

FORAGE PARTICLE SIZE AND STARCH CONTENT IN LAMB DIETS - EFFECTS ON PRODUCTIVITY AND PRODUCT QUALITY



OBJECTIVES

To evaluate the effects of **forage particle size** and of the **stepwise replacement of cereals** by low-starch agro-industrial by-products (LSBP) in complete mixed diets on **lamb's growth, carcass and meat quality traits**.

CONCLUSIONS

- **Feed intake, ADG and carcass weight** were higher with **ground alfalfa** and **high barley content** in the diets.
- **Meat tenderness** increased with **barley replacement** by LSBP in the diet.
- **Chopped alfalfa** conjugated with a **partial barley replacement** in the diet **improved meat nutritional value** by **reducing** the deposition of **t10-18:1** and **promoting** an efficient **control of the t10-shift**.

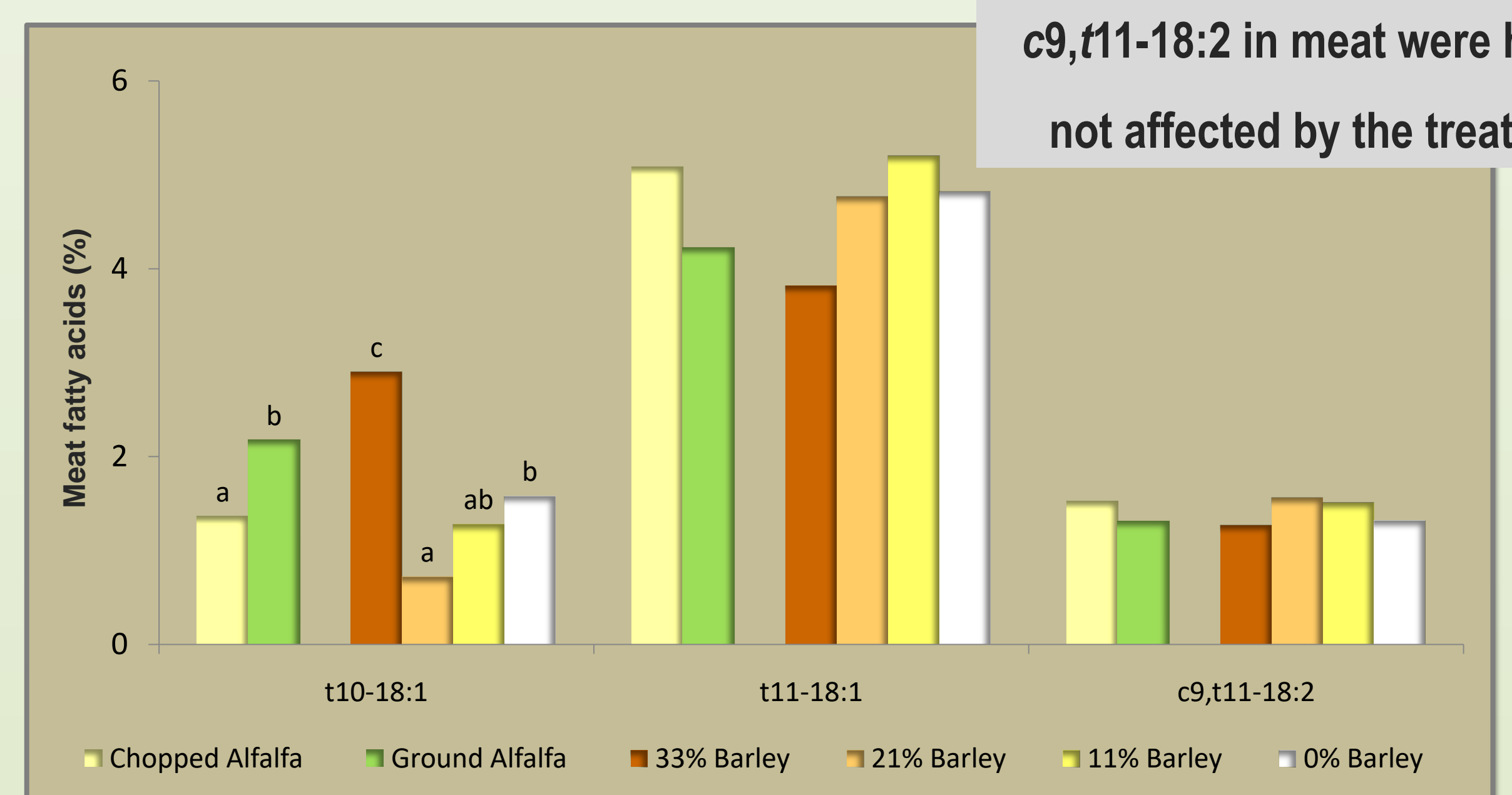
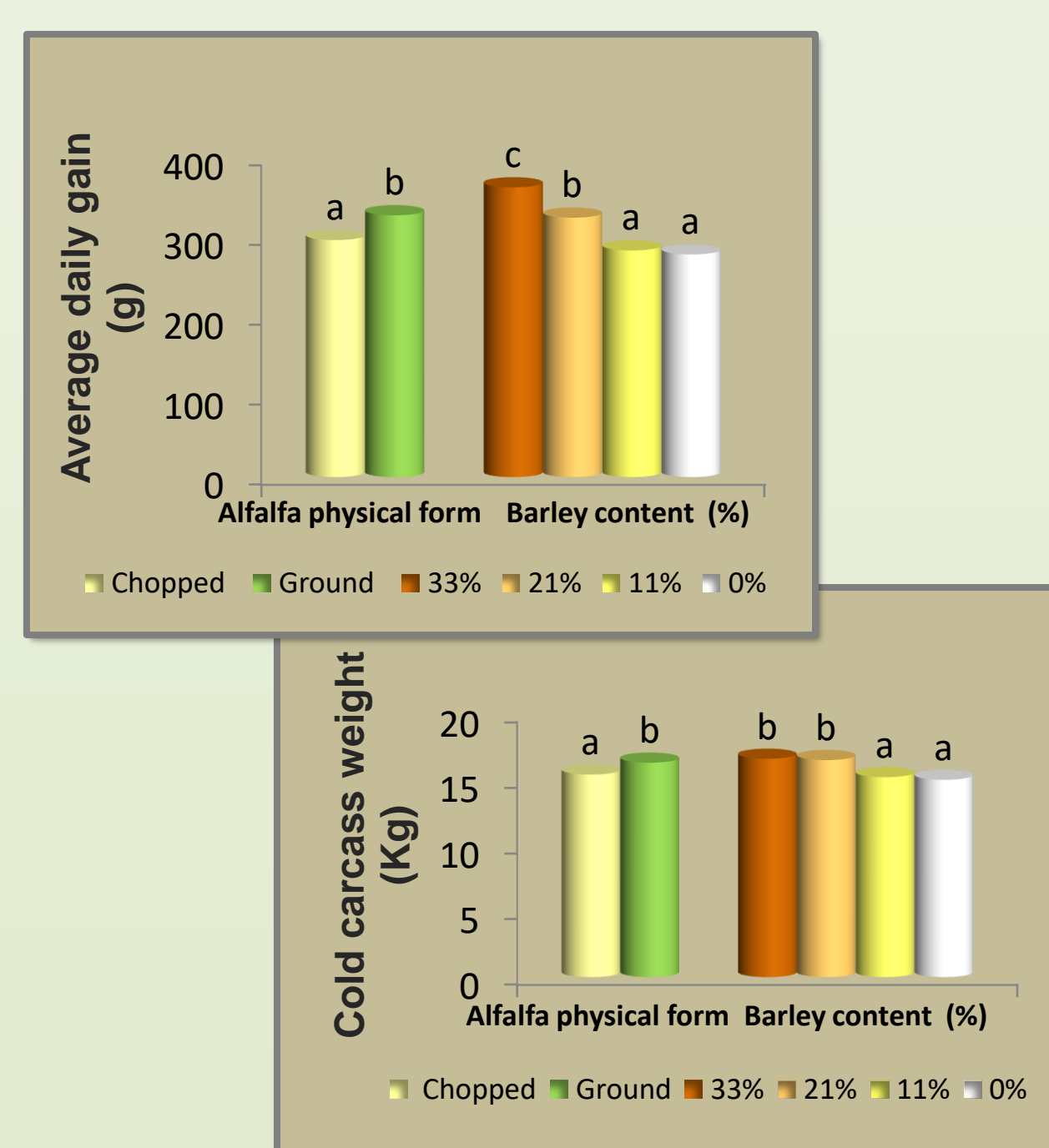
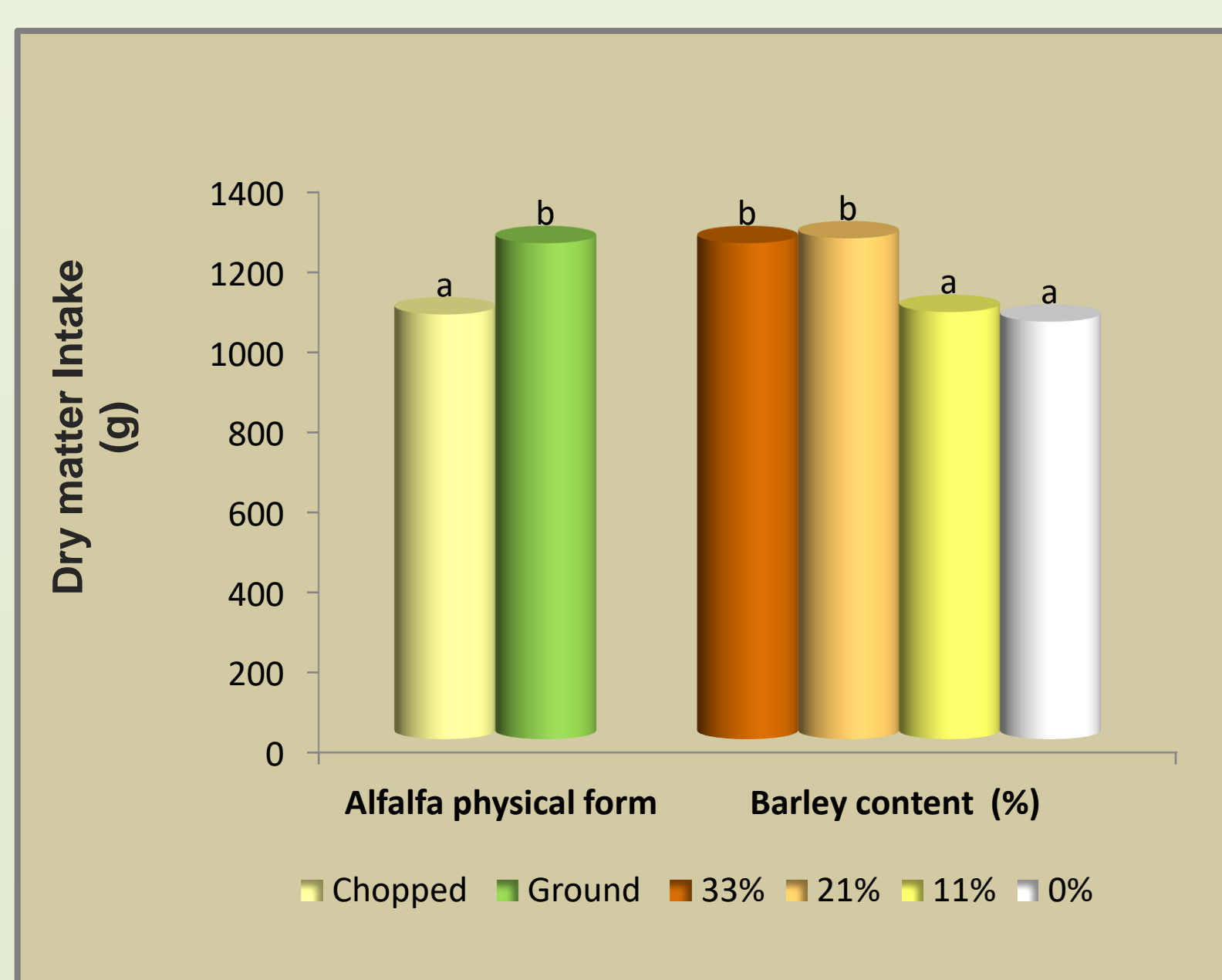
BACKGROUND

