



# Influence of Sunflower Meal, Dry Distiler's Grain and Alfalfa Silage as Protein Sources in the Feeding of Lambs after 25 kg

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## Abstract

The aim of the present study is to compare the effect of including in rations sunflower meal, dry distiler's grain and alfalfa silage as protein sources when feeding breeding lambs after 25 kg live weight. 30 male and female lambs from the Pleven blackface sheep breed were used. The intake of concentrated feed from one animal is highest in lambs fed alfalfa silage (0,866 kg DM / day). The lowest cost for KER is observed for lambs fed on a dry distiler's growth based ration. The average daily growth on the 14th day is the highest, in the group fed with a ration based on dry distiler's grain - 294g. While on the 28th day, the average daily gain was highest in the group of lambs fed silage (296g), and on the 42nd day the same group maintained its highest growth (292g) compared to the other two groups. The lambs fed with three rations based on three protein sources (alfalfa silage, sunflower meal and dry distiler's grain) achieved an average daily growth of up to 0,291 g, and the differences in growth between the three groups of lambs were insignificant.

**Keywords:** Lambs; Protein Sources; Feeding

## Introduction

The use of different protein sources in fattening lambs after weaning to a higher live weight depends on their effectiveness. In our previous studies with early weaned lambs with an initial live weight of 10 kg at fattening up to 25 kg, an average daily gain of 218 and 221 g was obtained using dry distiler's grain and sunflower meal and a limited amount of soybean meal. Early weaning is an important methodological approach in order to increase the milk yield of sheep and to increase the economic efficiency of farms [1,2].

It is well known that abundant feeding in the first 4-5 months of life of newborn lambs has a beneficial effect on their fertility and fertility throughout the life of sheep. After 5 months of age, during the period of puberty, it is desirable

for breeding animals to eat moderately. Modern knowledge of feeding and raising sheep makes it possible to completely avoid the accumulation of fat in the udder, which affects the future milk yield of sheep.

With good nutrition of the lambs in the first months they reach 30 - 32 kg live weight at 3.5 - 4 months of age. This age coincides with the end of the stable breeding of lambs and feeding of mangers, in the practice in our country with semi-intensive breeding and insemination mainly in August and lambing in January. After grazing at 3.5 - 4 months of age with moderate feeding is easily maintained about 130 - 150 grams of daily growth and at 7 months of age the spikes reach 44 - 45 kg live weight [3,4]. And this living mass is enough to breed young animals. In all bred large breeds in our country the first estrus appears when reaching a live weight of 35 - 42 kg live weight.

Therefore, with proper nutrition and rearing of young breeding animals, the desired live weight for fertilization and fattening can be achieved. Very abundant nutrition just before puberty, with a view to fertilization in the first year of the spikes, there is a danger of lowering the milk productivity of expectant mothers. The high growth leads to the deposition of fat in the body and in the udder, which affects the reproductive functions (impaired ovarian function) and the development of glandular tissue of the udder. Therefore, the feeding scheme, which has a positive effect on future milk yield and fertility, coincides with the feeding requirements of the growing animals.

The use of different protein sources in feeding lambs for fattening and breeding to a higher live weight depends on their effectiveness. Amino acid concentrations are closely related to protein content.

Some authors found an increase of 220 g when using dry alcohol residue, sunflower meal and a limited amount of soybean meal in lambs with an initial live weight of 10 kg and fattening up to 25 kg [4]. A guarantee for high productivity in animals is their provision with the necessary nutrients. In addition, a complete and balanced diet is necessary for the full realization of genetic talents. According to authors Shindarska, et al. [5], the source of protein in compound feed for fattened lambs does not affect their weight development.

The energy content of the ration is related to the amount of energy produced as a result of fermentation of the compound feed, and not to the „energy value“ of that feed. The metabolic energy content of the ration contributes significantly to the costs and is therefore essential for greater clarity in the feeding of lambs for fattening. There is currently a significant difference in the opinion of the authors and publications and their guidelines for energy needs for growing lambs. Although ruminant energy metabolism is a complex science, feeding systems can be complemented by the development of a set of guidelines to cover the energy needs of fattening lambs for fattening, rather than a complex set of scientific calculations.

In formulating the rations, the most important attention is paid to the nutritional needs of the gastric microorganisms so that the inflow of microbial protein to the small intestine is optimized so that the rate of passage of nutrients through the stomach is optimal to facilitate further absorption of protein in the small intestine.

