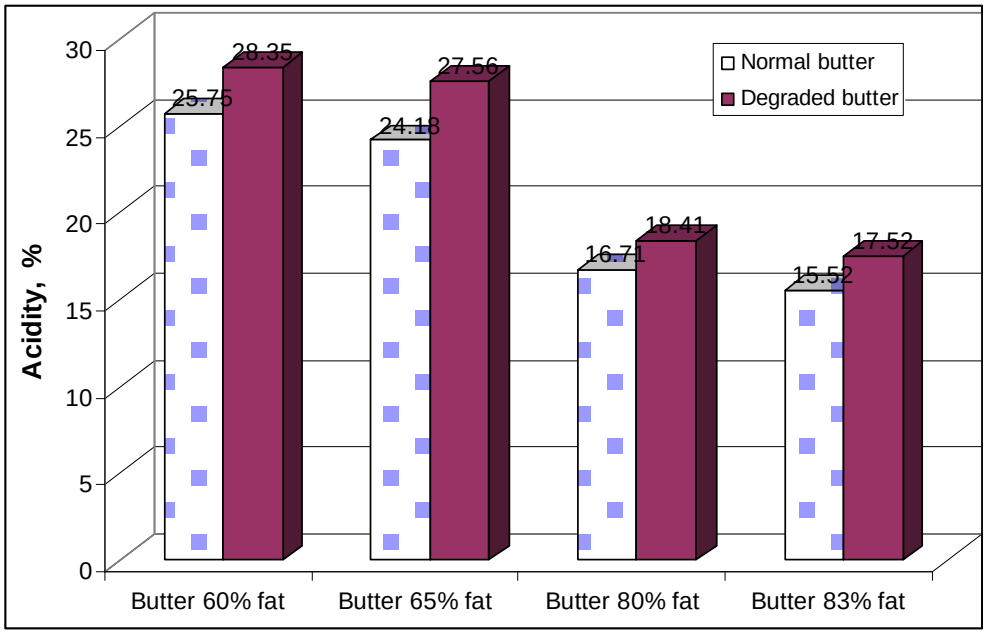

Figure 2. Acidity level in the butter samples

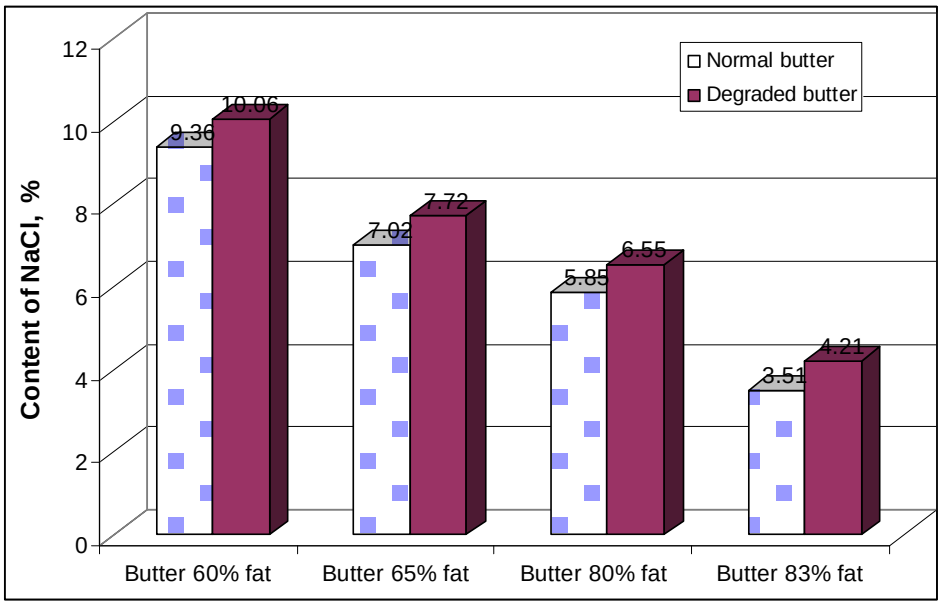

Figure 3. Contents of NaCl in butter samples

Table 2. Sensitive characteristics

Characteristics	Butter 83%fat	Butter 80%fat	Butter 65%fat	Butter 60%fat
Colour	yellow	Yellow	white	white
Aspect	Without dots of water	Very rearly dots of water	Small dots of water, small air gaps	Small dots of water, thick air gaps
Consistency	uncrumbly	Homogenous,compact	Not very oily	Not very homogenous
Smell	Odor, well exprimated	Odor, satisfactory	Barely perceptible	Barely perceptible
Taste	Fermented cream	Flavored	Not very flavored	Not very flavored

4. Conclusion

On the basis of the original researches we can see the following things:

- the water content of butter grows with the decrease of the butter fat and is bigger for the degraded butter
- the butter acidity grows with the decrease of the fat concentration of the butter and is bigger for the degraded butter
- the content in NaCl depends of the butter fat concentration . In these case the butter with 60% fat has the highest content in NaCl

- the freshness of the butter it's given by the Kreiss reaction and it's negative for normal, fresh butter and positive for the degradated butter when appears a pink to red colour depending of the degree of alteration
- the good butter has to have from yellow to white colour, without dots water, without air gapes,has to be uncrumbly, with good smell and taste, without strange smell and taste

In conclusion the butter is a fat product, absolutely natural, with different water content and different characteristics which depends of the type of butter we analyse.