In ruminants fed high cereal-starch and low fiber diets, the normal rumen biohydrogenation (RBH) pattern often changes, being **t11-18:1** replaced by the **t10-18:1 (t10-shift)**, which may have negative implications in consumer's health.

Forage particle size and the **dietary availability of starch** are involved in t10-shift. The first affects feed intake, rumination and saliva production, rumen retention time and fiber digestibility, which in turn influences rumen microbiome and RBH. Replacing cereals by low-starch agro-industrial by-products (LSBP) reduces starch in the diet and is being under study as a promising strategy to prevent t10-shift.

We hypothesize that the low fiber size in ground complete diets might contribute to the inconsistent effects observed when cereals are replaced by LSBP on t10-shift. Also, the combination of long forage particles with a partial replacement of cereals by LSBP is probably enough to avoid the t10-shift and the negative effects on productive performance of growing ruminants fed with low-starch diets.

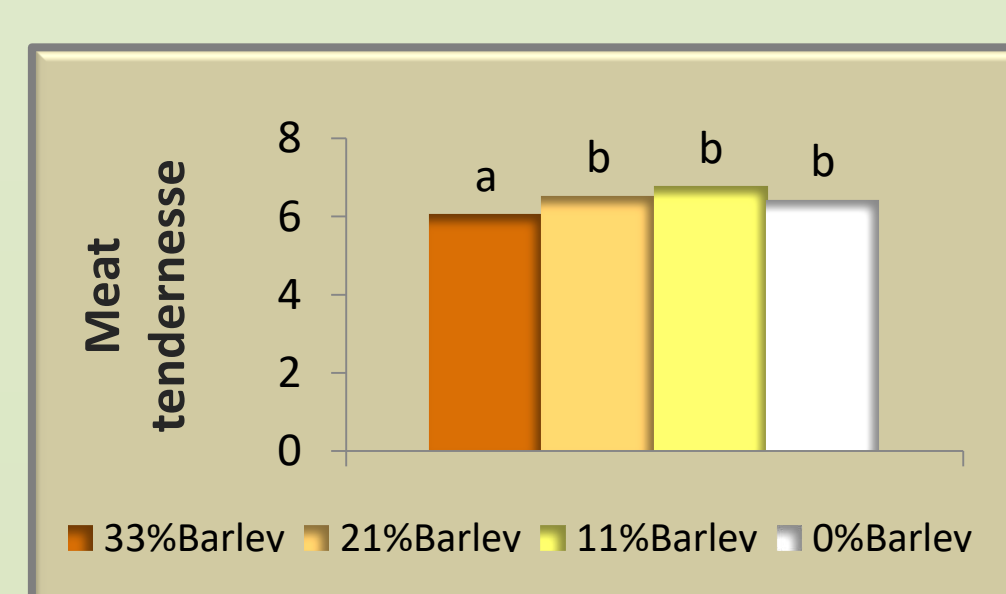
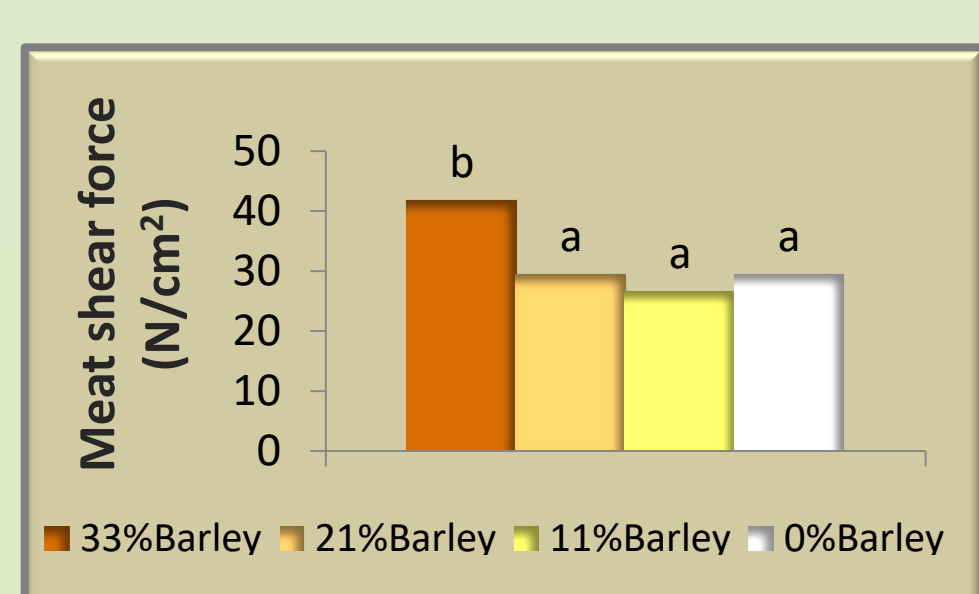
RESULTS



