

THE MILK AS RAW-MATTER: MONITORING, QUALITY AND SANITATION

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Abstract: Milk and dairy-products are a considered a base food in peoples' nutrition. Because of this; in recent years; the Romanian Government changed its legislation in accordance with the EU normative regarding the monitoring; quality and sanitation of milk as raw-matter (10).

For this study; a total of 225 raw-milk samples were collected; from 3 farms (one is a households' cow collectivity); and analyzed for fat content; percent protein and lactose; cryogenic point; antibiotic content; somatic cells (CS) and number of germs values (NTG); etc.

The overall results are encouraging given that 15% of the samples shows an A-quality milk conform to the European standards. This milk has less then 100.000 NTG/ml and less then 400.000 CS/ml; no added water; no antibiotics present; "very good" for processing. Twenty-five percent (25%) of the samples show a B-class milk; with NTG/ml between 100.000-500.000 and /ml between 400.000-600.000; no water added and inhibitors; "good" for processing. The remaining 60% denotes a C and D-class milk. This raw-milk has CS/ml between 500.000-1.000.000 and greater and NTG/ml between 600.000-1.000.000 and greater and cannot be processed without being pasteurized and homogenized first.

The results show a great diversity in regards with CS and NTG content; some within the specified regulatory index some above. This indicates that the hygiene; quality and safety regulations are not followed in all cases.

INTRODUCTION

The Romanian State; through the corresponding laws; protects the citizens in their quality of consumers by ensuring free access to products and services; offering complete; correct and precise information about products and services' characteristics; about the protection and assurance of their rights and lawfully interests (9).

The consumers must be protected in regards with their health and transactions' fairness. In modern society; with free market; the food-products sold are very divers and the consumers find hard to determine by themselves the product's quality and to compare it with other similar alimentary goods; such that the consumer's choice is a real and correct one (1; 9).

On the other hand; choosing a food-product is also influenced by the consumer's culinary habits; by religious restrictions in some cases; by the good's aspect; presentation; wrapping; the writing on the label; etc. even if the label contains all the nutritional facts of the product; the consumer; who is less of a connoisseur; cannot understand fully its nutritional value (10). Because of this; the State; through Rules and Laws; guarantees that the producer is following the recipes; so that the products are in accordance with the Concordance Certificate; so that the consumer is protected (1; 2).

In what concerns the public health; the producers are overseen by authorities through official inspections to monitor the quality. These inspections are carried out by the qualified authority – The National Veterinary and Food Safety Authority (NVFSA). (11)

The milk; as a product can be used as such or used in processing dairy-products (4). The milk as a distinct good is defined as a natural product; processed or unprocessed; recognized through a long experience as being good and necessary in human nutrition; for development and life sustainability. However; the long experience it is not necessary. Today; due to the technological progress; the producers launch constantly new dairy-products and their acceptance depends greatly on consumers' perception and the publicity that the product receives (2; 12).

As opposite with using milk as such; in human consumption of foods; the milk is also used as raw-matter in the production of processed dairy-products (5; 11). To ensure a good quality for the milk as good or for the dairy-products; the raw-milk must have certain characteristics in what concerns the level of fats and nonfat; protein and milk sugar; added water; antibiotics; somatic cells and total number of germs; etc. (6).

MATERIAL AND METHODS

For this analysis; three raw-milk farms were considered; from Cluj County: one farm has 150 Austrian Motley cows; a second one has 90 Austrian and Holstein Motley cows; and a third one has 20 cows from Romanian Motley and Métis of these ones.

A. The first farm is part of the Animal Diseases Monitoring; Prevention and Inspection Program (ADMPIP) and the Program for quality and milk safety (PQMS). The milking is mechanical; in a separate room; the cows are free in stable and the feeding is with fodder in covered paddock. The farm follows the hygiene regulations both pre- and post-milking. The farm has its own feed-crops; the raw-milk is considered A-quality has under 100.000 NTG and 400.000 CS; no water added; no inhibitors; used in Government's Corn-Milk Program.

B. The second farm has 90 Austrian and Holstein Motley cows; its own feed-crops and mill; the bran are mixed with corn; soy and sunflower as feeds. The milking is mechanized; has a cooling system; the raw-milk is delivered towards the processing unit. The farm is monitored through ADMPIP and PQMS. The collected raw-milk is also labeled as A-quality; with NTG below 100.000 and CS below 400.000; in accordance with the hygiene requirements; etc. This ensures a top selling price; which benefits the farmer.

