

## Effects of rapeseed oil duodenal infusion on dairy cow performances and blood metabolites during early lactation

Y Chilliard<sup>1</sup>, G Gagliostro<sup>1,2</sup>, A Ollier<sup>1</sup>, D Bauchart<sup>3</sup>

with the technical assistance of E Girard, R Lefaivre,  
C Legay, JN Rampon, G Sauvage

<sup>1</sup> Laboratoire de la Lactation, INRA, Theix, 63122 Ceyrat, France; <sup>2</sup> INTA, Balcarce, Argentina;

<sup>3</sup> Laboratoire d'Etude du Métabolisme Energétique, INRA Theix, 63122 Ceyrat, France

Rapeseed-oil was continuously infused (1.03 kg/d) into the duodenum of 6 multiparous fistulated cows ('O group'), from about 3 wk before to 3 wk after calving, in order to evaluate the metabolic effects of exogenous long-chain fatty acids, without disturbing rumen function, in cows that were mobilizing their body lipids. Six other cows were used as controls ('C group'). The diet was 60% corn silage and 40% concentrate. Groups O and C received 18 and 12% soybean meal, respectively. There was a between-group difference of 4.1 kg milk/d in previous peak lactation yield.

Milk yield during wk 3 of experimental lactation was significantly lower in group O (27.7 vs 33.8 kg/d,  $P < 0.05$ ), but not if corrected for previous milk potential. Milk fat and protein contents were non-significantly increased (+ 1.3 g/l) and decreased (-1.0 g/l), respectively. Oil-free dry matter intake was lower in group O (12.7 vs 15.2 kg/d,  $P < 0.05$ ), but absorbed metabolizable energy, including oil, was not different (39.4 and 41.8 Mcal/d, in groups O and C). Apparent intestinal digestibility of oil fatty acids was calculated to be 68%, but that of oil lipids was only 46%, due to increased endogenous excretion (+ 223 g/d) of unsaponifiable lipids.

Total organic matter digestibility was not changed.

Empty body weight loss (after rumen emptying on d 2 and 21 after calving) was the same (58 kg) in both groups, as well as the decrease in subcutaneous adipose cell diameter (-15 and -12  $\mu\text{m}$ , in O and C). These facts contrasted with the difference in calculated energy balance during the same period (-6.3 vs -11.3 Mcal/d, in O and C,  $P < 0.05$ ), although calculations were made with coefficients very close to those observed by Vermorel *et al* (1990) during respiratory chamber experiments.

Neither plasma cholesterol, phospholipids or 3-OH-butyrate were affected by oil infusion. Preprandial (but not postprandial) plasma glucose was decreased (0.46 vs 0.55 g/l,  $P < 0.05$ ). Responses of plasma glucose and non-esterified fatty acids to an insulin challenge (0.12 IU/kg) were not significantly different between groups. Most oil effects in this early lactation experiment were in accordance with those observed in a previous mid-lactation experiment (Chilliard and Gagliostro, 1988).

Chilliard Y, Gagliostro G (1988) *Reprod Nutr Dev* 28 (suppl 1) 173-174

Vermorel M, Chilliard Y, Vernet J, Bauchart D, Ollier A (1990) *Reprod Nutr Dev* suppl 2 231s