

INFLUENCE OF NUTRITION TO EXPOSE OF GENETIC POTENCY OF HOLSTEIN-FRISIAN COWS IN CONDITIONS OF R. MACEDONIA

Goce Cilev^{1*} Zivko Gacovski¹ Aleksandar Avramov¹

¹*Veterinary Faculty, Department of Technology of Production of Animal Feed and Animal Nutrition,*

str. Prilepska bb., p. box 150, 7000 Bitola, R. Macedonia

**Corresponding author: Associate Professor Goce Cilev, PhD, e-mail: goce_cilev@yahoo.com*

ABSTRACT

Importance of nutrition as a factor of achieving the production capabilities of the high milk productive Holstein-Frisian cows in conditions of Republic of Macedonia was presented in this paper.

In 2010 year on the cattle farm NOVACI from Bitola with capacity of 100 cows, controlled 30 cows with average body weight 552.3 kg in different phases of lactation. The nutrition was compound with ration from corn silage, alfa alfa hay, meadow hay, brewery by-product (dry), sugar beet by-product (dry) and concentrate like a mixture. Production of milk in lactation period from 305 days is 7585 kg standard milk with average daily content of milk 24.87 kg with the following chemical composition of milk: average percent of milk fat is 3.98%; protein -3.73%; lactose - 4.97% nonfat dry matter - 9.49% and total dry matter -13.48%. Getting results from the production of Holstein-Frisian cows in Macedonia, at once to confirm her exception high production superiority for production of milk and they were acclimated and accommodated in conditions found in Republic of Macedonia and farmers need to know the benefit her genetic and production potency.

Key words: Holstein-Frisian cows, nutrition, genetic potency, production of milk, chemical composition of milk

INTRODUCTION

Cattle breeding is important branch of the animal husbandry. In some European countries, like Denmark, Netherlands, Finland it contributes more than 50-60% of the agricultural production. It is same in our country where cattle products provide good results giving the best part of the milk (80%) and meat (50%) products, both as fresh or secondary products. This, gathered with the fact that there are 296.634 cattles, 133.838 (45.12%) belonging to the Holstein-Friesian breed (Official data from the Unit for animal identification at the Ministry of agriculture, forestry and water management of the Republic of Macedonia), makes it the major branch in the meat and milk production.

The milk is a basic cattle product consumed by the general population. It gives the highest financials to the cattle industry. Because it is a valuable product, with the add of selection, genetics and nutrition, there is an effort to create such breeds and types of dairy cattle that will give not just big amounts of milk but will improve the standard and health of the human population.

Milk production in R. Macedonia is generally achieved by breeding Holstein-Friesian cattle that have genes for high production that measure 8-10 tones of standardised milk and one calf in a 365-day reproduction cycle. But, the big production can be achieved only by controlling the paragenetic factors (nutrition, management, animal welfare, animal health) that are specific and can differ quite from the ones used in our general practice.

One of the major paragenetic factors in milk production is the nutrition. Without adequate nutrition considering all of the ingredients needed by the cow, the high milk production is not possible. Although a lot has been done on this issues through the years, the science can only give the numbers in part on what a successful ration is about (Grubic and Adamovic, 2003). We consider that the key to economical production of milk is creating and testing different models of rations for dairy cattle, with the help of the modern science of ruminants nutrition.

The purpose of this paper is to stress the importance of the nutrition in expressing the genetic potential in Holstein-Frisian dairy cattle in conditions found in Republic of Macedonia.

MATERIALS AND METHOD

The research has been done on a commercial dairy farm „Novaci” where cows have been fed with rations made of corn silage, alfa alfa hay, meadow hay, brewery by-product (dry), sugar beet by-product (dry) and concentrate mixture. All the forage and mixture samples were analysed according to AOAC (1980) analysis by the method of Weende.

The quantity amount of milk production and its chemical content has been analysed (percentage of milk fat, proteins, lactose, non-fat dry matter, total dry matter)

RESULTS AND DISCUSSION

The ration composition for nutrition of high-productive dairy cattle that were object in this research is given in Table 1.

