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An example of nutrigenomics and nutrigenetics in ovine: Stearoyl-CoA Desaturase *(SCD)*

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Introduction

Two experiments were conducted to study the effect of feeding system and a polymorphism located at *SCD* promoter on the *SCD* gene expression. Lamb meat is high in saturated fatty acids, in particular, stearic acid, which can be desaturated to oleic acid by the enzyme stearoyl-CoA desaturase (SCD). Ruminant CLA comes from two sources: one from biohydrogenation in the rumen, and the other one is derived from the synthesis from vaccenic acid (C18:1 trans-11) by the activity of *SCD* in animal tissues.

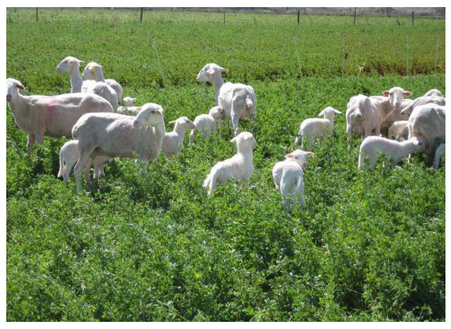
Material and methods

Experiment 1

44 Rasa Aragonesa male lambs were grouped in grazing alfalfa (ALF,n=22) and indoor concentrate feeding (IND,n=22) *(Dervishi et al. 2010)*.

Experiment 2

8 lambs with their dams feed with grazing alfalfa (ALF) and the rest (n=50) feeding commercial concentrate supplemented with 500 mg of dl-α-tocopheryl acetate/kg for different days before slaughtering (IND) *(Ripoll et al. 2013).*



When lambs reach 22-24 kg live weight were slaughtered and a sample of *Semitendinosus* (Exp.1) and *L.Thoracis* (Exp.2) were used for gene expression studies and SNP genotyping.

RNA extraction

↓

RT-PCR

- SYBR green
- Standart curve
- *Steibel et al. 2009*
- Bonferroni was applied

DNA extraction

↓

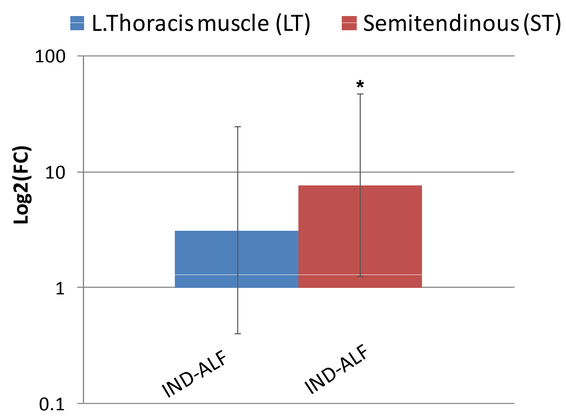
PCR

↓

RFLP-PCR
MnlI
FJ513370: g.31A>C

Results

➢ Effect of the feeding system on mRNA expression of *SCD*: Indoors vs. Alfalfa grazing

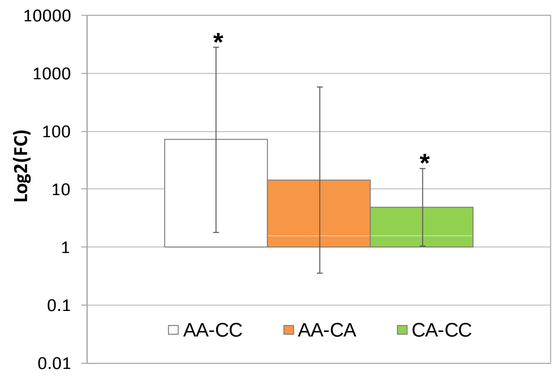


*$P < 0.05$

In ST muscle, the IND group showed differences in FC of 7.7-fold higher than ALF group. In LT muscle no significant differences were found.

➢ Effect of the genotype on mRNA expression of *SCD*: Indoors groups

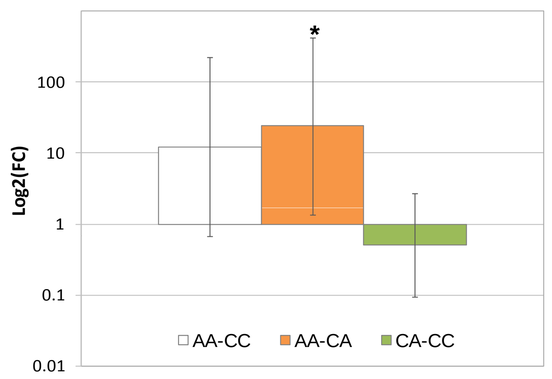
***Semitendinous* muscle**



*$P < 0.05$

In ST muscle, the relative expression of the AA (n=1) and CA (n=11) genotypes were 72 and 5-fold higher than the CC (n=10) genotype.

***L.Thoracis* muscle**



*$P < 0.05$

In LT muscle, the relative expression of the AA (n=7) genotype was 24-fold higher than the CA (n=25) genotype.

Conclusions

Results indicate that the feeding system acts as modulator of the effect of the polymorphism located at the *SCD* promoter over the gene expression in both muscles. In alfalfa lambs the genotype had not effect on gene expression while in lambs feeding concentrate the genotype seems to be implied in the regulation of the gene expression.

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