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INDIVIDUAL LABORATORY YIELD OF CHEESE FROM CONTROL DAY MILK OF PLEVEN BLACKHEAD SHEEP BREED[1]

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*Abstrac*t: 20 milk samples from Pleven Blackhead sheep during third lactation on the second control day were analyzed. The milk samples were equilibrated at 33°C and then a rennet was added. The coagulated milk was centrifuged. The curd was dried in the open air for 60 min and ILRC was defined by its weight.

It was found that the milk of Pleven Blackhead sheep on the second control day contined total solids 17,84%, protein – 6,99%, fat – 5,2 %. Active acidity (pH) of milk was 6,49. ILRC from milk with these properties was 2,60 g/10ml.

The positive high significant (P<0,001) correlations between the milk for control day and daily yield of protein and fat (r= 0,99 and r=0,91) were established.

Key words: Pleven Blackhead sheep, control milk day, individual laboratory yield of cheese (ILRC), coefficient of correlation.

Introduction

A numerous investigations on the effect of some factors on milk productiveness, on milk technological characteristics and on sheep cheese production were conducted in Bulgaria (*Peichevski et al., 1988 a,b, c, Dimov,1995, Djorbineva et al., 1995, Petrova and Nedelchev, 2000; Teneva, 1993*)

The milk from dairy sheep is used widely for production of high quality cheese. The cheese yield is the common selection objective and the yield of fat, protein and milk are used as the selection criterion in dairy sheep (*Gabica and Serradilla, 2000*).

Recently researchers pay attention to new trait as individual laboratory yield of cheese. *Othmane at al. (2002a,b)* proposed the modern analytic method for the estimation of the individual laboratory yield cheese. Also they discussed the application of this new trait as a selection criterion.

The information about use of the method for the estimation of the individual yield cheese in Bulgaria is very scanty. The development and putting into practice such method is very important for future sheep selection.

The aim of this work was an estimation of the individual laboratory yield of sheep cheese (ILRC) from control day milk of Pleven Blackhead sheep breed.

Material and method

The experiment was conducted with Pleven Blackhead sheep during third lactation from the herd of the Institute of Animal Science- Kostinbrod. 20 milk samples on the second control day were analysed. The individual samples of milk were obtained in accordance with the *Instruction (2003).* These samples were analysed for total solids, solids non-fat, fat and protein content. The milk composition was determined with Combi Foss 5000 (Type 76300, Foss Electric, Denmark). The daily protein and fat yield and of its ratio were calculated.

For estimation of the individual laboratory yield of cheese (ILYC) the modified method by *E.Raicheva et al. (2004)* was used on the basis of the method developed by *Othmane at al.(2002).* The milk samples were equilibrated at 33°C and then rennet was added. The coagulated milk was centrifuged to separate cottage cheese and whey by centrifuge Janetzki T 23 for 15 min/2500 rpm. The curd was dried in the open air for 60 min and ILYC was defined by its weight.

The standard variance-statistical methods and the regression procedure were used for analysis of obtained results.

1 Original scientific paper – Originalni naučni rad

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Results and discussion

The average values of the studied traits of the milk for control day are shown in table 1. The content of total solids of the milk was within the normal limits. The fat content was lower in comparison with the protein content. The daily protein yield was higher then fat yield. These results are similar with data reported by *Peiychevski et al.,* (*1988 b) and Petrova (2000).* The same sheep have shown the opposite results during the second lactation on the second control day. The content of protein (6, 30 %) in their milk was lower than the fat content (8, 00%) *(Raicheva et al., 2004).*

Table 1. Milk for control day and milk composition

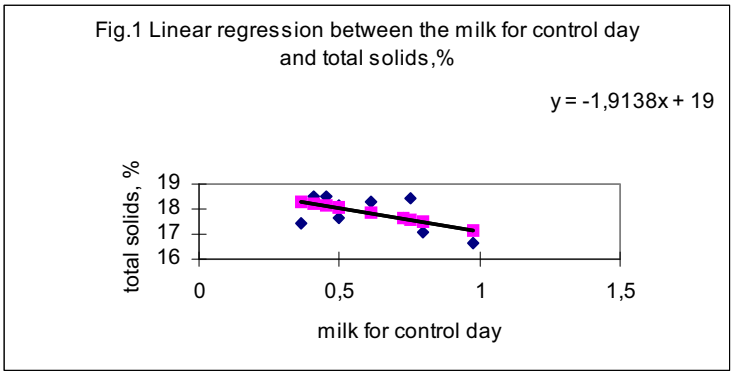
Traits	**X**	**Sx**	**SD**
Milk for control day, l	0,609	0,062	0,197
Total solids, %	17,84	0,207	0,656
Solids non fat, %	12,64	0,075	0,237
Fat, %	5,20	0,190	0,602
Protein, %	6,99	0,068	0,214
Fat, g/d	31,07	2,720	8,622
Protein, g/d	42,37	4,130	13,070