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THE INFLUENCE OF PRESERVATION PARAMETERS ON THE NUTRITIONAL CHARACTERISTIC OF SEA BUCKTHORNE (*HIPPOPHAE RHAMNOIDES*) SYRUP

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Abstract

The fruits of sea buckthorn (*Hippophae rhamnoides)* represent a valuable source of essential elements both for usually and special diets. Pherisability of fruits challenge the natural pharmacy to obtain nutritional and therapeutically products in which the above mentioned elements are preserved for a long time . The parameters of processing technologies influence essential the nutritional and therapeutically properties of these products.

The present study intends to determine the level of mineral elements and to emphasized the correlation between the preservation conditions (agents, termic regime) and the acidity and contents of A and C vitamins of sea buckthorn syrup.Experimental data indicates high content of K as others studies presents. Low content (Na, Cr, Cu, Zn, NI, Mn, Co) or even the absence (Fe, Pb, Cd) of others minerals resulted in opposition with other references studied. Pasteurization and preserving agents (benzoic acid and sugar) reduce significantly the content of C and A vitamins.Increase of acidity were noticed, the highest proportion in unpasteurized sample, due the fermentative process that occurs during preservation time range.

Keywords: *sea buckthorn juice, sea buckthorn syrup, C vitamin, A vitamin, mineral elements*

1. Introduction

The importance of nutrition in assuring a good health and shape of sportmen is welknown. The diet should be organized considering the particularities of metabolic processes related to different types of sports, it beeing determined by the substantces exchangd and the intensity of physically effort [1].

In case of sports characterized by intense physically effort and overheating of body the requirement of vitamines is increased. Also, a diet enriched in high energetic food, as proteine and sugars, increases the body requirements in vitamines. They rise the physically effort's capacity and decrease the recovery time range after

trainings. The C and B_1 vitamines are the most valuable in this actions. A high doses of vitamines B_1, B_2, PP, B_6, folic acid, pantothenic acid are necessary for the sportmens. B_6 vitamine is a regulator of substances exchanges during metabolic activities, E vitamine is an intracell antioxidant and interfferes in muscular activity. Producing the mioglobine, the oxygen source in muscle, requires 20% more iron and 1.5-2 times more phosphor that is necessary in bodies unsolicited in physically efforts.

The suplementary doses of vitamins are assured to sportmens by including in their diet the polivitamine complexes. The bioaccumulation of vitamines is more effective if their source is natural instead synthetical.

Sea buckthorn (*Hippophae rhamnoides*) is considered a perfect source for producing full naturally nutritional supplements. Mixed with others plant and apicultural products, these supplements help to preserve the healthy state, prevent diseases appearances and help in healing process.

They have no secondary effects and have no counter-indications. Usually, the supplements contain vitamins, mineral salts, microelements, antioxidants, phytohormons.

Considering the fruit of sea buckthorn (*Hippophae rhamnoides*) they content β-caroten (essential for visual acuity), bioactive elements P, Ca, Na, Fe, Mg, K, vitamines A, E, F, D, K, P, C (C vitamine is twice higher than in the dog rose -*Rosa canina* and ten times higher than in oranges), B complex, essential fat acids and all essential aminoacids.

Considering the benefits of sea buckthorn but also it perishability, the natural pharmacy processed the fruits in order to obtain products which preserve all benefic elements and available a long time range. Thus, nutritional and therapeutically products were obtained from fruits of sea buckthorn. The most known nutritional products are considered juice, syrup and wine of sea buckthorn. Therapeutically products are powder, oil, macerate and yolk sea buckthorn.

Sea buckthorn syrup, the subject of the present study, is obtained according the scheme presented in Figure 1 [7].

Nutritional and therapeutically properties of the syrup are essentially influenced by the processing parameters of juice, as the intermediary product.

The present study intends to analyze the content of minerals in fresh juice of sea buckthorne and to emphasize the influence of preservation conditions over content of C and A vitamines and acidity of syrup.

