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which brings us to the view finder as we got to 85.42% product premium, the agitators are effective but apparently do not reach an efficiency of 100% in this case.

GREEN GOUDA PRESSING WITH TWO STIRRES (SN:03T3.3)				
nr./row / rows	1	2	3	4
1	45	46	47	48
2	41	42	43	44
3	37	38	39	40
4	33	34	35	36
5	29	30	31	32
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7	21	22	23	24
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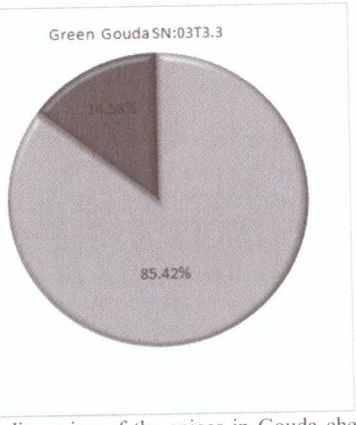

Figure 6. Pressing with two stirrers and the dispersion of the spices in Gouda cheese blocks (personal archive).

CONCLUSIONS

A conclusion of this paper is that the number of cheese pieces with corresponding homogenized (premium quality) rising by more than half of the number of cheese pieces processed with the standard technology.

The nature of the spice influences the homogenization process, if is too lite it will migrate to the surface if is to heavy it will migrate to the bottom.

The installation of the agitator is efficient but not enough to obtain the maxim number of corresponding homogenized Gouda cheese with spices blocks premium quality cheese.

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EXPERIMENTAL STUDIES ON QUALITY OF RAW MILK FROM SUCEAVA COUNTY

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ABSTRACT

Milk is one of the most complex and complete food, with high nutritive value and an important role in human feed. The aim of this study was to make a review over the main physical-chemical parameters of raw milk (density, freezing point, fat content, non fat dry substance, protein content), supervised over 6 months, at several collecting points from Suceava County. That experimental data obtaining were statistically processed and subsequent compared with legal normative for admitted values for raw milk quality parameters.

Keywords: raw milk, physicochemical parameters, milk collecting centres

INTRODUCTION

Food quality is a priority requirement in the market economy. In the dairy industry, the current requirement is to provide quality products safe for consumption [1, 2].
In the ordinary sense of the word milk is defined as a product of secretion of the mammary gland of mammals. It was rightly called "white blood", "elixir of life for children and adult health." The denomination of milk, without any qualification, is usually awarded for cow's milk [3].

Milk production and hence consumption of milk and dairy products have registered a continuous growth globally. Milk production around the globe amounts to 560 million tons annually, of which Europe is getting about a quarter [4, 5].

Milk consumption per consumer in Romania, cca.6.9 litters / month / capita is relatively low compared to the average consumption in the EU, in European countries the consumption being four times higher, as a person monthly consumes 14 to 15 litters / month / head of this product [6].

Rational consumption of milk provides good physical and mental development, increases resistance to disease, prolongs longevity and provides good health to all consumers; in women over 40 years, daily consumption of milk prevents osteoporosis, help remove toxic substances the body, as the chemical forms insoluble compounds with some heavy metals [7, 8, 9].

Milk quality assessment is performed in terms of sensory, physicochemical and microbiological. In assessing milk quality specialists have sought to use the most

appropriate and accurate analytical methods allowing the qualitative evidence of the finished product in time for disposition of raw material processing [10].

Classical methods of analysis are set out by current legislation. They are more laborious (complex, working mode, many reagents, etc.) but have the advantage that they require simple equipment, which are used in case of legal dispute [11, 12, 13].

Modern methods are the most commonly used nowadays due to the short response time of receiving the decision establishing milk processing units [14, 15].

Dairy processors in Suceava County are experiencing a fluctuation in the quality of milk - raw materials because of a large number of small farms that provide milk quantity required for a single manufacturer.

Knowing the physicochemical composition of milk is important for milk processing units, making it possible to intervene at every stage of flux with corrective measures, according to the changes that may occur in the physicochemical composition of the milk, giving the opportunity to prevent, reduce or eliminate risks that may appear on milk processing flow sheet [16, 17, 18].

