

IMPROVING POSSIBILITIES OF DAIRY COW DIETS IN SOME SMALL DAIRY FARMS FROM PAȘCANI RURAL ZONE

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Abstract

This study was developed in small farms from Pașcani rural zone, Iasi County, Moțca village which aimed at demonstrating that can be obtained a superior milk production as well as fat milk content with a rational feeding diet. The optimisation feeding research was carried out during November 2004- October 2007. The traditional cow feeding in this type of farm does not take into account the cows's need for nutrients and energy. The fodders are not used properly. A big amount of roughage is used in the diet and the mixed concentrate fails to balance the diet in energy and protein. The nutrients are thus wasted since fodders are not totally consumed by cows a fact that accounts for an increased milk production price. Hence, the quantity of rough fodders (straw, corn cobs) was reduced in average to 12 % and increased the succulent fodders (fodder beet) up to 52 % in the diet. Consequently, the milk yield increased with 27% from 3184 kg milk/ cow to 4048 kg milk/ cow and milk fat content with 4 % from 3.46% to 3.60 %.

Key words: dairy cows, diet optimisation, milk yield, farm management.

Dairy cows breeding represent one of the most important activities developed in the mainly small agricultural farms from Moldavian zone due to the possibility to obtain monthly incomes regularly.

Small farms have reduced dimensions (almost 1.68 cows/ farm). In Romania, in 2008 were almost 1 millions dairy cow farms with a number of 1.59 millions cows. Hence, there are exploited 91% of the dairy cows from Romania and it is mandatory that the farmers know and evaluate correctly the financial results obtained to improve their activity in the farm.

Average milk production on feeding cow is 3800 kg milk/ year. This is due to an insufficient farmer's knowledge regarding a proper technology (feeding, housing, attendance).

An important step in obtaining better results is to change the way of feeding dairy cows. In present, the cows are fed with straws, corn cubs, green fodder from low quality pasture or on the roads edge and the concentrates. Fodders aren't administrated properly without taking in account the energy and protein equilibrium and dairy cow's needs of nutrients.

This research of optimisation dairy cows feeding aimed to demonstrate to some farmers from Iasi County, Moțca parish dairy cows feeding's importance for a higher milk production (qualitative and quantitative). Using properly the fodders it is possible to obtain a higher milk production with a better fat content.

MATERIAL AND METHOD

This study was organised for the doctoral research and for this optimisation feeding research were selected farmers depending on the available agricultural surfaces, fodders, number of cows and the most important depending on the farmers' desire for learning and using new technologies.

The optimisation feeding research was carried out during November 2004- October 2007. In the first year of this research (November 2004- October 2005) we focused on observing the traditional dairy cow feeding in each farm. The data regarding milk production and milk fat and protein were collected from I.S.P.A. Association.

By the optimisation feeding research were studied the following parameters: nutritive values of the fodders, milk production, fat milk content, total income, variable costs (fodders, veterinary treatments, taxes), fix costs and gross margin.

The nutritive values of the fodders from each farm were calculated using French system, INRA (unite furajere lait - UFL, unite furajere viande - UFV, protein digestible en intestine - PDI and unite d'encrebrement lait - UIL).

Using the French system (INRA, 1988) we have calculate the norms for each cow depending on maintenance needs, lactation stage, physiological condition, planned milk production and available fodders from the studied farm (*table 1*). In this research, we aimed to increase milk production with 2- 4 kg milk/ cow/ day compared with milk production obtained in the period November 2004 - October 2005.

Table 1

Data about dairy cows from the studied farms and the calculated norms

Farms	Cow no	Weight (kg)	Period	UFL	PDI	Ca	P	SUI	UIL
Andrieși Viorel	990138	450	-for milk production	11,8	1160	99	50,5	14,4	14,7
	010210		-for 8- 9 month of gestation	6,2	490	47,5	26,5	13,5	14
	000061	550	-for milk production	12,4	1210	105	55,5	15,4	15,7
			-for 8- 9 month of gestation	6,8	540	53,5	31	14	14,5
Bechir Elena	000194	450	-for milk production	11,8	1160	99	50,5	14,4	14,7
			-for 8- 9 month of gestation	6,2	490	47,5	26,5	13,5	14
Zaharia Maricica	990105	450	-for milk production	11,8	1160	99	50,5	14,4	14,7
	000199		-for 8- 9 month of gestation	6,2	490	47,5	26,5	13,5	14

RESULTS AND DISCUSSIONS

The optimal diets were calculated depending on nutrients need for each cow, lactation phase, physiological condition and the available fodders from the studied farms.

