EFFECT OF GRASS AND GRAIN DIETS SUPPLEMENTED WITH VITAMIN E ON THE FATTY ACID COMPOSITION OF LIPIDS FROM *PSOAS MAJOR* STEER MUSCLES

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BACKGROUND

Beef is an important part of Argentine diet but same consumers consider its lipids as one of the main contributor to an excess of diet saturated fat. General current recommendations consider that total diet fat must be less than 30% of total cal from fat monounsaturated 15% and the rest saturated and polyunsaturated fat. Vitamin E is used as antioxidant to reduce lipid oxidation and increases the oxidative stability of stored meat. Vit. E has no effects on production parameters according to several research but co affects the lipid composition of meat lipids.

OBJECTIVES

The purpose of this paper is to study the total intramuscular fat, the fatty acid composition and cholesterol content from *Psoas ma* muscles from steers under two different systems of production, one the traditional Argentine grass system vs a feedlot system witho or with a supra nutritional supplementation with vitamin E.

MATERIAL AND METHODS

Samples from *Psoas major* muscles from 40 steers allocated to four treatment T1 (Grass), T2 (Grass + 500 UI Vit. E (Rominix E ads, Vitamin Division, Productos Roche, Argentine/animal/ during 120 days), T3 (Feedlot) and T4 (Feedlot+500 UI Vit. E/animal/ during 120 days). Data from the experimental essay are given by Descalzo et al. (2000). Aliquot samples from *Psoas major* muscles were used for total intramuscular fat % (IMF) by extraction of the dry sample with boiling hexane and lipid extraction according to the Folch et al., 1957 method. Aliquot samples from the chloroform extract were using for cholesterol (Chol.) determination with Roschlan et al.(1975) method. Fatty acid were analyzed by capillary GLC using a WCOT fused silica 50mx25mm CP-Sil 88 colum

Table 1. IMF % and cholesterol in *Psoas major* muscles in the four treatments

	Grass	Grass + Vit E	Grain	Grain +Vit E	All grass	All grain
IMF %	2.7±1.24a	2,9±1,10±a	4,7±1.4b	4.1±1.6b	2.8±1.5A	4.4±1.5B
Chol mg/100g	49±4a	48±5a	52±4b	51±3b	49±5A	51±4B

a b A B Means with different letters in the same row differ ($p<0.05$)

Table 2. Fatty acid composition of total lipids from *Psoas major* muscles from grass and grain steers

	Grass n=10	Grass &Vit E n=10	Grain n=10	Grain&Vit E n=10	All grass n=20	All grain n=20
14:0	2.2±0.3a	2.0±0.2a	2.2±0.5a	2.0±0.3a	2.1±0.3 A	2.1±0.43A
15:0+14:1	1.6±0.3a	1.6±0.3a	1.2±0.4a	1.3±0.5a	1.6±0.3 A	1.3±0.5 A
16:0	22.0±1.9a	22.4±1.3a	25.0±1.8a	23.1±0.9a	22.2±1.64 A	24.0±1.65B
16:1	3.8±0.3a	3.9±0.6a	3.6±0.2a	3.3±0.2a	3.9±0.51 A	3.5±0.24B
17:0	0.4±0.1a	0.3±0.1a	0.3±0.1a	0.3±0.1a	0.4±0.1A	0.3±0.1A
17:1	0.6±0.2a	0.6±0.2a	0.5±0.2a	0.4±0.2Aa	0.6±0.2A	0.4±0.2A
18:0	19.1±2.3a	19.8±2.4a	18.2±3.1a	19.1±1.8a	19.5±2.38 A	18.7±2.45A
18:1 t	4.2±0.6a	4.2±0.8a	2.8±0.5b	2.9±0.4b	4.2±0.71 A	2.8±0.44B
18:1 c	29.5±2.3a	29.7±2.8a	34.3±4.2b	34.5±2.6b	29.6±2.57 A	34.4±2.4B
18:2 n-6	5.4±1.1a	5.4±1.4a	4.7±1.7a	5.3±1.4a	5.4±1.22 A	5.0±1.53A
18:3 n-3	1.4±0.1a	1.3±0.3a	0.7±0.2b	0.7±0.1b	1.4±0.27 A	0.7±0.16B
20:3 n-6	0.4±0.1a	0.4±0.1a	0.3±0.1a	0.4±a0.1a	0.4±0.09 A	0.3±0.11A
20:4 n-6	1.6±0.6a	1.6±0.6a	1.2±0.2a	1.4a±0.4a	1.6±0.60 A	1.3±0.49A
20:5 n-3	tr	tr	tr	tr .	0.4±0.14 A	0.2±0.09A
22:4 n-6	0.03±0.01a	0.04±0.01a	0.10±0.04b	0.12±0.06b	0.04±0.01 A	0.11±0.06B
22:5 n-3	0.6±0.1a	0.5±0.2a	0.4±0.2a	0.4±0.1a	0.56±0.13A	0.38±0.15B
22:6 n-3	tr	tr	tr	tr	tr	tr

a b A B Means with different letters in the same row differ ($p<0.05$)

