

Quality and delivery of milk in Slovenia

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Summary

Milk production represents the possibility of earning monthly income and assures social security to many farms in Slovenia. In Slovenia the European rules and regulations on the quality of the delivered milk have been introduced, relating to the hygienic quality of milk and the count of somatic cells. The purchase price of the milk depends also on the protein and fat content. The aim of the research was to establish, whether the quality of the delivered milk complies with the prescriptions regulated by the Slovene legislation. The quality of the delivered milk in the area of the Šentjur agricultural cooperative (ACŠ) and in the entire area of Slovenia (SLO) has been studied. The bacteriological data in the individual quality classes, the data on the total count of somatic cells and the data on the fat and protein contents have been analyzed. 36 monthly accounts have been included in statistical processing. It has been established that the delivered milk of the areas in question does not differ in the relevant quality values.

Key words: cattle, milk quality, fats, proteins, micro-organisms, somatic cells

Introduction

The milk production is a tradition in Slovenia, since the natural conditions are the most suitable for animal breeding. Most of the agricultural land is covered by herbage, therefore cattle breeding is suitable to preserve the man-made landscape and the country population. In Slovenia, in the area of cattle breeding, two breeders' organizations are authorized, i.e., Chamber of agriculture and forest economics of Slovenia and the cattle breeding business association z.o.o. By the decree of the Ministry of agriculture, forest economics and food No. 321-06-261/2005, two breeding programmes of both breeders' organizations were classified into the joint basic breeding programme. The implementation programme ensures the execution of approved breeding programmes for the following breeds: Simmental, Brown,

Holstein, Charolais and Limousin and for the Slovenian autochthonous cattle «Cika» (Darovic, 2007).

In milk production the correct feeding of cows is the basic environmental factor assuring, together with the genotype, high milk productivity, the health of animals, normal reproduction and appropriate profitability (Janžeković et al., 1996; Kramberger and Gselman, 2000). To a smaller extent the chemical composition of milk is influenced also by the individuality of the animal, level of feeding of the animal, its body mass, sexual cycle, motion, duration of non-milking period and humidity and temperature of the environment. The chemical quality of milk is primarily determined by the animal's genetic features (Loumou et al., 2006).

The fat content in milk depends particularly on the provision with energy and share of structural fibrin in the ration. If the share of concentrates is excessively increased in the ration and the share of the fibrin is reduced, the fat content is reduced. With the increase of the milk productivity, in general, the fat percentage in the milk is reduced, whereas the quantity of fat is increased. The protein content in the milk depends particularly on the provision of dairy cows with proteins able to be assimilated. The protein content in the milk is influenced also by the genetic and some other factors, such as stage of lactation, age, season, udder diseases (Babnik and Podgoršek, 2002).

The somatic cells in the milk are epithelium cells and leucocytes and are present in the milk of any cow. The presence of increased count of somatic cells in the milk is the result of damages to the lacteal gland and udder inflammation. In healthy animals their number is between 10.000 and 200.000 in a millilitre of milk (Klopčič, 2005). If their number exceeds that limit, it is a signal of abnormal processes in the udder. The factors having influence on increased count of somatic cells include the stage of lactation and the period of the animal being on heat. The count of somatic cells increases naturally 8 to 14 days after calving and during the non-milking period, when the daily milk production falls below 4 kg. In spring, the count of somatic cells in the milk is lower than in autumn; it fluctuates also daily, in the morning milk the number is lesser than in the evening milk (Hlebec - Logar, 2000). The stressors, such as heat, moisture, storms, sudden changes of the air temperature, change of time of milking, change of milking machine operator, water shortage, changes of feed rations, special interventions in the barn (vaccination, taking of blood), calving time, geographic area, grassland, manner of breeding and manner of milking can influence the increase of somatic cells (Klopčič, 2005).

