EFFECT OF DIFFERENT FATTENING METHODS AND FEEDING SUNFLOWER SEEDS ON THE COMPOSITION OF CARCASS AND BEEF IN CROSSBRED ANGUS GROWING FATTENING BULLS

HAJDA Z.[1] LEHEL L.[1] VÁRHEGYI J.[1] KANYAR R.[2] VÁRHEGYI Jné.[1] SZABÓ F.[3]

[1]Research Institute for Animal Breeding and Nutrition; 2053 Herceghalom, Hungary
[2]Hubertus Lp.; 8646 Balatonfenyves, Hungary
[3]University of Pannonia, Georgikon Faculty of Agriculture; 8360 Keszthely, Hungary
hajda.zoltan@atk.hu

OBJECTIVES

The aim of the experiment was to prove how an extensive feeding period in the first phase of fattening and the use of sunflower seed at the end of the fattening affect the composition of carcass and meat.

INTRODUCTION

The quality of beef is principally determined by the age, body weight, body composition and fatness of young cattle. Good quality meat can only be expected from young beef that has adequately marbled beef. To reach this goal, cattle feeding must be properly intensive.
The human sanitary aspects have a great importance all over the world at the field of animal production. This includes the advantageous influence of the fatty acid composition of animal fats.

MATERIALS AND METHODS

After weaning 4 homogenous (45-45 animals) experimental group were established. Two experimental groups from weaning or rather from beginning of the fattening up to slaughter (361 days) were fed continually intensively. The other two experimental groups from weaning or rather from beginning of the fattening were extensively fed up to 400-450 kg live weight (161 days; limited energy-supply/restricted feeding period). After that period change followed by intensive feeding up to slaughter (200 days). 1-1 groups - from the 2 continually intensively fed groups or rather from the 2 previously extensively fed groups - when reached the 550 kg live weight were fed with high linoleic acid content additional feed (plus 1 kg/day sunflower seed) and were took up to slaughter (107 days long). At the end of the fattening 10 young bulls from each group were experimentally slaughtered and boned. We measured the quantity of meat, tallow and bone in the carcass and from the samples of longissimus dorsi - test hole was between the 12th and 13th ribs - and semitendinosus we defined the content of dry matter, protein, fat and ash. We determined the fatty acid composition in the samples of longissimus dorsi and subcutan tallow.

RESULTS

Apply of the restricted feeding period compared to continuous energy supply did not influence significantly on the rate of meat, bone and separated tallow in the carcass but there was a tendency that meat content increased and tallow content decreased in the carcasses (Table 1.).
The use of the restricted feeding period compared to continuous energy supply did not influence significantly on the rate of protein and fat in the longissimus dorsi and semitendinosus, but there was a tendency that protein content in percentage of the dry matter of meat increased and fat content in percentage of the dry matter of meat decreased in the longissimus dorsi and semitendinosus (Table 2.).
At the end of the fattening the use of additional sunflower seed significantly reduced (P<0,01) the rate of meat and significantly increased (P<0,05) the rate of separated tallow in carcasses (Table 3.).
Due to sunflower seed feeding the protein content in percentage of the dry matter of meat in the longissimus dorsi significantly decreased (P<0,05) and the fat content significantly increased (P<0,01). The same tendency can be seen in the case of semitendinosus muscles, as well (Table 4.).
At the end of the fattening the use of sunflower seed significantly reduced the rate of saturated fatty acid both in the subcutaneous tallow and in the longissimus dorsi and increased the unsaturated fatty acid in the same. The rate of saturated and unsaturated fatty acid significantly reduced. The use of sunflower seed significantly reduced the proportion of omega-6 fatty acid in the subcutaneous tallow, the rate of omega-6 and omega-3 fatty acid significantly narrowed in both tissues. Due to the sunflower seed complement the proportion of CLA grew in a small extent but significantly (Table 5.).

Table 1.: The effect of the restricted feeding period on the composition of carcasses

	Slaughter weight	Meat	Tallow (separated)	Bone
	kg	%	%	%
Continually intensively	689	74,1	9,2	14,1
Restricted	665	74,6	8,6	14,0

Table 2.: The effect of the restricted feeding period on the chemical composition of longissimus dorsi and semitendinosus

	Longissimus dorsi				Semitendinosus			
	Dry matter %	Protein	Fat	Ash	Dry matter %	Protein	Fat	Ash
		in % of the d.m.				in % of the d.m.		
Continually intensively	26,6	76,2	13,7	3,9	25,6	80,7	8,8	4,5
Restricted	26,6	78,1	11,7	4,5	25,6	82,2	7,1	4,5

Table 3.: The effect of sunflower seed feeding on the composition of carcasses

	Slaughter weight	Meat	Tallow (separated)	Bone
	kg	%	%	%
Control	672	75,5	5,2	13,8
Sunflower seed (additional)	682	73,3**	9,7*	14,3

Table 4.: The effect of sunflower seed feeding on the chemical composition of longissimus dorsi and semitendinosus

	Longissimus dorsi				Semitendinosus			
	Dry matter %	Protein	Fat	Ash	Dry matter %	Protein	Fat	Ash
		in % of the d.m.				in % of the d.m.		
Control	26,2	78,8	10,4	4,1	25,2	83,3	6,1	4,6
Sunflower seed (additional)	27,0	75,5*	15,0**	4,3	25,9	79,7*	9,7**	4,4

Table 5.: The effect of the feeding of sunflower seed on the rate of saturated and unsaturated fatty acids, omega-6 and omega-3 fatty acids and conjugated linoleic acid content of subcutaneous tallow and longissimus dorsi

	Control	Sunflower seed	Control	Sunflower seed
	Tallow (subcutaneous)		Longissimus dorsi	
	%		%	
Saturated fatty acids	48,13	43,95***	50,23	47,67**
Unsaturated fatty acids	51,87	56,05***	49,77	52,38**
Saturated/Unsaturated fatty acids	0,93	0,78***	1,01	0,91**
Omega-6 fatty acids	2,20	1,89***	8,54	7,51
Omega-3 fatty acids	0,23	0,27	0,88	0,91
Omega-6/Omega-3 fatty acids	9,59	6,97***	9,75	8,27**
CLA c9-t11	0,50	0,65***	0,21	0,26*

* P<0,05; ** P<0,01; ***P<0,001

CONCLUSIONS

The restricted feeding period compared to continuous energy supply did not influence significantly on the rate of meat, bone and tallow in the carcasses but there was a tendency that fat content decreased and protein content increased in the meat. The use of restricted feeding period in fattening do not influence negatively on the composition of carcass. The linoleic acid supplementation significantly decreased the rate of lean (P<0,01) and increased the rate of separated tallow (P<0,05). The protein content of longissimus dorsi and semitendinosus decreased (P<0,05) and the fat content increased (P<0,01). *At the end of the fattening the feeding of sunflower seed may be increased the fat content of beef. From the aspect of human healthcare the use of sunflower seed, which has a high linoleic acid content, has a positive effect on the fatty acid composition of meat and subcutaneous tallow*, the proportion of unsaturated fatty acid (P<0,01; P<0,001) and conjugated linoleic acid (P<0,05; P<0,001) has grown and the rate of omega-6 / omega-3 fatty acid narrowed (P<0,01; P<0,001).