Energy cost of eating long hay and pelleted feeds in horses. J Vernet, M Vermorel, W Martin-Rosset *(INRA-Theix, 63122 Saint-Genès-Champanelle, France)*

Differences in the energy cost of eating (ECE) may contribute to differences in metabolisable energy (ME) utilization by horses. To quantify the significance of this phenomenon, the time spent eating by horses was determined by recording jaw movements for 1 d per animal and per treatment, while energy expenditure (EE) was continuously measured over 4 d using 2 large open-circuit respiration chambers. Five adult sport horses were fed at 1.26 times maintenance in 2 equal distributions at 9.30 am and 4.30 pm each of the 3 following diets: long hay (H, 54% OMD); 60% hay + 40% pelleted sugar beet pulp (HSBP); and 70% hay + 30% pelleted maize (HM). Horses were continuously standing. The ECE was calculated from the difference between EE during each meal and the mean resting EE computed by regression from the values of EE obtained before and after the meal. The latter took into account the possible increase in EE due to digestion and metabolism of nutrients.

The total duration of ingestion and the ingestion rate were not significantly different between the 3 diets and averaged 709 ± 82 min.d^{-1} and 9.8 ± 1.1 g DM.min^{-1}. The 2 main meals following feed distributions lasted 483 ± 67 min.d^{-1} (NS) and the mean corresponding EE increase was 37.6 ± 5.8% for H and HM diets and 30.6 for HSBP diet ($P < 0.05$).

The ECE averaged 61.3^{a}, 44.1^{b} and 35.6^{c} kJ•kg BW$^{-3/4}$.d^{-1} for diets H, HSBP and HM, respectively (a, b, c, significantly different values, $P < 0.05$). The contribution of the 2 large meals to the total ECE averaged 87.2% for the 3 diets (NS). The total ECE accounted for 11.5^{a}, 8.2^{b} and 7.1%^{c} of daily EE for the same diets. Finally, ECE amounted to 10.1^{a}, 7.2^{b} and 6.0%^{c} of ME intake for the same diets.

The ECE of simple feeds was calculated from those of the diets and the hay. It averaged 0.80, 0.48 and 0.17 MJ.kg DM^{-1} and 10.2, 4.3 and 1.1% of ME for long hay, pelleted sugar beet pulp and pelleted maize, respectively. These results show that ECE varies greatly with the features of feeds and contributes to differences in the efficiency of ME utilization by horses.

Effects of estradiol injection on milk composition, milk fat lipolysis and lipase activity in the non-pregnant dairy cow. P Cartier [1,2], Y Chilliard [1*] *([1] INRA, Laboratoire Sous-Nutrition des Ruminants, 63122 Saint-Genès-Champanelle; [2] Institut de l'Élevage, 14310 Villers-Bocage, France; * corresponding author)*

Milk yield, composition and lipolysis were studied in 4 non-pregnant multiparous Holstein cows (6–7 months in lactation) which received 1 intramuscular injection of estradiol benzoate (EB, 40 mg). Sampling of evening milk and measurements were performed 7, 5 and 3 d before and 2, 4, 7, 9, 11, 15, 17 and 22 d after EB injection. The free fatty-acid (FFA) content of milk fat was determined by the BDI method, on freshly secreted milk (initial FFA) and on milk that was stored at 4°C for 22 h after the milking (FFA-22).

Milk yield was not affected (6.9 and 6.4 kg/evening milking at d 3 and 22, respectively). A transient decrease (–25%) was however observed at d 7. Fat and lactose contents were not affected. Milk protein content increased in all cows with a maximum (9.4 g/kg above the mean preinjection value, 31.6 g/kg) at 4–7 d after EB injection. Only 6% of this increase was explained by immunoglobulin G and serumalbumin. Initial FFA mean value was 0.20 mEq/100 g fat before EB injection and increased slowly in all cows to 0.53 mEq/ 100 g fat at d 4 after EB injection. FFA-22 content was 0.45 mEq/100 g fat before EB injection, increased sharply in all cows to 6.76 mEq/100 g fat at d 2, to 9.65 mEq/100 g fat at d 4, and returned to 1.03 mEq/100 g fat at d 11.

Milk from 2 cows was sampled 7 d after EB injection to study lipase activity. Lipase activity against tributyrin or Intralipid (Kabivitrum) was activated by deoxycholate (10–20 or 50–100 mM for these 2 substrates respectively), although purified lipoprotein lipase and milk lipase from control cows were strongly (80–100%) inhibited.

These results show that the injection of 40 mg EB induced the secretion of a bile salt-stimulated lipase activity, increased the secretion of milk proteins and increased sharply lipolysis during the cold storage of milk. This effect began rapidly after injection and lasted about 1 week. It could explain partly observations on the effects of oestrus or pregnancy stage on milk lipolysis and lipase activity.