The micro-organisms live everywhere - in the air, water, in the living and dead organisms. Therefore, there are numerous chances of their coming into the milk. The most dangerous source of the milk infection is inadequately or badly cleaned milking equipment. The basic price of delivery of milk in Slovenia is governed by the Rules and regulations on the elements of forming the price of delivery of milk (Off. Gazette of RS No. 107/2001), which are coordinated with the European standards.

In the study the quality and quantity of the milk delivered in the area of the Agricultural cooperative Šentjur were determined and compared with the quality of the milk delivered to all dairies in Slovenia during the period from 2003 to 2005.

Materials and methods

The data of the milk quality were obtained from the purchase manager of the Agricultural cooperative Šentjur (ACŠ). They have represented a comparable picture of milk production in Slovenia already for several years, since the quality parameters vary in the frame of the national average. 36 monthly accounts for the delivered milk have been analyzed, indicating the quantities of the delivered milk, the bacteriological quality for the individual quality classes, the data on the total count of somatic cells and the data on the fat and protein content.

The data were prepared in the programme Excel and were statistically analyzed by the statistical package SPSS version 12.0 for windows. For assessment of differences between the traits of the years the General linear model procedure was used.

Results and discussion

Basic statistical parameters for traits observed

Table 1 indicates the obtained results for the milk fat and protein percentage and the quantity of milk, quality class by quality class, with respect to the number of somatic cells and the total bacterial count in the area of the Agricultural cooperative Šentjur (ACŠ) and Slovenia (SLO) during 2003 to 2005.

Table 1: Basic statistical parameters for milk delivered

Tablica 1: Osnovni statistički parametri otkupljenog mlijeka

	n	KZŠ/ACSŠ	SLO
		$\bar{x} \pm SD$	$\bar{x} \pm SD$
Fat Mast (%)	36	3.90 ± 0.11	4.15 ± 0.11
Proteins (%) Protein	36	3.18 ± 0.07	3.35 ± 0.08
NSC (until 400000), litre BSS (do 400 000), litra	36	693507 ± 71340	36416064 ± 3348213
NSC (400 - 599000), litre BSS (400 - 599 000), litra	36	42910 ± 21603	2689242 ± 910269
NSC (>600000), litre BSS (>600 000), litra	36	4135 ± 5148	320323 ± 148841
TBC (E class), litre UBMO (E. klasa), litra	36	699380 ± 68905	36584554 ± 3189914
TBC (1 st class), litre UBMO (1. klasa), litra	36	30234 ± 15246	2205549 ± 743272
TBC (2 nd class), litre UBMO (2. klasa), litra	36	6824 ± 6873	443610 ± 243079
TBC (3 rd class), litre UBMO (3. klasa), litra	36	3004 ± 4601	157965 ± 78921
TBC (4 th class), litre UBMO (4. klasa), litra	36	1111 ± 2325	33808 ± 29116

NSC = number of somatic cell; TBC = total bacterial count; n = number of month; \bar{x} = average value; SD = standard deviation

BSS = broj somatskih stanica; UBMO = ukupan broj mikroorganizama; n = broj mjeseca; \bar{x} = prosječna vrijednost; SD = standardna devijacija

The comparison in Table 1 shows that a higher fat percentage (4.15 %) was present in the milk delivered in Slovenia, if compared to the milk delivered by AC Šentjur (3.90 %). Also the protein share in the milk delivered in Slovenia was higher by 0.17 % than in the milk delivered by the AC Šentjur.

Depending on the season which is not evident in the annual survey (Table 1) the variation of the quantities of the milk, delivered by the AC Šentjur and in Slovenia, between the individual quality classes with respect to NSC and TBC is obvious from the values of SD which, in lower classes of NSC (> 600.000) and TBC (2nd class) and lower, assumes the values higher than \bar{x} .

The microbiological quality results show that during three years the milk was present in all five quality classes. In the area of the AC Šentjur, 98.48 % of delivered milk contained 100.000 micro-organisms per millilitre of milk. In Slovenia the quantity of milk of such quality was 98.40 %.