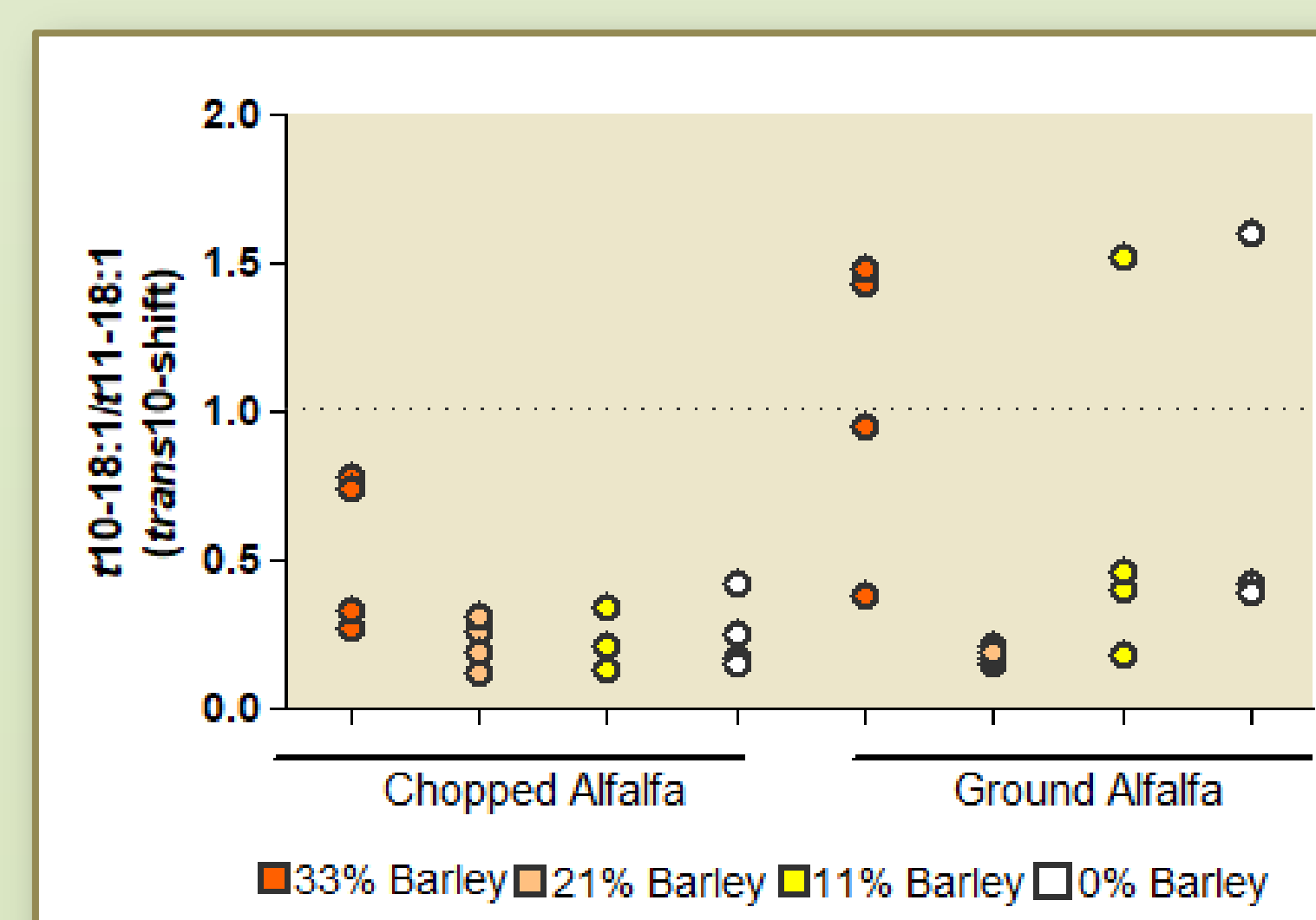
The proportions of t11-18:1 and c9,t11-18:2 in meat were high and not affected by the treatments.

Feed intake and growth rate were higher for diets with ground alfalfa and reduced with the replacement of barley by LSBP, which was reflected in the carcass weight.

Meat presented a low proportion of t10-18:1, which was reduced in lambs fed with chopped alfalfa and with the replacement of barley in the diet.



Meat shear force decreased and tenderness increased with barley reduction in the diet.



The t10-shift did not occur in the meat of lambs fed with chopped alfalfa and was reduced by the replacement of barley by LSBP.

MATERIAL AND METHODS

32 lambs individually housed and **fed for 6 weeks** with:

8 complete diets that combined **two forms of presentation of alfalfa hay - chopped or ground** - with **4 levels of barley** content in the diet - **33.0%; 21.3%; 11.2% and 0%**. Barley was replaced by a mixture of LSBP (soybean hulls, dehydrated citrus and beet pulps).

All diets presented a Forage:Concentrate ratio of 40:60 and included 6.0 g/kg of soybean oil.

Effects were evaluate on animal performance, carcasses , meat quality and lipid composition.