C. The third farm is actually households' cows; grown collectively; with 20 cows; the milking is manually; it is not part of any program; the hygiene regulations from milking; animals; shelter; milking personnel are not followed; there is no cooling room and the milk is delivered directly to consumers; without analyses. The feeding is not supervised; based on pasture and bran; and mealy remaining. The State requires a testing for the raw-milk for all producers; and that test refers to fat and protein content. The unit is not part of the ADMPIP and PQMS.

A total of 225 raw-milk samples were collected for testing; from the 3 farms; in 2007. The samples were coded at the collection moment and were sent for analyses to Floresti laboratory for milk's quality inspection. The lab runs eight (8) types of tests: NTG; CS; cryoscopy point; lactose; protein; dry-nonfat; fats and; presents of antibiotics as inhibitors (positive or negative).

RESULTS AND DISCUSSIONS

The overall results show that 15% of the samples are conforming to the European standards. This milk is classified as A-class: has less than 100.000 NTG/ml and less than 400.000 CS/ml; no added water; no antibiotics present; “very good” for processing.

Twenty-five percent (25%) of the samples show a B-class milk; with NTG/ml between 100.000-500.000 and /ml between 400.000-600.000; no water added and inhibitors; “good” for processing. The remaining 60% denotes a C and D-class milk. This raw-milk has CS/ml between 500.000-1.000.000 and greater and NTG/ml between 600.000-1.000.000 and greater and cannot be processed without being pasteurized and homogenized first.

In Table 1 below are presented the results for 20 observations; randomly selected from the collected samples used for the analyses. The results show a great variability in regards with the number of somatic cells and germs per ml raw-milk. Most of the samples tested negatively for antibiotic content; some of them tested positive. As it can be seen from the table; the fat content; percent of protein and lactose; freezing point are fairly close in values between the 20 observations. The differences are in regard with antibiotic content; somatic cells and number of germs; with values above and below the ones established through the Animal Diseases Monitoring; Prevention and Inspection Program (ADMPIP) and the Program for quality and milk safety (PQMS).

Table 1.

Collected raw-milk's characteristics

Barcode	Fats (percent)	Protein (percent)	Lactose (percent)	Dry Nonfat	Cryoscopy Point (degree C)	Added Water	Antib	Somatic Cells (1000)	Germs (1000)
1011801049	4.6	3.42	4.87	8.94	-0.534	0.00	Negative	139	72
1051101003	3.41	3.21	4.64	8.54	-0.53	0.00	Negative	302	13
1013701117	3.68	3.23	4.55	8.51	-0.524	0.00	Negative	314	49
1013701115	4.79	3.05	4.62	8.36	-0.53	0.00	Negative	50	47
1015001068	3.91	3.17	4.92	8.71	-0.527	0.00	Negative	125	17
1051301015	3.67	2.71	4.77	8.12	-0.534	0.00	Negative	11	10
1012701100	2.87	3.3	5.19	9.06	-0.528	0.00	Negative	31	10
1012701099	6.86	3.11	4.41	8.26	-0.534	0.00	Negative	153	16
1012701098	5.59	3.24	4.87	8.75	-0.541	0.00	Negative	97	10
1012701097	4.05	3.17	4.98	8.76	-0.526	0.00	Negative	56	10
2081301005	4	3.05	4.45	8.24	-0.526	0.00	Negative	666	614
1012301096	3.87	3.2	4.51	8.44	-0.525	0.00	Negative	863	298
1011501063	3.89	3.04	4.62	8.35	-0.531	0.00	Negative	868	266
1011901049	3.53	2.97	4.5	8.2	-0.52	0.00	Negative	362	999
2082601001	4.4	3.12	4.47	8.33	-0.53	0.00	Negative	867	4770
1051101005	3.39	3.36	4.71	8.76	-0.528	0.00	Positive	84	155
1012301094	3.25	3.35	4.79	8.81	-0.527	0.00	Positive	84	138
2038701027	3.42	3	4.5	8.21	-0.526	0.00	Positive	465	14129
1014501073	3.1	3.07	4.63	8.39	-0.521	0.00	Positive	503	32
1012801073	3.33	3.27	4.64	8.62	-0.523	0.00	Negative	279	1073

As a result; the analysis for the 20 observations randomly selected from the collected raw-milk; show that there are differences between the values for the parameters. For example; the percent for the fats is between 2.87% and 6.86 %; proteins are between 2.71% and 3.42 %; lactose between 4.41% and 5.19%; and dry nonfat between 8.12 and 9.06 g/dl.

