



## Effects of dietary cholesterol and fatty acids on the lipid composition of muscle in the preruminant calf

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L Leplaix-Charlat, Denys Durand, C Legay, C Leoty, R Souchet, et al.. Effects of dietary cholesterol and fatty acids on the lipid composition of muscle in the preruminant calf. *Annales de zootechnie*, 1994, 43 (Suppl1), pp.48s-48s. hal-00889130

**HAL Id: hal-00889130**

**<https://hal.science/hal-00889130>**

Submitted on 11 May 2020

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11.3  $\pm$  1.2 arbitrary units (AU) / $\mu$ g of total RNA ( $\pm$  SE) for weeks 1, 2, 4, and 12, respectively). Similarly, levels of hepatic apo B were unchanged between weeks 1 and 4 (2.5  $\pm$  0.3, 3.1  $\pm$  0.5, 3.5  $\pm$  0.5 AU/10<sup>9</sup> cells ( $\pm$  SE) for weeks 1, 2, and 4, respectively). However, in week 12, apo B levels were 3.7 times higher (9.4  $\pm$  2.4 AU / 10<sup>9</sup> cells,  $\pm$  SE,  $p < 0.01$ ) than in weeks 1–4.

These results indicate no changes in the level of hepatic apo B gene expression during the first 4 weeks of lactation although lipid infiltration increases by 85% during this period. However, the dramatic accumulation of hepatic apo B recorded in week 12, which occurred without changes in levels of mRNA, may have resulted from either a higher rate of tranlaction and/or a decrease in the rate of intracellular apo B degradation.

**Effects of dietary cholesterol and fatty acids on the lipid composition of muscle in the preruminant calf.** L Leplaix-Charlat, D Durand, C Legay, C Leoty, R Souchet, D Bauchart (*INRA, Laboratoire Croissance et Métabolismes des Herbivores, 63122 Saint-Genès-Champanelle, France*)

Muscle lipids determine the dietetic and organoleptic qualities of meat in various species. In the preruminant calf, a functional monogastric, lipid composition of muscle tissues can be modulated by nutritional factors, mainly by the lipids of the milk replacer. The combined effects of the ratio of saturated to polyunsaturated (PUFA) fatty acids and the cholesterol in the milk replacer on lipid composition of the rectus abdominis (RA) muscle in the preruminant calf have been determined.

Twenty-two 4-week-old male F x H calves (65  $\pm$  5 kg BW) were fed for 17 d one of the following diets: 1) a conventional milk replacer (5.2 Mcal/kg DM) containing triglycerides (TG, 23% diet DM) from either tallow (T, 4% of PUFA n-6;  $n = 6$ ) or soyabean oil (S, 57% of PUFA n-6;  $n = 5$ ); or 2) the same diets (T and S) supplemented with cholesterol (1% diet DM) (TC,  $n = 6$ ; SC,  $n = 5$ ).

A muscle (RA) sample (6 g) was taken at slaughter and immediately frozen in liquid nitrogen. Total lipids were extracted in chloroform/methanol (2:1, V/V) and TG, total cholesterol (TC) and phospholipids (PL) were determined by enzymatic or colorimetric methods. TG and PL were also isolated by thin-layer

chromatography and their fatty-acid (FA) composition was determined by gas-liquid chromatography.

Substitution of tallow for soyabean oil in the milk diet did not modify significantly mean liveweight gain (LWG; 0.9 kg/d). It increased total lipids in RA muscle (11.1 vs 8.6 mg/g of fresh tissue), because of the 2.2 times increase of TG ( $P < 0.05$ ). Similar variations were observed with the TC diet compared to the T diet (11.5 vs 8.6 mg/g). On the other hand, addition of cholesterol to the S diet led to a decrease of total lipids (8.9 vs 11.1 mg/g,  $P < 0.05$ ), mainly because of a decrease in TG (-38%). Compared to the diet T, the PUFA-rich diet increased the C18:2 n-6 proportion in TG (x 16;  $P < 0.05$ ) and PL (x 2;  $P < 0.05$ ) to the detriment of C18:1 n-9. Addition of cholesterol to diets T and S did not modify the LWG or FA composition of total lipids in RA muscle.

Dietary lipids only affect the TG fraction of lipids in RA muscle. Dietary PUFA n-6 favour TG synthesis by muscle tissue, probably because of the stimulation of TG-rich lipoprotein production by the liver, as described elsewhere in the calf. Finally, addition of cholesterol does not lead to a higher cholesterol content in RA muscle.

**Étude de la variation de composition en acides gras des tissus adipeux de petits ruminants : analyse par GC/MS.** A Rouzeau <sup>1</sup>, P Bas <sup>1</sup>, L Eveleigh <sup>2</sup>, D Sauvart <sup>1</sup> (<sup>1</sup> Laboratoire associé de nutrition et alimentation INRA de l'INA PG; <sup>2</sup> Laboratoire de chimie analytique de l'INA-PG, 16, rue Claude-Bernard, 75231 Paris Cedex 05, France)

Les tissus adipeux sous-cutanés des petits ruminants ont la particularité de pouvoir s'enrichir en acides gras ramifiés (AGR). La spectrométrie de masse est utilisée pour déterminer la structure des acides gras (AG) et tenter d'en déduire leur origine (micro-organismes du rumen ou synthèse endogène).

Quatre tissus adipeux (2 internes : omental et périséal, et 2 sous-cutanés : sternal et caudal) sont étudiés chez 2 agneaux et 2 chevreux abattus vers 25 kg de poids vif (14 et 17 sem d'âge, respectivement). Les animaux sont alimentés depuis l'âge de 7 sem avec une ration complète