THE RELATIONSHIP BETWEEN CARCASE WEIGHT, AND SEMIMEMBRANOSUS WEIGHT AND CROSS-SECTIONAL AREA

D.L. HOPKINS and W.R. ATKINSON

NSW Agriculture, PO Box 242, Cowra, N.S.W. 2794

Australian consumers of lamb have shown that they are not content with all the traditional lamb cuts (Currie 1986; Hopkins et al. 1992) and this has led to the launch and promotion of Trim lamb by the Australian Meat and Livestock Corporation. The Trim lamb range of cuts are all boneless and heavily trimmed with little visible fat. With these new cuts has come an impetus to retail meal sized portions of approximately 200 g/serving. This development has required a knowledge of the critical carcase weight which must be achieved to provide adequate serve sizes. To provide preliminary data on this issue and to relate changes in carcase weight to the cross-sectional area of the muscle, carcase data obtained from 40 second cross (Poll Dorset x Border Leicester x Merino) short scrotum (testes retained under the skin and the scrotum removed) lambs was analysed. At slaughter the hot carcase weight and GR measurement were obtained, where GR is defined as the tissue depth over the 12th rib 110 mm from the midline. The carcases all complied to the Elite lamb specification of 22 kg or heavier and fatscore 2 or 3. Carcases were chilled at approximately 4°C for 20 hours and the right side legs frozen at -10°C until muscle dissection.

Prior to dissection the legs were thawed at ambient temperature and the semimembranosus muscle (SM) removed. This muscle is the major component of 1 of the most popular Trim lamb cuts, the topside, the remaining component being the adductor muscle. The SM was removed from the leg, trimmed of visible fat, weighed and the cross-sectional area at the deepest part of the muscle determined using the grid technique (1 cm² squares).

The mean (s.d.) hot carcase weight (HWT) of the group was 25.2 (1.16) kg (range 23.4 - 27.6) with a mean (s.d.) GR measurement of 13.4 (1.36) mm. The mean (s.d.) SM weight was 328 (31.1) g and the cross-sectional area 29.5 (5.04) cm². The weight of the SM was significantly (P < 0.001) correlated with HWT (r = 0.59) but the cross-sectional area was not as strongly associated with HWT (r = 0.34) although it was significant (P < 0.05). From a regression equation, the HWT was found to explain only 35% of the variation in SM weight. Since the adductor muscle has been subsequently found to weigh approximately 120 g in lambs of the weight used in this study (D.L. Hopkins unpublished data) this means based on the regression equation that a carcase must weigh approximately 22 kg to provide a topside that is suitable for 2 servings.

This finding demonstrates the need for large, lean carcases as the basic requirement if retailers are to successfully offer Trim lamb cuts. If carcases from ewe or wether lambs were used, which is more common in industry, then even heavier carcase weights would be required as at heavy carcase weights they are much fatter and as such the cuts weigh proportionally less (D.L. Hopkins unpublished data).

The much poorer relationship between carcase weight and cross-sectional area of the SM indicates that carcase weight will be a poor predictor of this characteristic. If such aesthetic considerations influence the decision making of customers, specifically where the topside is sold as steaks then this aspect of marketability will not be easily predicted from carcase weight. Documented evidence about the significance of this feature for the Trim lamb cuts is lacking, although it is known consumers do prefer the "eye muscle" and hence loin cuts to come from heavy carcases (Hopkins and Congram 1986) because this gives more lean tissue. Evidence that this feature is important to the marketability of these cuts would warrant further development of objective means of measuring muscularity (Purchas et al. 1991) a characteristic which should indicate cross-sectional area.