

# RESEARCH REGARDING QUALITY OF RAW COW MILK UTILISED IN OBTAINING OF MEDIUM-HARD CHEESES

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## Abstract

Quality of cheeses is given by the ensemble of physical-chemical and microbiological features, those ones being decisive about the choice made by consumers.

The aim of the paper was to study the correlation between quality of raw material (cow milk) and quality of final product (Cașcaval de Șipote) obtained in a milk processing unit from Iași County.

For milk were effectuated determinations to establish content of non-fat dried substance ( $8.84 \pm 0.02\%$ ), fat ( $4.10 \pm 0.016\%$ ), protein ( $3.34 \pm 0.007\%$ ), lactose ( $4.83 \pm 0.011$ ), casein ( $3.04 \pm 0.05\%$ ) and ash ( $0.69 \pm 0.009\%$ ), making, also, determinations for acidity ( $^{\circ}T$ ) and density ( $g/cm^3$ ) of raw milk.

Regarding final product, were made determinations for establishing the fat content where mean was situated at a level of  $24.085 \pm 0.02\%$  minimum being 24% and maximum value reaching 24.15%. Regarding variation coefficient, those one presented a very homogenous character (0.201%). Also, were realised determinations to establish moisture content ( $44.964 \pm 0.02\%$ ), DM ( $55.036 \pm 0.02\%$ ) and FMD ( $43.67 \pm 0.02\%$ ). Other indicators with a real interest for defining the qualitative ensemble of analysed product were represented by salt content, which recorded a mean of  $2.45 \pm 0.01\%$  and acidity which was situated at a level of  $183.97 \pm 0.07^{\circ}T$ .

The obtained results at the end of research which was at the base of the current study highlighted the fact that utilisation of a raw material with a good quality lead to obtaining of final products with a rich nutritive value.

**Key words:** quality, raw milk, cheeses

## INTRODUCTION

Dairy and milk consumption are frequently included as important elements in a healthy and balanced diet. It is the first food for mammals and provides all the necessary energy and nutrients to ensure proper growth and development [1,2,3,8]. Nevertheless, raw milk is an ideal culture medium for microorganisms. Because the microbial load of milk may hold spoilage and/or health risks, the manufacture of milk and milk products is subject to very stringent rules.

Milk production is a dynamic and growing industry that is fundamental to the wellbeing of hundreds of millions of people worldwide and is an important part of the economy in many countries [7, 9].

To make cheeses is important to know the protein percentage in different milks because its percentage affects the quality of the final product. All milk bathes used for the cheese elaboration were analyzed, daily [2, 5,6].

The aim of this study was to highlight the fact that utilisation of a raw material with a good quality lead to obtaining of final products with a rich nutritive value.

## MATERIAL AND METHODS

Qualitative reception of milk was daily effectuated in period 24.02–10.03.2017, gathering samples on which were determined: fat content (%), dry matter (DM), non-fat dry matter (NFDm) (%), water content (%), lactose (%), ash (%), protein titre (%), acidity ( $^{\circ}T$ ) and density ( $g/cm^3$ ).

Determination of fat content was realised using acid-butyrometric method (dissolution of protein substance from milk in the

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presence of sulphuric acid and far separation by centrifugation, using heat and isoamyl alcohol) [9].

Dry matter was determined by oven drying method [8].

Water content was established by difference using the formula:  $\text{Water}(\%) = 100 - \text{DM}(\%)$  [8].

Non-fat dry matter (NFDm) was determined by using the relation:  $\text{NFDm}(\%) = \text{TDM} - \text{G}$  where TDM = total dry matter and G = fat content of milk [12].

Content of lactose was determined by potassium ferrocyanure method [12].

Milk density was determined with a thermo-lacto-densimeter, this physical parameter representing the rate between milk mass at +20°C and mass of the same water volume at a temperature of +4°C [11].

Ash determination is usually realised by calcinations of samples in given conditions, by slow method at 550°C (reference method) [12].

Protein titre was determined by Schültz method, which is based on milk treating with formic aldehyde which blocks the amino groups of proteins, and free carboxylic groups could be titre with a solution sodium hydroxide (0,143 N), so the result will be directly expressed in percents [12].

Acidity was determined by using Thörner method [10].

Regarding final product for determination of fat content we used acid-butyrometric method.

Dry matter (DM) was determined by oven drying method [8].

Moisture content was established by difference using the formula:  $\text{Water}(\%) = 100 - \text{DM}(\%)$  [8].

Fat in dry matter content was established by difference using the formula.

The obtained data after laboratory tests were statistically processed calculating: arithmetic mean, variance, standard deviation, mean standard deviation and variation coefficient.

## RESULTS AND DISCUSSIONS

The first quality parameters analyzed for the raw milk was acidity where the mean value was  $16.9 \pm 0.314^\circ\text{T}$ .