In other studies Simeonov, et al. [5] when testing two feeding schemes for lambs with an initial live weight of 16 kg, when soybean meal was excluded from their ration, they reached the desired live weight of 25-26 kg in 27 days, at average daily gain of 313 g / day. Lambs receiving soybean

meal reach this live weight in 29.4 days, with an average daily gain of 305 g / day.

According to some researchers Todorov, et al. [1] dried alcohol residue is preferable to sunflower meal because it contains less crude fiber and has a high energy value (1.57 KER), compared to sunflower meal (0.94 KER) and rapeseed meal (1.05 KER). The protein is broken down less in the stomach and is better utilized than that of sunflower and rapeseed meal. It has been found that when fattening lambs with rations, with the participation of rapeseed meal, in the amount of up to 42% of the dry matter, they give better results compared to the traditionally used sunflower meal [6]. According to the authors Irshaid, et al. [7] sunflower meal can replace soybean as a source of protein in lamb fattening rations. Studies by other authors Yosifov, et al. [6] have shown that for the production of 1 kg of growth and 1 kg of pure meat, when fattening lambs from 16 to 35 kg, feed costs are reduced by 37% and 28%, when replacing sunflower meal with rapeseed meal.

The meat of fattened lambs with a live weight of over 25 kg is valued in many countries. Therefore, the meat of such lambs is in demand and has a high price on the international market. The economic efficiency of the herd is higher when the sales of lambs for meat are higher. After experiments in Norway, it was found that the meat of female lambs has better taste than that of males [8]. Studies in our country, on rations with different levels and sources of protein, prove that the productive qualities of lambs for fattening are not affected by the type of protein source [9]. A guarantee for high productivity in animals is their provision with the necessary nutrients. In addition, a complete and balanced diet is necessary for the full realization of genetic talents. According to some researchers Shindarska et al. [9] the source of protein in compound feed for fattened lambs does not affect weight development. Similar results were obtained by other authors Krachunov, et al. [10] who found that in compound feed for lamb fattening, the source of protein does not affect weight development.

The aim of the present study is to compare the effect of including in rations sunflower meal, dry distiller's grain and alfalfa silage as protein sources when feeding breeding lambs after 25 kg live weight.

## Material and Method

30 male and female lambs from the Pleven black-headed sheep breed were used. The lambs are weaned early, at 18-19 days of age. The lambs were included in the experiment after reaching a live weight of 26,00 kg. Before entering the experiment, the lambs were weighed individually for two consecutive days. The average live weight of the weights

was assumed to be the initial live weight of the experimental animals. The animals are divided into three groups of 10 animals. The average live weight of the lambs entering the experiment of the first group is 25,90 kg; in the second group – 26,10 kg and in the third group – 25,90 kg.

The experiment used medium quality meadow and alfalfa hay, and as protein sources sunflower meal, dry disstiler's grain and alfalfa silage. The ration includes corn grain, triticale, vitamin microelement premix and salt. The rations are balanced in terms of energy, protein and minerals, according to the norms for feeding lambs [11].

The daily feed ration is set twice - at 8 am and 5 pm. Every day the remains of the previous ration are collected and weighed in the morning before setting the new ration for the day. It is ensured that the residues of roughage do not exceed 10% of the consumed forage. The daily ration is

determined on the basis of the amount of feed consumed, increased by 10%. The rations are set so as to provide about 250 g of average daily gain in lambs with live weight. 30,00 kg. The animals had free access to drinking water and licking salt.

During the experiment, the lambs were weighed every two weeks of the experimental period. The duration of the trial period is 42 days.

### Statistical Data Processing

The data from the experiments were statistically processed taking into account the average value ( $\bar{x}$ ) and its error with the application of statistical program MS Office 2007. The reliability of the difference between the values is determined by applying t-test (Student) and confidence level  $P > 0,05$ .

Forage	CP	CF	Fat	Ash	Nitrogen-free extracts	Ca	P
Corn	9.17	2.96	3.16	1.21	83.5	0.02	0.232
Triticale	13.56	3.42	2.03	1.92	79.07	0.08	0.343
Sunflower meal	34.52	20.31	0.79	7.83	54.55	0.63	1.318
Dry disstiler's grain	24.21	9.2	13.04	8.24	45.31	1.33	0.698
Meadow hay	7.71	32.68	1.28	6.95	51.38	0.36	0.207
Alfalfa hay	14.83	25.76	2.57	8.79	48.05	2.21	0.224
Alfalfa silage	12.58	36.51	4	11.4	35.51	1.82	0.231

**Table 1:** Chemical composition of the forage used in dairy sheep experiment,% of Dry Matter (DM).

Table 2 shows the feed intake and its consumption per 1 kg increment when testing the three protein sources.

