A NOTE ON THE ASSESSMENT OF THE TENDERNESS OF LAMB MEAT

D.L. HOPKINS and J.E. MORGAN

NSW Agriculture, PO Box 129, Cowra, NSW 2794

There has been a growing awareness throughout the lamb industry of the need to improve the eating quality of lamb, as retail audits have indicated that tenderness levels vary considerably and up to 15% of lamb may be categorised as tough (Hopkins et al. 1995). This need has been intensified through the development of strategic marketing alliances between the production, processing, wholesaling and retailing sectors (Farrell and Tozer 1995) where eating quality is being assessed. Assessment within such alliances has invariably been dependent on subjective methods using sensory assessments by panels rather than objective methods.

Subjective assessment of tenderness has been found to relate well to objective methods but this is dependent on the preparation and testing of samples and range in tenderness of the samples (Jeremiah et al. 1971; Bouton et al. 1975). In the work of Bouton et al. (1975) it was found that orientation of the sample when bitten by panellists affected the correlation with Warner-Bratzler (WB) shear force values; there was a much stronger association between subjective scores of tenderness and WB values when samples were bitten across the fibres, then when bitten between the fibres. Thus the conduct of industry based panels will be critical for meaningful results.

This paper reports on a small experiment to examine the strength of the association that could be established between WB values and assessment of tenderness by panellists drawn from the meat industry.

Frozen samples of *M. longissimus thoracis et lumborum* (LL) from five, 8 month old ewe lambs were thawed for 24 hours at 5°C. The muscles had been aged for 4 days prior to freezing. The samples were cooked in plastic bags in a water bath for up to 90 minutes at 80°C to an internal temperature of 75°C. They were cooled under running water for 30 minutes, dried with paper towel and held at 5°C for 24 hours. Fourteen panellists representing wholesalers, food service operators and chefs were asked to rank 1cm cubes for tenderness on an 8 point scale (1 = extremely tough to 8 = extremely tender). Prior to testing the cubes were heated in a microwave for 20 seconds. Particular care was taken to ensure each panellist bit across the fibres. A portion of each cooked muscle was retained and sub-samples of 1cm² cross section cut parallel to the muscle fibres. Tenderness was measured on at least 3 sub-samples of each muscle using a WB shear blade fitted to an Instron Universal Testing Machine.

Selection of the muscle samples was based on WB results for the opposing loin, ensuring a spread of tenderness levels. The pH of the loins was measured using a Jenco 6009 meter with temperature compensation and ranged from 5.56 to 5.70. The mean (± s.d.) WB value was 4.2 ± 1.85 kg and panel score 5.1 ± 1.82. Linear regression of panellist score against WB values showed that 62% of the variation in panellist scores could be accounted for by WB values with no evidence of a curvilinear relationship. A score of 4 (slightly tough) equated to a WB value of 5.1kg. Such a threshold level is consistent with the report of Shorthose et al. (1986) who suggested muscles with WB values less than 5kg would be considered acceptably tender by consumers.

The high correlation between panel scores and WB values is a function in part of the spread in WB values, but it also demonstrates that relatively untrained individuals can discriminate between samples for tenderness. It is critical however that panellists are given exposure to tender and tough samples so that they can establish a relative in scoring. Thus the use of samples with known WB values as standards before a panel tests a product should help discrimination between samples and if these standards are used to link panels over time this will also aid interpretation of trends over time. Emphasis on how the sample is orientated for biting is also needed.

Panel testing for tenderness within the strategic alliances operating in the meat industry can play a part provided a systematic approach is taken. Without this approach however they are liable to provide misleading results.