EFFECT OF SEX IN INTRAMUSCULAR LIPID CLASSES OF FRIESIAIN BREED SEPARATED BY THIN LAYER CHROMATOGRAPHY

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BACKGROUND

Thin layer chromatography (TLC) is an analytical method that can quickly separate total fat samples into their component lipid classes for the purpose of determining the relative contributions of each class to the whole fat content. In this method, it is necessary to fit a lot of intrinsic factors for each kind of sample that is going to be analized. Thus, if the conditions of TLC are appropiate, excellent results can be obtained with a modern scanning densitometer.

However, when working with TLC, there are some limitations that must be taken into account, because the sample is completly destroyed, the yield of carbon is variable, and appropriate reference standards are not always available (Cristie *et al*, 1970).

In this work, several modifications of TLC conditions were investigated to separate and measure by densitometry the following lipid classes in beef fat: phospholipids (PL), monoglycerols (MG), diacylglycerols (DG), cholesterol (C), free fatty acids (FFA), triacylglycerols (TG) and cholesteryl esters (CE).

OBJETIVES

The present aim of this research was to determine the effect of sex of Friesiain breed on intramuscular lipid classes after seven days of aging.

METHODS

In the present work, fifteen Friesiain young bulls (Y) (average carcass weight 260.6 ± 5.4 kg and 375 days old) and fifteen Friesiain heifer (H) (average carcass weight 229.2 ± 6.5 kg and 380 days old) were used. Both groups were fed artificial milk and concentrate until weaning and concentrated commercial fodder and barley straw *ad libitum* until slaughtering.

Longissimus dorsi muscle was removed from the left cascass side 48 hours *postmortem*. The samples were aged 7 days at 1-2 ºC. Intramuscular fat of meat was extracted by the Bligh and Dyer method (1959). Fat samples (100 mg) were dissolved in chloroform (200 µl). These samples were applied to the TLC plates as narrow bands under a stream of nitrogen with a quantitative applicator Linomat IV (CAMAG).

The chromatographic solvent was a mixture of hexane: diethyl ether: formic acid (80:20:4 v/v/v). Two one-dimensional developments were made (48 min each one).

For densitometric analysis, the plates were sprayed with a mixture of anisaldehyde: ethanol: sulphuric acid concentrate: acetic acid (0.5:9:0.5:0.1 v/v/v/v) and heated for 5 min at 200 ° C to visualize the lipid spots. The lipid classes were identified by comparing Rf values with those of the standard mixtures.

Each lipid spot was integrated using a GS-700 densitometer (BIORAD). The lectures of the densitometer were expressed in units of optic density (O. D. * mm) (Figure 1).

Statistical analysis was carried out with the SPSS6.1.2 (1995). One-way analysis of variance was applied to the data.

RESULTS AND DISCUSSION

Diferences in lipid classes (Figure 2) and in intramuscular fat content (Figure 3) were observed between heifers and young bulls. Heifers had significantly ($p< 0.001$) less PL than young bulls, which is in agreement with Hood *et al* (1971) who suggested that the PL decreases appredíably with increasing intramuscular lipid levels. Heifers longissimus dorsi muscle contained significantly ($p< 0.001$) higher levels of TG, DG and intramuscular fat content than young bulls. The higher TG in heifers reflects an increase in marbling due to adipocyte infiltration into the muscle (Mood and Cassens, 1968).

Young bulls had significantly ($p< 0.001$) more C than heifers. The C and PL are principally associated with the structured components of the adipocyte and decrease in concentration with increased marbling (Hecker et al, 1975). Afterwards, TG:PL ratio reflects the fat:lean ratio of the sample (heifers 15,57 and young bulls 4,2) which is strongly influenced by the degree of marbling in muscle (Eichorn et al, 1985).

CONCLUSIONS

The composition of the lipid classes were influenced by the intramuscular fat content of *longissimus dorsi* muscle, heifers had more intramuscular fat in *longissimus dorsi* muscle, DG and TG ($p< 0.001$) and less PL, MG, and C ($p< 0.001$) than the young bulls.

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Figure1.- Densitogram of lipid classes in intramuscular fat (—) and standar mixture (——).

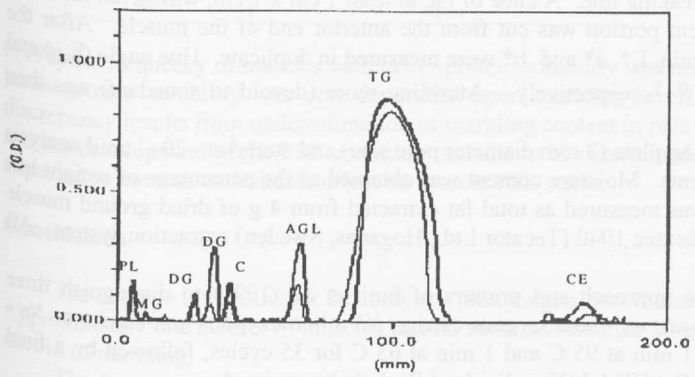

Figure 3.- Intramuscular fat content

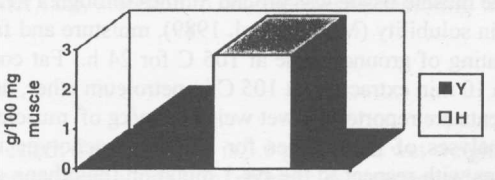

Figure 2.- Lipid classes in intramuscular fat