The quantity of milk delivered by the area of the AC Šentjur was greatest in 2003. The quantity of milk delivered in 2004 was lower also due to unfavourable weather, particularly, the drought in the previous year. In 2005, the milk delivery was reduced, particularly, because a considerable number of large farms decided to deliver milk through the Cattle-breeding bussines association to Italy. The least quantity of milk was delivered to the cooperative in November 2005, and the greatest quantity in May 2003.

The milk delivery in the area of the whole Slovenia was highest in 2004. In the ensuing year the milk delivery dropped. It is supposed that it happened because of milk quotas introduction, since that was, among other things, why many farms gave up the milk production, whereas a considerable number of farms started to export milk to the neighbouring Italy. Small season fluctuations are obvious. The leas quantity of milk was delivered in November 2005 and the greatest quantity in May 2003.

Influence of year and month of delivery on the traits observed

For the period 2003 - 2005 the variation of the observed traits of the deliverid milk was analyzed year by year and month by month in the area of the AC Šentjur and whole Slovenia. The milk delivery was increased in March, April and May. It is supposed that the quantity of milk starts to increse when the dairy cows change over to the summer feed ration which is usually of better quality than the winter ration.

Figure 1 shows constant uniform progresion of the fat percentage in the milk delivered in Slovenia and in the AC Šentjur in the first and second third of 2003, the two curves starting to diverge strongly in the third third of the year. Overlapping of the protein percentage curve in June is interesting, in spite of higher average value of the protein percentage in the milk delivered in Slovenia in comparison with the milk delivered by the AC Šentjur.

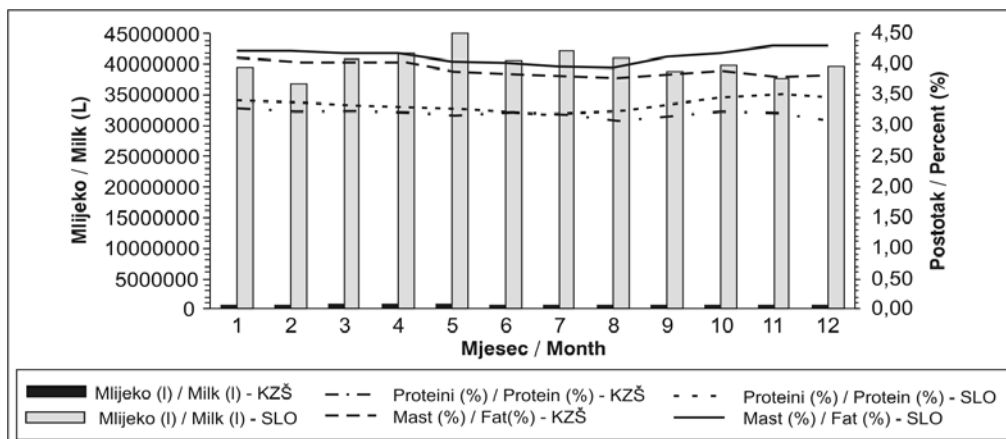


Figure 1: Quantities of delivered milk (L), percentage of proteins (%) and percentage of fat (%) of milk delivered in the area of the Agricultural cooperative Šentjur (ACŠ) and Slovenia in 2003 month by month

Grafikon 1: Količine otkupljenog mlijeka (L), postotak proteina (%) i postotak masti (%) u otkupljenom mlijeku na području Kmetijske zadruge Šentjur (KZŠ) i Slovenije u 2003. godini po mjesecima