This paper proposes a study of the main physicochemical parameters of milk-raw material (density, freezing point fat content, solids non-fat content, protein content) that were monitored over a period of 6 months to a milk collector unit in Suceava. Data were statistically analyzed and compared with the legislative limits of physical and chemical parameters for milk - raw material for the dairy industry.

MATERIALS AND METHODS

Milk samples were collected from a representative unit of milk collection in Suceava (average 100000 litres/day). Physicochemical parameters were monitored for a period of six months (July-December 2013).

Milk samples were collected according to Order no. 13/2005 - sanitary veterinary and food safety. Whatever the analysis performed before sampling, the milk must be stirred properly through a manual or mechanical means. Sample shall be taken immediately after mixing, while the milk is still moving [19].

The aim was to establish the level of quality of raw milk by analysis of physicochemical parameters using EKOMILK M machine, specially designed for fast analysis at minimum cost.

This device has some advantages in use, such as:

- enables a number of measurements; it can be a total of 40 samples / time parameters for the measurement of the sample performed in 90 seconds;
- has a simple construction and easy to carry;
- is simple in operation, maintenance, calibration and installation;
- the analysis of all the parameters used a relatively small amount of milk and is not necessary chemicals for the analyzes;
- has a low energy consumption;

- the results are easy to read, you can easily save and print.

Ambient conditions: air temperature: 10-30 ° C; temperature of the milk: 10-30 ° C; relative humidity: 30-80%. Detection limits for measured parameters are: minimum 0.1% fat, 5-12% non-fat dry matter, protein 2-6%.

The data obtained was statistically processed by multifactor method ANOVA. The validation of obtained values was made through compare with reference values for milk-raw material.

The experiments are made in the research laboratory of Stefan cel Mare University of Suceava, Faculty of Food Engineering.

RESULTS AND DISCUSSIONS

Milk quality monitoring was carried out over a period of 6 months in a representative milk collection centre in Suceava. For each physicochemical parameter determined a daily weighted mean, finally results were summarized for each month, resulting in the 184 milk samples, which were then compared with the laws in force (table 1).

Table 1 Legal requirements for raw milk

Physicochemical characteristic	**value**
Freezing point, ^{0}C	**≤ -0.515**
Protein content, % min	**3.2**
Fat content, % min	**3.2**
non fat dry substance, % min	**8.5**

In order to obtain some available data, it was made a few notification:

I-representing the first month of monitoring (July)

II-representing the second month of monitoring (August)

III-representing the third month of monitoring (September)

IV-representing the fourth month of monitoring (October)

V-representing the fifth month of monitoring (November)

VI-representing the sixth month of monitoring (December)

All the results of this monitoring activity are shown in the table 2, table 3 and table 4.

For all results we have accomplished average, standard deviation and relative deviation, values that could offer a better imagine about milk quality in the terms of conditions imposed by European legislation.

Table 2. Physicochemical parameters raw milk for summer time (July and August2012)