In table 2 are presented the data regarding the fodder used in dairy cows diets during the research period. The traditional diets for winter time were composed mostly from dry fodders (hay and roughage) which represented in average 26% from the diet; the fodder beet represented 32% and the concentrates only 15%.

Mention must be made that in the dairy cow diets are used a big amount of low value fodders (corn cubs, wheat and oat straws) which are not totally consumed by the cows and finally, leads to an increasing milk production price and a waste of fodders. Also, the farmers use a big amount of some concentrates (energetic or protein) which leads to an energy or protein waste, being unbalanced in those two elements.

In Andrieși Viorel farm, the traditional dairy cow's diets was composed from fodder beet 37%, hay 26%, roughage 19% and concentrate 18%. In the proposed diet for winter time, we increased the amount of fodder beet till 54% and reduced the roughages to 7%.

In Bechir Elena farm, the traditional diet for dairy cows consisted of fodder beet 22%, hay 38%, roughage 25% and concentrate 15%. Taking into account the dairy cow needs of nutrients, we have formulated an optimized diet which was composed from fodder beet 49%, hay 23%, roughage 14% and concentrate 14%.

In Zaharia Maricica farm, the traditional feeding was done with fodder beet 37%, hay 18%, roughage 31% and concentrate 14%. In the optimised diet we increased the fodder beet till 52%. The roughage represented only 16% from the diet.

In summer time almost all the diets are composed only by natural pasture which has a low

nutritive value and can't cover the cow's needs for maintenance and production. The pasture low productivity is due to the fact that during 20th years, no maintenance works were done, such as over sowing, fertilization and weed's cleaning. On the pasture there are many weeds as *Carduus acanthoides*, *Xanthium strumarium*, *Xanthium spinosum*, *Lepidium sp.*, etc. The mixture of concentrate is not balanced in energy and protein. In the optimised diets it was reduced the pasture proportion which was supplemented with green fodders as maize, alfalfa, clover.

In Andrieși Viorel farm, the dairy cow diet optimisation consisted in decreasing the pasture participation from 69% to 49% and supplementing it with maize and alfalfa green fodder (34%).

In Bechir Elena farm, the pasture represented only 66% from dairy cow diet and alfalfa green fodder 19%. In traditional diet as concentrate fodder was feed only sunflower cake (2.5 kg) representing 6%; there was a waste of protein.

In Zaharia Maricica farm the optimised diet consisted from pasture 53%, a mixture of maize, alfalfa and clover (green fodder) of 33%, alfalfa hay 5% and concentrate 9%.

Thus, the dairy cow's diets optimisation consisted in an increasing of succulent fodders in winter time, from 32% to 52% in average of all three farms. Also, it was reduced the amount of roughages in diets from 25% to 12%. The concentrate fodders were mixed depending on cows needs in nutrients, energy or protein. In optimal diets were mixed coarsely ground maize, wheat bran and sunflower cake to improve the diet's protein and energy values.

The optimised diets calculated depending on nutrient needs, balanced in energy and protein, had a positive influence on milk production, obtaining in average 4047 kg milk/ cow and a milk fat content 3.60%.

