

## Improving Beef Meat Quality: Feedlot or Grain Supplementation?

A. Simeone<sup>A</sup>, V. Beretta<sup>A</sup>, J. Franco<sup>A</sup>, D. Chalkling<sup>B</sup>, G. Brito<sup>B</sup>, E. Beriau<sup>A</sup>, J.M Iriarte<sup>A</sup> and D. Tucci<sup>A</sup>

<sup>A</sup> Universidad de la República, Paysandú, Uruguay. CP 60 000.

<sup>B</sup> Instituto Nacional de Investigación Agropecuaria. Uruguay.

Beef cattle grazing systems from temperate areas in Uruguay commonly include grain supplementation to finish steers grazing high quality pastures during the winter prior to slaughter to improve liveweight gains and reach slaughter weight specifications. Under these conditions cattle experience around 1.3 kg/day average daily gain (Simeone et al 2002, 2003). Recently, the industry started paying a differential price to producers for cattle finished in feedlot, looking for a differentiated product that meets market demands. A 120-day feedlot period is recommended. However, feeding costs are increasing. The question that arises is whether a 120-day feedlot period is necessary to create differences in meat quality relative to cattle finished on pastures or if the feedlot period could be reduced. The aim of this study was to examine the effect of days in feedlot relative to days on pasture plus supplementation on growth response and carcass traits of Hereford steers.

Sixty steers of 20-24 months of age and weighing 354 kg (s.d. 20.2 kg) were stratified by liveweight (LW) and randomly allocated to one of the following pre-slaughter feeding treatments: 1) 120 days in feedlot (FL), 2) 40 days on pasture plus grain supplementation (PS) followed by 80 days FL, 3) 80 days PS followed by 40 days FL, or 4) 120 days PS. Cattle grazed an oat/ rye grass pasture (pre-grazing dry matter (DM) biomass 2531± 961 kg/ha; CP: 13%, ADF: 35.4%) with a forage DM allowance of 5% of LW and was supplemented with ground sorghum grain (1% of LW). The feedlot diet was formulated to provide 1.3 kg/day LW gain, based on maize/ sorghum silage (40%) and a concentrate (60%) containing ground sorghum grain, sunflower meal and a mineral-vitamin premix. LW was recorded every 20 days prior to feeding. DM intake was estimated daily during a 7-day period every 2 weeks as the difference between DM on offer and DM residue. *Longissimus dorsi* area and subcutaneous fat thickness were measured (ribs 12-13) by ultrasound on day 120. Cattle were slaughtered at a commercial abattoir. Marbling score (1: devoid to 5: moderate at ribs 10-11), pH at 24 hours post-mortem and instrumental beef colour measurements were determined. Meat tenderness was measured using the Warner-Bratzler shear force technique on *L. dorsi* samples after 7-days ageing at 1-4°C. Results are summarized in Table 1.

**Table 1. Cattle performance and carcass traits as affected by finishing feeding system**

Days in feedlot: days on pasture	120:0	80:40	40:80	0:120	SE
Average daily liveweight gain (kg)	1.51 <sup>a</sup>	1.54 <sup>a</sup>	1.36 <sup>b</sup>	1.26 <sup>b</sup>	0.061
Final liveweight on day 120 (kg)	509.8 <sup>a</sup>	503.0 <sup>a</sup>	487.4 <sup>b</sup>	483.9 <sup>b</sup>	6.6
Dry matter intake (kg/ 100 kg liveweight)	3.20 <sup>a</sup>	3.21 <sup>a</sup>	3.21 <sup>a</sup>	3.34 <sup>a</sup>	0.11
Longissimus dorsi area on day 120 (cm <sup>2</sup> )	65.2 <sup>a</sup>	63.8 <sup>a</sup>	62.8 <sup>a</sup>	63.6 <sup>a</sup>	1.92
12 <sup>th</sup> rib fat thickness on day 120 (mm)	10.2 <sup>a</sup>	9.8 <sup>a</sup>	9.6 <sup>a</sup>	9.3 <sup>a</sup>	0.79
Marbling score (1-5)	3.6 <sup>a</sup>	3.4 <sup>a</sup>	3.2 <sup>a</sup>	3.3 <sup>a</sup>	0.24
pH, 24 hours post-mortem	5.4 <sup>a</sup>	5.4 <sup>a</sup>	5.5 <sup>a</sup>	5.6 <sup>a</sup>	0.13
Tenderness (Warner-Bratzler shear force, kg)	3.0 <sup>a</sup>	2.7 <sup>a</sup>	2.8 <sup>a</sup>	2.8 <sup>a</sup>	0.20

Values with the same superscript are not significantly different at  $P=0.05$

Days in feedlot increased LW gain and slaughter weight ( $P<0.01$ ), provided a minimum period of 80 days in the feedlot was imposed. No differences were observed for most carcass and meat traits ( $P>0.05$ ), only fat colour was affected by treatment. Fat from steers finished on pastures had less luminosity ( $L^*$ ) than fat from steers in the feedlot for at least for 40 days ( $L^*$ : 63.2 vs. 71.5, respectively;  $P=0.0485$ ) and was more yellow ( $b^*$ ) than fat from steers in the feedlot for 120 days ( $b^*$ : 18.8 vs. 14.3, respectively;  $P<0.0001$ ). LW gains were considered high for all treatments and it is interesting that given this result, meat quality characteristics from cattle finished on pastures and supplemented with grain did not differ from that of steers from the feedlot. However, if a differentiated product based on slaughter weight and/or fat colour is sought, a minimum of 80 days in the feedlot is necessary.

Simeone, A., Beretta, V., Rowe, J., Nolan, J. and Elizalde, J.C. (2002). *Anim. Prod. Aust.* **24**: 213.

Simeone, A., Beretta, V., Rowe, J., Nolan, J. and Elizalde, J.C. (2003). *Rec. Adv. Anim. Nutr. Aust.* **12**: 15A.

Email: [asimeone@adinet.com.uy](mailto:asimeone@adinet.com.uy)