INTRAMUSCULAR AND SUBCUTANEOUS LIPIDS IN BONSMARA STEERS

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BACKGROUND

Nutritional data related to the quantity and quality of lipids present in meats are important for the present meat commercialization. This kind of information is useful for consumers and physicians and will contribute to improve the public health and the meat concept as a safe food . The relation between breed and ruminant body lipids was reported by several researches. Bonsmara is a 5/8:3/8 combination of the Afrikaner (indigenous Sanga or *Bos taurus africanus*) and Shorthorn/Hereford (*Bos taurus taurus*). The breed was introduced recently in our country and this paper is the first information about the lipid characteristics of Bonsmara steers growing in Argentine grassland systems.

OBJECTIVES

To study the composition of intramuscular and subcutaneous lipids from Bonsmara steers growth under a traditional grass system in Bs As, Argentine. *Longissimus dorsi* muscle intramuscular fat %, total cholesterol, fatty acid composition of total, polar and triglyceride were determined. Fatty acids and cholesterol content was also determined in subcutaneous fat.

MATERIAL AND METHODS

Fifteen Bonsmara steers of an average live-weight of 450 kg and 25±1 month old at the sacrifice moment were used as experimental animals. The steers were castrated at 14-15 months old and were under an extensive system feeding only with natural grasses. Twenty four h after the sacrifice, in a commercial plant, samples from Longissimus dorsi (at 10-11 ribs) were taken and keep under vacuum at –20°C until they were analyzed. The ribs were sampling for muscle and subcutaneous fat . To obtain the % of intramuscular fat (IMF %) aliquot samples of muscle (±10 g) were dried before be extracted with boiling hexane in a Tekator equipment. Other aliquot samples were used for the extraction of total lipids with the Folch et al. (1957) method. Aliquot samples from the chloroform extract were saponified and total cholesterol determined with an enzymatic-colorimetric method (Roschlan et al. 1975) The lipids were separated in polar lipids and triglycerides using TLC. Methyl esters were analyzed using a capillary column WCOT fused Silica CP-SIL 88 of 50 m of 0.25 mm ID. The data were analyzed with the SYSTAT 1987 Statistical Program.

RESULTS AND DISCUSSION

In Table 1 are presented the results from water %, IMF % and cholesterol in LD muscle. The IMF% average and the CV% were similar or lower compared with British cattle under similar conditions (García et al., 1992). Cholesterol content was also low but typical of very lean beef (39±2,5 mg/100g). Rhee et al. (1982) found 51-66 mg cholesterol/100g and the cholesterol content in subcutaneous fat). The cholesterol subcutaneous fat was also low (Table 1). Rhee et al. (1982) found in subcutaneous 114 mg/100 g raw tissue.

Table 1. Water%, IMF %, mm subcutaneous fat and cholesterol content in muscle LD and in subcutaneous fat (Mean±SD and CV%) .

Item	Mean	SD	CV%
Muscle LD H2O %	74.2	0.95	1
IMF %	1.9	0.46	24
Subcutaneous fat mm	7.9	3.40	43
Cholesterol mg /100 g muscle	39	2.50	6
Cholesterol mg/100 g sub fat	56	12	21

The fatty acid composition from total, polar and neutral lipids are in Table 2. The fatty acid composition was similar to the found for the authors in Ld muscle with low levels of intramuscular fat (Garcia et al. 1992a,b; 1995) In Fig 1 are compared with fatty acid from Angus steers in similar grass system of production.

CONCLUSION

Longissimus dorsi intramuscular lipids muscles from Bonsmara steers produced on pasture in Buenos Aires, Argentine were very low in intramuscular fat and cholesterol. Fatty acid composition was similar to steers from other *Bos taurus* breeds in similar feeding system.

References

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Table 2. Fatty acid composition (%) from total, polar and triglyceride *Longissimus dorsi* lipids and from subcutaneous fat. Means ±SD

Fatty acid	Total	Polar	Triglyceride	Sub fat
14:0	2.5±0.31	0.5±0.23	3.0±2.1	3.5±0.40
15:0 + 14:1	1.3±0.20	0.2±0.18	1.1±0.24	1.6±0.39
16:0	24.2±0.86	19.1±1.23	25.8±1.29	25.9±1.29
16:1	5.9±0.57	9.5±0.48	4.8±0.76	5.7±1.16
17:0	0.4±0.11	0.9±0.61	0.2±0.07	0.2±0.05
17:1	0.4±-0.18	1.1±0.29	0.5±0.07	0.6±0.07
18:0	16.3±2.09	9.4±0.77	17.5±2.66	17.9±3.36
18:1 t	2.5±0.47	0.9±0.81	3.2±0.60	3.71±0.57
18:1 c	35.6±1.22	25.0±2.45	38.8±2.16	34.9±2.65
18:2 n-6	4.3±0.92	16.1±1.83	1.7±0.21	0.5±0.11
18:3 n-3	0.8±0.31	2.9±0.37	0.5±0.15	0.2± 0.10
20:3 n-6	0.7±0.09	1.5±0.19		
20:4 n-6	1.4±0.85	6.4±0.44		
20:5 n-3	0.6±0.48	2.3±0.29		
22: 5 n-3	0.6±0.15	0.8±0.35		
22:6 n-3	0.1 ±0.21	0.2±0.31		
SFA	43.0±2.06	28.9±1.57	46.3±2.31	47.3±2.9
MUFA	44.2±1.53	35.2±2.41	46.8±2.43	44.4±3.18
PUFA	8.4±3.72	30.2±2.94	2.2±0.26	0.5±0.11

Fig 1. SFA %, MUFA% and PUFA % in *Longissimus dorsi* IMF% from Bonsmara compared with other grass fed steers.