Sample / Daily average	Parameter									
	Density [g/cm^3]		Fat content [%]		Total protein (Nitrogen x 6.38) [%]		Non-fat dry substance [%]		Freezing point [°C]	
	I	II	I	II	I	II	I	II	I	II
1	1.0259	1.0265	3.59	3.41	3.22	3.19	8.06	8.12	-0.594	-0.534
2	1.0286	1.0290	3.43	4.38	2.99	3.36	8.02	8.96	- 0.538	-0.565
3	1.0259	1.0277	3.59	3.66	3.00	3.14	8.01	8.47	-0.575	-0.549
4	1.028	1.0280	3.75	3.16	2.91	3.20	8.58	8.45	-0.576	-0.550
4	1.0275	1.0254	3.76	3.06	2.95	3.00	8.46	7.76	-0.574	-0.535
6	1.0291	1.0273	3.20	3.58	3.50	3.15	8.70	8.35	-0.587	-0.543
7	1.0277	1.0302	4.1	3.50	3.00	3.45	8.58	9.06	-0.594	-0.597
8	1.0236	1.0268	2.85	3.58	3.36	3.19	7.28	8.24	-0.531	-0.540
9	1.0287	1.0275	3.47	3.76	3.20	3.20	8.15	8.46	-0.596	-0.543
10	1.0275	1.0251	4.05	3.67	3.00	2.98	8.60	7.84	-0.596	-0.540
11	1.0265	1.0295	3.4	3.60	3.50	3.38	8.05	8.92	-0.585	-0.578
12	1.0293	1.0289	3.43	4.54	3.20	3.40	8.04	8.97	-0.577	-0.570
13	1.0292	1.0274	4.88	2.86	2.70	3.19	8.56	8.23	-0.599	-0.542
14	1.0273	1.0287	3.40	2.39	3.10	3.18	9.14	8.44	-0.563	-0.569
15	1.0282	1.0251	4.02	3.79	3.00	2.98	8.41	7.86	-0.597	-0.538
16	1.0252	1.0289	3.06	3.71	3.50	3.32	8.60	8.79	-0.582	-0.570
17	1.0302	1.0297	3.22	2.89	3.10	3.30	8.63	8.80	-0.584	-0.580
18	1.0265	1.0281	3.35	4.23	3.50	3.26	9.04	8.70	-0.568	-0.555
19	1.0268	1.0272	3.87	3.52	3.30	3.14	8.46	8.33	-0.580	-0.541
20	1.0265	1.0283	4.44	2.65	3.14	3.18	8.65	8.40	-0.595	-0.560
21	1.0264	1.0277	3.62	3.80	3.20	3.24	8.80	8.50	-0.588	-0.545
22	1.0295	1.0303	3.03	4.16	3.00	3.50	8.37	9.23	-0.585	-0.587
23	1.0274	1.0279	3.52	3.53	3.16	3.24	8.38	8.51	-0.572	-0.549
24	1.0263	1.0268	2.83	3.34	3.34	3.19	8.72	8.18	-0.530	-0.558
25	1.0290	1.0279	3.71	3.87	3.24	3.26	8.59	8.57	-0.565	-0.548
26	1.030	1.0271	2.76	3.68	3.30	3.15	8.67	8.34	-0.540	-0.544
27	1.0262	1.0232	3.65	3.89	3.26	2.80	8.66	7.41	-0.578	-0.533
28	1.0284	1.0304	3.38	3.00	3.32	3.38	8.70	8.99	-0.569	-0.588
29	1.0254	1.0276	3.37	4.42	3.15	3.25	8.34	8.61	-0.549	-0.546
30	1.0255	1.0274	4.11	3.66	3.28	3.17	8.69	8.39	-0.570	-0.542
31	1.0298	1.0291	3.26	3.34	3.14	3.25	8.24	8.68	-0.570	-0.566
Xmed	**1.0275**	**1.0278**	**3.45**	**3.57**	**2.99**	**3.21**	**8.45**	**8.47**	**-0.574**	**- 0.555**
stdev	**0.0160 2**	**0.0016 3**	**0.4709 2**	**0.509 8**	**0.1955 4**	**0.1470 1**	**0.3648 6**	**0.413 6**	**0.0201 1**	**0.0226 6**
Rsd%	**0.0155**	**0.0015 9**	**0.1365**	**0.142 8**	**0.0654**	**0.0458**	**0.0432**	**0.048 8**	**0.0350 3**	**0.0408**

Table 3. Physicochemical parameters raw milk for September (III) and November(IV) 2012

Sample/ Daily average	Parameter									
	Density [g/cm^3]		Fat content [%]		Total protein (Nitrogen x 6.38) [%]		Non-fat dry substance [%]		Freezing point [°C]	
	III	V	III	V	III	V	III	V	III	V
1	1.0258	1.0248	3.62	4.23	3.05	2.80	8.00	7.83	-0.530	-0.518
2	1.0255	1.0254	3.79	3.84	3.01	2.85	7.96	7.90	-0.533	-0.523
3	1.0283	1.0244	3.64	4.12	3.26	2.66	8.60	7.71	-0.268	-0.511
4	1.0294	1.0268	2.77	3.64	3.30	3.10	8.70	8.21	-0.570	-0.542

