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THE EFFECT OF THE STRUCTURE OF THE PASTURE GROWTH ON THE SUBSTITUTION OF FATTY ACIDS IN THE MILK OF GRAZING DAIRY COW

EFECTUL STRUCTURII PĂSUNII ASUPRA ÎNLOCUIRII ACIZILOR GRAŞI DIN LAPTELE VACILOR CARE PĂŞUNEAZĂ

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The milk fat is unique among animal kinds of fat, because of its high content of fatty acids with short and medium long strings. Milk industry should be able to produce milk and dairy products with raising part of unsaturated FAs, which is useful and desirable for consumer. The milk samples were withdrawal individually once a month from 20 dairy cows of Holstein breading. The milk fat was separated by extraction in petrol-eter and further on it was re- esterifasised and methyl ester fatty acids were analysed by the help of gas chromatography (GLC). In exception of the current fatty acids was monitored also the substitution of families of fatty acids, it means saturated (SAFA), mono-non-saturated (MUFA) and poly-non-saturated (PUFA) greasy acids. From pasture growth is assessed the percentage of nitrogen matters (NL) according to Kjeldahla, crude fibre (CF), acido-detergent fibre (ADF) and neutral- detergent fibre (NDF) on instrument called Ankom Technology. The content of nitrogen matters in the herbal growth decreases during the herdsmen season and at the same time the content of CF increases. The content of coarse fibre during the herdsmen season in herbal growth increases from 18,72 % in May to 28,54 % in July and afterwards again diminishes to 20,51 % in September. It was stated the significant differences in funds ADF between the begin and the end of the pasture period (P<<0,01). Milk performance during the pasture period showed decreasing tendency in daily vessel from 23,4 l/piece/day in July to 22,10 l/piece/day in September. The content of oil in milk (as well as content of CF in pasture growth) during the pasture increases, namely from 3,78 % in May to 3,82 % in September. During the pasture season was the average efficiency of a dairy cow per day 22,44 l and during pasture period 20,27 l milks. The average concentration of fat in milk was higher during the winter period, up to 4,11 %, compared with 3,78 % in month September (IT<0,01).

Keywords: pasture dairy cows, chemical constitution growth, milk performance, fatty acids.

Introduction

Pasture is the most natural way of the sustenance ruminant. Livestock readjusted perfectly for receiving and exploitation pastures during its development. The pasture of dairy cow decreases the costs of feeds also regarding dotation on maintenance herbal growth in mountain areas and filling up also other production and non-production function, above all as carrying the outlook of the cultural landscape.

Carbohydrates complex (pulp) is one of the most significant components of fodder plants. Carbohydrates in vegetable feeds are stored firstly in walls of cellulites (it is crude fibre, created above all from wood - pulp, hemi cellulose and lignin, however not belonging to the carbohydrates extraneous, and little quantity gadgeteer) and on the other side in cellulite protoplasm. The variability of the possible usage of pulp fraction in feeding dues of ruminants can be characterized as parameter depending on whole series of factors, e.g. on botanical type of the fodder plant, vegetative phase of the growth or on the way of the preservation, etc. The main function of the neutral-detergent fibre (NDF) in feeding dues of ruminants is to offer energy for microbial synthesis, to support the correct activity of the paunch and also the welfare of the animals. Too high quantity of NDF in feeding dues has negative influence on the receiption of feeds by animals, because this fraction of feedstuffs substitutes also the main part of the content in the paunch.

One of the main limit factors of the milk efficiency dairy cow is their sustenance that is also important for the changes in composition of the milk, on its biological value, sensorial and technological qualities.

The part of all milk components is not constant and to biggest changes happen according to the milk fat. It is the subject of the constant politics of creamery technologists, because it affects remarkable the texture, taste, smell and endurance of milk products. The content of the fat in milk has also an economic importance, because the real price of the milk is established also according to fat content.

The milk fat is unique among animal kinds of fat, because of its high content of fatty acids with short and medium long strings. It is the reason why fatty acids are the most important contents in milk for human health. Milk industry should be able to produce milk and dairy products with raising part of unsaturated FAs, which is useful and desirable for consumer. It was stated that more unsaturated fatty acids useful for health and their derivations in milk of the ruminants is their specific feature which depends of the Cohere of their specific metabolism. It should be possible to heighten theirs part by choosing breeder procuration which increase metabolism specifics for higher contribution to the health of milk and its products for consumers.

Materials and Methods

The substitution of the fatty acids in milk fats was monitored on a farm situated on the foothills in an area 793 m above the sea level. (see table 1), which is in use for pasture of the dairy cows from May to October as the base of the summer feeding dues with benefits of albuminous and pithy feeds.