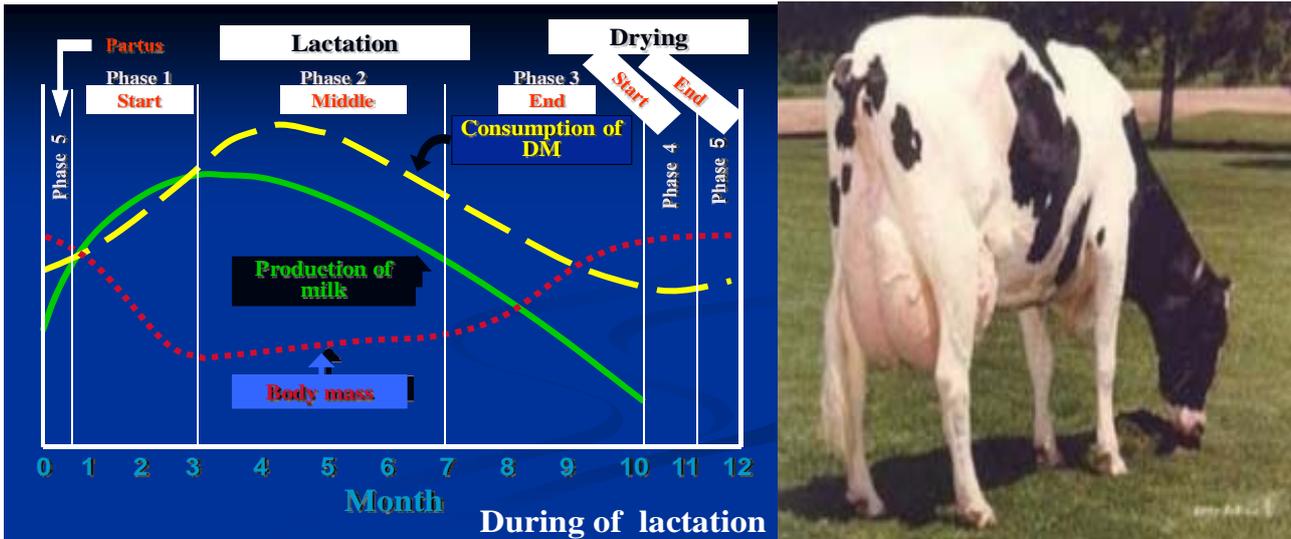
Tab.1. Composition of ration for nutrition of high productive cows on the farm NOVACI

	Daily	DM	NEL-total	Total protein	Digestable protein	Undigestable prote in	Crude fibre	ADF	NDF
	kg.	kg.	MJ	g.	%/g.	%/g.	g.	%/g.	%/g.
Rouhage feedstuffs									
<i>Corn silage</i>	13	4.16	23.40	130.21	65.7/85.55	25.3/32.94	467.58	10/46.76	17.2/80.42
<i>Brewery by-product (dry)</i>	1.5	1.32	10.04	331.06	5.2/17.22	57.5/190.3	193.38	4.9/9.48	11/21.26
<i>Alfa alfa hay</i>	4	3.60	17.32	354.96	48.8/173.2	33.3/118.2	1405.1	30.1/422.9	40.4/567.6
<i>Meadow hay</i>	4	3.56	18.80	239.94	20/47.99	56/134.36	1428	38.3/546.9	62.7/895.3
<i>Sugar beet pulp by-product (dry)</i>	1.5	1.27	10.14	119.60	5.2/6.22	61.6/73.7	319.38	32/102.2	41.1/131
Total rouhage feedstuffs	24	13.91	79.70	1175.77	330.18	549.56	3813.44	1128.24	1695.58
Concentrate	9	7.83	68.31	1202.4	155.7	616.5	454.5	61.11	120.51
Total (rouhage feedstuffs+ concentrate)	33	21.74	148.01	2378.17	485.88	1166.06	4267.94	1189.4	1816.1

The results of the average content of milk produced on the farm Novaci is given in Table 2.

Tab. 2. Average content of milk produced on the farm NOVACI, kg

Groups	n	Measures of variation				
		x	Sx	Sd	Cv	Iv
		Milk, kg				
I	15	25.13	2.18	8.42	33.52	12-40
II	15	24.60	2.32	8.99	36.58	8-41
Both groups	30	24.87	1.56	8.57	34.46	8-41



The results presented in Table 2 show that the average milk production was 25.13 kg in group I, 24.60 kg in group 2, and the average milk production for both groups was 24.87 kg while the standard milk production for 305 days of lactation was 7585 kg.

Our results on the total lactation in the period of 305 days are in the limits of 7420-8894 kg given by Sretenovic Ljiljana *et al.*, (2007), but are above 5795-7190 kg and 7290 kg given by Palasevski *et al.*, (1995) and Shokarovski *et al.*, (2001) respectively, and much better than 5849 kg in the first lactation of Holstein-Friesian cows in the Pelagonia region given by Kitanovski *et al.*,(1998) and Trajkovski and Bunevski (1999).