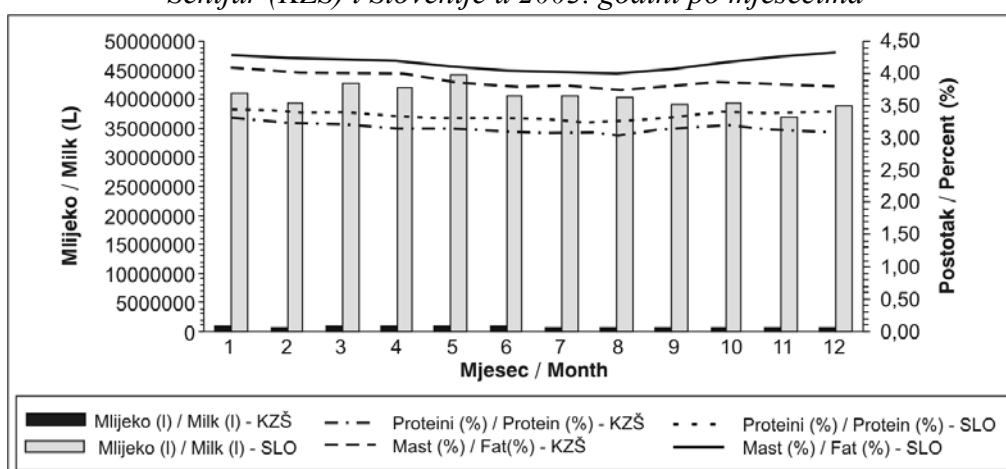


Figure 2: Quantities of delivered milk (L), percentage of proteins (%) and percentage of fat (%) of milk delivered in the area of the Agricultural cooperative Šentjur (ACŠ) and Slovenia in 2004 month by month

Grafikon 2: Količine otkupljenog mlijeka (L), postotak proteina (%) i postotak masti (%) u otkupljenom mlijeku na području Kmetijske zadruge Šentjur (KZŠ) i Slovenije u 2004. godini po mjesecima

Figure 2 shows a minor variation of the fat percentage in the milk delivered in Slovenia for 2004, where, comparably, in the milk delivered by the AC Šentjur there is a greater difference in the fat percentage. A greater divergence of curves occurs from October onwards in the fat percentage in the delivered milk between Slovenia and the AC Šentjur. However, the ratio of the protein percentage in the milk delivered in Slovenia and in the AC Šentjur was very constant.

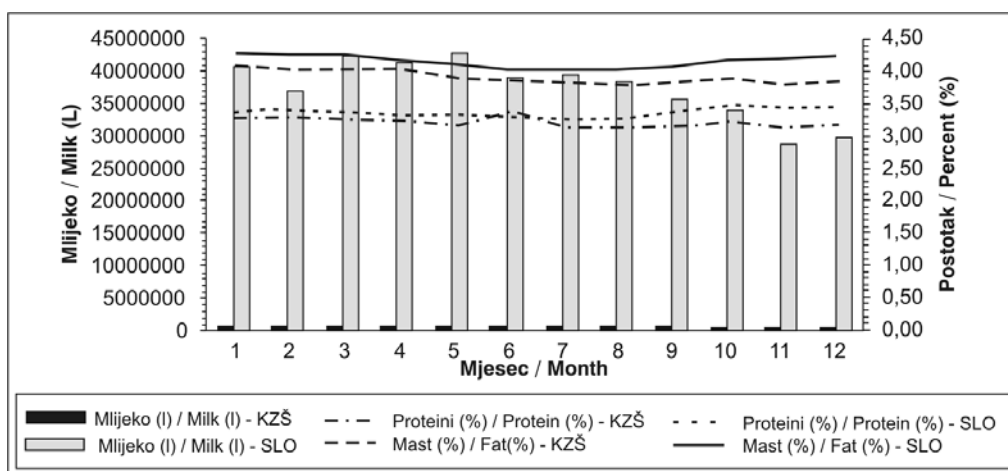


Figure 3: *Quantities of delivered milk (L), protein percentage (%) and fat percentage (%) in the milk delivered in the area of the Agricultural cooperative Šentjur (ACŠ) and Slovenia in 2005 month by month*

Grafikon 3: *Količine otkupljenog mlijeka (L), postotak proteina (%) i postotak masti (%) u otkupljenom mlijeku na području Kmetijske zadruge Šentjur (KZŠ) i Slovenije u 2005. godini po mjesecima*

Figure 3 shows very great variations in the fat and protein percentage in the milk delivered in the AC Šentjur in comparison with the milk delivered in Slovenia, particularly, in June for the protein percentage and in April for the fat percentage.

