

RESEARCH REGARDING THE QUALITY OF MELTED CHEESE SOLD IN ROMANIA

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Abstract

Although melted cheese is a disputed product due to its content in melting salts used in processing, it comes second on the cheese market in Romania. The aim of this study is to analyze the physico-chemical indicators of quality product „melted cheese with sour cream flavour” made by different producers (Clever, Hochland, Sibiana, Albalact and Oke). Indicators were followed are humidity (%), dry matter (%), fat content (%), proteins(%), salt content (%) and pH value.

Regarding the water content, the highest values were found for the product marketed under the brand Albalact ($70.478 \pm 1.004\%$), while the lowest were recorded at Oke cheese ($57.668 \pm 1.003\%$). Referring to fat content, the highest average value was recorded at Oke ($22.00 \pm 0.998\%$) followed by Hochland ($20.10 \pm 1.000\%$), Sibiana ($17.00 \pm 1.000\%$), Clever ($15, 00 \pm 0.984\%$) and Albalact ($9.00 \pm 1.000\%$).

Protein levels ranged from $5.09 \pm 0.986\%$ (for Sibiana) and $14.65 \pm 1.006\%$ (for Oke) and the salt content from $0.7 \pm 1.069\%$ (for Oke) and $1.3 \pm 0.877\%$ (for Sibiana). For pH values, the obtained data were 6.57 ± 0.048 at Sibiana, 0.008 ± 6.47 for Hochland, 5.96 ± 0.043 for Albalact, 5.95 ± 0.029 for Clever, 6.08 ± 0.022 at Ok, respectively.

We can state that the best qualitative indicators followed were registered for Oke product, although, Hochland products is preferred by consumers in our country according to market surveys of specialized companies.

Key words: melted cheese, quality, fat, salt

INTRODUCTION

Although melted cheese is one of the varieties of dairy favorite romanian breakfast and beyond, nutritionists prohibit its consumption because it has a low content of calcium and a very high content of fat and salt, the latter being due the main melting salts are added in the product.

By means cheese is a fresh product or cured that result by coagulating milk, sour cream, buttermilk or a mixture thereof, followed by the draining off the whey (Chintescu, GH., 1996). Most cheeses are obtained by processing milk, and it's must meet certain organoleptic, physico-chemical and microbiological requirements (COSTIN, G. M., 2005).

The melted cheese term has sparked a lot of controversy because it's obtained by melting fresh or fermented cheese with or

without the addition of milk powder, butter or sour cream in presence of melted salts which substantially affect their quality.

Melting salts used to form the processed cheese are: E 250 Sodium nitrite, E 450 diphosphite, E 451 triphosphates, E 415 Xanthan gum, E 621 Monosodium glutamate, E 301 Sodium ascorbate E 120 carminic acid, E 1422 distarch adipate acetylated, sodium citrate E 331, E 450 diphosphate, polyphosphate E 452, E 407 carrageenan, citric acid E330, E338 phosphoric acid.

Although they are in the limits permitted by the quality standards, it should be considered that a good part of them, such as phosphoric acid salts (E338) found in other foods such as carbonated drinks, processed meat products (sausages), bakery products etc., which consumed the same day can result in exceeding the acceptable daily intake of phosphorus compounds, combining it very quickly in the digestive tract by forming calcium and magnesium salts that are not absorbed by the body. In large amounts these

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The manuscript was received: 10.09.2016

Accepted for publication: 08.11.2016

salts produce hypocalcemia bone and soft tissue calcification. Phosphates are essential salts for the body, but to prevent calcium deficiency, their use is limited (BANU C. et al., 2011).

Starting from a study conducted by the National Association for Consumer Protection regarding the number of food additives (E's) existing in melted cheese composition, we aimed to analyze whether it affects in particular the content of fat and the salt products we analyzed they are the most contested elements of nutritionists.

According to the study, the products we analyzed have in their composition more or less E's, such as Sibiana 4 E's (E 452 (i) Sodium polyphosphate, E 450 (i) diphosphate sodium E 339 (ii) disodium phosphate, citric acid E330); Clever 3 E's (E 452 (i) Sodium polyphosphate, potassium citrate E 332, E 333 calcium citrate); Hochland with 3 E's polyphosphate E 452, E 331 sodium citrate, citric acid E330); Oke 6 E's (E 452 (i) Sodium polyphosphates, E 450 diphosphate, sodium phosphate dibasic, potassium polyphosphates potassium diphosphate calcium polyphosphates calcium.) Albalact 2 E's (E 452 (i) polyphosphate sodium E 452 (ii) potassium polyphosphate). Most of the E (food additives) were found in cheese products with added ham, their number reaching by 13 Es (National Association for Consumer Protection and Promotion of Programs and Strategies from Romania, 2015).

