

Influence of fish oil supply on diet digestibility and ruminal metabolism in cows. M Doreau, Y Chilliard (*Laboratoire sous-nutrition des ruminants, Inra, Theix, 63122 Saint-Genès Champanelle, France*).

Lipid supplementation often decreases diet digestibility in ruminants and leads to a shift of ruminal fermentations towards a propionate production. The digestive effects of fish oil intake are not well known and have been studied in two trials on lactating Holstein cows receiving diets made of maize silage and concentrates (65 and 35% on dry matter basis, respectively).

In trial 1 (six cows, 3 × 3 Latin square), a control diet (C1) was compared to diets supplemented with 200 (FO1) or 400 (FO2) mL/day fish oil of Menhaden type, given per os. Organic matter digestibility (OMD) was higher ($P < 0.01$) for diet FO2 (73.5%) than for diet C1 (69.2%), diet FO1 being intermediate (72.2%). Neutral detergent fibre digestibility (NDFD) was higher ($P < 0.05$) for diet FO2 (47.3%) than for diet C1 (42.7%), diet FO1 being intermediate (46.2%).

In trial 2 (six cows fitted with ruminal and duodenal cannulas, 3 × 3 Latin square), a control diet (C2) was compared to diets supplemented with 300 mL/day fish oil continuously infused in the rumen (FOR) or in the duodenum (FOD). Fish oil ruminal supply increased ($P < 0.05$) OMD and NDFD (OMD: 72.6, 75.5 and 74.2% for treatments C2, FOR and FOD; NDFD: 59.4, 64.5 and 60.2 for treatments C2, FOR and FOD). Ruminal fish oil infusion increased ($P < 0.01$) the proportion of propionate (C2, 18.8%; FOR, 23.9%) at the expense of acetate (C2, 65.0%; FOR, 60.0%) in ruminal volatile fatty acids. With treatment FOR, in which fatty acids (FA) from fish oil represented more than 60% of FA supply, FA reaching the duodenum comprised 0.33% of C20:5n-3 and 0.51% of C22:6n-3, whereas fish oil contained 21.7 and 7.3% of these acids; however the saturation pro-

cess was uncomplete (0.45% of C20:0 and 0.60% of C22:0) and many intermediate compounds were found. Moreover a high proportion (36.0%) of octadecenoic FA, of trans configuration for a major part, was found, suggesting a change in the hydrogenation process of dietary 18-carbon polyunsaturated FA.

These trials showed an unexpected positive effect of fish oil on diet digestibility and an extensive hydrogenation of 20- and 22-carbon FA.

Effects of CCK and gastrin on pancreatic secretion in vivo in the calf. G Le Drean, I Le Huerou-Luron, M Gestin, D Fourmy, P Guilloteau (*Laboratoire du jeune ruminant, Inra, 65, rue de Saint Brieuc, 35042 Rennes cedex, France*).

In the calf, beyond the first month of age, pancreatic CCK-B/gastrin receptors [with similar affinities for cholecystokinin (CCK) and gastrin] are predominantly expressed compared to pancreatic CCK-A receptors [Le Meuth et al (1993), *Endocrinology* 133, 1182-1191]. The only other species in which this particularity is observed is man. The effects of CCK and gastrin perfusions were examined on pancreatic secretion in vivo in the calf. The experiment was carried out on seven milk-fed Holstein calves aged between 2 and 4 months and fitted with two catheters (pancreatic duct and duodenum). The pancreatic juice was continuously collected and simultaneously reintroduced after sampling. The study, which was carried out during the interdigestive period (4.5 to 7.5 h after meal), was divided into six successive periods: basal (15 min), perfusion into the jugular vein of saline (1 mL/min; 30 min) and of saline containing CCK-9 or gastrin 13S (30 pmol/min/kgPV; 45 min) and post-perfusion (3 × 30 min). Since the pancreatic juice and protein flow as well as the protein concentration were similar for the two first periods (*t* test), they were put