The standard value for acidity varies between  $15 - 19^\circ$ , so the milk analyzed by us falls into a state of freshness.

The density determination indicates mainly if the milk was falsified, the most used falsification method being the addition of water. For the density, the mean value was  $1.0288 \pm 0.0002 \text{g/cm}^3$ .

Also we calculated the percentage of water and dry matter. For the water the average value we got was  $87.06 \pm 0.02\%$  and for the dry matter the mean value was  $12.94 \pm 0.02\%$ .

Fat content was also calculated, parameter for which the quality standard indicates a minimum value of 3.2%, the average obtained by us being higher by 0.90% (tab. 1).

Table 1 The physico-chemical properties of the raw milk

SPECIFICATION	Statistical estimators				
	N	$\bar{X} \pm s_{\bar{x}}$	V%	Min.	Max.
Acidity (°T)	10	$16.9 \pm 0.314$	5.88	16	19
Density (g/cm <sup>3</sup> )	10	$1.0288 \pm 0.0002$	0.08	1.028	1.030
Water (%)	10	$87.06 \pm 0.02$	0.08	86.97	87.18
Dry matter (%)	10	$12.94 \pm 0.02$	0.53	12.82	13.03
Non-fat dry matter (%)	10	$8.84 \pm 0.02$	0.72	8.75	8.91
Fat (%)	10	$4.10 \pm 0.016$	1.20	4.02	4.20
Protein (%)	10	$3.34 \pm 0.007$	0.68	3.31	3.37
Lactose (%)	10	$4.83 \pm 0.011$	0.72	4.78	4.87
Casein (%)	10	$3.04 \pm 0.05$	5.19	2.80	3.30
Ash (%)	10	$0.69 \pm 0.009$	4.02	0.66	0.75

To obtain the non-fat dry matter, the amount of milk fat has decreased from the dry matter. Therefore, the average value obtained by us was  $8.84 \pm 0.02\%$ , the variation limits being between 8.75% and 8.91%.

For the protein content the averaged was  $3.34 \pm 0.007\%$  and for the casein the average calculated by us was  $3.04 \pm 0.05\%$ . Also, the lactose content was also calculated where the average value was  $4.83 \pm 0.011\%$ . A final determination was made to determine the ash concentration, where the average value was  $0.69 \pm 0.009\%$ .

The milk analyzed has been processed into Sipote cheese, a product obtained after a 25-day maturation.

For the finished product, determinations have been made to establish the fat, water and dry matter content, FMD, acidity and, last but not least, salt content.

For the fat content, the average value we calculated was  $24.085 \pm 0.02\%$ , the variation limits ranging between 24% and 24.15%. The character studied showed a very good homogeneity, the value of the coefficient of variation was 0.201%.

The water content and the dry matter content were also calculated, where the values were  $44.964 \pm 0.02\%$  respectively  $55.036 \pm 0.02\%$ .

For the FMD the mean value was  $43.67 \pm 0.02\%$  where the minimum value was 43,59% and the maximum 43,74%. The character studied showed a very good homogeneity, the value of the coefficient of variation was 0.114% (tab. 2).

In order to determine the freshness status, it was considered important to establish the acidity. So for this parameter the average value was  $183.97 \pm 0.07^\circ\text{T}$ ,  $183.45^\circ\text{T}$  minimum being and the maximum value of  $184,25^\circ\text{T}$ . The character studied also presented a very good homogeneity this time, the value of the coefficient of variation being of 0.128%.

An important parameter in determining the quality of the finished product is the determination of the salt concentration. For this parameter, the maximum allowed value of the standard is max. 3%, which is 0.35% lower than our average (tab. 2).

Table 2 The physico-chemical properties of *of final product (Caşcaval de Şipote)*

SPECIFICATION	Statistical estimators				
	N	$\bar{X} \pm s_{\bar{x}}$	V%	Min.	Max.
Fat (%)	10	$24.085 \pm 0.02$	0.201	24	24.15
Moisture (%)	10	$44.964 \pm 0.02$	0.132	44.89	45.04
DM (%)	10	$55.036 \pm 0.02$	0.108	54.96	55.11
FMD	10	$43.67 \pm 0.02$	0.114	43.59	43.74
Acidity ( $^\circ\text{T}$ )	10	$183.97 \pm 0.07$	0.128	183.45	184.25
Salt (%)	10	$2.45 \pm 0.01$	1.598	2.39	2.50

## CONCLUSIONS

The quality of the milk may be influenced by the storage period and a non-fresh milk can influence the finished product. Therefore, our data on physicochemical parameters on raw milk was compared with the data stipulated in the quality standards. We mention that all the values we have achieved have been in the standard.

For the Sipote cheese assortment, the average values resulting from the physico-chemical determinations indicated the media as mentioned in the standard.

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