In the period 2003 - 2005 the fat content in the area of whole Slovenia varied between 3.94 % and 4.32 %. The farms reached the lowest fat content in August 2003. In general, the lowest fat content is noticeable in the summer months, and the highest in January, November and December. In the period 2003 - 2005 the protein content in the area of whole Slovenia varied between 3.20 % and 3.50 %. The lowest protein content occurred in the summer

months. During that period the peak was reached in November 2003, when the protein content was 3.50 %. The highest protein content occurred in November and December.

The cooperative reached the highest protein content of the delivered milk in June 2005. In 2003 and 2004 the protein content was lower. The lowest protein content occurred in 2004 as a consequence of strong drought recorded in 2003, when the quality of the voluminous feed was lower. Considerable season fluctuation of the protein content is noticeable. The protein contents are the highest in the spring and winter months and the lowest in the summer months except in June 2005. The fat content in the area of the AC Šentjur during the period 2003 - 2005 varied relatively equally between 3.76 % and 4.10 %. The highest and the lowest fat content were reached in 2004.

Influence of the month on content of the total count of micro-organisms and the count of somatic cells

Table 2: Microbiological quality of delivered milk in the area of the Agricultural cooperative Šentjur (ACS) during 2003 - 2005 month by month

Tablica 2: Mikrobiološka kakvoća otkupljenog mlijeka na području Kmetijske zadruge Šentjur (KZŠ) u razdoblju 2003. - 2005. po mjesecima

Month Mjesec	N	Microbiologic milk quality (TBC) in classes in % Mikrobiološka kakvoća mlijeka (UBMO) po klasama u %				
		E class E klasa	1 st class 1. klasa	2 nd class 2. klasa	3 rd class 3. klasa	4 th class 4. klasa
1	3	96.72 ± 1.08	3.09 ± 1.00	0.04 ± 0.07	0.12 ± 0.18	0.04 ± 0.07
2	3	96.86 ± 2.07	2.55 ± 1.55	0.44 ± 0.40	0.15 ± 0.15	0.00 ± 0.00
3	3	97.34 ± 1.17	2.00 ± 0.98	0.34 ± 0.30	0.16 ± 0.17	0.16 ± 0.28
4	3	96.63 ± 0.68	2.68 ± 1.18	0.29 ± 0.50	0.06 ± 0.10	0.35 ± 0.54
5	3	93.78 ± 2.63	5.22 ± 2.09	0.95 ± 0.57	0.03 ± 0.06	0.02 ± 0.04
6	3	92.77 ± 3.15	5.67 ± 1.67	0.98 ± 1.10	0.18 ± 0.20	0.40 ± 0.70
7	3	91.12 ± 4.77	6.29 ± 2.99	1.42 ± 1.02	0.87 ± 0.86	0.29 ± 0.51
8	3	90.89 ± 4.75	5.66 ± 2.81	2.30 ± 1.63	0.99 ± 0.87	0.16 ± 0.27
9	3	93.50 ± 1.40	4.24 ± 0.64	1.51 ± 1.06	0.59 ± 0.64	0.16 ± 0.14
10	3	94.42 ± 2.90	4.07 ± 2.63	1.20 ± 0.79	0.22 ± 0.39	0.09 ± 0.08
11	3	92.90 ± 1.75	4.91 ± 2.20	0.86 ± 0.45	1.33 ± 1.44	0.00 ± 0.00
12	3	95.37 ± 1.86	3.07 ± 1.14	1.15 ± 1.76	0.36 ± 0.34	0.05 ± 0.10

TBC = total bacterial count

UBMO = ukupan broj mikroorganizama

Table 2 shows the season differences in the microbial milk quality. The farmers face the most problems concerning assurance of microbial milk quality in the summer time. Most milk, not complying with the E class conditions was delivered to the Agricultural cooperative in the period from May to August. Moreover, the quantity of the delivered milk, containing less than 100.000 micro-organisms, was lowest in the summer months, i.e., June, July and August.

