

Effects of vitamin E supplemented to rapeseed and linseed diets on the slaughter value of lambs*

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ABSTRACT

The effects of feeding lambs with diets containing different proportions of rapeseed and linseed and their supplementation with vitamin E on fattening performance and slaughter value were studied in 30 ram lambs fattened intensively from 18.6 (on average) to 30-35 kg body weight. The use of 10% oilseeds (rapeseed and linseed mixture) in diets did not significantly affect the fattening performance or slaughter value of the lambs. On the whole, more favourable parameters were obtained with feeding rapeseed and linseed at a 1:1 ratio than at a 2:1 ratio and when the diets were supplemented with vitamin E.

KEY WORDS: lambs, fattening, oil seeds, vitamin E, slaughter value

INTRODUCTION

Studies on the effects of feeding lambs with diets containing different proportions of rapeseed and linseed and their supplementation with vitamin E on the quality of lamb meat (Borys et al., 2004) showed that the fatty acid profile and concentrations of CLA and cholesterol can be favourably modified. The aim of this study was to determine the effect of the above nutritional factors on fattening performance and slaughter value of lambs.

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MATERIAL AND METHODS

Ram lambs (Merino sheep crossed with prolific breeds and the meat breed Ile de France) were fattened from weaning at 7-8 weeks of age to 30-35 kg body weight. There were 5 groups of lambs, 6 animals per group. A standard diet was fed to group C (control), and the same diet supplemented with different proportions of full-fat rapeseed and linseed (to a total of 10% diet weight) was used in the experimental groups (E). Rapeseed and linseed were added at a 2:1 ratio in groups E1 and E2 and at a 1:1 ratio in groups E3 and E4. In addition, the diets used in the experimental groups differed in their vitamin E content. In groups E2 and E4 vitamin E was supplemented at a dose of 234 IU per kg diet. The control and experimental diets were of a similar nutritive value (UFV - 0.78; PDIE - 98 g), but all E diets contained almost 3 times more fat than diets C (1.9 and 5.6 g/100 g, respectively), and more vitamin E: diet C, 24.1; E1, 38.7; E2, 273.1; E3, 42.9; E4, 277.0 IU/1 kg.

Observations on the slaughter of lambs, evaluation of slaughter value, half-carcass dissection and leg dissection were made following the procedure described by Nawara et al. (1963). The results were analysed statistically using the ANOVA procedure of STATISTICA 6.PL packet for a one-factorial design, and the Scheffé test was used to verify significant differences between the groups.

RESULTS AND DISCUSSION

Weight gains in group E1 were 18.2% lower than in group C when using rapeseed and linseed at a 2:1 ratio, without vitamin E, and there was a tendency towards improvement in groups E3 and E4 when the oilseeds were used at a 1:1 ratio. The vitamin E supplement in both oilseed diets had a beneficial effect on weight gains of lambs, especially in group E2 in relation to E1 (by 18.3%). No greater differences were found in the intake level of control and experimental diets, which shows that they were of similar palatability. Differences in the unit intake of diets (per kg weight gain) reflected the differences in growth rate.

No significant effects of the nutritional factors on conformation score, meatiness and carcass fatness were found (Table 1). It is noteworthy that the groups receiving oilseed diets without vitamin E (E1 and E3) had higher fatness score, whereas no greater differences in relation to group C were noted when vitamin E was supplemented (groups E2 and E4).

The effect of the experimental factors on the analysed parameters of lamb slaughter value was generally not significant, but in several cases quite characteristic (Table 2). Weaker growth results of lambs from group E1 were accompanied by the lowest slaughter yield in this group. Half-carcasses of lambs

Table 1. Results of fattening

	Group					SEM
	C	E1	E2	E3	E4	
No. of lambs	6	6	6	6	6	
Liveweight, kg	35.90	34.28	35.17	35.87	35.58	0.35
Average daily gain, g	314	257	304	331	341	9.94
<i>Feed intake, kg</i>						
per lamb/day	1.19	1.15	1.09	1.18	1.18	
per kg of gain	3.87	4.49	3.67	3.69	3.59	
<i>Lamb evaluation, pt</i>						
form and musculature, 100	87.2	85.8	85.5	88.7	85.5	0.95
fatness, 5	2.3	2.5	2.2	2.8	2.2	0.12
<i>Carcasses evaluation, pt</i>						
form and musculature, 27	21.7	20.8	20.3	21.7	21.2	0.41
fatness, 9	3.2	3.8	3.5	3.8	3.2	0.16

