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Influence of wheat supplementation on intake and digestibility in dairy cows fed autumn grass *ad libitum* indoors

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The supplementation of fresh grass with a significant amount of rapidly fermentable cereal (6 kg : Arriaga-Jordan and Holmes, 1986, J Agric Sci, Camb, 106, 581-592) reduces herbage intake and digestibility. The aim of this study was to determine the effect of lower levels of supplement (wheat) on intake and digestibility in dairy cows fed on a herbage-based diet.

A 'control' diet (C) comprising only fresh perennial ryegrass was compared to a 'supplemented' diet (S) comprising the same fresh grass plus 3 kg of pelleted wheat. Three ruminally cannulated Holstein cows (632 kg live weight) in mid-lactation were used in an incomplete switchback design during 3 periods of 12 days, in October and November 1993. Cows were stall fed with grass *ad libitum* 3 meals per day at 7.30 am, 2 pm and 9.30 pm. Cows on the S diet were given concentrate before grass at 7.00 am and 9.00 pm (1.5 kg each time). Grass was cut once daily and stored at + 4°C until meal times. Herbage intake was recorded for each period from day 7 to day 11, and digestibility measured from day 8 to day 12 by total faecal collection. Urine was collected with harnesses. On day 10 of the two first periods, the pH, NH_3 and VFA contents of the ruminal fluid and blood urea were measured 13 times throughout the day, i.e. at 12 pm, 4 am and every 90 min from 7 am to 10 pm.

The mean chemical composition of the grass (per kg DM) was as follows : 878 g OM, 223 g CP and 463 g NDF. Cows on the S diet showed both higher total OM intake (15.0 vs 14.5 kg/d, $P<0.05$) and higher milk production (21.1 vs 20.0 kg FCM, $P<0.03$) than cows on the C diet, but milk fat content (39.3 g/kg) and protein content (31.7 g/kg) were not affected by supplementation. Herbage OM intake was greatly depressed by supplementation (12.4 and 14.5 kg OM for the S and C diets respectively, $P<0.001$). This high substitution rate (0.80 kg per kg OM concentrate) is probably due to the positive energy balance (+ 1.1 and 1.4 UFL/d for the S and C diets respectively ; Faverdin *et al*, 1991, Livest Prod Sci, 27, 137-156). The organic matter digestibility (OMD) of the whole diet was higher for the S than for the C diet (0.832 vs 0.815, $P<0.05$). For the S diet, herbage OMD was estimated by subtracting the indigestible wheat OM from total feacal output, assuming that wheat OMD is 0.89 (INRA, 1989, Ruminant Nutrition (ed R Jarrige), London, Paris, John Libbey). In these conditions, supplementation had no effect on herbage OMD (0.821 and 0.815 for the S and C diets respectively, $P>0.20$). Neither the mean pH (5.9), the total acidity (138 mmoles/l), the acetate (62.1 %), propionate (21.6 %) and butyrate (10.7 %) contents in the ruminal VFA, nor the postprandial dynamics of ruminal fermentations were affected by supplementation. These results support the absence of variation in herbage OM digestibility and in milk fat content when wheat was given. Feeding concentrate had little effect on N metabolism since ruminal ammonia (290 mg/l), uremia (45 mg/100 ml) and urine N output (280 g/d) were not statistically different between diets.

Despite a high substitution rate, no digestive interaction is expected in high-quality pastures with a moderate amount of a rapidly fermentable cereal supplement.