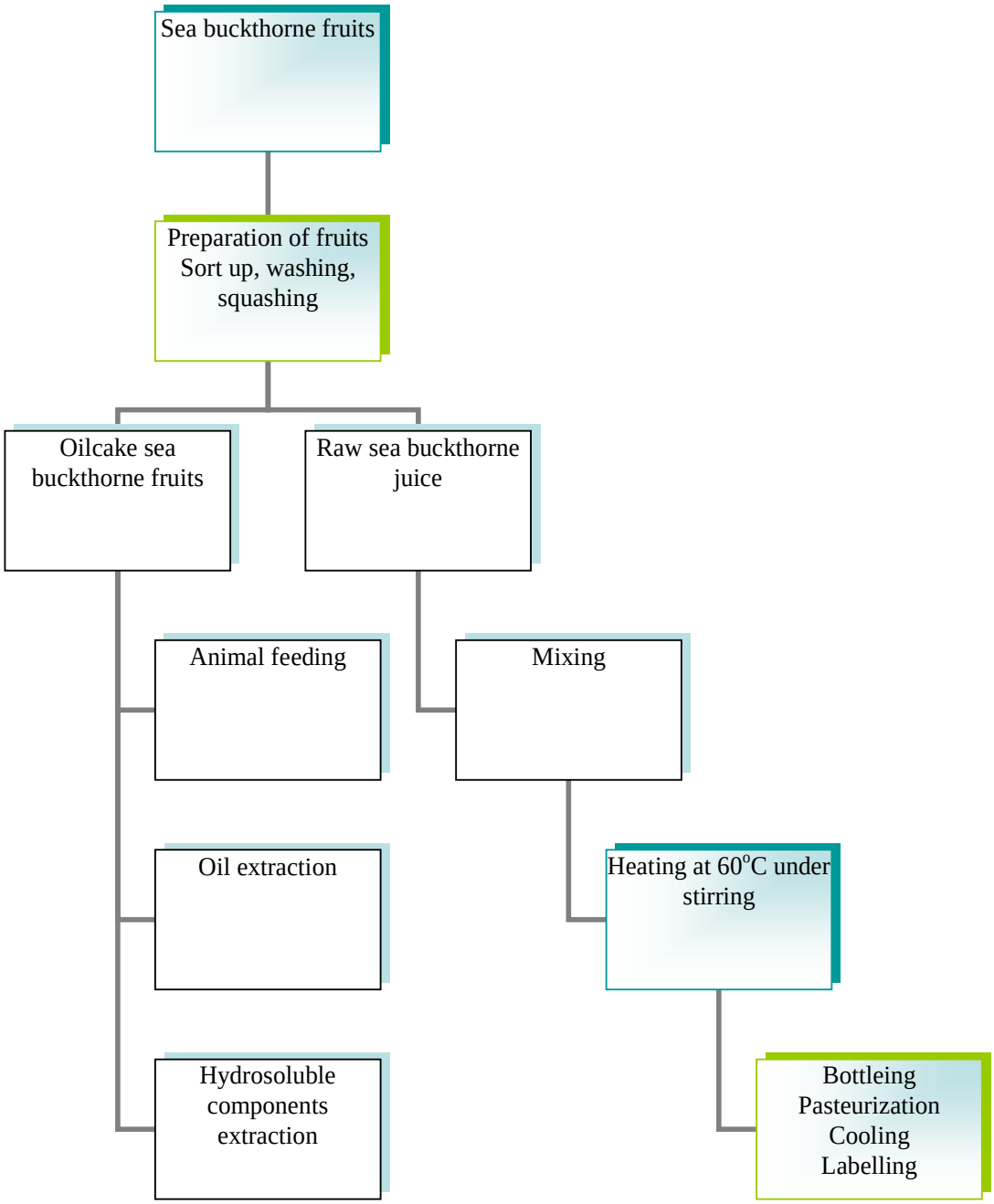


Figure 1. Processing scheme of sea buckthorn fruits for syrup obtaining

2. Materials and methods

The sea buckthorne juice was prepared from sea bucktorne fruits (*Hippophae rhamnoides)* according to the scheme indicated in Figure 1. Samples of juice (Figure 2) were conditioned usig benzoic acid and sugar and and preserved in different thermal conditions as the Table 1 indicates.

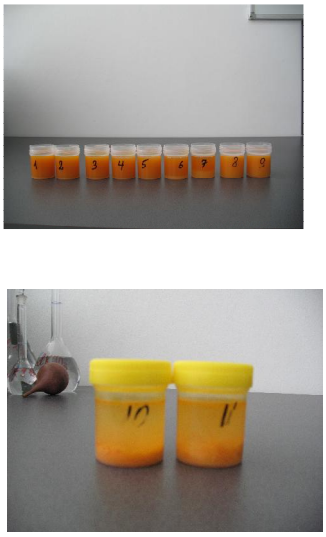


Figure 2. Sea buckthorn juice samples

At different time ranges, samples of underbrush syrup were collected and analyzed.

a) The analysis of mineral content in fresh juice were performed by spectrometric absorbtion method, according to SR EN 14082/2003, using a Perkin Elmer AAS 800 spectrometer.

b) The analysis of C vitamine [8,9] were established using iodometric method. That is based by oxidation with iodine of C vitamine to dehidroascorbic acid under acid solution, as the reaction (3) indicates. As indicators is used starch of which color is turnes blue at the moment of complete oxidation of C vitamine. The iodine requires by the oxidation reaction coming from the reaction between KIO_3 and KI under acid solution (1,2).

$$KIO_3 + 5KI + 6HCl \rightarrow 3I_2 + 6KCl + 3H_2O \quad (1)$$

$$I_2 + H_2O \rightarrow [O] + 2HI \quad (2)$$

$$\text{Ascorbic acid} + [O] \rightarrow \text{Dehidroascorbic Acid} + H_2O \quad (3)$$

The content of C vitamine were calculated according to the equation:

$$\text{Content of C vitamine} = \frac{V_1 \cdot V_2 \cdot 0.3522}{m} \quad (4)$$

where:

V_1 – volume of KIO_3 solution usen in titration procedure, mL

V_2 – analyzed sample volume, ml

0.3522 – concentration of KIO_3 solution, Eg/L

m – weight of underbrush juice analyzed, g

c) The analysis of A vitamine were performed by measuring the color intensity resulted after extraction of carotenoides in organic solvents (alcohol-benzen) [9]. Calibration curve was built using standard solutions of de $K_2Cr_2O_7$ and reading the transmitance at 460 nm wavelenght. For the juice samples also the transmitances at 460 nm wavelenght were red. The concentration of A vitamine in juice samples was established considering that to 1 ml standard solution of $K_2Cr_2O_7$ correspond to 2 mg of carrotens.

d) The acidity of syrup during the preservation time range was determined by using pH indicator paper.

