THE pH OF FOUR LAMB HINDLEG MUSCLES

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Focus on the pH of meat cuts has increased in recent years with companies such as Qantas now specifying pH limits on the meat they purchase (R. Cox pers. comm.) in an attempt to obtain a more consistent product particularly in terms of tenderness. This is primarily because of the association which exists for some muscles between pH and tenderness (Bouton et al. 1971). Requirements such as this must account however, for the fact that pH values differ between muscles (Devine and Chrystall 1988). There appears to be little published data on the pH values of different muscles of the lamb and particularly those from the leg as usually the M. longissimus et thoracis lumborum (LD) is measured. Related to this, the meat quality characteristics of heavy, lean lamb carcases as required for the food service sector have not been extensively considered.

From a mob of 180 second cross (Poll Dorset x Border Leicester x Merino) short scrotum (testes retained under the skin and scrotum removed) lambs, 15 carcases were selected that complied to the Elite specifications of 22 kg or heavier and fat score 2 or 3. Hot carcase weight (with kidneys and kidney and channel fat retained) was obtained, as was the hot GR measurement where fat score 2 and 3 carcases have GR measurements ranging from 6-10 and 11-15 mm respectively and GR is defined as the tissue depth over the 12th rib 110 mm from the midline. The carcases were chilled at approximately 4°C for 20 hours. The right side was retained, cut into primal cuts and the legs were held frozen at -10°C until muscle dissection.

Prior to dissection the legs were thawed at ambient temperature and then the following muscles dissected from the legs; biceps femoris (BF), semimembranous (SM), semitendinosus (ST) and vastus lateralis (VL). The pH of each muscle was measured using a Jenco 6009 meter with automatic temperature compensation and an Ionode IJ20 spear electrode.

The mean (s.d.) hot carcase weight of the group was 25.5 (1.25) kg (range 23.6 - 27.6) with a mean (s.d.) GR measurement of 13.7 (1.22) mm (range 11 - 15). The mean (s.d.) pH values for the 4 muscles BF, SM, ST and VL were 5.51 (0.05), 5.48 (0.06), 5.56 (0.06) and 5.62 (0.08) respectively. Of these values, those for the SM and VL muscles were significantly (P < 0.001) correlated (r = 0.66). The ranking of the pH values for the BF, SM and ST muscles was the same as reported for 10 lambs by Devine and Chrystall (1988) although their mean values were higher overall, with much larger variation particularly for the ST. Comparing the mean pHs of the SM and BF with those of Apple et al. (1993) it appears that the BF generally has an ultimate pH 0.03 to 0.04 units higher than the SM.

The different pH values for muscles means that pH specifications for meat must account for this variation. Further, Devine and Chrystall (1988) suggested that measurement of the LD pH will underestimate the effect of stress on meat quality particularly when the forequarter muscles are considered. This implies that to set specifications for pH, a clear understanding of the ultimate pH of each cut (muscle) must be established otherwise inequity will result for suppliers of meat throughout the meat supply chain particularly when 2 muscles can make up a cut (eg. the silverside). The other important consideration is that the relationship between pH and tenderness varies for different muscles (Bouton et al. 1971) such that predicting tenderness levels from pH values requires a knowledge of the type of relationship between the 2 variables.


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