The milk samples were withdrawal individually once a month from 20 dairy cows of Holstein breading. Monitored dairy cows were approximately in the same phase and sequence of lactation. The milk fat was separated by extraction in petrol-eter and further on it was re-esterifasised and methyl ester fatty acids were analysed by the help of gas chromatography (GLC). In exception of the current fatty acids was monitored also the substitution of families of fatty acids, it means saturated (SAFA), mono-non-saturated (MUFA) and poly-non-saturated (PUFA) greasy acids.

At the same time was taken samples of the pasture growth, near whose was determined vegetative state, perceptual part of grass sorts, trefoil - coil and herbs and dominant sorts grass, trefoil - coil and herbs. From mixed representative samples is assessed the percentage of nitrogen matters (NL) according to Kjeldahla, crude fibre (CF), acido- detergent fibre (ADF) and neutral- detergent fibre (NDF) on instrument called Ankom Technology.

Table 1

Content of the feeding dues

Feeding	winter	summer
hay	ad libitum	ad libitum
rapecake	1 kg/ks	-
concentrate	5 kg/ks	3,5 kg/ks
mineral supplements	100 g/ks	100 g/ks
fresh forage	-	ad libitum
conserved forage	ad libitum	-

Results and Discussion

The content of nitrogen matters in the herbal growth decreases during the herdsmen season and at the same time the content of CF increases.The same conclusion found out also Urban et.al. (1997), curl and wheels. (1998), Míka et.al. and Klimeš (1997) according to the raising content of nitrogen matters and contemporary decrease of the CF content. Mladek et al. (2006) state that the content moves with NL of qualitative herbal growth at intervals from 18 to 20%, with the same of poor quality

from 10 to 15%. The herdsmen growth is from this point view as gently substandard, because funds of NL in herdsmen growth drives from 18,39% in May up to 13,97% in October (table 2).

Table 2

Constitution of the pasture and milk performance

	fresh forage				milk		
month	NL (%)	CF (%)	ADF (%)	NDF (%)	(l/ks/ den)	fat %	protein (%)
V.	18,39	18,72	26,82	42,90	22,10	3,78	3,34
VI.	11,12	25,69	32,52	56,54	23,40	3,73	3,25
VII.	14,91	28,54	29,08	47,97	23,00	3,75	3,21
VIII.	17,64	24,43	30,12	53,51	21,60	3,81	3,25
IX.	13,97	20,51	31,48	51,10	22,10	3,82	3,32

The content of coarse fibre during the herdsmen season in herbal growth increases from 18,72% in May to 28,54% in July and afterwards again diminishes to 20,51% in September. For the correct movement of the paunch and digestive tract is necessary the share of coarse roughage in the fodder at least 18 - 20% and with about 30% remarkable decreases the digestibility of the fodder (Pozdisek, 1997, Cemak, 2000). During the herdsmen season was not the state of 30% overcome.

The main function of NDF fraction in the feeding dues of ruminants is to offer energy for microbial synthesis and interlock the correct activity of the paunch. If there is no content of NDF in the feeding dues in needed quantity and in correct structure, it is supposed the limited receipt of feedstuffs. The minimum content of NDF for cows in the first phase of lactation is fixed to 27 up to 30% dry matter of feeding dues (Koukolova, Homolka, 2008). This value was overcome during the whole pasture period, mostly in June, at about 27%. The minimal demand on ADF was fixed by 19 - 21% from the dry matter feeding dues for all dairy cows in lactation, which is necessary minimum to preserve the correct conduct activities of launch system and normal fatness of milk. The numbers of ADF did not fall below this line in no from the tracked months. It was stated the significant differences in funds ADF between the begin and the end of the pasture period ($P<0,01$).

Milk performance during the pasture period showed decreasing tendency in daily vessel from 23,4 l/piece/day in July to 22,10 l/piece/day in September. The highest milk efficiency have dairy cows in spring at the beginning of the herdsmen season and gradual decrease of the NL content in pasture growth and through the growth of roughage the milk performance decreases (Čermák et al, 2008). The content of oil in milk (as well as content of CF in pasture growth) during the pasture increases, namely from 3,78 % in May to 3,82 % in September (Figure 1). For the

production of milk fat is of a big importance the content of fibre in feeding dues of animals, because the pulp is the source for production of vinegar acid, the main antecedent in production of milk fat (Jelínek et al, 2003, Wilcox et al, 1999).