The data from table 2 show that the average values of the titrable acidity and of the active acidity were within the normal limits. The ratio protein : fat is high (1,34). This value is higher than the requirement for sheep milk at the manufacture of cheese *(Peiychevski et al., 1988a).* The same authors obtained the values of this proportion 0.97 – 0.96. When this ratio is high, the obtained cheese has the lower content of fat in the total solids *(Peiychevski and Chomakov, 1988).*

Table 2. Individual laboratory yield of cheese and physical-chemical characteristics of the milk

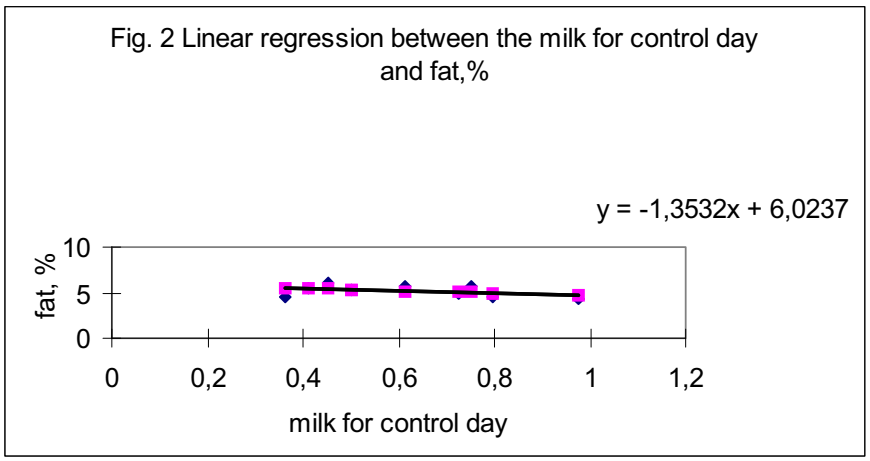
Traits	**X**	**Sx**	**SD**
Individual laboratory yield of cheese, g /10 ml	2,60	0,131	0,414
Titrable acidity, ^{o} T	22,25	0,160	0,506
Active acidity, pH	6,497	0,025	0,079
Protein: fat ratio	1,341	0,055	0,175

The individual laboratory yield of cheese was 2,60g/10ml. It means that from 100 l of milk 26, 00kg cheese will be obtained (Table 2). These results corresponded with the cheese yield at manufacture condition *(Peiychevski et al., 1988a).* The obtained value of the individual laboratory yield of cheese is higher than the same one from Bulgarian milk breed *(Raicheva and Kistanova, 2004).*