Table 2

The diets used by farmers in dairy cows feeding during the research

Farm	Feeding period	Traditional diet		Optimised diet	
		Fodder	Quantity (kg/ day)	Fodder	Quantity (kg/ day)
Andrieși Viorel	Winter time	Alfalfa hay	7	Clover hay	3
		Corn cubs	5	Alfalfa hay	3
		Fodder beet	10	Fodder beet	15
		coarsely ground maize	3	coarsely ground maize	2
		Sunflower cake	1	Grounded maize	3.5
		Wheat bran	1	Wheat bran	0.5
	Summer time			Sunflower cake	1
		Pasture	35	Pasture	25
		Alfalfa (green fodder)	8	Alfalfa (green fodder)	6
		Alfalfa hay	3	Maize (green fodder)	12
		coarsely ground maize	3	Alfalfa hay	4
		Sunflower cake	1	coarsely ground maize	3.5
Zaharia Maricica	Winter time	Wheat bran	1	Sunflower cake	1.3
				Wheat bran	0.5
	Summer time	Alfalfa hay	6	Alfalfa hay	5
		Oat straws	5	Oat straws	2
		Corn cubs	5	Corn cubs	3
		Fodder beet	12	Fodder beet	16
		coarsely ground maize	2	coarsely ground maize	3
	Summer time	Sunflower cake	2	Sunflower cake	1.4
		Wheat bran	0.5	Wheat bran	0.5
		Pasture	45	Pasture	30
		Alfalfa (green fodder)	10	Alfalfa (green fodder)	5
		coarsely ground maize	2	Clover (green fodder)	4
		Sunflower cake	1.5	Alfalfa hay	3
Bechir Elena	Winter time	Wheat bran	2	Maize (green fodder)	10
				coarsely ground maize	3.5
				Sunflower cake	1
				Wheat bran	0.5
	Summer time	Alfalfa hay	7	Clover hay	3
		Clover hay	5	Alfalfa hay	5
		Fodder beet	7	Fodder beet	17
		Corn cubs	4	Corn cubs	3
		Wheat straws	4	Wheat straws	2
		coarsely ground maize	4	coarsely ground maize	3.2
	Summer time	Sunflower cake	1	Sunflower cake	1.5
				Wheat bran	0.3
		Pasture	40	Pasture	35
		Sunflower cake	2.5	Alfalfa (green fodder)	10
				Corn cubs	4
				coarsely ground maize	3
				Sunflower cake	1
				Wheat bran	0.5

Analysing data from the *table 3* can be noticed that through rational diet feeding, the average milk production increased with 27%, from 3184 kg milk/ cow to 4047 kg milk/ cow. The daily milk production increased in average with 3 kg milk/ cow.

From the analysed data can be noticed that the rational feeding had a positive influence on milk quality as well. The fat milk content in the

first period was in average 3.46% and in the second period was 3.60%; so, it is noticed an increasing with 4%.

In Andrieși Viorel farm, the milk production increased in average with 24% from 3180 kg/ cow to 3948 kg/ cow. Also, the fat milk content increased from 3.48% to 3.63%.

In Bechir Elena farm, milk production obtained in the second period was 3756 kg/ cow

compared with 2750 kg/ cow obtained in the first period; the increasing of milk production was with 36%. The fat milk content increased with 4.4%.

In Zaharia Maricica farm, the milk production increased in average 27% from 3408 kg/ cow to 4341 kg/ cow. Also, the fat milk content increased from 3.46% to 3.58%.

Table 3

The milk production and milk fat content obtained through feeding by traditional and optimal diets

Farms	1 nov. 2004- 31 oct. 2005		1 nov. 2005- 31 oct 2006		Differences	
	Milk production	%Fat	Milk production	% Fat	Milk production	% Fat
Andrieși Viorel	3382	3.50	4242	3.67	860	0.17
	3029	3.43	3628	3.58	599	0.15
	3130	3.52	3975	3.65	845	0.13
Bechir Elena	2750	3.41	3756	3.56	1006	0.15
Zaharia Maricica	3175	3.40	4202	3.53	1027	0.13
	3640	3.51	4480	3.63	840	0.12
Media	3184	3.46	4047	3.60	863	0.14

CONCLUSIONS

Dairy cows breeding represents one of the most important activities developed in the mainly small agricultural farms from Moldavian zone due to the possibility to obtain monthly incomes regularly.

In optimised diets for winter time we increased the amount of succulent fodders (beet) in the diet, from 32% to 52% in average for all three farms and decreased the roughage from 25% to 12% in the diet.

In summer time the optimised diet included green fodders such as maize, alfalfa and clover to supplement the pasture. So, we decreased the pasture participation in the diet from 74% to 56% and increased the other green fodders participation till 28%.

The concentrate fodders (coarsely ground maize, wheat bran and sunflower cake) were mixed depending on cows need for energy and protein.

Our research in feeding cows with the optimal diets has shown that the milk production increased from quantitative and qualitative point of view. Thus, in average the milk production

increased with 27%, from 3184 kg/ cow to 4047 kg/ cow.

The fat milk content increased with 4%, from 3.46% to 3.60%.

The farmers have to learn that for a better milk production they have to calculate the diets depending on the production level, cow's needs in nutrients and fodder's nutritive value. They have to understand that the roughage can't be considered major resources in cow's diet, especially when it is expected quantitative and qualitative performances.

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