
Sampling of raw cow milk by a conventional method and autosampler

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The creation of a unified European market with raw materials and foodstuffs of animal origin requires also to unify the rules, procedures and legislation, mainly the criteria of hygiene and quality. We may say that this development has been very dynamic in the Slovak Republic.

This related to processing of a complex standard for judging, classifying and evaluating raw cow milk for the purposes of its dairy treatment and processing.

The standard valid in this sense is STN 57 0529 Raw Cow Milk, which became effective on 1st December 1999. By its last amendment the conformity with the standards valid in the member states of the European Community has been reached.

The objective of this work was to:

- (1) Carry out the research of suitability of autosampler use in sampling raw cow milk in relation to its classification to individual classes of quality;
- (2) Analyse the number of somatic cells (NSC), content of proteins (P), content of fat (F) and total number of microorganisms (TNM) in taken samples;
- (3) To compare the results of sampling of raw cow milk between the conventional method and autosampler and

Introduction

- (4) To propose the next procedure.

Material and methods

In order to carry out determined objectives we have selected the Senica dairy (Senická mliekareň a.s., Senica) and its hinterland (24 suppliers with maximum distance of 35 kilometres from the dairy plant).

The above-mentioned dairy meets the criteria prescribed by EU legislation and is an export plant for EU member states (Edam cheese and butter). In addition to it, this dairy exports milk products also to Hungary and Croatia.

Sampling of raw cow milk was carried out

- by a conventional method / manually (STN 57 0530 and STN 56 080), immediately before sampling by a transporting tank vehicle equipped with the automatic device for sampling by a flow method
- by an automatic sampler (STN 57 005/Z1) – autosampler of the German company Schwarte & Werk GmbH.

Totally in four samplings 96 samples were taken, 24 samples in one sampling.

In laboratory analyses the following methods and analytical devices were used for the determination of

- the number of somatic cells (STN 57 0532, Fossomatia 90)
- the content of proteins (STN 57 0536, Milko Scan FT 120)
- the content of fat (STN 57 0536, Milko Scan FT 120)
- the total number of microorganisms (STN 57 0537, Minipetross).

Results and discussion

- (1) the number of somatic cells
Judging this criterion the number of somatic cells according to valid standard was as follows: 43 samples taken manually, irrespective of the moving average, would conform to Q class of quality and 41 samples taken by autosampler would conform to Q class of quality.
- (2) the content of proteins
The results were similar as in the number of somatic cells. But autosampler showed higher values than manual sampling in 58 samples.
- (3) the content of fat
The content of fat was different in the samples taken manually and in the samples taken by autosampler. A higher content of fat was found in 23 samples taken manually. The highest difference in the content of fat was 0.5 %. 4 samples taken manually were very close to this result. On the contrary, one sample taken by autosampler showed the content of fat by 0.65 % higher than in case of the sample taken manually.

- (4) the total number of microorganisms
With respect to dynamic development of individual indicators a notable development was recorded. Out of 96 samples, 84 samples showed a higher number of microorganisms than in case of samples taken manually. The maximum percentual difference of this indicator was in third sampling (Klátov), where the sampling by autosampler was higher by 188 %.
- (5) differences between the sample taken manually (100 %) and the sample taken by autosampler were the following:
- number of somatic cells (101.8 %)
 - proteins (102.2 %)
 - fat (104.7 %)
 - total number of microorganisms (110.9 %).
- (6) the research was made
on the basis of the requirements of primary producers, who, in suppliers-customers relations in monetizing the milk, refused to use the results obtained in sampling by autosampler referring to present unpreparedness and inaccuracy of these results.
- (7) autosampler system for raw cow milk sampling
corresponds to the most advanced level of technology. By means of cooperation with national and foreign institutions it offers the solution, which exactly corresponds to operating conditions and takes into account also the requirements resulting from law and special characteristics of milk transport in Slovakia.

On the basis of the comparison of results reached when sampling manually (according to STN 57 530 and STN 56 0080) and sampling by autosampler (according to STN 57 0005) we recommend to carry out the following procedures:

- (1) also for the future period to leave in validity the exception from the use of sampler in the purchase of milk, granted by the Ministry of Land Management of the Slovak Republic
- (2) to use sampling by autosampler for the determination of:
 - the number of somatic cells / NSC (results are comparable)
 - the content of proteins (results are comparable)
 - the quantity of fat only in case the difference between a conventional and automatic sampling is not more than 0.05 weight % of fat (results are provable)
- (3) not to use sampling by autosampler for the determination of:
 - the total number of microorganisms / TNM . ml⁻¹ of raw cow milk (higher values in sampling by autosampler than when using a conventional method)
- (4) for practical application by autosampler
 - to ensure the necessary quantity of raw cow milk for washing out the whole system before next sampling.

Conclusion

References

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