

Cis-15 intermediates of biohydrogenation in the duodenal flow of cows receiving linseed

Enjalbert F., Akraim F., Juaneda P.*, Troegeler-Meynadier A., Nicot M.C.

Veterinary School, Toulouse, France ; *INRA Flavic, Dijon, France

Introduction

The pathway of C18:3 ruminal biohydrogenation (BH) leads to the production of *cis*-15 intermediates, including *cis*-9,*trans*-11,*cis*-15C18:3 (CLnA). The aim of this poster is to present the percentages of *cis*-15 intermediates of ruminal biohydrogenation (BH) in the duodenum of dairy cows receiving linseed. These results are based on a new method of analysis of samples (Akraim *et al.*, 2006).

Materials and methods

Three dry Holstein cows fitted with a duodenal cannula received a diet with 14% (dry matter basis) raw linseed. C18 fatty acids represented 6.3% of dietary dry matter, and contained 57.8% of C18:3. After 18 days adaptation, on each cow, twelve samples of duodenal flow were taken over 3 days, composited, and analysed for FA composition. CLnA and *trans*-11,*cis*-15C18:2 were identified by GC-MS.

Results and discussion

The proportion of CLnA was low, in spite of the high C18:3 intake. The first step of C18:3 BH, isomerisation to CLnA, was extensive because the C18:3 proportion was 13.5 times lower in the duodenum than in the diet (Akraim *et al.*, 2006). The extensive C18:3 BH and the low proportion of CLnA suggest a rapid ruminal reduction of this FA.

	% of total C18 (mean \pm SD)
<i>cis</i> -9, <i>trans</i> -11, <i>cis</i> -15C18:3 (CLnA)	0.21 \pm 0.01
<i>trans</i> -11, <i>cis</i> -15C18:2	1.89 \pm 1.21
<i>cis</i> -15C18:1	1.00 \pm 0.49

The proportion of the product of this first reduction, *trans*-11,*cis*-15C18:2, was much higher than that of CLnA, but quite variable among cows. This suggests that the reduction of this FA was slower than that of CLnA, although this reduction is supposed to be due to a broad range of bacteria. According to responsible bacteria, this reduction can lead to *trans*-11C18:1, or *cis*-15C18:1 and *trans*-15C18:1. *Cis*-15C18:1 represented only half the proportion of *trans*-15C18:1, suggesting either the possibility of a direct BH of *trans*-11,*cis*-15C18:2 to *trans*-15C18:1, or a rapid isomerisation of *cis*-15C18:1 to *trans*-15C18:1.

Conclusion

These results provide evidence for CLnA in the rumen of cows receiving linseed. Among other *cis*-15 intermediates, *trans*-11,*cis*-15C18:2 was quantitatively the most important.

Reference cited

Akraim F., Nicot MC, Weill P, Enjalbert F. Effects of preconditioning and extrusion of linseed on the ruminal biohydrogenation of fatty acids. 1. In vivo studies. *Anim. Res.*, 2006, 55, 83-91.