A COMPARISON OF TWO METHODS OF MEASURING FOOD CONVERSION EFFICIENCY

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Researchers world-wide have studied feed conversion efficiency (FCE) in a range of species. The pig and poultry industry, partly through selection for FCE, have improved their competitive position against the red meat industries who have placed little direct selection pressure on their species for FCE. In pigs, selecting for increased FCE based on an ad lib. feeding system (AFCE) improves FCE, but can result in some unacceptably fat animals (Luxford, pers. comm.). Selecting for increased FCE using diets comprising only 85% of required daily intake, a scale feeding system (SFCE), produced pigs with faster genetic gain, improved FCE and leaner carcasses, compared with an AFCE feeding system (McPhee et al. 1988). Our experiment was conducted to compare the two systems as a test for FCE in cattle.

Twenty-eight Hereford Angus cross steers, liveweight 349 ± 16 kg, P8 fat 4.5 ± 1.2 mm (mean ± s.d.) were randomly allocated to two treatments: ad lib. feeding (AFCE), or scale feeding (SFCE). The diet comprised a pelleted lucerne and grain based ration (15% CP, 10.7 MJ ME/kg) with 0.5 kg of straw fed daily. Each group of steers was fed one of these diets for 50 days, weighed after a 12 hour fast, then fed the other diet for 50 days. This process was repeated, so that each steer was fed each ration twice, for a total of 100 days on each treatment. This cross over design was partly to negate the effect of body composition change on FCE. The SFCE ration was calculated on 1.75% of the starting liveweight for each animal at each feeding period.

The mean gross FCE of the steers was 10.1 and 11.2 kg DM/kg liveweight gain for the AFCE and SFCE diets respectively (l.s.d. 0.91kg). The P8 fat gain, measured ultrasonically, was 3.0 mm and 0.4 mm on the AFCE and the SFCE diets respectively (l.s.d. 0.8mm). Total feed intake (s.d. 60.3 kg DM) and total weight gain (s.d. 8.1kg DM) for a 50 day AFCE feeding period showed considerable variation with a significant positive correlation between these traits \( r = 0.7 \). With SCFE the variation in intake is restricted (s.d. 23.8), but the variation in liveweight gain was still quite large (s.d. 6.2 kg) and the correlation with intake was non significant \( r = 0.1 \) (Figure 1.)

Figure 1. Liveweight gain and feed eaten for AFCE (□ --- - - - -) and SFCE (△ 

A comparison between AFCE and SFCE indicated no correlation \( r = -0.18 \), suggesting that measuring FCE using scale feeding should be a better indicator of feed efficiency for lean growth, given most cattle spend a large proportion of time at less than maximum nutrition levels. Scale feeding is also a simple method of measuring feed efficiency and overcomes many of the problems due to variation in appetite. More work needs to be done to determine the most appropriate feeding system for measuring FCE and incorporating it in profitable selection indexes.

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