Parameters	Sunflower meal	Dry disstiler's grain	Alfalfa silage
Accepted forage from 1 animal, kg DM / day	1.118	1.164	1.132
Compound feed	0.844	0.836	0.866
Meadow hay	0.274	0	0
Alfalfa hay	0	0.328	0
Alfalfa silage	0	0	0.266
Feed consumption per 1 kg of growth			
DM, kg	4.25	4.013	3.89
DM of compound feed, kg	3.209	2.882	2.975
Consumption of KER per 1 kg of growth	4.31	3.96	4.24

**Table 2:** Forage consumption, kg DM / day.

It is clear from the table that there are no significant differences in the total intake of feed per animal per day. The intake of concentrated feed in kg DM / day is highest in the

experimental group of lambs fed on alfalfa silage (0,866 kg / day). The amount of ingested roughage is the highest in the group fed on the basis of dry disstiler's grain and alfalfa

hay, as roughage (0,328 kg DM / day). In the group fed with sunflower meal and meadow hay as roughage, the average intake of one animal was 0,274 kg DM / day. While the average intake of alfalfa silage from one animal in the group is 0,266 kg DM / day.

The consumption of forage per 1 kg of growth is the highest in the group fed with sunflower meal (4,250 kg dm). The lowest feed consumption per 1 kg of growth was observed in lambs receiving alfalfa silage as a protein source

(3,890 kg DM). As the consumption of the amount of DM from the concentrated feed is the highest, again in the same group - 3,209 kg / DM. The lowest cost for DM from concentrated feed is observed in lambs receiving dry distiler's grain.

Comparing the consumption of KER per 1 kg of growth, the highest is found in the group fed with a ration based on sunflower meal, followed by that based on alfalfa silage. The lowest cost for KER is observed for lambs fed on dry distiler's grain based ration (Tables 3&4).

Average daily growth	Sunflower meal	Dry disstiler's grain	Alfalfa silage
14th day	0.288±0.030	0.294±0.035	0.285±0.036
28th day	0.247±0.012	0.289±0.039	0.296±0.017
42nd day	0.256±0.014	0.289±0.022	0.292±0.022

**Table 3:** Average daily growth of lambs, kg.

The average daily gain on the 14th day is the highest in the group fed with a ration based on dry disstiler's grain - 294g. While on day 28, the average daily growth was highest

in the group of lambs fed alfalfa silage (296g), and on day 42 the same group maintained its highest growth (292g) compared to the other two groups of lambs.

Parameters	Sunflower meal	Dry disstiler's grain	Alfalfa silage
Live weight at the beginning of the experiment, kg	25.863±0.463	26.090±0.472	25.900±0.490
Live weight at the end of the experiment, kg	36.930±0.774	38.304±0.964	38.130±0.997
Total growth, kg	11.067±0.458	12.215±0.824	12.228±0.760
Average daily growth, kg	0.263±0.011	0.290±0.020	0.291±0.020

**Table 4:** Growth and development of lambs, Kg.

The highest absolute growth was observed in lambs fed with ration based on alfalfa silage (12,228 kg), with the average daily growth being the highest in the same group - 291 g per day (Table 4).

## Conclusion

Studies have shown that there are no significant differences in total feed intake per animal per day, with the lowest forage consumption per 1 kg increase observed in lambs receiving alfalfa silage as a protein source (3,890 kg DM).

The amount of ingested roughage is the highest in the group fed on the basis of dry disstiler's grain and alfalfa hay, as roughage (0,328 kg DM / day).

The intake of concentrated feed from one animal is highest in lambs fed alfalfa silage (0,866 kg DM / day).

The lowest cost for KER is observed for lambs fed on a dry disstiler's growth based ration.

The average daily growth on the 14th day is the highest, in the group fed with a ration based on dry disstiler's grain - 294g. While on the 28th day, the average daily gain was highest in the group of lambs fed silage (296g), and on the 42nd day the same group maintained its highest growth (292g) compared to the other two groups.

The lambs fed with three rations based on three protein sources (alfalfa silage, sunflower meal and dry disstiler's grain) achieved an average daily growth of up to 0,291 g, and the differences in growth between the three groups of lambs were insignificant.

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