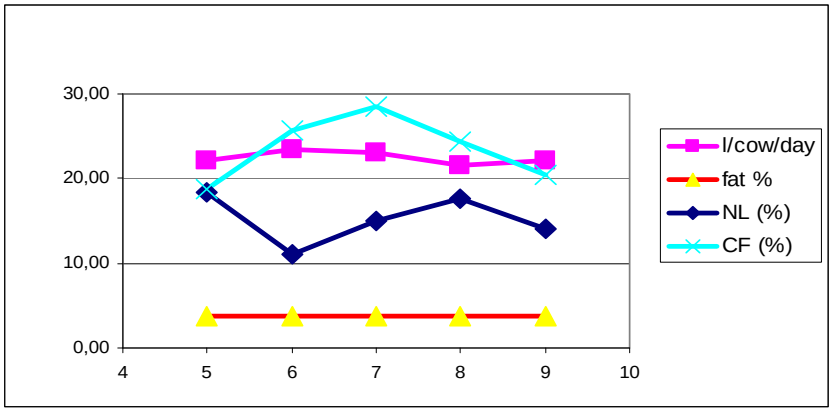

Figure 1. Milk production, fat, NL and CF

The table 3 shows the differences in quantities of milk and milk components during herdsmen period (from May to September) and in winter period. The average yield of milk for a dairy cow per day was during pasture period higher as during the winter period. During the pasture season was the average efficiency of a dairy cow per day 22,44 l and during pasture period 20,27 l milks. The average concentration of fat in milk was higher during the winter period, up to 4,11%, compared with 3,78% in pasture period ($P<0,01$). This difference is due to different composition of feeding dues (Table 1).

Table 3

Seasonal influence on the constitution of milk and milk efficiency

month	l/pc/day	fat (%)	protein (%)	lactose (%)
1	21,50	4,03	3,18	4,90
2	19,40	4,22	3,25	4,88
3	20,80	3,97	3,19	4,80
4	20,80	3,92	3,12	4,92
5	22,10	3,78	3,34	4,74
6	23,40	3,73	3,25	4,82
7	23,00	3,75	3,21	4,81
8	21,60	3,81	3,25	4,75
9	22,10	3,82	3,32	4,69
10	17,20	4,42	3,24	4,78
11	21,20	4,08	3,14	4,76
12	21,00	4,13	3,19	4,85

During the pasture season was evaluated the substitution of families of greasy acids. The lowest value SAFA was in May 64,3% and it increases gradually up to 68,2% in September (P<0,05) (Figure 2). The difference between the start and the end of the pasture by groups of MUFA and PUFA wasn't statistically conclusive. In summer period a number of authors registered the rise of content of greasy acids with short strings, of the total content UFA and high growth of oil acid. The investigation of the differences of the content of greasy acids with short strings are at feeding freshly fodder that turns profile of greasy acids produced by „de novo". Ellis et al. (2006) followed during the year the constitution of dairy cows from breeding in conditions of ecological economy and from conventional breeding and they found out statistically significant differences in engaged MUFA (26,19 and 27,63%) also PUFA (3,98 and 3,33%).

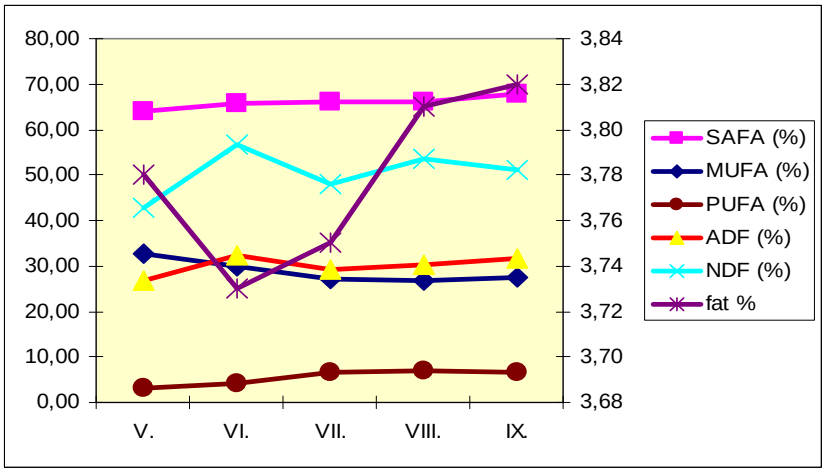

Figure 2. Fat, fatty acids. ADF, NDF

Conclusions

The pasture cattle have a positive influence on milk efficiency of the cows, because of the pasture period was the efficiency of the cows higher by 2,13 litre.

The evaluation of single faction roughage (NDF and ADF) is necessary indices for evaluation of levels of sustenance dairy cows. The relationship of current components of feedstuffs has Effected the use of feeding dues and at last also the actual efficiency of animals.

The pasture cattle has contribution above all thanks to the higher substitution of conjugate acids linol (duty), which has positive effects on human health.

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