Table 1. Work condition for preparing the sea buckthorn syrup

Sample	**Sea buckthorne juice (mL)**	**Benzoic acid (g $^0/_{00}$)**	**Sugar (g/L)**	**Thermal treatment**	**Preservation**
S 1	50	0	300 g/l	pasteurized	cold
S 2	50	0.2 $^0/_{00}$	300 g/l	pasteurized	cold
S 3	50	0.5 $^0/_{00}$	300 g/l	pasteurized	cold
S 4	50	1 $^0/_{00}$	300 g/l	pasteurized	cold
S 5	50	0.2 $^0/_{00}$	250 g/l	pasteurized	cold
S 6	50	0.2 $^0/_{00}$	500 g/l	pasteurized	cold
S 7	50	0.2 $^0/_{00}$	750 g/l	pasteurized	cold
S 8	50	0	0	pasteurized	cold
S 9	50	0	0	pasteurized	20^0C
S 10	50	0	0	pasteurized	cold
S 11	50	0	0	non pasteurized	20^0C

3. Results and discussions

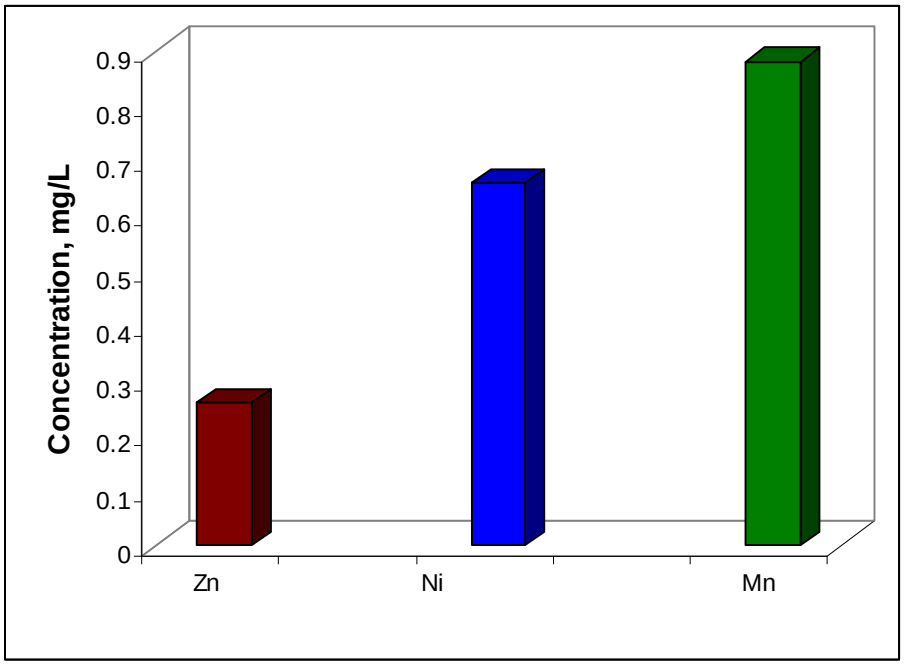
a)The content of minerals in the fresh sea buckthorn juice is presented in Figure 3.

As the Figure 3 indicates a high concentration of K (328.03 mg/L) in the fresh juice of sea buckthorn, an essential bioactive microelement in supporting of physically effort and also muscles recovery after intense efforts.

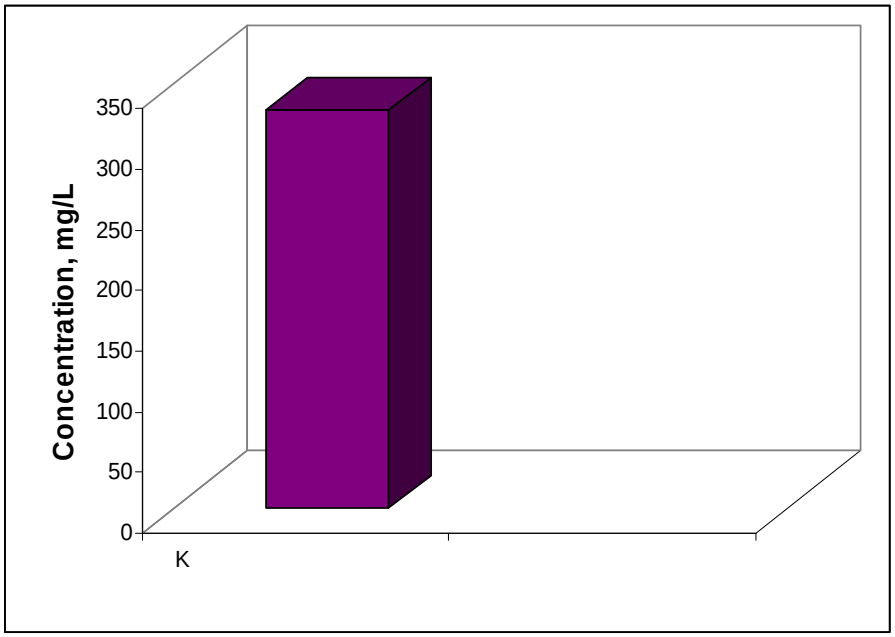
Average concentrations are founded for Na (7.3 mg/L), Cr (2.26 mg/L) and Cu (1.08 mg/L) while low concentrations are indicated for Zn (0.26 mg/L), Ni (0.66 mg/L), Mn (0.88 mg/L) and Co (0.05 mg/L). The absence of Fe, Cd and Pb (or in concentrations lower than the detection limit of used equipment) can be noticed.