RESULTS AND DISCUSSION

In Table 1 are presented the IMF% and cholesterol mg/100g for the 4 treatment. No statistical differences were detected in IMF% or cholesterol due to the Vit E supplementation. As expected grain muscles were fatter than the grass ones and with more cholesterol. Vit. E supplementation do not has also effects on fatty acid composition . The grass muscles have less 16:0, 18:1 cis and 22:4 n-6 and more 16:1, 18:1 trans, 18:3 n-3 and 22:5 n-3 than grain ones (Table 2). The ratios 18:2 n-6/18:3 n-3; 18:2 n-6/20:4 n-6, 20:4 n-6/20:5 n-3 and 20:4n-6/ 22/:5 n-3 were lower in grass muscles compared with the grain one showing differences in omega 6 and omega 3 contribution of beef according to the system of production (Fig 1). In Fig 2 are given the SFA%, MUFA % and PUFA%. Grass beef has less SFA% and MUFA% but more PUFA% higher than 18:2 n-6. The saturated fatty acids more hipercholesterolemics 14:0 and 16:0 are lower in grass beef than in grain beef.

CONCLUSION

The supplementation with 500 UI Vitamin E/animal/day in steers on grass or with grain in a feedlot system do not have effect on the fatty acid composition of *Psoas major* muscles, IMF% and cholesterol content. The grass diet produce *Psoas major* lipids with less IMF %, cholesterol, 16:0, 18:1 cis and 22:4 n-6 and more 16:1, 18:1 trans, 18:3 n-3 and 22:5 n-3 compared with the grain ones. The ratios 18:2 n-6/18:3 n-3; 18:2 n-6/20:4 n-6, 20:4 n-6/20:5 n-3 and 20:4n-6/ 22/:5 n-3 were lower in grass muscles compared with the grain one showing differences in omega 6 and omega 3 contribution of beef according to the system of production. Grass beef has less SFA% and MUFA% but more PUFA% higher than 18:2 n-6. The saturated fatty acids more hipercholesterolemics 14:0 and 16:0 are lower in grass beef than in grain beef.

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Fig 1. Ratios 18:2 n-6/18:3 n-3, 18:2 n-6/20:4 n-6, 20:4 n-6/20:5 n-3 and 20:4 n-6/22:5 n-3 in total lipids from *Psoas major* muscles in grass and grain steers.

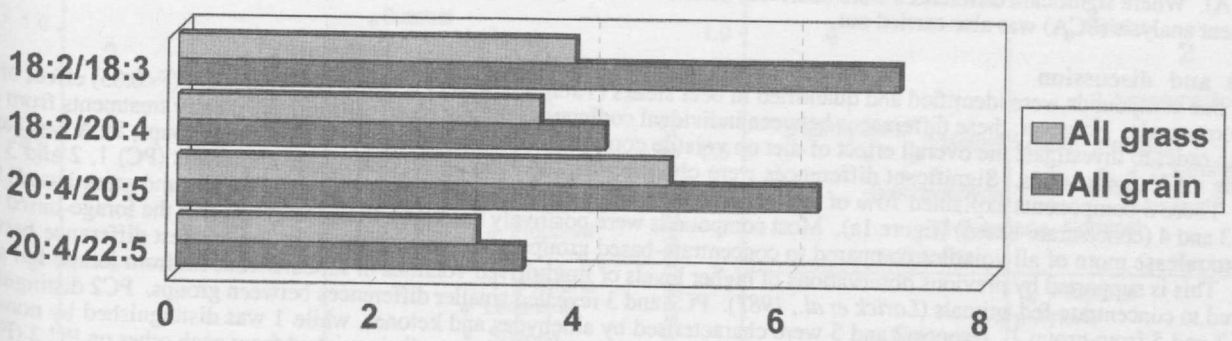

Fig 2. SFA %, MUFA %, PUFA% , 14:0+16:0 and PUFA-18:2 n-6 in total lipids from *Psoas major* muscles in grass and grain steers.