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# Х А Б А Р Л А Р Ы

## ИЗВЕСТИЯ

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**STRUCTURE AND BASIC PARAMETERS OF NUTRITIONAL  
VALUE OF THE DIET OF HOLSTEIN MILKING COWS  
IN «BAYSERKE-AGRO» LLP**

**Abstract.** The article presents the data of the structure and energy nutrition of the diet of the Holstein milking livestock in the «Baysyerke-Agro» LLP dairy complex. Calculations of the costs of exchange energy, the net energy of lactation, protein and dry matter per unit of dairy products are given. The authors describe the technology of balancing the diet and keeping of dairy livestock, as well as ways of rational use of forage resources. The data of the chemical analysis of the diet components of milking cows and the structure of the diet, including the ratio of structural and concentrated feed in the dry matter are presented.

**Keywords:** exchange energy, protein, the net energy of lactation, productivity, diet, concentrates, feed, dry matter.

**Introduction.** When forming the productive traits of animals, the share of feeding accounts for an average of 59%, of selection - 24%, of keeping conditions and technology - 17%, therefore, the level of productivity is primarily determined by the completeness of feeding. The poor quality of the main feed leads to a large overrun of concentrates when feeding dairy cattle, especially milking cows. Some studies have shown that to obtain 30-32 liters of milk with a fat content of 3.5%, the consumption of concentrated feeds at low, medium and high-quality bulky feeds is 14 kg, 9.9 kg, and 7.6 kg, respectively, that is as the quality of the bulky feed deteriorates, the consumption of concentrates to obtain 1 kg of product is 0.45 kg at low, 0.32 at medium, and 0.25 at high quality, respectively. The low quality of the main feed leads to balancing the diet by increasing the grain feed, which causes an additional risk of acidosis of rumen, limbs, reproduction problems, and, moreover, overrun of concentrated feed, which is the most expensive of all the diet components [1-3].

In most farms with low dairy productivity of cows, the main shortcoming of feeding is still the lack of energy in the diet, based not only on the poor quality of feed, but also an elementary deficiency in concentrated feed supply. Thus reducing the cost of feed, CEOs and middle and top managers of dairy complexes personally reduce the profitability of farms, as it is well known that the higher the dairy productivity the lower the prime cost of milk and, consequently, the higher the payment of feed in products [4-6].

In this way, they not only reduce the yield of products, but in most cases lead primarily to the loss of the most high-yielding cows in the first phase of lactation because of a negative energy balance or the so-called ketosis of the digestive system. Ketosis caused by the negative energy balance of the diet or simple energy deficit in the feed is formed against the background of intensive use of fat reserves (reserve) of the body, when large quantities of free fatty acids entering the liver to convert them into volatile fatty acids do not cope with them and they accumulate in the liver and, accordingly, resulting fatty liver syndrom and accumulation of ketone bodies in the blood and urine. This disease is particularly relevant for cows of the first calving, when, along with reduced appetite (feed consumption in a small amount after calving), there

is a rapid increase in average daily milk yield, while additional energy is also required to increase live weight. The negative energy balance of feed usually brings a massive mortality of newly-calved cattle, which can be clearly seen with the large importation of dairy cattle from abroad, especially Holstein breed, against the background of rounded calving when it occurs up to 100-150 calves per month.

**The foundation for the implementation of research work.** State order by the Ministry of Agriculture of the Republic of Kazakhstan for 2018 - 2020. Budget Program 267 "Increasing Accessibility of Knowledge and Research", subprogram 101 "Program-targeted funding of research and activities" on the topic "Transfer and adaptation of technologies for automatization of manufacturing processes of livestock production on the basis of model farms in dairy cattle breeding using 100 cows from different regions of the Republic of Kazakhstan".

**Research results.** When formulating diet depending on the productivity of milking cows, the following parameters should be kept - the hay content in the daily allowance in the region is 0.8-1% of the live weight of the cows, the total mass of feed is preferably not more than 50 kg, dry matter is on average 20-21 kg, the ratio of dry matters concentrated to the main feed is not more than 55-60%, and the amount of concentrated feed per liter of milk in the average is 0.4 kg, depending on the diet structure, i.e. the content of high-protein and energy-intensive concentrated feed and the quality of bulky feed. Balancing and compensating vitamins, as well as macro and micronutrients in the diet is most rational by adding vitamin-mineral supplements (premixes) for milking cows, depending on the level of productivity from 0.1 to 0.2 kg and on the concentration of active substances or the use of special vitamin and mineral saltlicks for dairy cattle.

The diet of milking cows with average productivity in the group of 33-35 liters with the fat content of 3.6-3.7% on the dairy complex of Bayskerke-Agro LLP

Feed name	Mass, kg	Dry matter, kg	Digest. protein, g	Metabol. energy. MJ	Crude fiber, g
Corn silage	19.7	3.9	275.8	45.3	1477
Alfalfa hay	6	4.9	600	40.2	1518
Soybean cake	2.2	1.9	702	36.7	175
Barley	7.5	6.4	639.4	78.9	368
Wheat	1	0.83	83.6	10.4	47
Feed yeast	1	0.9	419	12.2	2
Corn	1.5	1.3	97.5	18	57
INR-18 premix	0.1				
<b>Total</b>	<b>39.3</b>	<b>20.1</b>	<b>2 817</b>	<b>241.7</b>	<b>3644</b>
*Analysis data of the Bayskerke-Agro LLP laboratory.					

