

## QUALITY OF RAW COW MILK UTILISED IN CHEESE PROCESSING

Roxana Nicoleta Rațu<sup>1</sup>, M.G. Usturoi<sup>1</sup>, B.V. Avarvarei<sup>1</sup>

<sup>1</sup>University of Agricultural Sciences and Veterinary Medicine from Iasi, Romania

### Abstract

The importance of food quality and the high requirements of consumers regarding foodstuff safety led to an increased demand for high quality cheeses, which is an aliment processed from high quality milk. Therefore, in the current paper we aimed to analyse the quality of raw milk which is processed in one of the most known unit from Botoșani County. To achieve this goal were studied a series of physical-chemical indicators (acidity, density, fat content, dry matter, protein titres) as well as some microbiological ones (CFU/ml, somatic cells/ml, *Listeria Monocytogenes*/25 ml), values which were compared with firms' quality standard. Analyses were carried out on a number of 10 milk samples, and the results shown very good quality milk. The mean value for acidity was  $17.658 \pm 0.36^\circ T$ , variation coefficient being 6.50% fact which shows a very good homogeneity. The fat content obtained a mean value of  $3.24 \pm 0.07\%$  and for protein titres the recorded values was  $3.23 \pm 0.13\%$ . Microbiological determinations enlightened a value of  $140800 \pm 4409.09$  CFU/ml and a number of  $242200 \pm 4637.53$  somatic cells/ml of milk. Regarding *Listeria Monocytogenes*, this one was absent in all samples.

**Key words:** quality, raw milk, acidity, protein

### INTRODUCTION

Since ancient times man selected foodstuff in according with sensorial criteria, choosing those products which assure a maximum of satisfaction through a minimum of effort [1, 3, 4]. Starting from this principle, milk is in the class of essential foods for children, elders and people in general speaking, having a nutritious and biological value of around 74–82%, a high digestibility coefficient (around 97%), being considered by the great majority of specialists as the most complete aliment [2].

In man nutrition, milk and dairy products assure over 50% from protein needs, could assure over 22% from calories needs (one litre of milk having 680 calories), support all the necessary of phosphorous and gaurantee a rate of 66% from the needs in other mineral elements and vitamins [4].

Due to the importance of milk in human nutrition, increasing of milk production, analysis of the main physical-chemical characteristics of it for improving them,

processing in a large amount of assortments of dairy products, must be a permanent concern also in Romania [5].

### MATERIAL AND METHOD

To achieve the desire aim were analysed a number of 10 milk samples gathered from a well-known firm from Botoșani County. Physical-chemical determinations were effectuated in according with the existed methods described in literature. So, for determination of milk acidity was utilised Thörner method, which presumes the neutralization of acids from a certain milk volume, by titration with sodium hydroxide, in the presence of a colour indicator [6, 8]. Density which represents the mass of volume unit at 20°C expressed in  $g/cm^3$  was determined using aerometric method. Before analysing milk was heated at a temperature of 20°C, then the content was homogenized by turning upside down for 8-10 times, so to avoid formation of foam. To determine density was utilised a thermo-lacto-densimeter and a glass cylinder with 500 ml capacity [7].

Fat content in milk was determined using acid-butyrometric method, method principle

\*Corresponding author: roxana.ratu@gmail.com

The manuscript was received: 17.12.2014

Accepted for publication: 20.01.2015

being separation of fats through centrifugation, after a previously dissolving of protein substances under the action of sulphuric acid, in the presence of isoamlic alcohol [8].

Dry matter content was determined through direct method, by drying at oven, method consisting in drying of a milk sample, till a constant mass of residuum [7].

Determination of protein titre was realised through a rapid method, treating milk with formic aldehyde which block the amino groups of proteins, and free carboxylic groups will be treated with sodium hydroxide 0.143 N, having the result directly expressed in percents [8].

For microbiological determinations, analysis was effectuated in laboratories of Sanitary-Veterinary Department from Iași. So, for determination of CFU/ml was utilised SR ISO 4833/2003 standard, for determination of somatic cell number was utilised Nucleo-counter equipment, and identification of *Listeria Monocytogenes* was effectuated in according with SR ISO 11290-2 standard.

## RESULTS AND DISCUSSIONS

At the end of physical-chemical determinations effectuated on raw milk, the obtained results were analysed and correlated with the firms' quality standard, appreciating the correspondence level of them.

Regarding microbiological examinations realised for raw milk, analysis enlightened a mean value of  $140800 \pm 4409.08$  CFU/ml minimum being 129000 CFU/ml and maximum reaching the value of 173000 CFU/ml. The analysed character presented a good homogeneity, value of variation coefficient being 9.90%.

For somatic cells, the calculated mean value was  $242200 \pm 4637.53$ /ml, minimum in this case being 210000/ml and maximum being 261000/ml, value of variation coefficient being 6.05% (fig. 1).