The comparison of studied mineral elements with those reported in different studies [4,6] dedicated to sea buckthorn fruits and products, indicates a good match in case of K. Regarding the others minerals, lower values were obtained in this study. We consider that the mostly part of the mineral elements were retained in the oilcake sea buckthorn fruits resulted after the squashing process. Of course, further studies should prove the advanced hypothesis.

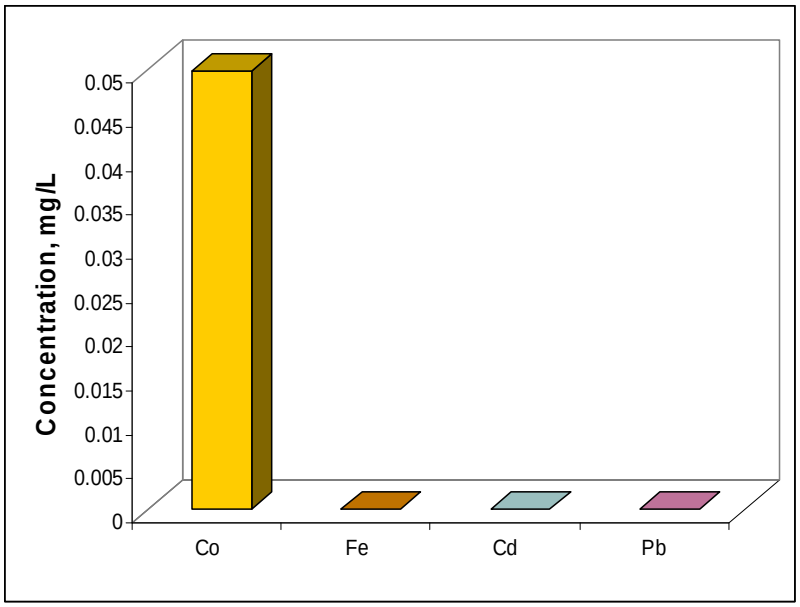
b) Contents of C vitamin during of preserving time range are indicated in Figure 4. A continuous decrease of C vitamin concentration is occurred while the preservation time range increases. The decrease rate depends by the conditioning agents and preserving parameters. The deepest lowering is recorded after 15 days, respectively 30 days, in case of sample 7 of which high sugar content (750 g/L) and pasteurizing treatment led to a significant destroy of C vitamin. This hypothesis is supported by the Figure 5, which indicates a decrease by 28.57% after 15 day of preservation and by 71.42% after 155 days. The smaller loss of C vitamin appears in case of sample 11 (syrup were kept at 20^{o}C, unpasteurized and without preserving agents). It represents 1.2% after 15 days and 18.48% after 155 preservation days. Even if experimental data indicates the highest content of C vitamin in the absence of pasteurizing and preserving agents, the prevention of microbiological contamination requires preservation agents and pasteurization. In this situation as technology for sea buckthorn syrup producing should be selected the one of which paramaters have the lowest impact over the bio-active elements. In this case, the best choice seems to be the sample 9, of which C vitamine decrease rates are indicated in Figure 5.


Concentration, mg/L
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Zn
Ni
Mn

A


Concentration, mg/L
350
300
250
200
150
100
50
0
K

B



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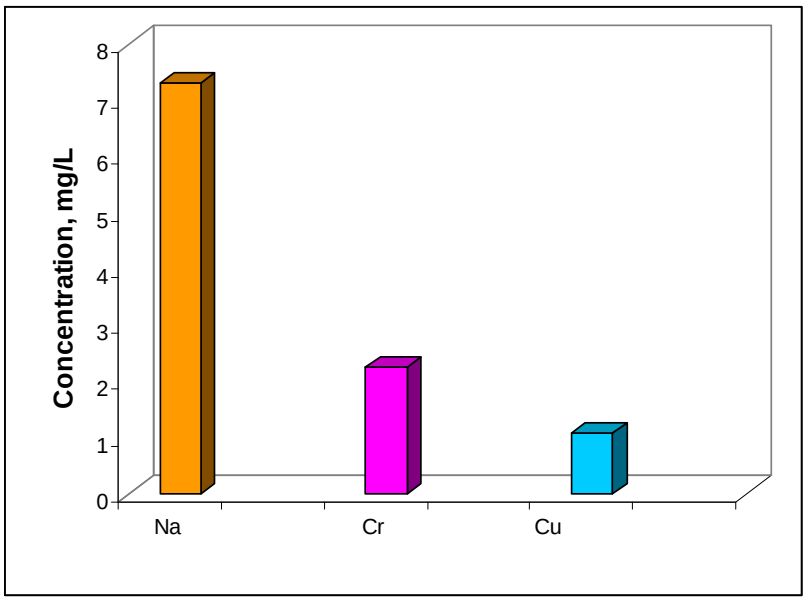