As can be seen from the table at actual average daily milk yield of 33-35 liters in the group of 60 animals, the cost of metabolizable energy (ME) and digestible protein met the standards. With an average deduction of 54-56 MJ in metabolizable energy for the body's need, the cost of producing each liter of milk averaged 5.6 MJ of ME and 151 MJ of NEL, of which 38 MJ is the body consumption and 3.3 MJ of NEL - for each liter of products. According to the calculations of the digestible protein, taking into account 480 grams per organism with 600 kg average live weight of dairy cows, in the production of 1 liter of milk the indicators were in the region of 70 grams considering the fact that at a rate for the production of one kg it is necessary from 70 to 90 grams of digestible protein, depending on the percentage of fat in milk, and in this case it is in the range of 3.6-3.7%. Protein consumption is quite reasonable, that is its maximum use. The cost of concentrated feed for each unit of production amounted to 0.388 kg, i.e. the quality of bulky feeds can be described as below average.

In the formulation of diets, the parameters for metabolizable energy, digestible protein, the ratio of dry matters of structural and concentrated feeds, the content of crude fiber and the vitamins and minerals compensation at the expense of ready-made premixes were taken into consideration. So the ratio of the

dry matter of concentrated and structural feed for cows with a milk yield of 32-34 liters was 52.2 / 47.8%, respectively. Calculation of NEL per 1 liter of milk is 3.2 MJ and 80 grams per liter of milk for digestible protein, with an additional view on the use of its own organism. The content of crude fiber is 14.7%, which corresponds to the norms of feeding milking cows.

It should also be noted that the most important aspect of the rational use of forage resources and the preservation of cow health is based on the rearrangement of cow groups by the phases of lactation and the actual average productivity over the last 7-10 days. The grouping of dairy cows is based on daily monitoring of productivity, while the transfer of cows is carried out every 7-10 days according to the milk yield for the last 3-4 days.

So, in a highly productive group, animals are selected mainly from a newly-calved group with an average daily milk yield of over 32 liters, i.e. from the group of newly-calved cows before the peak of dairy productivity. At the same time, animals with a decline in productivity are transferred to the group with a lower yield, respectively, depending on the average daily milk yield over the last 3-4 days.

Formation of groups by productivity and rearrangement of cows allows to avoid obesity, acidosis, ketosis and, accordingly, more efficient use of forage resources. Also the multiplicity of distribution of feed plays an important role, so according to the results of our own research, when transferring from three times (after each milking, with an interval of 8 hours) to a two times delivery (morning and evening with an interval of 12 hours), the average daily milk yield of cows decreased to 1.5 - 2 liters, while the fat content of the gross daily milk yield of the herd decreased on average by 0.2-0.3% with an increase in protein by 0.2%, while the ratio of fat to protein in milk was less than 1.2%, and this is the risk of rumen acidosis.

This is connected, firstly, with a large amount of one-time delivery (eatability) of concentrated feed, and this is more than 6 kg, and, secondly, a decrease in palatability of bulky feed due to loss of moisture and, accordingly, feed eating qualities, since consumption of non-fresh and dry feed is much lower. Therefore, when formulating diets for dairy livestock, it is advisable to reliably determine the indices of the feed nutritional value in the diet and, accordingly, to determine the net energy of lactation per 1 kg of dry matter of the feed in the diet.

Determining this indicator, it is possible to more objectively describe the digestibility, eatability and ultimately its productive action. Since the net energy of lactation (NEL) is related to dairy productivity, and knowing the NEL content in the feed and the proportion of this feed in the diet, it is possible to calculate how much milk will be obtained when it is fed. Definitely, it is important to impose these data on a specific diet, live weight of the cows and the estimated productivity of the dairy herd or group, and the grouping by productivity, including the phases of lactation, plays a pivotal role.

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### **"БАЙСЕРКЕ-АГРО" ЖШС-ГІ ГОЛШТИН ТҰҚЫМЫНЫҢ САУЫНДЫ СИЫРЛАРДЫҢ РАЦИОНЫНЫҢ ҚҰНАРЛЫЛЫҒЫНЫҢ НЕГІЗГІ ПАРАМЕТРЛЕРІ**

**Аннотация.** Мақалада "Байсерке-Агро" ЖШС сүт кешенінің голштин тұқымының сауылатын мал басы рационның энергетикалық қоректілігі мен құрылымы берілген. Сүт өнімдерінің бірлігіне алмасу энергиясы, таза энергия, протеин және құрғақ зат шығындарының есебі келтірілген. Толық рационның технологиясы және сауын мал басын дұрыс ұстау, сондай-ақ жемдік ресурстарды тиімді пайдалану жолдары сипатталған. Сауын сиырларды азықтандыру рационның құрамын химиялық талдау деректері және оның рационның құрылымы, оның ішінде құрғақ заттардағы құрылымдық және концентрацияланған жемдердің арақатынасы келтірілген.

**Түйін сөздер:** алмасу энергиясы, протеин, таза лактация энергиясы, өнімділік, рацион, концентраттар, азық, құрғақ зат.

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## СТРУКТУРА И ОСНОВНЫЕ ПАРАМЕТРЫ ПИТАТЕЛЬНОСТИ РАЦИОНА ДОЙНЫХ КОРОВ ГОЛШТИНСКОЙ ПОРОДЫ В ТОО «БАЙСЕРКЕ-АГРО»

**Аннотация.** В статье приведены данные структуры и энергетической питательности рациона дойного поголовья голштинской породы молочного комплекса ТОО «Байсерке-Агро». Приведены расчеты затрат обменной энергии, чистой энергии лактации, протеина и сухого вещества на единицу молочной продукции. Описана технология балансирования рациона и содержания дойного поголовья, а также пути рационального использования кормовых ресурсов. Приведены данные химического анализа составляющих рациона кормления дойных коров и структура рациона, в том числе соотношение структурных и концентрированных кормов в сухом веществе.

**Ключевые слова:** обменная энергия, протеин, чистая энергия лактации, продуктивность, рацион, концентраты, корма, сухое вещество.

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