4	1.0276	1.0247	3.45	3.90	3.20	2.60	8.41	7.74	-0.544	-0.513
6	1.0280	1.0259	3.57	3.99	3.24	2.60	8.53	8.04	-0.550	-0.531
7	1.0291	1.0233	3.70	4.38	3.32	2.56	8.83	7.49	-0.568	-0.498
8	1.0283	1.0248	3.41	4.36	3.20	2.70	8.56	7.85	-0.566	-0.528
9	1.0292	1.0264	3.13	4.00	3.30	3.10	8.74	8.19	-0.569	-0.546
10	1.0295	1.0274	3.40	4.11	3.32	3.00	8.87	8.44	-0.578	-0.556
11	1.0290	1.0269	3.24	3.93	3.28	3.00	8.70	8.29	-0.565	-0.547
12	1.0279	1.0279	3.75	4.08	3.25	3.10	8.55	8.58	-0.549	-0.564
13	1.0276	1.0265	3.87	4.03	3.27	3.05	8.49	8.21	-0.545	-0.542
14	1.0282	1.0265	3.47	3.77	3.23	2.80	8.56	8.15	-0.564	-0.538
15	1.0282	1.0280	3.58	4.01	3.24	3.10	8.58	8.57	-0.560	-0.564
16	1.0279	1.0260	3.35	4.57	3.18	3.00	8.46	8.21	-0.549	-0.541
17	1.0267	1.0266	3.52	4.45	3.17	3.16	8.20	8.33	-0.540	-0.548
18	1.0273	1.0261	3.69	4.58	3.20	3.05	8.38	8.22	-0.541	-0.542
19	1.0270	1.0250	4.11	4.40	3.21	2.50	8.40	7.92	-0.540	-0.524
20	1.0247	1.0275	4.10	3.86	2.66	3.20	7.83	8.42	-0.530	-0.555
21	1.0287	1.0283	3.19	3.97	3.28	3.10	8.62	8.65	-0.569	-0.569
22	1.0281	1.0236	2.91	4.98	3.15	2.10	8.41	7.70	-0.550	-0.511
23	1.0276	1.0252	3.44	4.28	3.30	2.50	8.40	7.93	-0.544	-0.524
24	1.0277	1.0298	3.46	3.78	3.28	3.20	8.44	8.98	-0.545	-0.590
25	1.0274	1.0253	3.56	4.16	3.15	2.66	8.37	7.95	-0.540	-0.526
26	1.0290	1.0261	3.27	4.20	3.30	2.99	8.71	8.20	-0.565	-0.538
27	1.0298	1.0274	3.49	3.62	3.38	3.00	8.95	8.37	-0.580	-0.551
28	1.0281	1.0245	3.58	3.64	3.24	2.79	8.57	8.02	-0.566	-0.505
29	1.0294	1.0270	3.52	3.80	3.33	3.10	8.86	8.32	-0.571	-0.556
30	1.0284	1.0276	3.58	3.89	3.25	3,10	8.64	8.46	-0.564	-0.557
Xmed	**1.0279**	**1.0261**	**3.50**	**4.08**	**3.218**	**2.88**	**8.51**	**8.16**	**-0.545**	**-0.538**
stdev	**0.0012**	**0.0014**	**0.295**	**0.3188**	**0.1338**	**0.2645**	**0.264**	**0.3290**	**0.0551**	**0.0211**
Rsd%	**0.0012**	**0.00144**	**0.0842**	**0.07815**	**0.04161**	**0.09184**	**0.0311**	**0.04032**	**0.10112**	**0.03930**

Table 4. Physicochemical parameters raw milk for October (IV and December (VI) 2012

Sample/ Daily average	Parameter									
	Density [g/cm^3]		Fat content [%]		Total protein (Nitrogen x 6.38) [%]		Non-fat dry substance [%]		Freezing point [°C]	
	IV	VI	IV	VI	IV	VI	IV	VI	IV	VI
1	1.0212	1.0277	5.36	4.21	2.60	3.13	7.20	8.55	-0.510	-0.562
2	1.0250	1.0275	4.43	4.53	2.90	3.14	7.46	8.56	-0.528	-0.562
3	1.0273	1.0292	3.51	3.63	3.04	3.20	8.32	8.80	-0.542	-0.579
4	1.0258	1.0287	3.40	3.89	2.90	3.20	8.02	8.74	-0.532	-0.568
4	1.0284	1.0283	4.04	3.63	3.19	3.14	8.70	8.58	-0.568	-0.575
6	1.0250	1.0272	4.59	4.08	2.90	3.08	7.98	8.41	-0.534	-0.560
7	1.0268	1.0286	3.72	3.53	3.02	3.16	8.25	8.64	-0.538	-0.560
8	1.0295	1.0291	3.43	3.65	3.20	3.22	8.86	8.79	-0.578	-0.562
9	1.0264	1.0273	4.21	3.92	3.01	3.07	8.24	8.40	-0.538	-0,570
10	1.030	1.0269	2.98	4.05	3.24	3.06	8.88	8.35	-0.597	-0.558
11	1.0279	1.0276	3.40	3.75	3.01	3.09	8.44	8.44	-0.549	-0.568
12	1.0242	1.0279	3.41	3.77	3.24	3.12	8.86	8.53	-0.530	-0.574
13	1.0277	1.0280	3.77	3.59	3.10	3.11	8.48	8.50	-0.545	-0.558
14	1.0267	1.0288	4.38	3.88	3.06	3.17	8.35	8.66	-0.538	-0.574
15	1.0275	1.0281	3.53	3.84	3.06	3.12	8.38	8.55	-0.540	-0.570

