LIPID COMPOSITION OF MUSCLES AND ADIPOSE TISSUE IN PIGS

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OBJECTIVE

The aim of present work is to determine the lipid composition of the muscles *Biceps femoris* (Bf), *Triceps brachii* (Tb) and *Longissimus dorsi* (Ld) and the adipose tissue adyacent to Bf and Ld in order to asses the suitability of pork meat in an equilibrated and healthy diet.

MATERIAL AND METHODS

Animals and diet

Eighteen (female) crosbreed pigs animal (Landrace x Large White x Duroc x Pietrain) were slaughtered at 100 kg of live weight (6 month age). samples of the following muscles were dissected from the carcass:

- muscle *Longissimus dorsi* at the position of the 4-5 th dorsal vertebra
- muscle *Biceps femoris* and *Triceps brachii* taken from the middle part of muscle
- adipose tissue located at the level of *Biceps Femoris* and *Longissimus Dorsi*, inner layer

The pigs were fed on diet containing 49.97% barley, 15% corn, 5% wheat, 20.2% soybean meal, 4% meat meal, 3.77% lard, 1% dicalcicum phosphate, 0.3% salt, 0.17% L-lysine.

The standard methods used in lipidology have been applied in this work (i.e. Folch extraction, methylation of fatty acid and TMS derivatization of cholesterol and GC chromatography).

Statistical Analysis

The lipids characteristics of muscles and adipose tissues were compared by one-way analysis of variance (Snedecor y Cochran, 1980)

RESULTS AND DISCUSSION

Muscles Tb and Bf present a higher fat content (3.15 g/100 g) than Ld (2.7 g/100 g) as reflected in figure 1. The muscle Tb, which is red and with oxidative metabolism, has a significative higher amount of phospholipids (see figure 1), and therefore a higher content of polyunsaturated fatty acids (see table 1). The fact that the variation of lipids, mainly the phospholipid content, is depending on the metabolique type of muscle has been pointed out elsewere (Leseigneur-Meynier and Gandemer,1991). Fat content is similar for both adipose tissues from Ld and Bf (87.6 and 89.2 g/100g, respectively). As compare with the adipose tissue from Ld, the adipose tissue from Bf contain more monounsaturated fatty acids and less saturated fatty acids (see table 2).

A comparison of lipid composition in muscle and adipose tissue is shown in figure 2. The amount of saturated fatty acids is similar in both cases (36 %) However, the muscle shows a lower content in monounsaturated fatty acids (41.3 vs. 49.9 %) and higher in PUFA (22.7 vs. 13.8). This is the typical result of feeding with a mixture of corn, soy bean and barley (Skelley et al, 1975; Brooks, 1971).

On the other hand, the content in cholesterol is higher in Tb and Bf (51.31 and 52.24 mg/100 g, respectively) than in Ld (46.14 mg/100g) and similar in both adipose tissues (around 50 mg/100 g). These values are quite below comparing to the allowance for daily intake of 300 mg (National Institute of Health, 1985).

CONCLUSIONS

- Lean pork meat does not contribute to the excess of lipidic calories since the mean fat content is around 3%.
- The ingestion of pork meat contributes to a high intake of monounsaturated fatty acids, particularly oleic acid.
- The cholesterol content of pork meat is fairly low.

ACKNOWLEDGEMENTS

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Figure 1. - FAT CONTENT

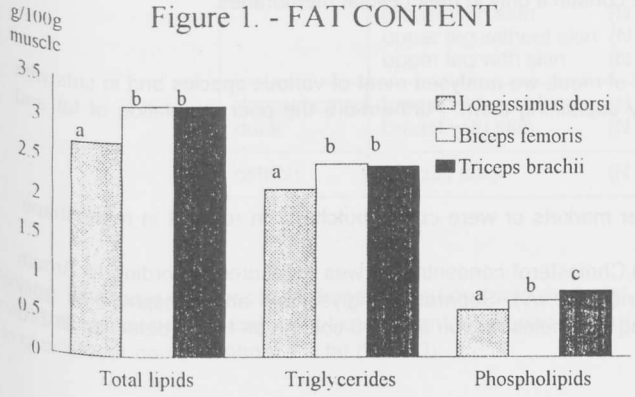

Figure 2.- LIPID COMPOSITION

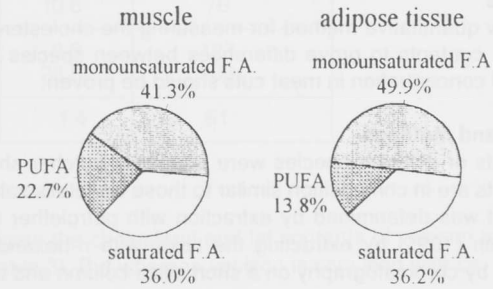

Table 1. Least square means (LSM) and standard deviation (SD) of the fatty acid composition of muscles at different anatomical locations Percent of methyl ester present. Ld: *Longissimus dorsi*. Bf: *Biceps femoris*. Tb:*Triceps brachii*.

		C14:0	C16:0	C16:1	C18:0	C18:1	C18:2	C18:3	C20:4	SFA	MUFA	PUFA
Ld	LSM	1.21	23.8	3.13^{a}	11.9	39.6^{a}	15.5^{a}	0.43a	4.52	36.9^{a}	42.7^{a}	20.4^{a}
	SD	0.207	1.49	0.371	0.840	3.24	2.32	0.075	0.885	1.96	3.44	3.17
Bf	LSM	1.15	23.0	2.86^{ab}	11.3	38.7^{ab}	17.5^{b}	0.52^{b}	5.08	35.4^{b}	41.5^{ab}	23.1^{ab}
	SD	0.272	1.54	0.511	0.862	3.51	2.92	0.082	1.52	1.82	3.87	4.42
Tb	LSM	1.05	23.1	2.68^{b}	11.5	37.0^{b}	19.0b	0.587^{b}	5.14	35.6^{ab}	39.7^{b}	24.7^{b}
	SD	0.247	2.23	0.593	1.31	3.92	3.27	0.158	1.28	2.36	4.27	4.24

Within column, the means with superscripts of different letters differ significantly (P>0.05)

Table 2. Least square means (LSM) and standard deviation (SD) of the fatty acid composition of different adipose tissues Percent of methyl ester present.

		C14:0	C16:0	C16:1	C18:0	C18:1	C18:2	C18:3	C20:4	SFA	MUFA	PUFA
Ld adipose	LSM	1.63	24.7	2.52^{a}	11.1^{a}	45.8^{a}	13.2^{a}	0.90	0.21	37.4^{a}	48.3^{a}	14.3
	SD	0.273	1.85	0.247	0.895	2.35	1.17	0.159	0.201	2.65	2.28	1.37
Bf adipose	LSM	1.61	23.6	2.87^{b}	9.89^{b}	48.7^{b}	12.3^{b}	0.86	0.202	35.1^{b}	51.6^{b}	13.4
	SD	0.156	1.54	0.318	1.45	2.92	1.26	0.126	0.157	2.89	2.94	1.41

Within column, the means with superscripts of different letters differ significantly (P>0.05)