D

Figure 3. Mineral content in fresh sea buckthorn juice

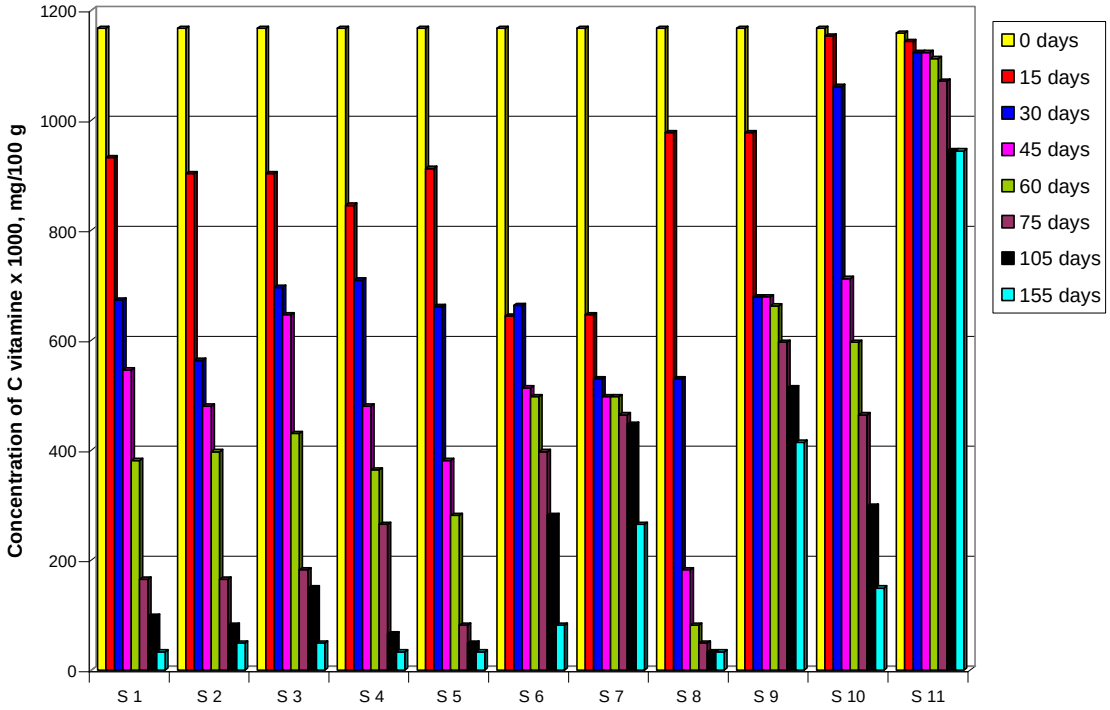

Figure 4. Variation of C vitamin concentration in the sea buckthorn syrups during the preservation time range

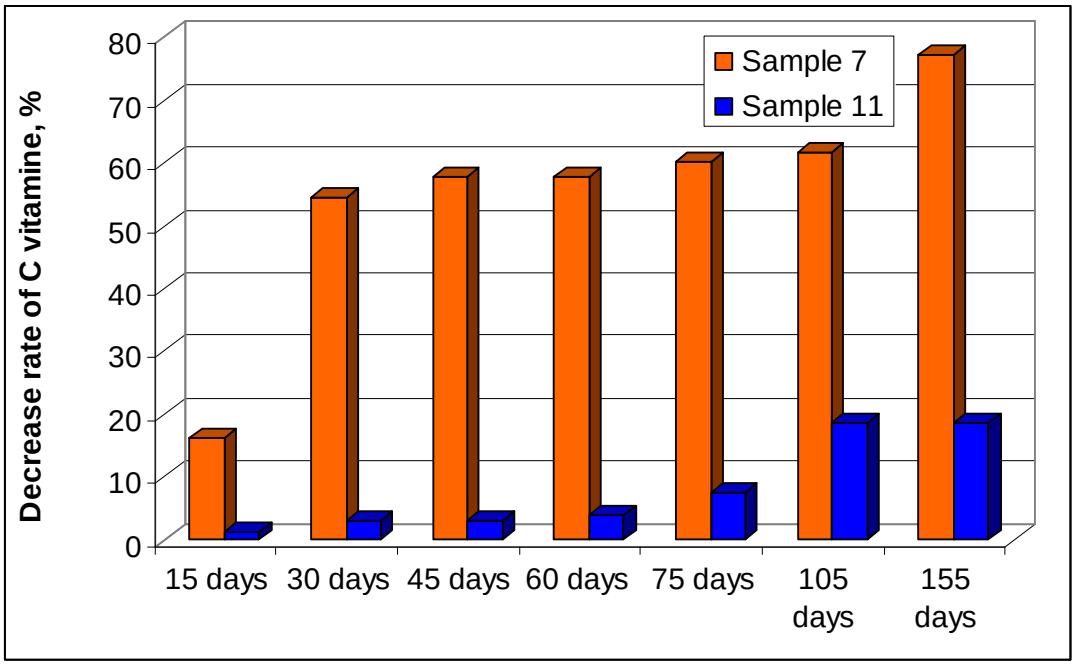

Figure 5. Decrease rate of C vitamin in the sea buckthorn syrups samples during preservation time range

c) The concentration of A vitamin during preservation process is indicated in Figure 6.

Over the first 13 days of preservation a reducing concentration of A vitamine can be noticed for all samples, as consequence of it destroy due pasteurization (samples 1-10) or light exposure (sample 11) or acidity. After 13 day of preservation, a irregular evolution of A vitamin content is observed. In mostly samples incresing of A vitamin concentration is indicated in Figure 6, due probably water evaporation process that occured.

d) The acidity of sea buckthorne syrup during preservation is indicated in Figure 7.

