

FEED COSTS FOR COWS IN RELATION TO MILK YIELD AND FEEDING

Jānis Latvietis¹, Juris Priekulis²

Latvia University of Agriculture ¹Faculty of Agriculture, ²Faculty of Engineering
Juris.Priekulis@llu.lv

Abstract. Consumption of feed and costs for cows depending on their productivity level are compared. It has been stated that with increase in the productivity the consumption of feed and its costs increase adequately but the consumption of feed decreases calculating per one kilogram of the obtained milk. So, for instance, with the milk yield increasing from 10 to 40 kg per day the cost of the consumed feed increases from 0.88 to 3.01 LVL, but the feed consumed for production of 1 kg milk decreases from 8.8 to 7.5 santims. It indicates that increasing the productivity of the cow herd it is possible to reduce the milk production costs. The possibility to reduce the milk production cost through optimisation of the structure of cow feed ration that includes the increase of the proportion of high quality grass has also been evaluated.

Key words: animal feed, milk yield, costs.

Introduction

The general economic crisis has essentially influenced agriculture, including dairy farming. The milk purchasing prices have reduced up to even 12-15 santims per kilogram of standard milk. At the same time the prices for energetic resources and animal feed have rapidly increased. It requires the producers of milk to search for every possible solutions how to reduce the production cost of the obtained milk. In this respect animal feed is of great importance as in the structure of milk production cost it occupies approximately 40 % of the total costs.

The most essential factors influencing the costs of animal feed depend on the balancing of the feed ration (in respect to nutrients and energy), the structure of the feed ratio (including in it possibly more self-produced, cheap and good quality forage), possibilities of the farm to use the genetic potential of the cow herd.

It is obvious that different farms will be able to use these factors in different ways. It depends on the machinery available on the farm for preparation of animal feed, technology of handling cows and financial resources. Though, the total trends and guidelines of all farms that are producing milk are similar.

Materials and methods

For the research accountancy data of the Latvia University of Agriculture training and research farm „Vecauce” (MPS „Vecauce”) on production of animal feed and milk in the period of time from 2003 to 2008 are used. The chemical composition and energetic value of animal feed was determined at the scientific laboratory of agrochemical analyses of the Latvia University of Agriculture. The need for the main nutrients (total protein etc.) and energy (net energy for lactation NEL) for 600 kg cows with milk yield 10 kg, 20 kg, 30 kg, 40 kg per day was calculated according to the recommendations of the USA National Scientific Center (NRC) [1]. The changes in animal feed costs on farms during the five last years (in 2002 and 2007) are compared according to the summary of informative materials of the Latvian Agricultural Advisory and Education Center (LLKC) in the corresponding years [2, 3].

Results and discussion

Analysis of the available data confirms the opinion that the rise in the price of animal feed has promoted the increase in milk production cost. So, for instance, on the training and research farm “Vecauce” during the last five years animal feed consumed in animal breeding has become more than three times more expensive (Figure 1).

The situation is similar on other farms in Latvia. As it can be seen from the summary of the LLKC informative materials in 2007 compared to 2002 (within the period of 5 years) self-produced animal feed used for feeding milk cows has become by 2-3 times more expensive.

This rise in the price for animal feed is caused by several objective reasons, for instance, essential increase in the price for mineral fertilizers, fuel and salaries. Therefore, choosing the animal feed it is advisable to give preference to economically more efficient crops.

