

EFFECT OF FEEDING LEVEL ON CARCASS COMPOSITION IN LAMBS OF LOCAL SHEEP BREEDS

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A series of investigations are available dealing with the effect of feeding level on slaughtering characteristics and carcass composition in lambs /Jilala, K., et al., 1985; Turgeon, M., et al., 1986/. Establishing the needs of nutrients as well as optimizing the energy and protein concentration in diets for lambs of different breeds is of significance to obtaining both leaner and cheap meat. No information is available about feeding effect on chemical composition and allometric growth of carcass component in Bulgarian local sheep breeds.

The aim of the present study is to establish the effect of two feeding levels / at the same energy - protein ratio in diet / on carcass composition in Karakachan /KK/ and Zapadna-Stara Planina /ZS/ sheep, in two preslaughter weights /25 and 35 kg/.

MATERIAL AND METHOD

An experiment, involving 48 male lambs of two local breeds - Karakachan and Zapadna Stara Planina /Small Size breed/ was carried out. According to feeding level, lambs of each breed refer to two groups. The first group lambs / first level / receive complete mixture containing 6.0 MJ of energy and 171g of crude protein and those of second group / second level / - 5.1 MJ of energy and 147g of crude protein. Feeding was in group, ad libitum. Their live weight was controlled once a month and feed intake - every day. When reaching 25 and 35 kg of live weight a carcass analysis was made after the method of Dardjonov /1983/. The weights of both 24h post mortem carcass, subcutaneous fats, meat and intramuscular fats and internal fats / perirenal and caul / were measured. In mean samples of minced meat / incl. subcutaneous fats /, boned left half, chemical composition of the carcass was assessed. On the basis of controlled slaughtering characteristics and chemical composition of meat, were determined retention of carcass protein, fats, ash, moisture, of meat, fats, protein, carcass and its calorificity.

The effect of breed, feeding level and preslaughter weight were established through multi-factorial analysis of variance, by using standard program STAT, 1991. Allometric growth equation of the form $Y = A.X^b$ / where $Y = A.X^b$ / where Y = weight of the physical and chemical components and X = carcass weight /, were used to determine the allometric relationships of each component with carcass weight.

RESULTS AND DISCUSSION

Results obtained show that preslaughter weight has greater effect on variation of traits studied (table 1). With increasing the preslaughter weight from 25 to 35 kg, both the carcass weight, gain of fats, proteins and carcass / $P < .001$; $P < .01$; $P < .05$ / increase significantly. Gain of fats increases averagely by 50%, regardless of feeding level and breed. Increase of protein gain is by 4-5 % less than that of fats. Changes in calorificity of follow regularities in gain of both fats and proteins.

The feeding exerts a significant effect only on the gain of fats and calorificity of carcass gain in both preslaughter weight / $P < .05$ /. The gain of fats is averagely by 37% higher in the first level compared to second feeding level at 25kg of preslaughter weight for both breeds. Feeding effect on the gain of fats reduces with increasing of preslaughter weight / 35 kg/ i.e. as result of feeding greater changes in carcass composition are observed up to 25kg. Results obtained are similar to those by Greef, J., et al., /1986/. Feeding level exerts no significant effect on the gain in both meat and protein. Higher calorificity value of carcass gain in first level - fed lambs for both breeds - at the same protein gain - is associated with higher gain in fats, this being more strongly marked in the second fattening period /35kg /.

The comparison of the value of the allometric coefficients of all components of the carcass shows small differences / table 2 /. No significant differences there are between breeds for any of the carcass components. It is probably associated with the fact that both breeds are from the same type / small size local breed / and were compared at similar physiological stage, in their development. No significant differences there are between feeding level for any of the carcass components. The lambs fed second feeding level tend to have faster relative growth rates for subcutaneous fat and carcass fat weight and slower relative growth rates for carcass protein weight compared to first level.

However it can be concluded from this experiment that breed and feeding level have no significant effect on relative growth of physical and chemical component of the carcass. The preslaughter weight remains the main factor determining carcass composition.

