# EFFECT OF DIET ENERGY ON STEER MUSCLE LIPIDS

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## SUMMARY

The quality and quantity of intramuscular fat, the fatty acid composition and the dry matter were determined in *Longissimus dorsi* and *Semitendinosus* muscles from 20 Abeerden Angus steers under two different diets, grass alone or grass supplemented with corn grain. Diet and muscle affected the percentage of intramuscular fat and the fatty acid composition. Grain fed steers muscles were fattier and had more oleic acid and less stearic and linolenic acids than the muscles from the grass fed steers.

## Introduction

The lipid composition of the diet is the most relevant factor in nutritional studies. Diet energy intake can affect the characteristics of ruminant lipids (Marmer et al. 1984) and this is a very important aspect owing to the tendency to reduce the red meat consumption for health arguments. The purpose of this paper was to study the intramuscular lipids in *Longissimus dorsi* and *Semitendinosus* muscles from 20 Aberdeen Angus steers under 2 experimental diets: a) grass alone and b) grass supplemented "ad libitum" with corn grain.

## Materials and methods

*Longissimus dorsi* (LD) and *Semitendinosus* (ST) muscles were dissected from 20 Aberdeen Angus steers under 2 experimental treatment (10 each): a) full feed on a mixed pasture and b) mixed pasture and supplemented "ad libitum" with corn grain. Steers from both treatments were slaughtered in standard conditions and the half carcass weight was 106±7 kg. The whole muscles, free of external fat, were minced and aliquot samples of 50 g each prepared. Some of the samples were oven-cooked in standard conditions at an internal temperature of 75°C. Aliquot samples, from both raw and cooked meat, were dried and extracted with boiling hexane during 16 hs to determine the percentage of chemical fat (IMF%) or extracted according to Folch et al. (1957). Aliquot samples from the final chloroform extract were used for fatty acid analysis (García et al., 1992).
The data were analyzed using a General Linear Model Procedure (SAS Institute, 1987).

## Results and discussion

The effects of diet, muscle and thermal treatment on intramuscular lipid content (IMF%) are shown in Table 1. The effects of diet and muscle on IMF% were significant but thermal treatment shows no significant influences in the IMF%. The raw and cooked muscles from grass fed steers had significantly less IMF% than the corn grain supplemented ones (Table 2). These results were similar to those obtained by Dolezal et al. (1982) and showed the importance of diet in the beef IMF%. LD have always more IMF% than ST muscle as was founded in previous studies (García et al., 1992) . The effect of the diet in the IMF% is more evident in LD than in ST muscles.

The effects of diet, muscle and thermal treatment on the percentage of dry matter are shown in Tables 3 and 4. Diet and muscle affect the dry matter percentage. In general, the dry matter percentage was lower in grass than in grain fed steers and lower in ST than in LD muscle.

The fatty acid composition of total lipids in LD and ST muscles is presented in Figure 1. Grass fed beef had higher percentages of saturated fatty acids (14:0, 16:0 and 18:0) and lower of monounsaturated fatty acids (16:1 and 18:1). Similar results were obtained for several researchers (Brown et al., 1979). The higher levels

of linolenic acid (18:3 n-3) in grass fed lipids can be explained by the high levels of this acid in the lipids of the grass (Body, 1974).

## Conclusions

Diet affects the percentages of intramuscular fat in steer muscles and also the fatty acid composition, then it is possible to modify the beef lipids quality and quantity by diet manipulations and produce beef according to the market demands.

## References


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Table 1: Effect of diet, muscle and thermal treatment on intramuscular lipid content (%).
Table 2: Influence of diet and muscle type on lipid (%) on raw and cooked samples
Table 3: Effect of diet and muscle type on dry matter percentage
Table 4: Influence of diet and muscle type on dry matter percentege
Figure 1: Fatty acid composition of Longissimus and Semitendinosus muscles total lipids.