ValRuMeat - How to reconcile the intensive production of ruminants with production of meat with high nutritional value

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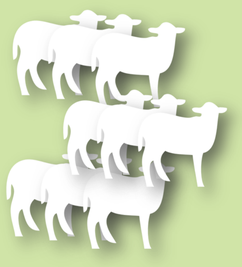
BACKGROUND

In ruminants fed with diets rich cereals and with low fiber content, a change in rumen biohydrogenation (BH) pathways occurs, resulting in the replacement of the healthier t11-18:1 (vaccenic acid) by the prejudicial t10-18:1 (*t*10-shift), with negative impact in the nutritional quality of the product.

ValRuMeat
https://valrumeat.iniav.pt/

The causes of *t*10-shift are still not know but it has been associated to diets with high-starch content and to low rumen pH. However, it may also occur in ruminants fed diets with low-starch and higher fiber content. ValRuMeat aims to study the main factors related to *t*10-shift and define the main lines for the formulation of diets to improve t11-18:1 and c9,t11-18:2 in ruminant s meat.

Were conducted **3 trials** with **Merino Branco lambs:** lambs were **individually housed ;** trial **duration 6 weeks; slaughter at the INIAV** abattoir; determination of **fatty acid composition** of subcutaneous and intramuscular fat.



Trial 1: NDF source

3 low-starch diets with **similar NDF content, but with different composition: dehydrated alfalfa** (200, 400 and 600 g/kg DM) balanced with **soybean hulls**

Trial 2: Forage particle size and replacement of cereal by low-starch by-products

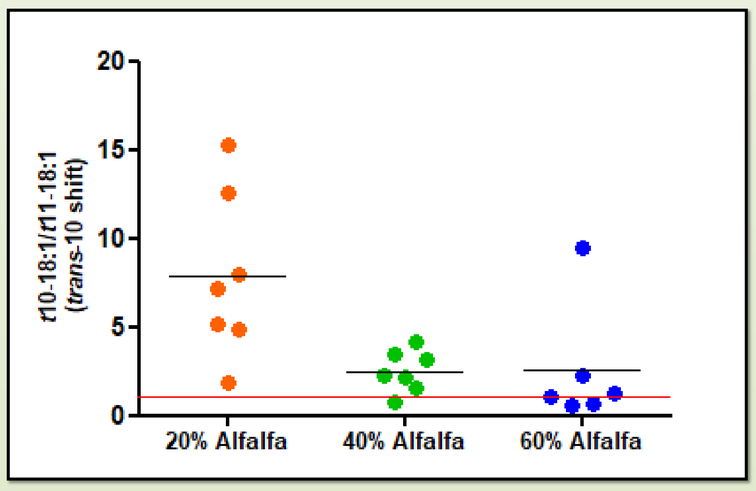
2 types of forage particle size **(ground *vs* chopped lucerne hay)** and 4 levels of cereal replacement **(0, 35, 65 and 100%)**

Trial 3: Forage species and rumen buffer capacity

2 types of forage (alfalfa *vs* ryegrass) and 2 **proportions of sodium bicarbonate** in the concentrate **(0.5 vs 2.0%)**

Trial 1

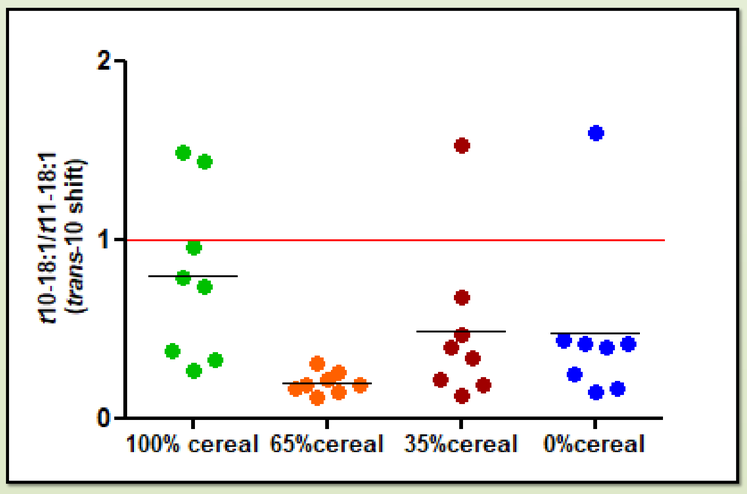
40 % of dehydrated alfalfa in the diet reduced *t*10-shift intensity. The *t*10-shift (t10 18:1/t11 18:1 > 1) may occurs with low-starch and high-NDF diets.

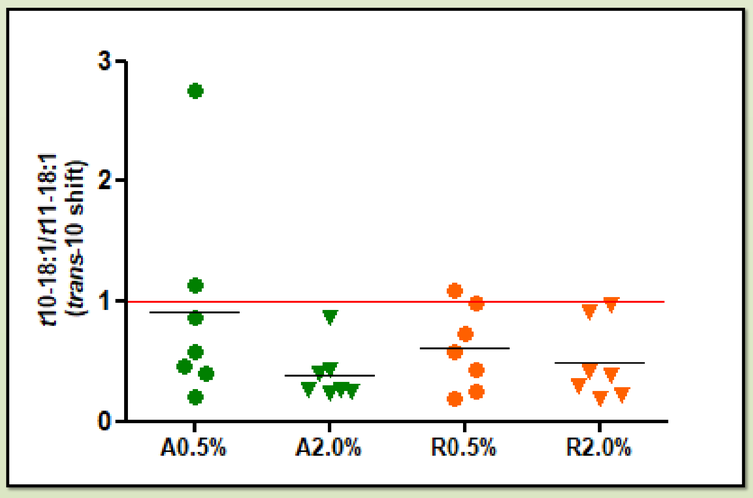


Trial 2

In diets with 40% forage (alfalfa):

The replacement of 35 % of cereals by low-starch by-products was enough to prevent the occurrence of *t*10-shift.





Trial 3

In diets with 40% of dehydrated alfalfa and 35 % of cereals replaced by low-starch by-products:

- **The forage species had no impact on the risk or intensity of occurrence of *t*10-shift**
- **The increase of level of sodium bicarbonate in lamb s diet reduced t10-18:1/t11 18:1 ratio**

- **Regardless of the treatments, there was a high individual variability in the resistance to shift**
- **The combination of the treatments with better results allowed to reduce the risk of occurrence of *t*10-shift to residual levels, increasing the nutritional level of meat without compromising productivity**

To test an experimental diet composed by 40% forage + 40% replacement of cereals + 2% sodium bicarbonate against a conventional diet for growing beef, a 4th trial with Alentejana breed steers is actually in course at EZN- INIAV

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