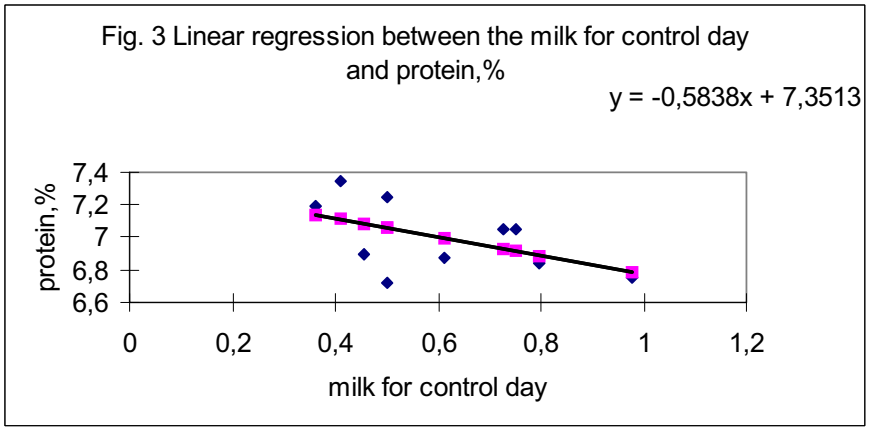


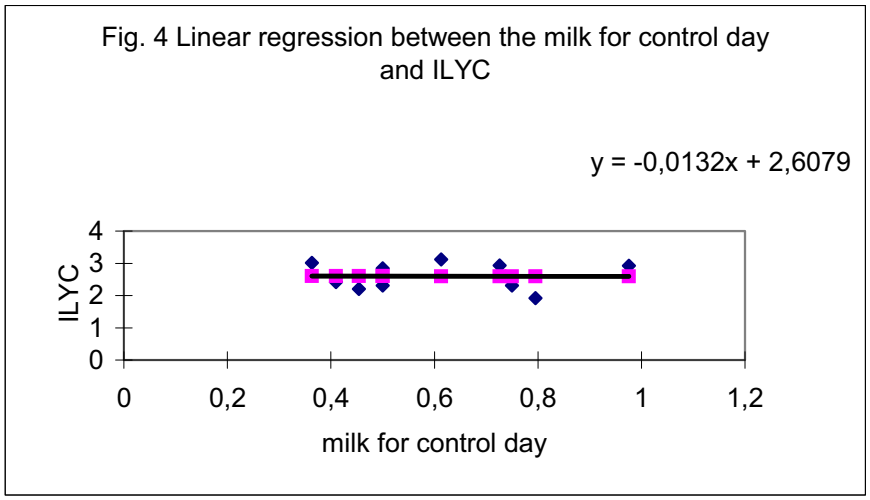
The figures (1,2,3) reflect the linear regression relationships between milk for control day and content of fat and protein, total solids and ratio protein : fat. The equations of regression of milk for control day, content of protein and total solids show the negative relationships. That confirms by high negative but significant (P<0,05) coefficients of correlation (Table 3).

The equation of regression of milk for control day and fat content reflects tendency to negative relationship between them (Fig.2). The coefficient of correlation is negative, but no significant (Table3).



The line of regression of milk for control day and the individual laboratory yield of cheese shows no relationship between them (Fig.4). The coefficient of correlation is positive but no significant (Table3). *Othmane et al.(2002)* and *Raicheva et al.(2004*) have been reported about low, no significant but negative coefficients of correlation between milk for control day and ILYC.





There are a high positive (r = 0,91***, r = 0,99***) and significant (P< 0,001) correlations between the daily yield of fat, the daily yield of protein and milk for control day (Table 3).

Table 3. The phenotypic correlation coefficients between the milk for control day, milk composition and individual laboratory yield of cheese

	r
Total solids, %	- 0,58 *
Fat, %	- 0,44 NS
Protein, %	- 0,54 *
Fat, g/d	0,91 ***
Protein, g/d	0,99 ***
Individual laboratory yield of cheese, g /10 ml	NS

Note: Significant of correlation coefficient at P < 0,001 - ***, P < 0,05 - *

Conclusion

During the study of milk for control day from Pleven Blackhead sheep breed the following values were defined concerning the content of total solids, protein, fat, protein : fat ratio, titrable acidy(^{o}T) and active acidy (pH): 17,44%, 6,99%, 5,20%, 1,34, 22,25 and 6,49. The individual laboratory yield of cheese from this milk was 2,60g.

The negative and significant coefficients of correlation between the milk for control day and the content of total solids and the content of protein (r = - 0,58* and r = - 0,54*) were established.

The high positive and high significant coefficients of correlation between the milk for control day and the daily yield of fat and the daily yield of protein (r = 0,99***, r = 0,91***) were established.

INDIVIDUALNI LABORATORIJSKI PRINOS SIRA OD MLEKA DOBIJENOG KONTROLNOG DANA OD RASE PLEVENSKE CRNOGLAVE OVCE

E. Raicheva, E. Kistanova

Rezime

Cilj ovog istraživanja je ocena individualnog laboratorijskog prinosa sira (ILRC). Sakupljeno je 20 uzoraka mleka od plevenske crnoglave ovce tokom treće laktacije i drugog kontrolnog dana. Uzorci mleka su ujednačeni na 33^0 C a zatim je dodat estrakt sirišta – ferment. Koagulisano mleko se zatim tretirano u centrifugi Janetski T23 15 minuta/2500 rpm kako bi se odvojio sir od surutke. Gruš je sušen na otvorenom vazduhu 60 minuta i ILRC utvrđivan prema njegovoj težini.

Utvrđeno je da mleko plevenske crnoglave ovce drugog kontrolnog dana ima sadržaj ukupnih čvrstih materija 17,84%, proteina – 6,99%, masti – 5,2 %. Aktivna kiselost (pH) mleka je bila 6,49. ILRC od mleka sa ovakvim karakteristikama je bio 2,60 g/10ml.

Negativne signifikantne korelacije ($P<0,05$)su utvrđene između mleka u kontrolnom danu i ukupnih čvrstih materija i (r=- 0,58) i proteina (r=- 0,54). Pozitivne visoko signifikantne korelacije ($P<0,001$) utvrđene su između mleka u kontrolnom danu I dnevnog prinosa proteina i masti (r= 0,99 i r=0,91).

Ključne reči: plevenska crnoglava ovca, kontrolni dan, individualni laboratorijski prinos sira (ILRC), koeficijent korelacije.

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