

REDUCING MAINTENANCE ENERGY REQUIREMENTS OF STEERS USING TRENBOLONE ACETATE

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There is evidence that the mode of action of trenbolone acetate in animals gaining weight is to reduce both the rates of protein synthesis and protein degradation with the greater effect being on degradation (Vernon and Buttery 1976). Since the energy cost of protein turnover is a substantial component of maintenance energy requirements, some estimates being as high as 50 per cent (Webster et al. 1980), a reduction in protein turnover should be associated with a decrease in energy requirements for maintenance. If so, trenbolone and other compounds which act similarly may be useful for reducing the rate of liveweight loss in cattle grazing poor quality pasture.

In the first experiment 12 Bos indicus x Bos taurus steers, initially 400 kg live weight, were fed low-quality, long-chopped pasture hay (4.3 g N/kg dry matter (DM)) ad libitum for 8 weeks. Six steers were implanted in the ear with 300 mg trenbolone and 6 left as controls. At the end of the 8 weeks steers were fasted for 72 h and metabolic rate measured in closed circuit respiration chambers. The mean (\pm SEM) rate of liveweight loss for control and implanted steers was 0.57 ± 0.095 and 0.59 ± 0.070 kg/d respectively. Voluntary feed intake was significantly ($P < 0.05$) higher in control steers (12.8 ± 0.43 v 10.9 ± 0.45 g DM/kg live weight (LW)). Control steers had a significantly ($P < 0.01$) higher fasting metabolic rate (83.3 ± 1.37 v 74.5 ± 2.34 KJ/kg/d). The significant difference in metabolic rate between groups remained after covariance adjustment for the amount of feed eaten daily.

At the end of the first experiment implants were surgically removed and all steers treated similarly for 4 months. The same 6 steers were then reimplanted with 300 mg trenbolone acetate and the other 6 again left as controls. All steers (mean initial weight 410 kg) were fed ad libitum another long-chopped, low-quality pasture hay (3.9 g N/kg DM) diet supplemented with 100 g urea and 4.6 g S as dilute H_2SO_4 . A solution of urea and S was mixed with the feed. The steers were fed the diet for 6 weeks and then fasting metabolic rate measured. Control and implanted steers gained weight at 0.23 ± 0.06 and 0.34 ± 0.08 kg/d respectively the difference being non significant. Intake was similar in both treatment groups (control, 19.4 ± 0.51 ; implanted 19.7 ± 0.36 g DM/kg LW). Fasting metabolism was again significantly ($P < 0.05$) higher in control steers (76.9 ± 1.70 v 70.7 ± 1.51 KJ/kg/d).

These data demonstrate that in two separate experiments trenbolone acetate was effective in decreasing metabolic rate by approximately 10 per cent in adult steers during a period of rapid liveweight loss and a period of liveweight gain. The magnitude of the difference in liveweight change between experiments was unexpected. A component of the gain in the second experiment may have been rumen load as there was a steady increase in weekly intake by both groups in this experiment, but not in the first. Factors such as differences in pre-experimental history, diet and rate of liveweight change probably accounted for the differences in metabolic rate of control steers between experiments. It is suggested that the depression in feed intake in implanted steers fed a diet, deficient in rumen soluble N, was consistent with there being less N recycled to the rumen through the protein sparing action of trenbolone (Donaldson and Heitzman 1982).

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