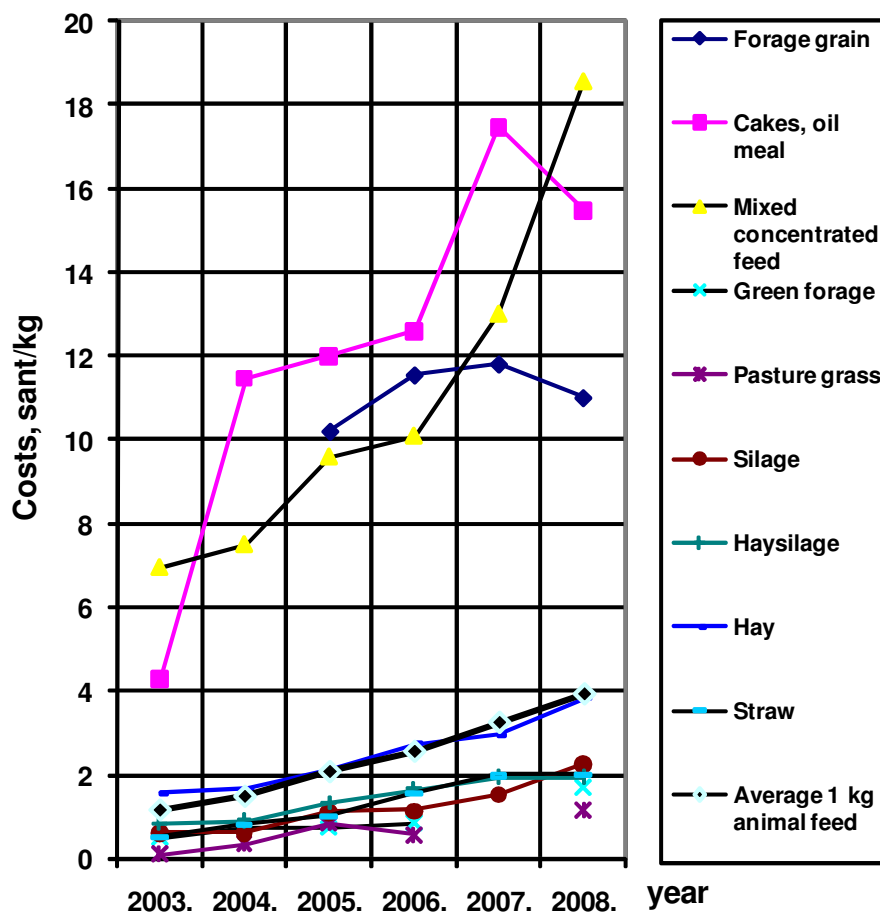


Fig. 1. Changes of costs of separate nutrients and total costs of animal feed for milk cows on the training and research farm „Vecauce” from 2003 to 2008

In previous research [4] the opinion was expressed that it is possible to reduce the prices in milk production if the structure of animal feed for cows is changed reducing the proportion of expensive purchased feed in it and increasing the proportion of cheaper self-produced feed that is rich in protein and of good quality. According to our calculations the costs for 1 kg total protein in forage grain are 3-4 times, but in cakes and oil meal – 2 times more expensive than for green forage, haysilage and pasture grass. In turn, the energy costs in cakes and oil meal are 3-4 times, but in forage grain 2 times higher than in all kinds of grass forage (green forage, silage, hay and pasture grass).

Consequently, from the point of view of increasing the protein content and reducing of the costs, grass forage is more advantageous. Therefore, its proportion in the structure of animal feed should be increased from the present 63 % to 68 % (calculating from the total amount of energy) so economizing the expensive feed concentrate. Such measure could reduce the milk production costs by approximately 3 %.

Also balancing of the feed ration according to the content of the main nutrients (protein, mineral substances etc.) and energy supply is of great importance. Our calculations show that in this respect the situation on the training and research farm "Vecauce" is satisfactory (See Table 1). But according to the summary of the LLKC informative materials it can be calculated that in the larger part of the farms in the country in feed rations for cows (in winter period) more than 10 % protein deficit has been allowed. It has caused 13 % feed consumption.

Sometimes a discussion among agricultural specialists arises about the most economically efficient productivity level of cows, that is, to be satisfied with average milk yields (about 5000 kg cow⁻¹ per year) that can be achieved using mainly local feed or to try to raise the milk yield up to 8000 – 10.000 kg using considerably more expensive feed concentrate and different admixtures for this purpose.

Table 1

Characterisation of feed ratio for a cow with 600 kg live weight and 20 kg milk yield (fat content in milk 4.4 %)

Animal feed	Amount, kg	Dry matter of feed, kg	Total protein, g	NEL, MJ	Ca, g	P, g	Mg, g	Costs, LVL
Haylage, grass silage	11.0	4.6	573	27.2	47	13	6	0.21
Corn	24.0	8.8	682	57.8	24	28	16	0.54
Barley grain	3.0	2.6	287	21.4	2	11	2	0.24
Rape cakes	1.0	0.9	318	7.0	6	8	4	0.16
Mixed feed concentrate	2.0	1.8	460	13.0	20	16	6	0.36
Mineral admixture	0.1	0.1	-	-	3	1	1	0.05
Common salt	0.1	0.1	-	-	-	-	-	0.01
Total	41.2	18.9	2320	126.4	102	77	35	1.57
Need	x	18.0	2296	105.4	92	58	25	x

In order to explain this issue basing on the point of view of animal feed costs we compared milk production costs for cows with the daily milk yield 10 – 20 – 30 – 40 kg. For this purpose the feed rations calculated for milk cows on the training and research farm “Vecauce” and animal feed price lists used on the farm were used. The results of the comparison are summarised in Figure 2.

