

## Relationship between animal age and meat tenderness using survival analysis

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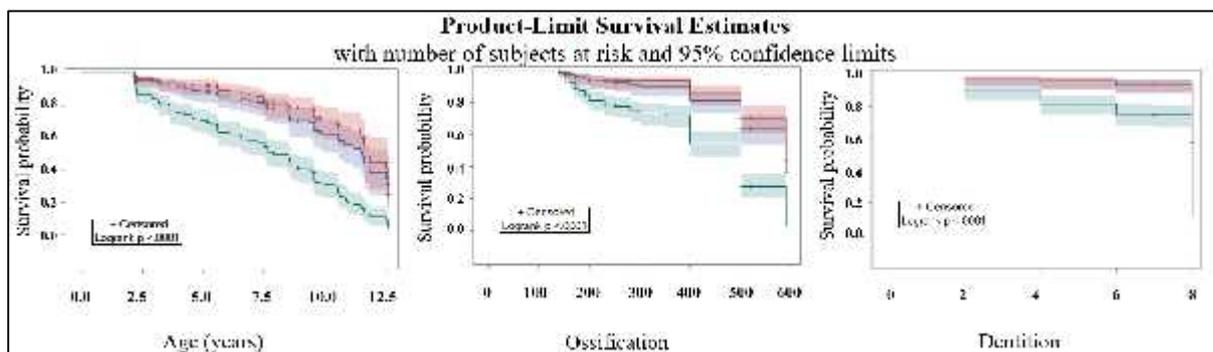
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Cull cows represent over a quarter of Australian's beef carcass production with the majority sold for production of low value manufacturing beef. The aim of this study was to quantify the potential of cull cows up to 13 years of age to produce meat of sufficient tenderness to be sold as higher value cuts which in principle could potentially increase returns through the supply chain.

One hundred and seventy-three well-recorded Angus cattle with known date of birth were slaughtered across an age range of 26 months to 12.6 years at commercial abattoirs. The *longissimus lumborum* muscle was collected at 1 day post mortem (pm) in the abattoir, vacuum packed and transported to a meat science laboratory in portable thermal boxes with ice. At 2 days pm, the striploin was sub-sampled into 3 portions in a chiller at 4 °C. The portions were randomly allocated to three ageing periods (2, 14 and 28 days pm). Shear force analysis were performed using a Lloyd Instruments. Survival analysis of time (i.e., years, ossification, and dentition) in proportion to samples from cull cows with shear force values < 42.9 N (i.e., tender meat) and > 42.9 N (i.e., intermediate or tough meat) (Destefanis et al., 2008) was conducted using Kaplan-Meier method (PROC LIFETEST of SAS).



**Figure 1.** Survival analysis curves for tender striploin at 2 (—), 14 (—) and 28 (—) days postmortem of cattle from 26 months up to 12.6 years old.

The mean ( $\pm$  s.d.) age at which approximately 50% of the meat was likely to be classified as non-tender (intermediate or tough) at the ageing times of 2, 14 and 28 days pm was  $7.6 \pm 0.29$ ,  $10.1 \pm 0.23$  and  $10.6 \pm 0.29$  years respectively, indicating the benefit of ageing beef and the potential to obtain acceptable meat from older cattle. Further, the shadowed area indicates the 95% confidence interval for the survival curve, and this shows that chronological age provides a better resolution in terms of differences between meat aged for the different periods. A significant proportion of tender meat can be produced by cattle until 10 years old if aged for at least 14 days. This study shows that there is a valuable opportunity to grade and sell a substantial proportion of meat from cull cows at a higher price if tenderness can be assessed by meat processors.

### Reference

Destefanis G, Brugiapaglia A, Barge MT and Dal Molin E. (2008) *Relationship between beef consumer tenderness perception and Warner-Bratzler shear force. Meat Science.* **78**, 153–156.

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