A32

EFFECT OF CASTRATION ON SOME PHYSICOCHEMICAL AND LIPID CHARACTERISTICS OF m.L.Dorsi AND FAT DEPOTS WITH DIFFERENT ANATOMIC LOCALISATION IN HOGGETS

V. BANSKALIEVA, P. MARINOVA, A. ANGELOV
Institute of Animal Science - Kostinbrod, 2232, BULGARIA

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The present study was designed with purpose of comparing some physicochemical and lipid characteristics of m.L.Dorsi/m.LD/, fatty acid composition of plasma lipids, as well as morphological and parametres of fat depots with different anatomic localization in the carcass of uncastrated and castrated hoggets.

MATERIAL AND METHODS. Investigations were conducted in male uncastrated and castrated (accomplished at 9 month age) hoggets. Animals of both groups were reared up to 16 month-age, receiving the same diet in composition, containing energy 4.1 MJ/kg of diet and protein 130/kg of diet. Blood sample /v. jugolaris/ were taken prior to slaughtering, samples of perirenal adipose tissue /PAT/, tail adipose tissue /TAT/, breast adipose tissue /BAT/, caul, intermuscular adipose tissue /IMAT/-in m. Semimembranosus area in the course of slaughtering and m.LD samples 24 h post mortem. Fatty acid composition of triacylglycerols /TG/ from fat depots, of TG and free fatty acids /FFA/ from blood plasma was determined by gaz chromatography (Banskalieva et al., 1992). There also were assessed total cholesterol (Schoenheimer et al., 1986), pH, colour, Water Binding Capacity /WBC/, myoglobin (Pincas et al., 1984) of m.LD, as well mean diametre of adipocytes of TAT, PAT, IMAT, as described previously (Banskalieva et al., 1992).

RESULTS AND DISCUSSION. Data presented in table 1 show that physicochemical composition of m.LD does not differ essentially between castrated and uncastrated hoggets and is in the ranges of that class of animals. Cholesterol content /table 1/ in castrated animals reduces by about 27% and corresponds to analogous changes /20%/ in lipid content of that muscle (Shindarska et al., 1992). Data by Arnold et al., 1988 also point out that castration of lambs at a later age does reduce lipid content. On the other hand, as a result of changes in relative part of oleic /18:1/ and linoleic acid /18:0/(table 2), TG of m.LD in castrated animals become more unsaturated. It was established that mean diametre of adipocytes from TAT, PAT and IMAT does not differ essentially, both between single depots and between castrated and uncastrated animals /table 1/. Distribution curves of diametre in adipocytes /fig. 1/ however, show a certain specificity of distribution as regard to the size of fat cells between both classes of animals. To the increased subcutaneous adipose tissue /SAT/ content /by some 70%/ in castrated animals (Banskalieva et al., 1992) correspond also relatively more cells of greater diametre. In intramuscular adipose tissue, maximum of curve for castrated animals is also moved to righter while in PAT, differences between castrated and uncastrated animals are minimum. In the last tissue, changes in lipid content are also least /by about 18%/(Banskalieva et al., 1992). Analogous results are also pointed out by Benmansour et al., 1991 finding that castration of pigs increases the size of fat cells and de novo lipogenesis in both SAT and PAT. Lower plasma level of FFA /table 2/ in castrated animals is a sign for reduced rate of adipose tissue hydrolysis compared to uncastrated, this corresponding to data by Benmansour et al., 1991, who report that castration reduces lipolysis in PAT and SAT. In maintenance of that fact is both changes total unsaturation and 18:1/18:0 ratio in plasma FFA /table 2/. The presence of metabolic relation between plasma FFA and TG is demonstrated through analogous changes in their fatty acid composition. Palmitic /16:0/ acid level decreases and that of stearic /18:0/ and 18:1 grows, and as a final result it conditions a reduction in total unsaturation of FFA and TG in castrated animals. Observed differences in both level and composition of FFA and TG between uncastrated and castrated animals have to be sought in changed status of the last ones. In all studied depots, castration reduces 18:2 content. In general, in depots where an increase of lipid content was established, decrease - although insignificant - is obsered in total unsaturation /more marked in TAT/. Analogous changes in unsaturation of breast fat were reported by Nicholls et al., 1987, El Shahat et al., 1992, establish a decrease of 18:2 and 18:3, and an increase of 16:0 and 18:0 in SAT and PAT in castrated goats. Results obtained by us show that castration rate of fats in single depots (Banskalieva et al., 1992) and on fatty acid composition of their TG. It is worth nothing that BAT, as well a part of SAT is of highest total unsaturation, and the converse to tail one, it's of a trend an increase in castrated animals.