The highest microbial quality of the delivered milk was reached in March, since 97.34 % of the delivered milk was of E class. The lowest percentage of the delivered milk of the E class was reached in August, namely 90.89 %. For other classes there was an increase of the delivered milk in the summer period in conjunction with the reduction of the E class. In the 1st class the increase was 4.29 %, in the 2nd class it was 2.26 %, in the third class it was 0.96 and in the fourth class it was 0.4 %.

Table 3: Microbial quality of delivered milk in the area of Slovenia in the period 2003 - 2005, month by month

Tablica 3: Mikrobiološka kakvoća otkupljenog mlijeka na području Slovenije u razdoblju 2003. - 2005. po mjesecima

Month Mjesec	N	Microbiologic milk quality (TBC) in classes in % Mikrobiološka kakvoća mlijeka (UBMO) po klasama u %				
		E class E klasa	1 st class 1. klasa	2 nd class 2. klasa	3 rd class 3. klasa	4 th class 4. klasa
1	3	95.01 ± 0.19	4.10 ± 0.16	0.59 ± 0.19	0.25 ± 0.08	0.05 ± 0.02
2	3	95.61 ± 0.67	3.57 ± 0.59	0.59 ± 0.15	0.20 ± 0.04	0.03 ± 0.02
3	3	95.59 ± 0.52	3.53 ± 0.23	0.66 ± 0.31	0.17 ± 0.05	0.04 ± 0.02
4	3	94.27 ± 0.09	4.47 ± 0.23	0.91 ± 0.28	0.26 ± 0.07	0.09 ± 0.12
5	3	92.78 ± 1.54	5.52 ± 1.19	1.28 ± 0.37	0.36 ± 0.05	0.14 ± 0.07
6	3	91.29 ± 2.93	6.61 ± 2.30	1.42 ± 0.62	0.48 ± 0.12	0.21 ± 0.11
7	3	90.19 ± 2.93	7.35 ± 1.98	1.82 ± 0.95	0.52 ± 0.06	0.11 ± 0.04
8	3	89.77 ± 2.58	7.50 ± 1.74	1.83 ± 0.56	0.76 ± 0.31	0.14 ± 0.01
9	3	90.42 ± 1.46	7.37 ± 1.11	1.51 ± 0.51	0.62 ± 0.05	0.08 ± 0.04
10	3	91.66 ± 0.39	6.65 ± 0.42	1.14 ± 0.13	0.51 ± 0.08	0.04 ± 0.03
11	3	93.04 ± 0.45	5.63 ± 0.40	0.90 ± 0.18	0.37 ± 0.07	0.06 ± 0.02
12	3	94.26 ± 0.69	4.65 ± 0.78	0.73 ± 0.03	0.33 ± 0.11	0.04 ± 0.02

TBC = total bacterial count

UBMO = ukupan broj mikroorganizama

The representation of the milk delivery in Slovenia (Table 3) for the period 2003 - 2005 from the microbial quality point of view, shows that the most milk of E class was delivered in February (95.61 %) and the least in the summer month of August, when 89.77 % of the milk delivered was of E class. The most milk of the 1st class was delivered in summer and the least in winter, where the difference was 3.93 %. A smaller difference was in the 2nd class (1.24 %), in the third class it was 0.59 % and in the fourth that difference was 0.18 %.

Table 4: Average quantity of delivered milk with respect to the class of the count of somatic cells (NSC) in the delivered milk in the area of the Agricultural cooperative Šentjur (ACŠ) in 2003 - 2005 month by month

Tablica 4: Prosječna količina otkupljenog mlijeka s obzirom na klasu broja somatskih stanica (BTS) u otkupljenom mlijeku na području Kmetijske zadruge Šentjur (KZŠ) u razdoblju 2003. - 2005. po mjesecima