16	1.0293	1.0281	3.54	3.81	3.20	3.12	8.83	8.59	-0.569	-0.572
17	1.0280	1.0289	4.09	3.66	3.16	3.18	8.62	8.74	-0.569	-0.580
18	1.0286	1.0278	3.69	4.18	3.18	3.12	8.68	8.58	-0.569	-0.555
19	1.0287	1.0289	3.89	3.78	3.20	3.19	8.74	8.78	-0.568	-0.577
20	1.0277	1.0291	3.54	3.76	3.08	3.21	8.43	8.82	-0.547	-0.574
21	1.0312	1.0271	3.11	4.25	3.36	3.07	9.28	8.43	-0.598	-0.555
22	1.0281	1.0278	3.34	4.08	3.10	3.12	8.48	8.56	-0.566	-0.556
23	1.0282	1.0276	3.63	3.56	3.14	3.08	8.58	8.40	-0.566	-0.559
24	1.0272	1.0284	4.08	4.04	3.08	3.19	8.41	8.70	-0.540	-0.560
25	1.0286	1.0265	3.53	4.09	3.16	3.00	8.64	8.26	-0.569	-0.564
26	1.0299	1.0267	3.09	4.47	3.24	3.00	8.88	8.36	-0.588	-0.565
27	1.0293	1.0273	3.46	3.51	3.22	3.04	8.80	8.32	-0.570	-0.566
28	1.0311	1.0295	3.63	3.43	3.40	3.20	9.29	8.86	-0.598	-0.556
29	1.0291	1.0279	3.65	3.40	3.22	3.01	8.79	8.44	-0.565	-0.550
30	1.0273	1.0280	3.92	4.09	3.07	3.16	8.40	8.62	-0.543	-0.568
31	1.0276	1.0276	3.56	4.45	3.08	3.15	8.40	8.40	-0.542	-0.545
Xmed	**1.0277**	**1.028**	**3.73**	**3.88**	**3.10**	**3.12**	**8.50**	**8.56**	**-0.555**	**-0.564**
stdev	**0.00211**	**0.0007**	**0.4970**	**0.293**	**0.155**	**0.0635**	**0.44453**	**0.16374**	**0.02266**	**0.00800**
Rsd%	**0.0205**	**0.00759**	**0.13325**	**0.0755**	**0.0500**	**0.0204**	**0.0523**	**0.0191**	**0.0408**	**0.0142**

The main conclusion that we have to specify is that the milk from Suceava county must be considerate a good raw material for milk industry from the point of view of admission limits.

There are few exceptions in the course of a month, so from 30, 31 days of collection, only 2 or 3 samples does not respect minimum limits for physical-chemical parameters.

CONCLUSIONS

Knowing the physicochemical composition of raw milk is very important in order to obtain proper processing dairy quality and safety for consumption.

Milk collection centers, are experiencing large fluctuations in milk quality. Trough monitoring of main physicochemical parameters of raw milk, over a six month period of time (summer, autumn and winter) it could be observed , indeed, that exists significant variation of them.

Statistical processing proved that these variation are significant over summer time. Very important is that all physicochemical parameters of raw milk , are falling in the legal requirements, so, the milk collected from Suceava county could be processed in optimal condition with a little beet attention for summer time.

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