C - control group, E1 - 10% of rapeseed and linseed at a 2:1 ratio, E2 - like in group E1 + vit. E, E3 - 10% of rapeseed and linseed at a 1:1 ratio, E4 - like in group E3 + vit. E

SEM - standard mean error

Table 2. Slaughter value

	Group					SEM
	C	E1	E2	E3	E4	
Cold carcass weight, kg	15.26	14.15	15.00	15.17	14.82	0.21
Dressing, %	45.07	43.95	46.39	45.74	45.33	0.36
Valuable cuts*, %	43.42 ^{ab}	41.12 ^b	41.67	40.71 ^a	41.62	0.26
<i>Parts of half carcass, %</i>						
front	40.21	41.84	41.48	41.71	41.90	0.24
middle	26.03	24.67	25.36	25.27	25.24	0.21
rump	33.75	33.49	33.15	33.02	32.85	0.21
<i>Leg tissue composition, %</i>						
muscles, M	75.26	74.76	73.87	73.62	74.64	0.49
fat, F	10.14	10.93	11.72	10.69	9.93	0.48
bones	14.60	14.31	14.40	15.69	15.43	0.28
M:F ratio	8.033	7.234	6.768	7.147	8.023	0.39
loin eye area, cm ²	13.62	12.27	12.08	12.03	12.15	0.34
<i>Fat layer, mm</i>						
over the loin eye	2.4	2.0	2.1	2.1	1.4	0.12
over the ribs	6.0	5.2	5.4	5.7	4.1	0.30

symbols of groups like in Table 1, ^{a,b} - P≤0.05, * entrecote + loin + leg

from all E groups had the lowest proportion of valuable cuts (entrecote, loin and leg) compared with C - from 1.75 (E2) to 2.71 percentage units (E3), and the differences for groups E1 and E3 receiving diets without vitamin E were statistically significant ($P \leq 0.05$). This was due to the higher proportion of front parts and lower proportion of middle and rear parts (containing valuable cuts) in half-carcasses of all E groups.

In groups E1, E2 and E3, the meat-to-fat ratio deteriorated (by 9.9-15.7%, NS) as a result of the lower muscle tissue and higher adipose tissue content in these groups. The tendency towards poorer meatiness parameters of the lambs receiving oilseeds was reflected in smaller loin eye area in E groups, by 10.9% on average (NS). At the same time, the external fatness of carcasses from E lambs, both for measurements over loin eye and over ribs, was surprisingly lower than in group C, by an average of 7.1 (E3) to 34.5% (E4) for the two measurement points.

CONCLUSIONS

The use of 10% oilseeds in complete diets for lambs did not significantly affect fattening results and slaughter value. Generally more favourable parameters were obtained when feeding rapeseed and linseed at a 1:1 ratio than at a 2:1 ratio and when the diets were supplemented with vitamin E.

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STRESZCZENIE

Wpływ stosowania nasion rzepaku i lnu oraz dodatku witaminy E na wartość rzeźną jagniąt

Analizowano wpływ żywienia tuczonych jagniąt mieszankami z udziałem nasion rzepaku i lnu w różnych proporcjach oraz ich uzupełnienia witaminą E na wyniki tuczu oraz wartość rzeźną jagniąt. Doświadczenie przeprowadzono na 30 tryczkach tuczonych intensywnie od średniej masy ciała 18,6 kg do 30-35 kg. Stosowanie 10% nasion oleistych (razem rzepaku i lnu) w mieszankach dla jagniąt nie wpłynęło istotnie na wyniki tuczu i wartość rzeźną, jednak lepsze wyniki uzyskano przy stosowaniu nasion rzepaku i lnu w proporcji 1:1 niż 2:1 oraz dodatku witaminy E do mieszanek.