Month Mjesec	N	Number of somatic cells (NSC) in months per % Broj somatskih stanica (BSS) po mjesecima u %		
		< 400000	400000 - 599000	> 600000
1	3	95.60 ± 1.93	4.29 ± 1.76	0.12 ± 0.18
2	3	96.45 ± 3.16	3.40 ± 3.08	0.15 ± 0.15
3	3	96.99 ± 2.07	2.85 ± 2.17	0.16 ± 0.17
4	3	97.29 ± 0.40	2.65 ± 0.34	0.06 ± 0.10
5	3	94.96 ± 2.55	5.00 ± 2.51	0.03 ± 0.06
6	3	91.64 ± 2.82	8.18 ± 2.82	0.18 ± 0.20
7	3	91.69 ± 3.49	7.36 ± 2.94	0.95 ± 0.74
8	3	89.00 ± 2.65	10.03 ± 2.97	0.97 ± 0.73
9	3	90.52 ± 2.75	8.27 ± 2.68	1.22 ± 0.87
10	3	92.02 ± 0.93	7.06 ± 1.17	0.92 ± 1.07
11	3	92.64 ± 2.44	5.75 ± 3.48	1.61 ± 1.13
12	3	93.63 ± 1.15	5.76 ± 1.05	0.61 ± 0.18

Table 4 shows the quality of milk with respect to the count of somatic cells in milk for the period 2003 to 2005 month by month. Seasonal fluctuations are observed also in this trait. The least percentage of milk with up to 400.000 somatic cells per millilitre of milk (89.00 %) and the greatest quantity of milk of the second class (10.03 %) and of the third class (0.97 %)

were delivered to the AC Šentjur in August. In April the milk with the least number of somatic cells was delivered, since most delivered milk was of the 1st class (97.29 %) and the least milk of the other two classes.

Table 5: Average quantity of delivered milk with respect to the class of the number of somatic cells (NSC) in the delivered milk in Slovenia in 2003 - 2005 month by month

Tablica 5: Prosječna količina otkupljenog mlijeka s obzirom na klasu broja somatskih stanica (BSS) u otkupljenom mlijeku u Sloveniji u dobi 2003. - 2005. po mjesecima

Month Mjesec	N	Number of somatic cells (NSC) in months per % Broj somatskih stanica (BSS) po mjesecima u %		
		< 400000	400000 - 599000	> 600000
1	3	93.76 ± 0.89	5.73 ± 0.97	0.51 ± 0.08
2	3	94.69 ± 0.14	4.99 ± 0.10	0.41 ± 0.09
3	3	95.07 ± 0.01	4.40 ± 0.12	0.52 ± 0.13
4	3	94.97 ± 0.57	4.62 ± 0.38	0.41 ± 0.19
5	3	93.53 ± 0.05	5.82 ± 0.14	0.65 ± 0.09
6	3	91.12 ± 0.94	7.68 ± 0.85	1.21 ± 0.09
7	3	89.33 ± 1.44	9.49 ± 1.24	1.18 ± 0.20
8	3	87.64 ± 1.52	10.90 ± 1.32	1.46 ± 0.20
9	3	88.99 ± 1.07	9.81 ± 1.15	1.21 ± 0.08
10	3	91.29 ± 0.70	7.84 ± 0.69	0.87 ± 0.01
11	3	93.55 ± 0.31	5.75 ± 0.24	0.70 ± 0.07
12	3	94.43 ± 0.41	4.93 ± 0.13	0.62 ± 0.25

Table 5 shows the least frequency of somatic cells in the milk delivered in March, when 95.07 % of all delivered milk was of class < 400.000 NSC, whereas in February and April the least milk delivered (0.41 %) was of class > 600.000. The greatest number of somatic cells was in the milk delivered in August, where 87.64 % of milk was of class < 400.000; the highest percentage (10.90 %) of delivered milk of class 400.000 - 599.000 and also 1.46 % of the third class was reached.

Conclusion

The greatest quantity of the milk delivered in the area of the AC Šentjur occurred in 2003. The quantity of the delivered milk in 2004 was lower due to adverse weather conditions, particularly, due to drought in 2003. In 2005 the

delivery decreased mainly because many large farms decided to deliver milk through the cattle breeding business association to Italy. The least milk was delivered to the cooperative in November 2005 and the most in May 2003.