MATERIAL AND METHODS

To carry out this study was purchased melted cheese with sour cream flavour manufactured by Clever, Hochland, Sibiana, Albalact and Oke, all products are packed in artificial membrane. For each type were purchased five packing units, indicators monitored are: water content (%), the content of DM (%), the fat content (%), the protein

content (%), the content of salt (%) and the pH value.

Physico-chemical determinations were performed according to existing methods in the literature. In order to determine the water content (%) and DM (%) was used the direct method, i.e. drying oven, the method comprising drying a sample (at a temperature of + 60 ° C) until it is brought to a constant weight.

The fat content (%)/DM was established by Soxhlet method, using an extraction device model Velp Scientific - SER 148.

As regards to the protein content (%), it was determined by the Kjeldahl method, which is based on the following principle: the nitrogen of combinations of organic by heating with concentrated sulfuric acid in the presence of a catalyst, is converted to ammonium sulfate.

Determination of the salt content (%) was conducted by the method titratable principle of the method that consists in the precipitation of cheese chloride with silver nitrate in the presence of potassium chromate as indicator color.

The value of pH was determined with electronic pH oximeter, by immersing the electrode in an aqueous extract (10 g in 100 ml of distilled water, allow to stand for 20 minutes at room temperature and filtered).

RESULTS AND DISCUSSIONS

Regarding the water content (%), the highest values was recorded for the Albalact product ($70.478 \pm 1.004\%$), the lowest values being highlighted for the assortment of cheese with sour cream produced by Oke (57.668%) (fig. 1).

Regarding the content of dry matter (%), mean values obtained were 29.522% for Albalact, 35.926% for Clever, 36.930% for Sibiana, 38.446% for Hochland and 42.332% for Oke.

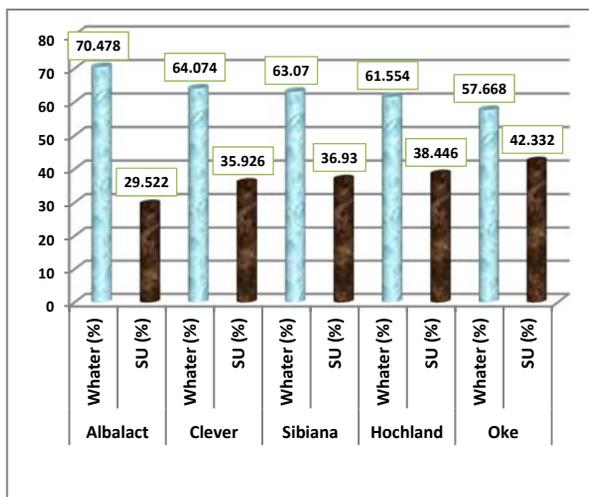


Fig. 1 The water content (%) of the analyzed products

Comparing the data on cheese assortment with existing literature, we can say that the level of concentration of DM (%) is significantly lower than other types of cheese. So for example, T. P. Guinea and P.F. Fox (2004) following a more detailed study on certain types of cheese content shows dry matter values of 52% for

Camembert, 55% Domi, 53% to 42% for Feta and Blue.

For fat content/DM (%), the highest levels were highlighted for the Oke products, calculated mean value being $22.00 \pm 0.998\%$, minimum at 21.50% and maximum value reaching at 22.40%. (Tab. 1).

Table 1 Fat content/DM (%) din produsele analizate

Specification	N	$\bar{X} \pm s_{\bar{X}}$ (%)	V%	Minimum (%)	Maximum (%)
Albalact	5	9.00 ± 1.000	3.928	8.50	9.50
Clever	5	15.00 ± 0.984	2.357	14.50	15.50
Sibiana	5	17.00 ± 1.000	2.080	16.50	17.50
Hochland	5	20.01 ± 1.000	2.081	19.50	20.50
Oke	5	22.00 ± 0.998	1.473	21.50	22.40

For Albalact melted cheese, the limits of variation ranged between 8.50% and 9.50% average hovering at a level of $9.00 \pm 1.000\%$. Regarding the character studied, this presented a very good homogeneity, the coefficient of variation being 3.928%.

The Hochland product, who also leads the market sales of our country, recorded an average fat content / DM for $20.01 \pm 1.000\%$,

minimum in this case was 19.50% and the maximum value reaching at 20.50%.

The highest values for protein content (%) were obtained for Oke product (14.368%), followed by Albalact with a protein level of 12.724% and 10.930% for Hochland. The lowest level is highlighted product from Sibiana (fig. 2).

