

EFFECTS OF BRAHMAN CONTENT, ELECTRICAL STIMULATION, CHILLING RATE AND AGEING ON MEAT TENDERNESS

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Bos indicus cross cattle offer substantial increases in profit for producers and processors when cattle are grown in tropical environments. However, many people involved in the meat industry believe that these cattle have poor meat quality and exclude them from the more lucrative markets. These cattle are usually grown and often finished in harsh environments where management factors themselves often contribute significantly to poor meat quality. Processing procedures such as electrical stimulation (ES) and ageing of product can enhance meat quality. This paper examines the effects of these techniques on tenderness of striploins from 28-month-old steer carcasses with a full range of *Bos indicus* content.

The 48 carcasses studied were part of a three-year breeding program based at Grafton including Angus, Brahman (B) and Piedmontese sires, and B, BxHereford (BxH) or Hereford (H) dams, giving progeny with B contents of 0, 25, 50, 75, and 100%. Sire breed differences in growth, carcass and meat quality were reported for these and sibling cattle (Hearnshaw *et al.* 1997, 1998). Half the carcasses from each level of %B were ES with low voltage, with one side chilled slowly (LS) and one rapidly (LF); remaining carcasses were chilled rapidly, one side being ES with high voltage (HF), whilst the second side was not stimulated (CF), giving four processing treatments. Loins were subdivided, aged for one, 14 or 28 days (d) and shear force (PF) measured. Greater PF values indicate less tender meat. Since variances for PF (tenderness) were heterogeneous, values were log transformed before analysis using models which tested %B, treatment, ageing and interactions.

Processing, ageing and percent B affected tenderness, the latter accounting for only 4% of total variation compared with 35% for ES and ageing. HF was most effective for producing tender loins, and CF least effective (3.8 vs 5.0 kg PF). Loin aged 28 days was more tender than that aged for 14 or one day (3.8, 4.1, 5.1 kg PF respectively). Over all post-slaughter treatments, loins from 0 and 25%B carcasses ranked most tender (4.0 kg PF) compared to 100%B (4.7 kg PF), while 50 and 75%B were intermediate (4.3 and 4.4 kg PF). These results are similar to others from the USA (eg Cundiff *et al.* 1990).

From a practical perspective it is important to consider the variation in loin tenderness of carcasses with varying percent B, when different stimulation and ageing treatments (n=6) were superimposed *within* an animal. Using data from the worst and best treatments *within the same animal* (CF and HF, each with 1, 14 or 28d ageing), only 13% of loin samples from CF-1d would have been considered 'tender' (PF < 4 kg), compared with 25, 48, 54, 75 and 91% for CF-14d, CF-28d, HF-1d, HF-14d and HF-28d respectively. Genotype differences indicated by differing superscripts were significant ($P < 0.05$) for loin samples which received the least effective processing treatment (CF-1d) : 6.3^{ab}, 5.2^a, 6.1^{ab}, 6.6^{ab}, and 7.8^b kg PF for 0 to 100%B respectively, compared to the non-significant differences (mean = 3.4 kg PF) for the best processing treatment.

This shows the powerful effect that processing can have on meat tenderness. When one side of a carcass was not ES, and the loin was not aged, only 13% of loins were 'tender', with PF being inferior for 100%B. When HF and 28 days ageing were used on the second side of the same carcass, 91% of loin samples were classed 'tender' with mean PF values being similar for carcasses irrespective of percent B.

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