During the 60 days time range, an increase of syrups acidity was noticed, expressed in decrease of pH. Beyound the acidity assigned by the preservation agents (benzoic acid and sugar) the fermentative processes that occured in syrups should be taken in consideration. The presence of fermentation in the samples was indicated by the foam observed at the surface of each sample.The intensity of the fermentative process is also related to the preservation conditions.

The highest increase of acidity, respectively the deepest decrease of pH, was recorded in cases of unpasteurized sample (sample 11) as the Figure 8 presents.

It indicates a decrease with 28.57% after 15 days and with 71.42% after 155 day of preservation. In this sample, due the absence of pasteurization and preservation agents, properly conditions for fermentation were accomplished (high concentration of microorganism in syrup, presence of growing factors for microorganisms, low initial acidity).

Pasteurization and addition of preservation agents reduced the concentration of microorganisms in syrup, destroyed a great amount of growing factors and assigned to syrups high initial acidity. All that are expressed in low rates of fermentation and acidity increasing.

The lowest incresing of acidity was recorded in case of sample S 4 (Figure 8), representing 16.66% from initial acidity, value which remains constantly during all time range of preservation. It seems to be a regular behavior considering that sample 4 contains the maximum amounts of preservation agents (benzoic acid and sugar) of which acidic character inhibate de fermentation process.

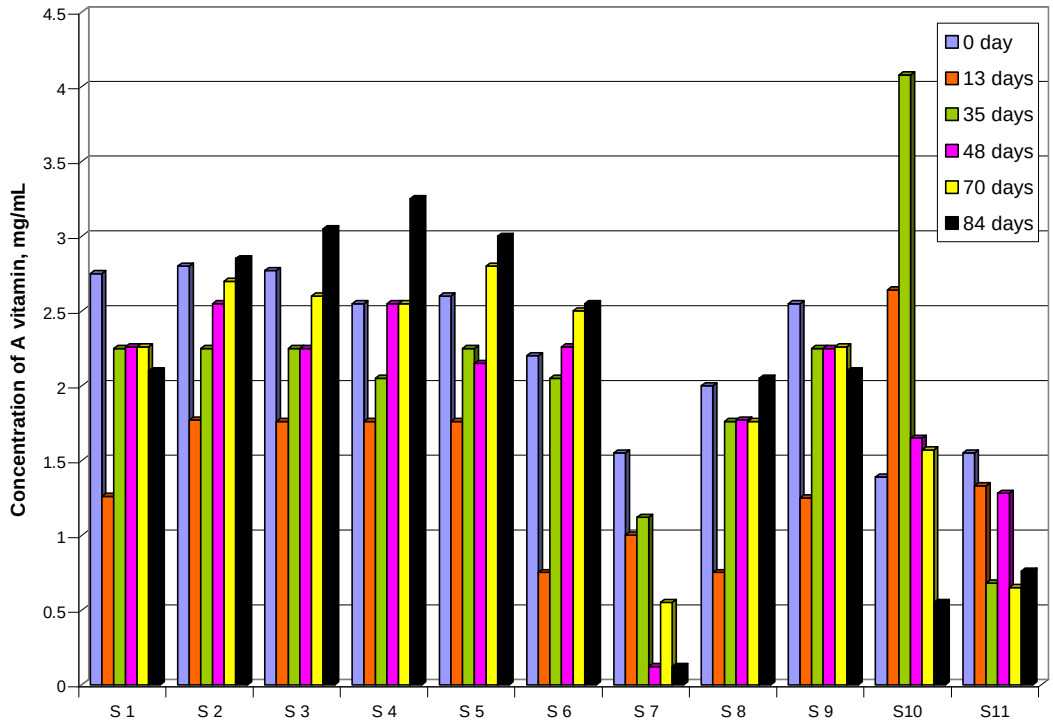

Figure 6. Decreasing of A vitamin concentration in sea buckthorn syrups during the preservation time range