It can be noted that the average milk production of the cows that were tested in our conditions related to that of some European countries (Arend, 1999) like Netherlands, Sweden, Italy where for the lactation period of 305 days of the tested black and white cows it is 8000 kg (8003, 8504, 8134 kg respectively) and Germany, Finland and UK where it measures more than 7000 kg (7438, 7496, 7109 respectively), is in the limits of the genetic potential of the breed of the cows.

In table 3 presents the results of the chemical content of the milk in the farm tested.

Tab. 3. Chemical composition of milk on farm NOVACI, %

	n	Measures of variation				
		x	Sx	Sd	Cv	Iv
Milk fat, %						
I	15	3.86	0.16	0.63	16.29	2.78-5.04
II	15	4.10	0.22	0.87	21.26	2.74-6.32
Both groups	30	3.98	0.14	0.76	19.02	2.74-6.32
Proteins, %						
I	15	3.76	0.08	0.33	8.81	3.04-4.37
II	15	3.69	0.09	0.36	9.82	2.87-4.28
Both groups	30	3.73	0.06	0.34	9.21	2.87-4.37
Lactose,%						
I	15	4.93	0.06	0.23	4.60	4.53-5.26
II	15	5.00	0.06	0.24	4.88	4.36-5.28
Both groups	30	4.97	0.04	0.23	4.72	4.36-5.28
Non fat dry matter,%						
I	15	9.50	0.09	0.38	4.05	8.86-10.3
II	15	9.48	0.12	0.48	5.02	8.57-10.37
Both groups	30	9.49	0.08	0.43	4.48	8.57-10.37
Total dry matter,%						
I	15	13.36	0.22	0.85	6.40	12.42-14.86
II	15	13.59	0.26	1.02	7.48	12-15.39
Both groups	30	13.48	0.17	0.93	6.90	12-15.39

According to the results shown in the Table 3, the average chemical content of the milk is 3.94% fats, 3.73% protein, 4.97% lactose, 9.49% non-fat dry matter and 13.48% total dry matter.

Our results for the average content of fat, protein and lactose in the milk are in the limits of those reported by Djordevic *et al.*, (2005) where the fat content in the milk is 3.34-3.81% depending on the diet and those of Gutic *et al.*, (2001) where the milk protein is 3.56%. Our results are measurably better than those of Bobos *et al.*, (2001) where the control group of cows gave milk with average milk fat of 3.47%, 3.20% of protein, 8.27% of non-fat dry matter and 11.47% of total dry matter, while the tested group that were given the preparation Sel-Plex TM in the ration yielded better results of 3.59%, 3.38%, 9.04% and 12.61%, respectively. Our results were also better than those of Adamovic *et al.*, (2004), where the control group gave milk with average fat content of 3.29%, 2.90% of protein, 11.62% of dry matter, while the tested group that were given buffer (mineral mixture of magnesium oxide, sodium bicarbonate, bentonite and organic zeolite) in the ration yielded better results of 3.58%, 3.03% and 11.99% respectively.

Sretenovic Liljana *et al.*, (2007) in their research on the use of yeasts in combination with probiotics and enzymes in the diet of the dairy cow and its effect on the milk production gave results of 3.91% fat, 3.05% protein, 4.91% lactose and 11.65% of dry matter in the control group of cows, and 4.19%, 3.11%, 5.16% and 11.72% respectively in the tested group. Those results are similar to ours.

CONCLUSIONS

The results from the research done on Holstein-Friesian dairy cows in conditions found in the Republic of Macedonia focused on the effect of the nutrition as a factor for expressing their genetic potential led us to the conclusion that:

- The milk production in the lactation period of 305 days with the use of a ration (corn silage, alfa alfa hay, meadow hay, brewery by-product (dry), sugar beet by-product (dry) and concentrate mixture) in the cow farm AD Novaci was 7585 kg standard milk and average daily milk production of 24.87 kg;
- The milk quality had the following chemical content: average percentage of milk fat of 3.98%, 3.73% protein, 4.97% lactose, 9.49% non-fat dry matter and 13.48% total dry matter.

Our research done on the Holstein-Friesian breed of cows in the Republic of Macedonia establish the genetic potential of milk production in this breed, and the fact that the breed has been totally adapted, acclimatized and accommodated in the conditions found in Republic of Macedonia, so the farmers should learn how to use its genetic and production potential solely through correct nutrition.

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