

## MEAT QUALITY CHARACTERISTICS AND FATTY ACID COMPOSITION OF TRIACYLGLYCEROLS IN OUT- OF- SEASON BORN LAMBS

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The multiple oestrus in ewes and their lambing out of the season is one of possibilities of increasing the quantity of lamb meat. But the consumers put their attention on the meat quality, particularly in respect of total fat content and composition of fatty acids. Hypotheses on the roles of cholesterol and saturated fats in heart diseases are widely distributed (Majjala, 1994) and according to the NRC (1989) recommendations the amount of saturated fats in human diet should be reduced.

The purpose of present study was to determined some meat quality characteristics and fatty acids composition of triacylglycerols of two muscles in out -of -season born Ile de France lambs.

## METHODS

In the study were used 10 Ile de France lambs (second group) born in August-September after oestrus synchronization of their mothers. As a control group (first group) were used 10 lambs born in the normal season of lambing in November-December. The oestrus synchronization of ewes is not a practice in Bulgaria. The lambs of each group were fed up to 30 and 40 kg live weight under the same conditions of growing and feeding. All details of the experiment are described in the paper of Ivanov et al (1995). Samples for analyses were collected from m. Longissimus Dorsi (mLD) and m. Semimembranosus (mSM) from the left carcass side 24 h post mortem. Some measurements of meat quality characteristics were made: pH 48 h post mortem; color was measured as reflectance at 525 nm wave length; water holding capacity (WHC) and myoglobin content.

The lipids from the muscles were extracted according to the method of Bligh and Dyer. The triacylglycerols (TG) were isolated by TLC and fatty acids composition was determined using gas chromatography.

## RESULTS AND DISCUSSION

The obtained results for meat quality characteristics (Table 1) do not show significant differences between the both groups of lambs. The season of lambing has no effect on the investigated meat quality characteristics in lambs born out-of-season. Significant changes with the increasing of live weight also were not found.

Table 1. Meat quality characteristics of m. Longissimus Dorsi and m. Semimembranosus in lambs

Traits/ mLD	A30kg	A40kg	B30kg	B40kg	Traits/ mSM	A30kg	A40kg	B30kg	A40kg
pH, 24h	5.54±0.14	5.81±0.32	5.50±0.07	5.62±0.06	pH, 24h	5.16±0.14	5.81±0.30	5.50±0.02	5.65±0.08
Color	20.71±2.06	19.43±1.64	19.64±0.88	19.26±1.09	Color	19.84±3.91	17.45±0.76	18.63±1.15	19.11±1.37
WHC, %	36.90±3.16	34.96±1.22	36.67±3.33	35.80±1.59	WHC, %	37.13±2.79	35.82±2.77	34.36±1.38	34.33±1.43
Myoglobin	2.53±0.61	2.72±0.46	2.30±0.06	2.39±0.25	Myoglobin	3.01±0.66	3.06±0.30	2.56±0.20	2.57±0.55

A - The group of lambs born in November-December

B - The group of lambs born out of season August-September

It was found (Table 2) that the total unsaturation of TG increased as a result of changes in the proportion of 16:0, 18:0 and 18:1 fatty acids regardless of the season of lambing. The ratio 18:1:18:0 also increased with the live weight. Similar results have been found by Webb and Casey (1995).

Table 2. Fatty acids composition (mol/g) of triacylglycerols of m. Longissimus Dorsi and m. Semimembranosus in lambs

Fatty acids in mLD	A30kg	A40kg	B30kg	B40kg	Fatty acids in mSM	A30kg	A40kg	B30kg	B40kg
14:0	5.6±0.9 <sup>ab</sup>	4.1±0.1 <sup>a</sup>	7.2±0.9 <sup>b</sup>	6.2±0.6 <sup>b</sup>	14:0	5.3±0.9	4.6±0.6	6.4±0.7	5.9±0.6
16:0	28.6±0.7 <sup>a</sup>	28.6±0.5 <sup>a</sup>	33.9±0.7 <sup>b</sup>	35.0±0.3 <sup>b</sup>	16:0	28.0±0.7 <sup>a</sup>	29.1±1.8 <sup>ab</sup>	31.6±1.1 <sup>bc</sup>	34.4±1.2 <sup>c</sup>
16:1	2.9±0.3	2.1±0.5	2.9±0.3	3.0±0.2	16:1	2.5±0.3	2.4±0.5	3.2±0.2	3.1±0.3
18:0	18.1±0.9 <sup>a</sup>	17.1±0.3 <sup>a</sup>	15.8±0.9 <sup>ab</sup>	14.3±0.4 <sup>b</sup>	18:0	16.9±0.9 <sup>a</sup>	14.6±0.3 <sup>ab</sup>	15.1±0.7 <sup>ab</sup>	13.9±0.8 <sup>b</sup>
18:1	39.8±1.6 <sup>ab</sup>	42.8±0.4 <sup>a</sup>	36.5±1.6 <sup>b</sup>	38.1±0.7 <sup>b</sup>	18:1	42.8±1.6 <sup>ab</sup>	45.4±1.8 <sup>a</sup>	41.5±1.9 <sup>ab</sup>	39.5±1.3 <sup>b</sup>
18:2	2.7±0.4	4.7±1.0	2.7±0.4	3.6±0.2	18:2	4.4±0.4 <sup>a</sup>	3.9±0.8 <sup>ab</sup>	2.6±0.3 <sup>b</sup>	3.1±0.3 <sup>b</sup>
TUFA	47.8	49.6	42.1	44.9	TUFA	49.7	51.7	46.9	45.7

a, b, c - Means on the same line without a common superscript are different (P&lt;0.05)

TUFA - Total unsaturated fatty acids

A - The group of lambs born November-December

B - The group of lambs born out of season August-September

In the muscles of lambs born out-of-season the TG were more saturated i.e. the quality of fats was worse. Changes were found in the levels of all investigated fatty acids: the quantity of 14:0, 16:0 and 16:1 fatty acids increased while the proportion of C18 decreased. The higher content of 16:0 and 16:1 correspond to the increased fat content in the muscles in the lambs of second group (Ivanov et al, 1995). It is considered that synthesized de novo fatty acids are desaturated preferably (Vernon, 1981). In our results the content of 18:1 decreased parallelly with the decrease of 18:0 and the reasons for that decrease are not clear yet. It is well known that the activity of stearoyl-CoA desaturase depends on the type of feeding (Jeffcoat and James, 1977). Also the established higher fat content in the muscles (Ivanov et al, 1995) of out-of-season born lambs and changes in fatty acids composition probably are due to the hormonal changes in the organism of their mothers during the pregnancy out of the normal season. The increased 16:0 fatty acid in out-of-season born lambs must be taken into consideration because it was found that palmitic acid increased the level of plasma cholesterol (Grundy, 1986).

#### CONCLUSIONS

Significant differences were not found in the meat quality characteristics between the both groups of lambs. Probably the season of lambing has no influence on the meat quality in lambs born out-of-season.

If fatty acids composition is considered the eating quality of the meat declines.

It was found undesirable increase of 16:0 fatty acid in the muscles of out-of-season born lambs.

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