# BUFFALO MILK QUALITY IN RUCĂR AREA

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**Abstract**

*The study was conducted in 2011 during spring in Romania, Rucăr area in the farm of a ecological farmer. This study research the quality of fresh buffalo milk in order to optimised the producing daiery products. Althrough we try to find how parameters of milk are changed during studied period and if this parameters are significant variable. The final results will be integrated in an larger study toghether with the research results regarding the quality of sheep and buffalo milk during studied period.*

**Key words** : buffalo milk, milk freezing point, milk conductivity, lactose, protein content.

## INTRODUCTION

For evaluation the buffalo milk quality we study Organolepticall (taste, smel and color) and Physical – chemical parameters (Fat percent, %, Non faty dry matter, %, Protein content, %, Acidity, Tº, Lactose ratio, %, Freezing point, Cº, Mineral content, %, Milk conductivity, mS/cm). Methods used for analysis are according with romanian standards and are quottation in latest studys. The device used was Lactostar from FunkeGerber producer. The sheep milk was colected from the farm of Duruianu Ionut. The milk was colected from 3 buffalo female, Romanian Buffalo breed. The milk was colected in the morning at first milking and the buffalo was in free stabulation on the hill pasture without fertilisation and without suplimentary dietary.

## MATERIALS AND METHODS

Taking samples: We use to take samples glass probes. From serface and upper layers samples was taken with cilindrical probes after homogenisation. Procedure was according to S.TA.S. 9535/1-74 and STA.S. 9535/2-74.

1.Organoleptical analysis: Was study colour, aspect, smell and taste of milk according with Georgescu Gh., 2005. If those parameters was out of normal range milk was considered out of standards and study of those samples was ended.

2.Physical analysis : We study follow parameters : fat percent, non faty dry matter (SNF), protein content, acidity, lactose ratio, freezing point, mineral content and milk conductivity.

We use the LactoStar device from Funke Gerber with following parameters :

Table 1. LactoStar parameters

| Constituents | Disolving | Repetability |
|---|---|---|
| Fat | 0,01 % | +0,02% |
| Protein | 0,01 % | +0,03% |
| Lactose | 0,01 % | +0,03% |
| SNF (nonfaty dry matter) | 0,01 % | +0,04% |
| Freezing point | - 0,001 ºC | +0,02% |
| Mineral content | 0,01 % | +0,02% |
| Conductivity | 0,01 % | +0,02% |

3. Experimental Methodic

Samples was study according following schema :

$V_1$ – 11 May; $V_2$ – 12 May; $V_3$ – 13 May ; $V_4$ – 14 May, $V_5$ – 15 May, $V_6$ – 16 May, $V_7$ – 17 May, $V_8$ – 18 May, $V_9$ – 19 May, $V_{10}$ – 20 May, $V_{11}$ – 21 May, $V_{12}$ – 22 May.

4. Biological material

We study milk colected from 3 buffalo female, Romanian Buffalo breed from Rucăr area, farm of Duruianu Ionuț.

5. Statistics methodic

We use ANOVA statistic tests for data processing.

**RESULTS AND DISCUSSION**

1.Organoleptical analysis:

Colour, Aspect, Smell and Taste was according with standards and there was no deviation from this point of wiew.

2.Physical analysis :

Table 1. Fat percent, %

| No. | Sample | V1 | V2 | V3 | V4 | V5 | V6 | V7 | V8 | V9 | V10 | V11 | V12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Fat percent | 7,62 | 7,13 | 7,39 | 7,31 | 7,23 | 7,87 | 7,62 | 7,45 | 7,31 | 7,30 | 7,45 | 7,59 |

The fat percentage was in the normal range of buffalo milk, close to the maximum value. This was a consequence of the periode, because the lack of suplimentary feeds during the week and a moderate milking.

Table 2. Non faty dry matter, %

| No. | Sample | V1 | V2 | V3 | V4 | V5 | V6 | V7 | V8 | V9 | V10 | V11 | V12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SNF, % | 17,21 | 17,32 | 17,29 | 17,45 | 17,27 | 17,56 | 17,64 | 17,29 | 17,33 | 17,45 | 17,21 | 17,15 |

The SNF is at the higher rates because of the production level. That reveal the high value of the milk colected in this periods and it will valuable for chees production.

Table 3. Protein content, %

| No. | Sample | V1 | V2 | V3 | V4 | V5 | V6 | V7 | V8 | V9 | V10 | V11 | V12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Protein content, % | 6,23 | 6,12 | 6,45 | 6,34 | 6,73 | 6,23 | 6,54 | 6,29 | 6,49 | 6,31 | 6,78 | 6,45 |

The protein content have high rates becase of the presence of green feed in this time and for this reason the milk will be very good for dairy products.

