

Effect of the inclusion of palm oil in the diet of female lambs

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Abstract

The aim of the experiment was to study the effect of the inclusion of palm oil in the female lambs. The trial was conducted with 20 Ile de France lambs, reared in the Experimental farm of the Institute of Animal Science – Kostinbrod for a period of 30 days. The animals had equal live weight and the same date of birth. They were divided in two groups: control (n = 10) and experimental (n = 10). The lambs of the latter received palm oil in amount 150 g/animal/day, derived from the product Palm Fat 85. The data was statistically analysed through Data Analysis, EXCEL, 2016 of Microsoft. The dietary inclusion of palm oil did not affect the live weigh and the weight gain of the lambs. The traits increased by 30 g and 0.3% respectively for the live weight and the average daily gain.

Key words: sheep feeding, palm oil, live weight, weight gain

Introduction

Palm oil is one of the world's leading vegetable oil produced and accounts for more than half of the total oil exports (Gunstone, 2003). With the new millennium, the addition of the dietary fats became an usual practice for increase of the energy of the diet in ruminants (Bauman et al., 2003). The supplements based on palm oil are widely used since they do not affect adversely the fermentation in the rumen as the unsaturated fats (Jenkins, 1993). The palm fatty acid distillate (PFAD) is a by-product of palm oil refinery process and is widely used in the animal nutrition. It is a fatty supplement in the ruminant diets which is available and relatively stable to rancidity. It is applied as fatty acids, hydrogenated fatty acids and calcium salts (Palmquist, 2004). The latter are particularly beneficial for different categories of sheep (Casals et al., 1999).

The aim of the study was to find the effect of the dietary inclusion of palm oil in breeding female lambs.

Material and methods

The study was carried out with 20 female breeding Ile de France lambs, Reared in the experimental farm of the Institute of Animal Science – Kostinbrod, Bulgaria. The trial period was 30 days. The animals had the same date of birth and equal live weight and were divided in two groups: control and experimental, each containing 10 lambs.

Table 1 presents the composition of the diet of both groups. The lambs from the experimental group received palm oil in amount 150 g/animal/day. The oil was derived from the Palm Fat 85.

Table 1. Ingredients of daily diet

Ingredients, kg	Control group	Experimental group (Palm Fat 85)
Meadow hay	1.0	1.0
Concentrate mixture	0.550	0.400
Palm Oil	-	0.150

This product is a dery high energy feed supplement based on vegetable fats and is a mixture of calcium salts of long chain fatty acids.

The concentrate composition is presented in Table 2.

Table 2. Ingredients of concentrate mixture

Ingredients	%
Corn	20
Barley	19
Wheat	20.8
Sunflower meal	15
Soybean meal	7
Wheat bran	15
Salt	0.5
MCF	2.5
Premix	0.2

The lambs had ad libitum access to water and salt. The feed intake was controlled daily. The live weight was controlled in the beginning and at the end of the trial before feeding after 12 hours of fasting. The average daily gain in both groups was calculated.

The data was statistically analysed through Data Analysis, EXCEL, 2016 of Microsoft. The effect of the dietary inclusion of palm oil was assessed through t-test.

Results and discussion

The information about the chemical composition and nutritional value of the feeds is presented in Table 3.

The dry matter of the hay and concentrate contains crude protein 7.0% and 17.5%, respectively, and crude fiber 27.0% and 8.8% respectively.

The crude fats in Palm Fat (85.0% of DM) exceed the fat content of the hay (2.2%) and the concentrate (3.0%).

The same table displays the metabolizable energy and crude protein in 1 kg of dry matter in the feeds (Table 3).

The dry mater, energy and protein intake of both groups is presented in Table 4.

The dry matter intake in lambs receiving Palm Fat 85 did not differ significantly from the control group. The latter, however has lower energy intake (12.69 MJ), but higher protein intake (166.25 g) when compared to the control (16.18 MJ ME and 140 g CP, respectively).

In an experiment conducted by Manso et al. (2009) the animals receiving dietary fat did not show decrease in the total dry matter intake although one of the groups consumed less feed. Regardless, no differences in the growth were observed in line with our results. Haddad and Younis (2004) and Bessa et al. (2005) reported decreased feed intake when refined fats (5%) and

Table 3. Chemical composition and feeding value of feeds

Items	Forages		
	Meadow hay	Concentrate mixture	Palm Fat 85
Dry matter, %	86.0	88.0	97.0
<i>% of the DM</i>			
Crude protein	7.0	17.5	-
Crude fibers	27.0	8.0	-
Ether extract	2.2	3.0	85.0
NFE	41.6	50.5	-
Ash	8.2	8.0	12.0
<i>1 kg DM contains:</i>			
OE, MJ	6.77	10.76	34.0
СП / CP, g	70.0	175.0	-

Table 4. Dry matter, energy and protein intake

Items	Control group	Experimental group (Palm Fat 85)
Dry matter intake- total, kg	1.349	1.362
Energy intake – total ME, MJ	12.69	16.18
Protein intake – CP, g	166.25	140.00

soybean oil (10%) were included in the diet of lambs, which contradicts to our results.

The live weight of the animals in the beginning of the experiment is at average 34 kg. For the trial period no significant difference in the live weight and weight gain of the animals was observed. The lambs receiving oil reached 37.15 kg with a gain of 116.3 g/d, while the control animals showed live weight of 37.12 kg and 116.0 g/d weight gain (Table 5).

Manso et al. (2009) reported average daily gain of 243 g for the control and 273 g for the experimental lambs receiving hydrogenated palm oil for 30 days. In line with our results, the authors did not find significant differences in the weight gain between both groups.

Conclusions

The inclusion of palm oil in the diet of female breeding Ile de France lambs did not have significant effect on the live weight and weight gain. The traits increased by 30 g and 0.3% respectively for the live weight and the average daily gain.

Table 5. Live weight and average daily gain

Items	Контролна група / Control group	Опитна група / Experimental group (Palm Fat 85)
Живо тегло / Live weight, kg		
В началото на опита / Initial	33.64 ± 1.634 ns	33.66 ± 1.297 ns
В края на опита / Final	37.12 ± 2.040 ns	37.15 ± 1.269 ns
Опитен период, дни / Experimental period, days	30	30
Средно дневен прираст / Average daily gain		
g	116 ± 0.022 ns	116.3 ± 0.015 ns
%	100	100.3

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