The values for somatic cells and total number of germs exhibit great differences: somatic cells between 11.000 – 868.000 CS/ml and total number of germs with values between 10.000 – 14.129.000 NTG/ml.

This emphasizes grouping the milk into quality classes (A; B; C and D); proving that the hygiene; quality and safety regulations are not always followed.

CONCLUSIONS

As a follow up of the analysis and results; we can conclude:

- Analyzing the 225 observations; the results show that: 15% of the samples are classified as A-class milk; conform with the European standards; has less then 100.000 NTG/ml and less then 400.000 CS/ml; no added water; no antibiotics present; “very good” for processing; 25% of the samples show a B-class milk; with NTG/ml between 100.000-500.000 and /ml between 400.000-600.000; no water added and inhibitors; “good” for processing; and; 60% denotes a C and D-class milk. This raw-milk has CS/ml between 500.000-1.000.000 and greater and NTG/ml between 600.000-1.000.000 and greater and cannot be processed without being pasteurized and homogenized first.
- As a result; the analysis for the 20 observations randomly selected from the collected milk; show that there are differences between the values for the parameters: fats are between 2.87% and 6.86 %; proteins between 2.71% and 3.42 %; lactose between 4.41% and 5.19%; and dry nonfat between 8.12 and 9.06 g/dl. The values for somatic cells and total number of germs exhibit great differences: somatic cells between 11.000 – 868.000 CS/ml and total number of germs with values between 10.000 – 14.129.000 NTG/ml.
- The results show a great diversity in regards with CS and NTG content; some within the specified regulatory index some above. This indicates that the hygiene; quality and safety regulations are not followed in all cases.

BIBLIGRAPHY

1. Banu C.; 1998; Procesarea industrială a laptelui. Ed. Tehnica Bucuresti; p. 250-253.
2. Banu C.; 2003; Principii de drept alimentar. Ed. Agir; p. 142-156.
3. Barzoi D. Apostu S.; 2002; Microbiologia Produselor alimentare. Ed. Risoprint; Cluj-Napoca; p. 212-230.
4. Grecu G.; D. Cosarca; G. Duicu; Sorina Petrut; Claudia Alexandru; Hilda Gieb-Schramm; 2007; Ghid de Bune Practici de Igiena și de Productie in Industria Laptelui și P{roduselor Lactate; Edit. Afir; Bucuresti; p. 70-88.
5. Gus Camelia; 2007; Laptele și Derivatele Sale. Ed. Risoprint Cluj; p. 25-49.
6. Mihaiu M. Fratila R.; 1995; Dinamica numarului de celule somatice din lapte in functie de productia obtinuta. Buletin USAMV; p. 49 și 563-567.
7. Munteanu M.; I. Groza; I. Morar și L. Bogdan; 2004; Importanta Probelor de Sanitatie in Eteopatogenia Mamitelor Subclinice la Vaca; Edit. USAMV Timisoara; p. 3-5.
8. Rotaru O. Mihaiu M.; 2004; Controlul sanitar veterinar al salubritatii produselor de origine animala. Lucrari practice Tipo Agronomia Cluj-Napoca; p. 38-45.
9. O.G. 21/1992 privind protectia consumatorilor; republicata in 2007.
10. H.G. 924/2005 privind aprobarea Regulilor generale pentru igiena produselor alimentare.
11. H.G. 925/2005 pentru aprobarea Regulilor privind controalele oficiale efectuate pentru a se asigura verificarea conformitatii cu legislatia privind hrana pentru animale și cea privind alimentele și cu regulile de sanatate și de protectie a animalelor.
12. Suteu Lenuta; 2006; Productia; transportul și depozitarea laptelui și a produselor din lapte; conditii; supraveghere și calitate; Referat Doctorat; USAMV Cluj; p. 34-56.