Table 4. Acidity, Tº

| No. | Sample | V1 | V2 | V3 | V4 | V5 | V6 | V7 | V8 | V9 | V10 | V11 | V12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Acidity, Tº | 16 | 16 | 15 | 15 | 15 | 15 | 15 | 15 | 16 | 15 | 17 | 17 |

The milk was fresh, the acidity reveal that the milk was analized after milking and is suitable for processing.

Table 5. Lactose ratio, %

| No. | Sample | V1 | V2 | V3 | V4 | V5 | V6 | V7 | V8 | V9 | V10 | V11 | V12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Lactose ratio, % | 5,87 | 5,77 | 5,83 | 5,91 | 5,44 | 5,83 | 6,11 | 6,08 | 6,01 | 5,84 | 5,92 | 5,96 |

High ratio of lactose are the consequence of the green feeds and the active methabolism of the buffalo, the high amounts are also influenced by specific high altitude flora present in the pasture.

Table 6. Freezing point, Cº

| No. | Sample | V1 | V2 | V3 | V4 | V5 | V6 | V7 | V8 | V9 | V10 | V11 | V12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Freezing point, Cº | - 0,758 | - 0,754 | - 0,761 | - 0,732 | - 0,741 | - 0,744 | - 0,723 | - 0,755 | - 0,764 | - 0,738 | - 0,745 | -0,752 |

Freezing point is normal and reveal that are no falsifications of the milk.

Table 7. Mineral content, %

| No. | Sample | V1 | V2 | V3 | V4 | V5 | V6 | V7 | V8 | V9 | V10 | V11 | V12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Mineral content, % | 0,85 | 0,84 | 0,91 | 0,92 | 0,92 | 0,90 | 0,93 | 0,95 | 0,96 | 0,98 | 0,91 | 0,92 |

Mineral content is high because of the feeding with fresh grass.

Table 8. Milk conductivity, mS/cm

| No. | Sample | V1 | V2 | V3 | V4 | V5 | V6 | V7 | V8 | V9 | V10 | V11 | V12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | milk conductivity, mS/cm | 28,87 | 28,76 | 28,68 | 28,57 | 28,65 | 28,78 | 28,73 | 28,56 | 28,34 | 28,37 | 28,59 | 28,45 |

The milk conductivity reveal that was no exogen NaCl inside, the milk is authentic and there are no falsifications.

**CONCLUSIONS**

The analyzed milk sowed high contents in valuable components. The high content in lactose and proteins the milk analyzed is one of the row material proper for all kind of dairy products. That improves the organolepticall parameters of dairy products.

The high content in proteins recommends the milk also for cheese production.

Milk freezing point is at levels that reveal the absence of foreign substances for conservation or improving the milk stability.

The milk conductivity reveal that was no exogen NaCl inside, the milk is authentic.

Lacto Star electronic milk analyzer for basic physical – chemical parameters was the technical solutions for a better and quick feedback of the

milk quality management. The device was connected to a printer and also to a portable personal computer.

The analyzed milk had all parameters in normal range at the high levels, proper for dairy products.

There was no significant diferences in the values of analyzed parameters.

