

Relationship between intake and duodenal flows of linoleic acid in dairy cows fed lipid-supplemented diets

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Introduction — The metabolic processes involved in ruminal hydrogenation lead to an intense conversion of C18 unsaturated fatty acids (UFA), mainly into stearic acid with smaller quantities of positional and geometrical isomers of C18 monoenoic acids. However, there is evidence that some of the UFA, mainly linoleic acid (C18:2n-6), escape ruminal hydrogenation and thus contribute to fulfilling the essential FA requirement of the ruminant animal. Therefore, we studied the potential ability of the rumen to hydrogenate C18:2n-6 and measured the C18:2n-6 duodenal flow (D) in dairy cows given various amounts of C18:2n-6.

Materials and Methods — Ten dairy cows, fitted with proximal duodenal cannulae were used in a 4 x 4 and two 3 x 3 latin square design experiments and received a diet consisting of one part hay and one part barley-based concentrate supplemented or not (■) with free oils

(●) (rapeseed and soya bean oils, palmitostearin) or fat-free tallow (▲) or with crushed (□) or extruded (○) full-fat rapeseed. Dry matter (DM) duodenal flow was determined by the dual marker technique and C18:2 content in diet and duodenal samples (mixture of 24 spot samples taken over 3 d) was measured chromatographically.

Results and Discussion — Results showed that the apparent ruminal hydrogenation of C18:2 ($D - I / I \times 100$) increased from 55 to 91% with increasing C18:2 intake (I) (4.1 to 46.6 g/d/kg DM intake, fig 1a). However, C18:2 escaped the hydrogenation step (Y) linearly with the intake (X) between 50 and 600 g/d ($Y = 0.080 X + 0.947$, $r = 0.9112$) (fig 1b), probably because of direct and specific incorporation of this acid by solid-adherent bacteria (Bauchart *et al*, 1990).

Bauchart D, Legay-Carmier F, Doreau M, Gailard B (1990) *Br J Nutr* 63, in press

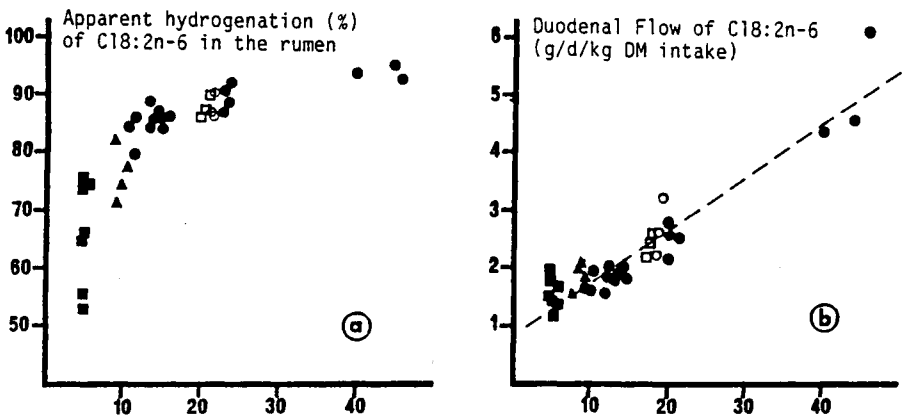


Fig 1. Variation of ruminal hydrogenation (a) and duodenal flow (b) of C18:2n-6 in dairy cows.