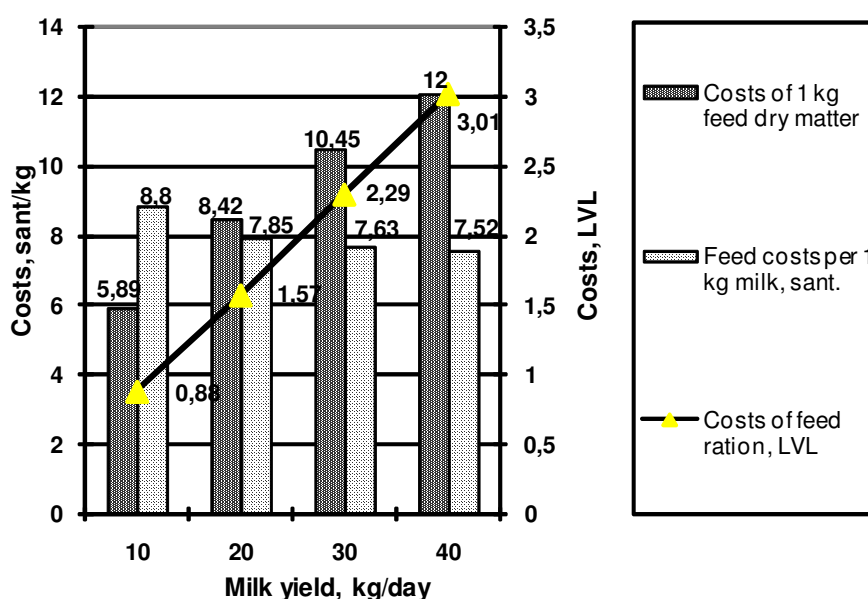


Fig. 2. Economic characterization of feed rations for cows with different milk yield level

This research shows several regularities. With the increase of the milk yield the need for the feed dry matter and all nutrients increases accordingly and it is satisfied by feed concentrate to a great extent. So, the proportion of the feed ration in dry matter increases with the milk yield from 12 % (for cows with the milk yield 10 kg) up to 49 % (for cows the milk yield of which reaches 40 kg per day). But it creates a rise of the price for feed concentrate in the dry matter of the consumed feed for more than 2 times (from 5.8 sant. To 12.00 sant kg⁻¹) as well as the rise in cost of the whole feed ration (from 0.88 LVL to 3.01 LVL per day). But calculating the feed costs per the amount of the obtained milk an opposite view can be seen: additionally obtained amount of milk covers the rise of the price for feed. Therefore, the feed costs that are used for production of one kilogram of milk reduce from 8.8 to 7.5 santims. In the present research it is observed for the milk yield up to 40 kg day⁻¹. It is

possible that such a correlation exists also at milk yields 50 kg per day and higher, but for explanation of it further research is necessary.

Relating the daily milk yields to the productivity level of cows during the whole period of their lactation it is possible to prognosticate according to [5, 6] that the milk yield 40 kg in the prime of lactation, that is, in the second lactation month corresponds to 9200-10.100 kg milk yield in 305-320 days of lactation. It means that in respect to consumption of feed increase of the milk yield up to this margin is economically efficient.

Conclusions

1. Increase of expenses for production of milk is related to feed costs that during the last five years have become in the average 3 times higher.
2. If the proportion of good quality grass forage would be increased in the structure of cow feed ration up to 65-68 % reducing the amount of feed concentrate accordingly, the animal feed costs would reduce by approximately 3 %.
3. In order to achieve more rational usage of animal feed more complete balancing of it in cow feed rations is needed (according to energy and nutrients). It is especially essential in winter period when the deficit of protein exceeds 10 % of the desired and causes about 13 % high consumption of feed.
4. The increase of the milk yield from 10 to 40 kg per day makes the consumed feed ration 3.4 times and the feed dry matter two times more expensive. But the obtained increase of the produced milk not only covers the rise in the price of feed but even reduces the feed costs by 1.3 santims calculating per one kilogram of milk.
5. The results of the research allow for the hypothesis that in the conditions of Latvia it is economically efficient to increase the milk yield up to 9200-10.000 kg of milk per year.

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