**REFERENCES**


1. American Public Health Association, 1992, "Standard methods for the examination of dairy products". R.T. Marshall PhD, Editor, 16th Edition,
2. Ardelean M., R Sestraş., M. Cordea., 2005, Tehnică experimentală horticolă, Edit. Academicpres, Cluj – Napoca,
3. Bani P., Sandrucci S. 2003, Il metodo biologico e la qualità del latte. Sc.Tecn.Lattiero-Casearia, 54, 267-286,
4. Banu, C., 2008, *Tratat de industrie alimentară. Probleme generale*, Ed. ASAB, Bucureşti, 608 p,
5. Bennedsgraard A.W., Thamsborg S.M., Vaarst M., Enevoldsen C., 2003, Eleven years of organic production in Denmark: herd health and production related to time of conversion and compared to conventional production. Livestock. Prod. Sci., 80, 121-131,
6. Bishop, J. R. A simple shelf life estimation method as an integral part of a total dairy quality assurance program. *Dairy, Food Environ. Sanitation* 1989, *12*, 698-701,
7. Bishop, J. R.; White, C. H. Assessment of dairy product quality and potential shelf life a review. *J. Food Prot.* 1986, *49*, 739-753,
8. Bishop, J. R.; White, C. H.; Firstenberg-Eden, R. Rapid impedimetric method for determining the potential shelf life of pasteurized whole milk. *J. Food Prot.* 1984, *47*, 471-475,
9. Bossuyt, R. A 5-minute ATP platform test for judging the bacterial qulality of raw milk. *Neth. Milk Dairy J.* 1982, *36*, 355-364,
10. CZAPLICKA M., PUCHAJDA Z., IWAŃCZUK K., IWULSKI Z., 1993 – Wpływ stanu zdrowotnego wymienia na wydajność i skład mleka krów rasy CB i CB x HF. I Poszczególne laktacje (Effect of health status of the udder on yield and composition of milk in Black – and-White and Black-and- White x HF cows. I. Individual lactations). *Acta Acad. Agricult. Tech. Olst. Zootechnica*, 38, 27- 38,
11. GEORGESCU Gh. and col., 2000, *Laptele şi produsele lactate*. Ed. Ceres, Bucureşti,
12. Ghidini S., Zanardi E., Battaglia A., Pinotti M.A., Varisco G., Campanini G., Chizzolini R., 2002 – Indagine sulla presenza di contaminanti chimici in latte e carne di produzione tradizionale e biologica. Ann.Fac.Med.Vet. Parma, 22, 87-97,
13. Hermansen J.E., 2003, Organic production systems and appropriate development in relation to public expectations. Livestock Prod.Sci., 80, 3/15,
14. KLINDTWORTH M., 1998 – Von der elektronischeu Tierkennzeichnung zum Gesundheitsmanagement. *Elektronik in der landtechnik, FAT – Schriftenreihe*, 59, 33-46,
15. Kouba M., 2003, Quality of organic animal products. Livestock Prod.Sci., 80, 33-40,
16. Marsili, R. T. Comparison of solid-phase microextraction and dynamic headspace methods for the gas chromatographicmass pectrometric analysis of light-induced lipid oxidation products in milk. *J. Chromatogr. Sci.* 1999a, *37*, 17-22.,

17. Marsili, R. T. SPME-MS-MVA as an electronic nose for the study of off-flavors in milk. *J. Agric. Food Chem.* 1999b, *47*, 648-654.,
18. Marsili, R. T.; Miller, N. Determination of the cause of offflavors in milk by dynamic headspace GC/MS and multivariate data analysis. In *Food Flavor Formation, Analysis,and Packaging Influences*,
19. MEIER W., 1998 – Elektronik, Lantechnik und „Precision forming". *Elektronik in ger Landtechnik, FAT – Schriftenreihe*, 59, 5-10.,
20. Mussinan, C., Contis, E., Ho, C.- T., Parliament, T., Spanier, A., Shaidi, F., Eds.; Elsevier Science Publishers: Amsterdam, The Netherlands, 1998; pp 159-171.,
21. Oprean, L., 2002, *Analiza microbiologică a produselor alimentare*, Ed. Univ. "Lucian Blaga", Sibiu, 182 p.,
22. Patel, G. B.; Blankenagel, G. Bacterial counts of raw milk and flavour of the milk after pasteurization and storage. *J. Milk Food Technol.* 1972, *35*, 203-206.,
23. Phillips, J. D.; Griffiths, M. W. Bioluminescence and impedimetric methods for assessing shelf life of pasteurized milk and cream. *Food Microbiol.* 1985, *2*, 39-51.,
24. Toledo P., Andrèn A., Björck, 2002, Composition of raw milk from sustainable production systems. Int.Dairy J., 12, 75 –80,
25. Urbach, G.; Milne, T. The concentration of volatiles in pasteurized milk as a function of storage time and storage temperaturesa possible indicator of keeping quality. *Aust.J. Dairy Technol.* 1988, *43*, 53-58.,
26. Vallejo-Cordoba, B.; Nakai, S. Keeping-quality assessment of pasteurized milk by multivariate analysis of dynamic headspace gas chromatographic data. 1. Shelf life prediction by principal component regression. *J. Agric. Food Chem.* 1994, *42*, 989-993.,
27. Van Crombrugge, J.; Waes, G.; and Reybroeck W. ATP-F test for estimation of bacteriological quality of raw milk. *Milk Dairy J.* 1989, *43*, 347-354.,
28. WĘGLARZY K., WAWRZYŃCZAK S., KACZOR A., BILIK K., BEREZA M., KRASZEWSKI J., 2008 – Proekologiczna technologia produkcji mleka wysokiej jakości na fermie o obsadzie 200 krów w cyklu zamkniętym (Pro-ecological technology of high-quality milk production on the farm maintaining 200 cows in closed cycle). Published by the National Research Institute of Animal Production, Cracow, 5-30.,
29. WENDEL G., 1998, Elektronikeinsatz in der Rinderhaltung – von der Identifizierung bis zur Automatisierung. *Elektronik in der Landtechnik, FAT – Schriftenreihe*, 59, 101-112.