Regarding *Listeria Monocytogenes*, after the realised determinations those one was absent in all the samples gathered from the factory.

Tabelul 1 Physical-chemical characteristics of raw milk

SPECIFICATION	Firm standard (ASRO SR 2418, January 2008)	Statistical estimators				
		n	$\bar{X} \pm s_{\bar{x}}$	V%	Minimum	Maximum
Acidity ( $^{\circ}$ T)	15...19	10	17.658 $\pm$ 0.36	6.50	15.23	19.01
Density (g/cm <sup>3</sup> )	1.027 – 1.030	10	1.0318 $\pm$ 0.001	0.71	1.028	1.052
Fat (%)	Min. 3.2	10	3.241 $\pm$ 0.07	6.50	2.90	3.50
Dry matter (%)	12.5	10	11.473 $\pm$ 0.19	5.33	10.52	12.30
Protein titre (%)	Min. 3.2	10	3.233 $\pm$ 0.13	12.89	2.75	4.10

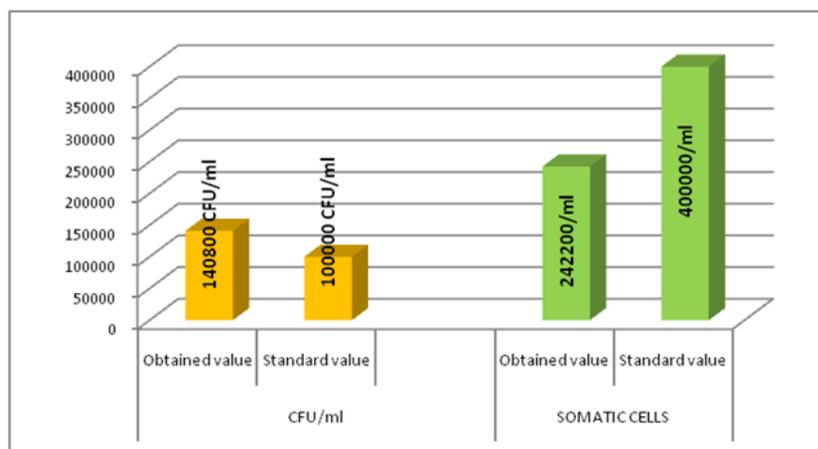


Fig. 1 Microbiological results obtained for raw milk

## CONCLUSIONS

On the basis of effectuated studies was analysed from physical-chemical and microbiological point of view raw milk which enter for being processed into cheeses. So, based on effectuated analysis was made a comparison between obtained mean values with the existed data in firms' quality standard.

For acidity, mean obtained by us  $17.658 \pm 0.36^{\circ}\text{T}$  was with  $2.658^{\circ}\text{T}$  higher than the minimum value stipulated in standard and with  $1.342^{\circ}\text{T}$  lower than the admissible maximum ( $19^{\circ}\text{T}$ ).

Regarding density, admissible limits are between  $1.027\text{--}1.030\text{ g/cm}^3$  value obtained by us being higher with  $0.0018\text{ g/cm}^3$ .

Fat content of milk recorded a mean higher with  $0.041\%$  than the minimum imposed by standard, and protein titre with  $0.033\%$ .

Differences were remarked also at effectuation of microbiological determinations. So, for CFU/ml were obtained a value of  $140000\text{ CFU/ml}$  maximum admissible being  $100000\text{ CFU/ml}$ .

For somatic cells was identified a mean number of  $242200/\text{ml}$ , standard imposing a number of  $400000/\text{ml}$ .

At the end of effectuated study we consider useful to made a series of recommendations: all the hygiene-sanitary-veterinary norms must be respected in all gathering centers, especially during filtration and chilling; a care selection of milk suppliers and achievement of the milk which have the minimal quality conditions imposed by the unit; a permanent care of the workers for respecting the hygiene norms and rules.

## REFERENCES

- [1] Banu, C., Quality and sensory analysis of foods, Food safty collection, Ed. Asab, București, 2007 (in romanian)
- [2] Bohoțiel, R., Chintescu, G., and Scorțescu G., Technology of milk and milk products, vol. I, Ed. Tehnică, București, 2007 (in romanian).
- [3] Bondoc, I., Technology and quality control of dairy products, vol II, Ed. Tehnică București, 2007 (in romanian).
- [4] Chintescu, G., Technology guide for cheese, Ed. Tehnică, București, 1980 (in romanian).
- [5] Georgescu, Gh., et all. Milk and milk products, Ed. Ceres, București, 2000 (in romanian).
- [6] Jiboreanu Anamaria and Țibulcă, D., Technology of dairy products, Ed. Risoprint, Cluj-Napoca, 2008 (in romanian).
- [7] Usturoi, M.G., Technology of milk and derived products, Ed. Pim, Iași, 2007 (in romanian).
- [8] Usturoi, M.G., Control of milk and derived products. Ed. Pim, Iași, 2012 (in romanian).