When studying the fat content in the milk delivered in the area of the AC Šentjur and the whole Slovenia, considerable season fluctuations were established. The milk was poorest in fat in the summer time, and the richest in winter and in early spring months.

Also when studying the proteins, the lowest content was noticed in the summer time. The fat content (3.9 %) as well as the protein content (3.2 %) was lowest in August and highest in January, when the fat content was 4.2 % and the protein content 3.4 %. A similar trend with minor fluctuations occurred also in the milk delivered in Slovenia, where during the winter months the average percentage of fat was 4.3 and the average protein percentage 3.4, whereas during the summer months which values were 4.0 % and 3.3 % respectively. This may be caused by inexpert and incorrect calculations of feed rations. In the summer time the animals are grazing or they are fed with fresh green feed in the barn. Usually such feed contains much proteins and little raw fibrin, therefore the fat content in the milk is reduced. The summer feed is also modest in energy which would equalize the surplus of proteins in the ration. This results in lower protein content in the milk.

When studying the microbial quality of milk, it was established that the farmers have most problems in the summer time. The quantity of all delivered milk containing less than 100.000 micro-organisms was the least in the summer months, i.e., June, July and August (92.77 %, 91.12 %, 90.89 %); the same applies also to the quantities of delivered milk in Slovenia (91.29 %, 90.19 %, 89.17 %). This may be caused by deficient cooling, since the efficiency of cooling devices, intended stop multiplication of micro-organisms as soon as possible after milking, owned by breeders, is very different (bad, obsolete equipment). The milk from many breeders starts to be cooled only when it is brought to the common milk collection station. It is just in the summer time that the milk production is exposed to high temperatures and other stressed situations increasing the risk of the milk being infected with micro-organisms. It is in July and August that, in general, the farms in the area of whole Slovenia face most difficulties concerning assurance of the microbial milk quality.

When studying the milk quality with respect to the number of somatic cells it was established that the least milk delivered in the summer time was of

the class of 400.000 somatic cells in millilitre of milk. In August, 89.00 % of milk delivered to the AC Šentjur was of E class, whereas in Slovenia that percentage in the same month was 87.64 % of all milk delivered and was lowest in the whole year, too.

In the summer months the problems faced include high temperatures, moisture, storms and great differences in the milk production technology between breeders. All those factors are reflected in the inferior quality of the milk with respect to the number of somatic cells. Further, also the health state of the udder has a great influence on the number of somatic cells in the milk, since in summer the farmers are more burdened with work and devote less time to the individual dairy cow.

KAKVOĆA I OTKUP MLIJEKA U SLOVENIJI

Sažetak

Proizvodnja mlijeka predstavlja mogućnost stjecanja mjesečnog dohotka i time osigurava socijalnu sigurnost mnogim seoskim gospodarstvima. U Sloveniji su na snazi europski propisi o kakvoći otkupljenog mlijeka i odnose se na higijensku kakvoću mlijeka te broj somatskih stanica. Otkupna cijena mlijeka ovisi i o postotku proteina i masnoće. Cilj rada bio je ustanoviti odgovara li kakvoća otkupljenog mlijeka aktualnim propisima u Sloveniji (SLO). Istraživana je kvaliteta otkupljenog mlijeka na području Kmetijske zadruge Šentjur (KZŠ) i cjelokupnom području Slovenije (SLO). Analizirani su bakteriološki podaci u pojedinim razredima kakvoće, podaci o ukupnom broju somatskih stanica te podaci o udjelu masti i proteina. U statističku obradu podataka uključeno je 36 mjesečnih obračuna. Utvrđeno je, da se otkupljeno mlijeko istraživanih područja ne razlikuje u bitnim elementima kakvoće.

Ključne riječi: govedo, kvaliteta mlijeka, mast, proteini, mikroorganizmi, somatske stanice

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