These results agree with the conclusion by Theriez et al., /1992/. With increasing carcass weight the meat increases isometrically / $b=1.05$ /, the subcutaneous and internal fats / caul and perirenal/ grew with strong positive allometry / $b=1.88$; $b=1.78$; $b=1.45$ /. The order of the relative growth of the tissue agree with the physiological principle of the development /Benevent, 1881/. Growth coefficients for carcass fat weight increase / $b=2.16$ /, for carcass moisture humidity and ash weight / $b=1.0$; $b=1.0$ / are constant and for carcass protein decrease / $b=81$ / with increasing of carcass weight.. Those values

are within the ranges of allometric coefficient obtained by Notter et al., 1983; Theriez et al., 1981 and Theriez et al., 1992 in studying of different breeds of lambs and feeding levels.

CONCLUSION

From the point of view of obtaining higher quality meat and economically more profitable fattening of lambs for both breeds, the second feeding level is preferable /5.0MJ of energy and 147g of crude protein/kg of complete mixture/. At that level a better protein/fats ration [s observed in the carcass /1:0.7/ in 25kg of preslaughter weight. With increasing the preslaughter weight that ration changes at the expense of fats /1:50/ in both feeding levels. For both these breeds referred to SMALL SIZE BREED, examined feeding levels during fattening period over 25kg are probably not suitable to influence the content of fats. It is most likely, however, to be associated with reduced effect of feeding on carcass composition, with increased preslaughter weight.

Table 1. Effect of breed and feeding level on the gain of carcass, fats, meat and protein

Breeds Feeding level preslaughter weight	Karakachan				Zapadna - Stara Planina			
	first		second		first		second	
	25 kg	35 kg	25 kg	35 kg	25 kg	35 kg	25 kg	35 kg
		a		a		a		a
Carcass weight, kg	11.10±0.12	15.53±0.29	9.87±0.27	14.97±0.74	10.43±0.44	16.17±0.17	9.97±0.18	15.30±0.32
		b		c		b,u		b
Carcass gain, Kcal	12.50±1.87	24.25±2.50	9.01±2.01	20.09±1.17	11.51±2.14	22.40±1.14	7.84±1.12	18.12±0.53
		c		b		a		a
Meat gain, kg	3.98±0.50	6.18±0.27	3.46±0.40	7.12±0.54	2.99±0.23	7.36±0.29	2.56±0.25	6.23±0.33
		c		a		a		b
Protein gain, kg	0.56±0.11	1.03±0.07	0.51±0.03	1.10±0.04	0.51±0.01	1.13±0.08	0.42±0.08	1.12±0.04
		a,u		b		b,u		b
Fat gain, kg	0.97±0.10	1.87±0.24	0.63±0.11	1.48±0.14	0.90±0.04	1.66±0.12	0.57±0.09	1.22±0.04

a, b, c - effect of preslaughter
d - effect of feeding level P<0.05

P<0.001; P<0.01; P, .05

Table 2. ALLOMETRIC GROWTH COEFFICIENTS /b/ FOR THE EFFECT OF BREED AND FEEDING LEVEL ON CARCASS COMPONENTS /y/ TO THE CARCASS WEIGHT /x/

Dependent Variete	Breed		Coefficients B (SE)	R ²	Feeding level	
	1(SS)	2(KK)			1(first)	2(second)
y						
Log meat	-0.046		1.066a	0.921	0.012	
	0.046		-0.066		-0.012	
Log subcutaneous fat	0.062		1.888a	0.886	0.186	
	-0.062		-0.209		-0.186	
Log Perirenal fat	-0.026		1.456c	0.604	0.359	
	0.026		-0.347		-0.359	
Log Caul	0.032		1.788c	0.654	0.05	
Log carcass fat weight	-0.115		2.165a	0.875	-0.167	
	0.116		0.174		0.167	
Log carcass protein weight	0.074		3.11a	0.685	0.104	
	-0.074		0.117		-0.104	
Log carcass moisture weight	-0.046		1.022a	0.771	-0.02	
	0.046		0.118		0.02	
Log ash weight	-0.04		1.050a	0.718	0.04	
	0.04		0.142		-0.04	
Log energy, Kcal	-0.05		1.669a	0.882	-0.01	
	0.05		0.13		0.01	

A Slopes were significantly At
C Slopes were significantly At

P<.001***
P<.01**

PERTINENT LITERATURE

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