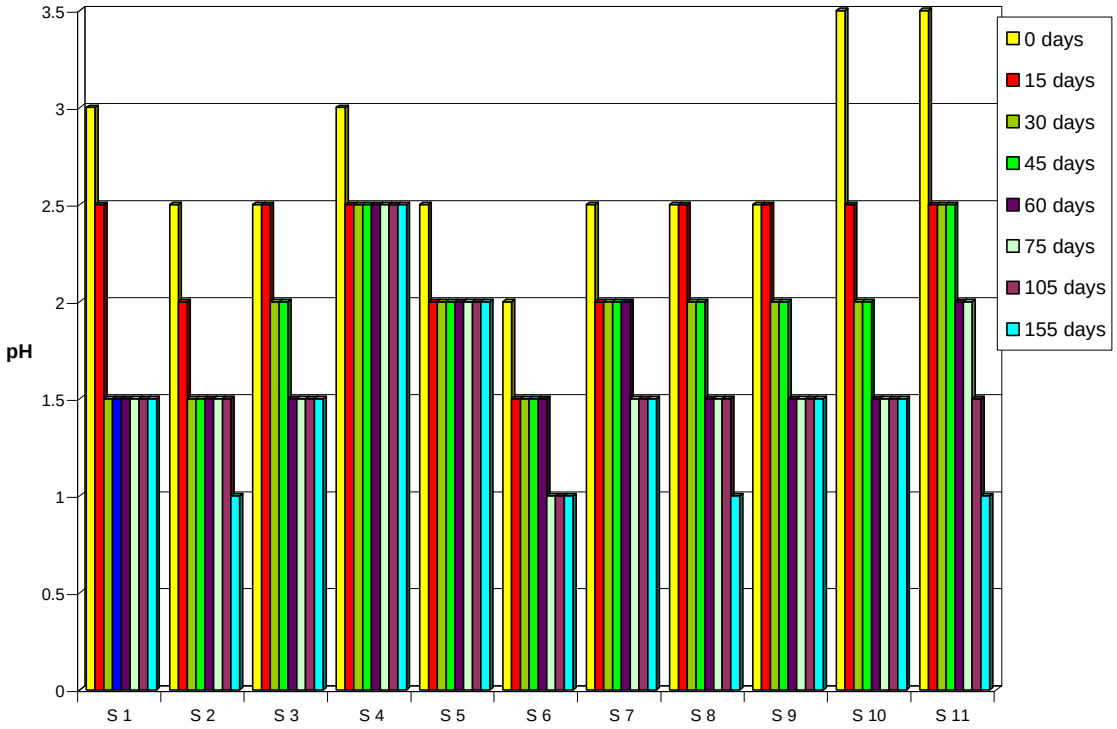

Figure 7. Variation of acidity of sea buckthorne syrups during preservation time range

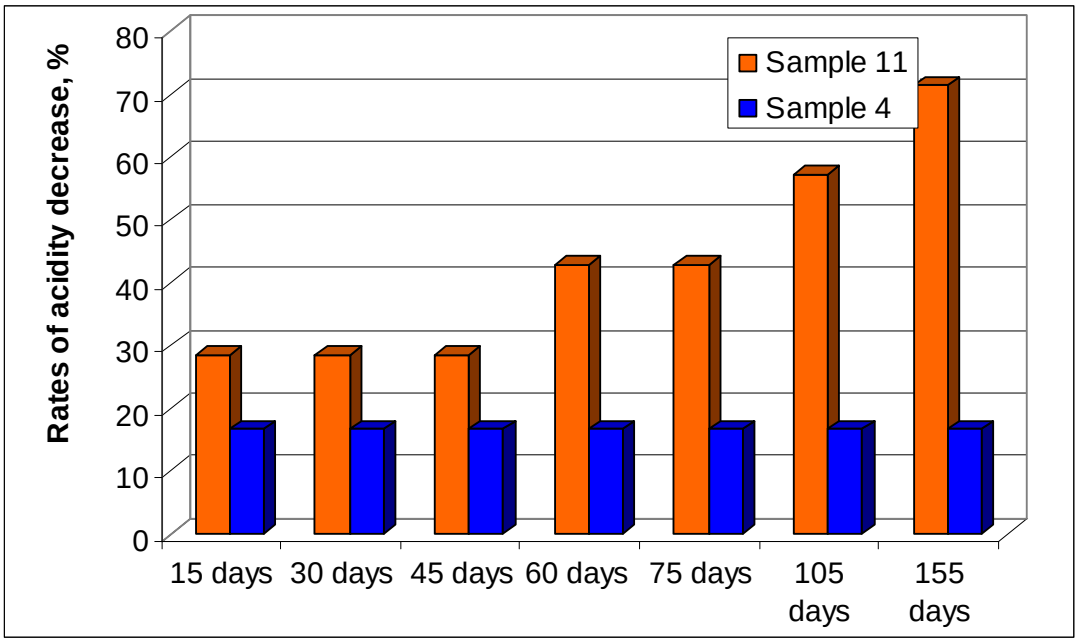

Figure 8. Decrease rate of sea buckthorn syrup's acidity during preservation time range

4. Conclusions

Considering the experimental results, the follow conclusions can be deduced:

1. The sea buckthorn syrup contents a large concentration of K but low concentrations of (Na, Cr, Cu, Zn, NI, Mn, Co). Some elements (Fe, Pb, Cd) are missing. It is possible that the higher part of them to be found in the oilcake that results after squashing process.

2. Using of preservation agents (benzoic acid, sugar) and pasterurization treatment destroy significantly the content of A and C vitamins in the sea buckthorn syrup.

3. Despite the above mentioned issue, the ineherent microbiological contamination of syrup requires assuring the preservation conditions. Their selection should be done considering an advanced preservation of nutritional value of the product and the safety from consumers point of view. The results of this study indicates that the processing of sea buckthorn fresh juice under respecting pasteurizing thermal regime at 60^{o}C and preservation at 20^{o}C in the absence of benzoic acid and sugar will assure a high level of A and C vitamins at least 155 days.

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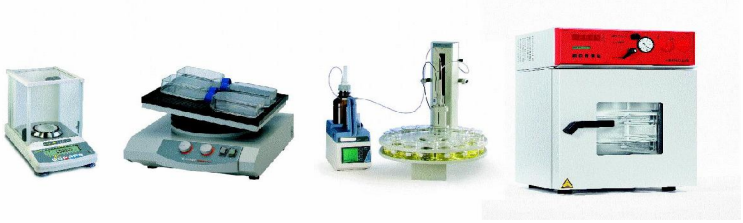

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