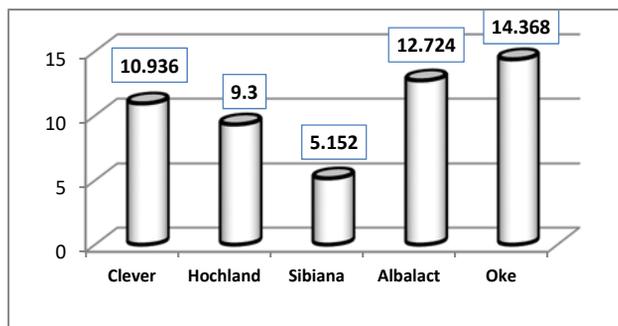


Fig. 2 Protein content (%)

For salt content (%), the highest level was registered at Sibiana, namely from $1.16 \pm 0.877\%$, the minimum value of 1.00% and the maximum value of 1.3%. Studied

character showed a very good homogeneity, the coefficient of variation being 9.829% (tab. 2).

Table 2 The content of salt (%) of analyzed products

Specification	N	$\bar{X} \pm s_{\bar{x}}$ (%)	V%	Minimum (%)	Maximum (%)
Albalact	5	0.88 ± 1.000	9.508	0.8	1.00
Clever	5	0.94 ± 1.054	12.130	0.8	1.1
Sibiana	5	1.16 ± 0.877	9.829	1.00	1.3
Hochland	5	0.94 ± 1.049	12.130	0.8	1.1
Oke	5	0.90 ± 1.069	17.568	0.7	1.1

The obtained pH values revealed values ranged from 5.95 for the Clever product and 6.57 for Sibiana melted cheese (Fig. 3).

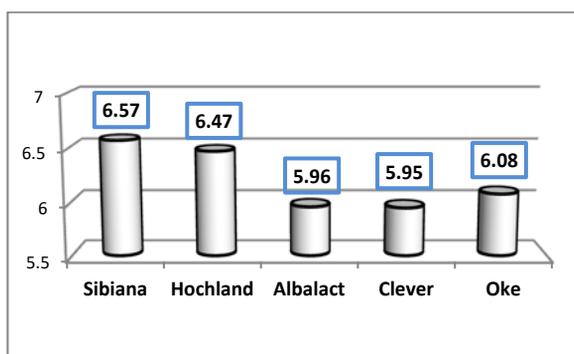


Fig. 3 pH value of analyzed products

CONCLUSIONS

Cheese is an important source of nutrients, high biological value, concentrated in a small volume and high digestibility. The nutritional value of the cheese is given by the high content of protein and fat easily assimilable, mineral salts of calcium,

phosphorus, magnesium, sodium and chloride as well as vitamins. By concentrating the fat curd obtained by precipitation of casein, cheese become a source of fat-soluble vitamins A, D, E, K, more important than milk.

The energy value of cheese is subject to the fat content of the product. From the

product's quality standard it appears that melted cheese has a moderate caloric density of 270 kcal / 100 g.

Following determination was shown a relatively low protein content, which ranged from $5.09 \pm 0.986\%$ (Sibiana) and $14.65 \pm 1.006\%$ (Oke). Also have been recorded very low concentration of dry matter, namely 29.522% of the product to Albalact, 35.926% for melting cheese of the Clever, 36.930% for the Sibiana, 38.446% to Hochland and 42.332% for Oke.

Concerning the levels of salt, it has been relatively high, averaging 0.88% for Albalact, 0.94% for Clever, 1.16% for Sibiana, which also has the highest salt content.

Analyzing the data from the literature and linking them with those obtained, we can say that the concentration of the E's (food additives) is adversely affecting their quality.

Therefore, the product from Oke containing 6 E's (E 452 (i) Sodium polyphosphate, E 450 diphosphates of sodium, dipotassium phosphate, polyphosphates, potassium phosphate dibasic, calcium polyphosphates, calcium) had a concentration of 0.90% salt, the fat content of $22.00 \pm 0.998\%$, compared to 9.00

$\pm 1.000\%$ obtained for Albalact product, which has the lowest melting salts according to the recipe manufacturing.

Thus, we advise the melt cheese consumers to analyze the label before purchasing and to consume more moderately this assortment of cheese.

REFERENCES

- [1] Banu, C. și colab., 2011 – “Living food - Dead food (Alimente vii - Alimente nevi) Good food - Bad food (Alimente bune - Alimente rele)”, Editura București.
- [2] Chintescu, Gh, 1996 – „Produse lactate tradiționale”, Editura Ceres, București.
- [3] Costin, G.M., 2005 – „Produse lactate fermentate”, Editura Academică, Galați.
- [4] Guinee, T.P.; Fox, P.F., 2014 – “Salt in Cheese: Physical, Chemical and Biological Aspects, Cheese: Chemistry, Physics and Microbiology”, Third edition - Volume 1: General Aspects, pg. 207-259.
- [5] Turhan, M., Gunasekaran, S., 1999 – “Analysis of moisture transfer in white cheese during brining”, *Milchwissenschaft* 54, 446-450.
- [6]***National Association for Consumer Protection and Promotion of Programs and Strategies from Romania, 2015