CONCLUSION. Castration of hoggets at a later age- along with the changes in common lipid status of carcass and plasma lipids- exerts a specific effect on fatty acid composition of TG from fat depots with defferent localization. Physicochemical status and positive changes in lipid characteristics of m.LD would be of significance by assessing meat quality.

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Table 1
Physicochemical Parameters of m. Longissimus Dorsi and Mean Diameters /µm/ of Adipocytes of Various Adipose Tissues of uncastrated and Castrated Hoggets

	m. Longissimus Dorsi					Adipose Tissues		
	pH 24 h	Colour 525 nm	WBC %	Myoglobin mg/g	Cholesterol mg/g wt	Perirenal	Tail	Intermuscular
Uncastrated	5.69	17.30	39.82	3.37	0.41	40.42	41.52	41.56
Castrated	5.77	16.27	37.52	3.87	0.30	38.25	41.21	41.66

Table 2
Fatty Acid Composition (M%) of Triacylglycerols (TG) from Various Adipose Tissue, m. Longissimus Dorsi and Plasma Free Fatty Acids (FFA) and TG in Uncastrated and Castrated Hoggets

	Adipose Tissues					m. Longissimus Dorsi	Plasma	
	Breast	Tail	Intermuscular	Perirenal	Caul		FFA	TG
Fatty Acids	Uncastrated Hoggets							
16:0	25.9	23.4	25.7	23.2	25.3	28.0	23.5	28.4
16:1	5.3	3.9	2.9	2.7	2.6	4.1	2.1	3.6
18:0	14.8	19.3	26.7	28.1	28.6	20.8	29.5	28.9
18:1	49.4	47.1	38.6	40.7	38.3	41.0	36.1	27.6
18:2	4.6	6.3	6.1	5.2	5.2	6.0	8.8	11.1
TUFA	59.3	57.3	47.6	48.6	46.1	51.1	47.0	42.6
18:1/18:0	3.33	2.44	1.44	1.44	1.33	1.97	1.22	0.95
nM/ml	-	-	-	-	-	-	221.4	47.5
	Castrated Hoggets							
16:0	25.0	25.3	26.2	21.5	24.9	25.8	25.3	30.8*
16:1	5.1	3.1	3.1	2.9	3.1	4.1	2.2	2.2*
18:0	13.5	23.5	25.5	30.6	30.8	18.0	31.1	35.4*
18:1	51.5	44.0	41.1	40.1	36.3	45.0	34.2	23.2*
18:2	4.9	4.1	4.1	4.8	4.8	7.1	7.2	7.6
TUFA	61.5	51.2	48.3	47.1	44.2	56.2	43.6	33.0
18:1/18:0	3.81	1.87	1.61	1.31	1.18	2.50	1.09	0.65
nM/ml	-	-	-	-	-	-	187.7	63.8

TUFA - Total Unsaturated Fatty Acids; *$P < 0.05$

Fig. 1
Adipocyte diameter distribution of tail adipose tissue (I), perirenal adipose tissue (II) and intermuscular adipose tissue (III) in uncastrated (A) and castrated (B) hoggets