Adaptive changes in the appetite, growth and feeding behaviour of pony mares offered ad libitum access to a complete diet in either a pelleted or chaff-based form

Seven, 3-year-old pony mares (similar to 230 kg) were used in a cross-over study to compare the appetite, energy and nutrient digestibilities, growth rate and feeding behaviour, when a complete diet was offered ad libitum in either the original loose-chaff mix (C), or as a more convenient, milled and pelleted preparation (P). Ad libitum access to the study diet (gross energy 17.2 MJ/kg dry matter (DM)) was attained over 2 weeks. In the following 4 weeks, groups 1 (no. = 3) and 2 (no. 4) received pelleted and chaff-based diets respectively. Dietary forms were exchanged during week 5 and ad libitum provision continued for a further 4 weeks. Behaviour and apparent nutrient digestibilities were assessed in weeks 3 and 4 of each period. Pelleted food had a lower proportion of water (P, 0.12; C, 0.22), but relative proportions of oil (0.04), crude protein (0.08), crude fibre (0.29), neutral-detergent fibre (NDF, 0.53) and gross energy (GE) were neither altered by food processing nor time. Apparent digestibilities (DM, 0.49; GE, 0.50; NDF, 0.40 in period 1) of the pelleted and chaff- based diets were similar within periods but decreased (P <0.01) to a similar extent for both diet types (proportional changes: DM, -0.14; GE, -0.16; NDF, -0.28) in period 2. Overall, mean intakes of digestible energy (DE) for chaff-fed animals during period 1 were 0.73 (P <0.001) cl pellet DE intake (DEI). Mean DEI of pellets increased (P <0.001) during period 1 to attain 1.76 (s.e. 0.25) MJ/kg M-0.75 on day 25. Following transfer from pellets to chaff, DEI decreased (P <0.001) to 0.68 (s.e. 0.07) MJ/kg M-0.75 by the end of period 2. In contrast, DEI of animals which progressed from chaff to pellets remained relatively constant between periods. Oestrous behaviour caused no detectable change in the appetite of individual mares. Irrespective of differences in DEI, average daily gain (ADG) in body weight and condition score (CS) did not differ between groups. Overall, mean ADG decreased (P <0.01) from 1.54 (s.e. 0.17) kg/day in period 1 to 0.26 (s.e. 0.08) kg/day in period 2. Changes in body weight were associated with CS (R-2 = 0.72). Each CS point represented a 53.4 (s.e. 4.8) kg gain in body weight. Chaff meals were longer (30.6 (s.e. 1.6) min, P <0.001), less frequent (23.8 (s.e. 1.4) per day, P <0.001) and associated with a lower bite rate (3.8 (s.e. 0.2) per min, P <0.001) and increased chewing requirement (23 (s.e. 1.2) per bite, P <0.001), which decreased the rate of DM intake (17.0 (s.e. 0.9) g/min, P <0.001). Overall, chaff-fed animals spent more time feeding (0.50 (s.e. 0.1) of the time, P <0.001), primarily at the expense of non-feeding activity and rest. The ad libitum feeding regime enabled stabled ponies to re-establish natural feeding patterns and offers a viable alternative to meal and forage feeding. The more slowly ingested chaff form maximized time spent feeding and limited changes in DEI during the introductory period. Although CS and ADG increased over the first 4 weeks, growth and appetite returned to near maintenance values within 9 weeks in association with a decrease in dietary energy intake and nutrient digestibility.