# PREDICTION OF BEEF CARCASS COMPOSITION USING COMMERCIAL RETAIL YIELD, DISSECTION OF MAJOR PRIMAL CUTS, CAT-SCAN AND PROXIMATE ANALYSES

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To study the influences of early-life nutrition and genotype on growth and body composition, an accurate assessment of the carcass composition from birth to market weight is required. To achieve this without the high cost of foregoing returns from sale of carcasses, and to avoid extremely high labour inputs required to prepare carcasses for measurement of proximate composition, we are investigating methods to accurately predict carcass lean, fat, bone and proximate composition using commercial boning and computerised axial tomography (CAT) scanning. Specifically we want to identify the primal cut(s) that best predict the composition of the carcass. This paper presents preliminary data for the dissection of primal cuts and commercial retail yield.

Cattle were slaughtered at ~8 months of age, ranging from 160 to 306 kg liveweight, 71 to 160 kg carcass weight with 1-11 mm P8 fat. They comprised 13 steers and 11 heifers, from Hereford or Hereford-cross dams, and sired by Piedmontese (P), Angus (A) or Wagyu (W) sires (n = 8/sire breed). Carcasses were assessed by MSA, and one side boned-out commercially to give weight of saleable meat (sale meat), bone and fat waste. Tails were frozen and will be analysed for bone density using Dual X-Ray Absorptometry (DEXA). The other chilled half-carcasses were cut into forequarter and hindquarter, from which five bone-in primal cuts (butt plus rump, short loin, rib set, rump, butt minus rump) were prepared and CAT-scanned. Cuts were then dissected into soft tissue and bone, and prepared (ground) for proximate analyses. These analyses will enable relationships to be determined between lean, bone and fat in individual primal cuts or in combination, and whole side proximate composition (dry matter, nitrogen or protein, fat and ash).

P-sired carcasses tended to have less subcutaneous fat depth (1.6 *vs* 1.9, 5.9 mm at P8), lower USDA marble score (148 *vs* 172, 176), but greater eye muscle area (55 *vs* 46, 45 $cm^2$) than W- or A-sired carcasses respectively. Body composition estimates (%) for meat yield from commercial boning, and bone and soft tissue from dissections of five primals and the entire side, are summarised in Table 1.

**Table 1. Summary of estimates of body composition (%) from commercial boning or dissection of five primal cuts from one side of 24 weaner carcasses sired by Angus, Piedmontese or Wagyu sires.**

| | | Commer. | | Dissection of primal cut | | | | | Carcass |
|---|---|---|---|---|---|---|---|---|---|
| Sire breed | | boning | | Butt+Rump | Short loin | Rib set | Rump | Butt-Rump | Side |
| Angus | Bone | 27.4 | Bone | 19.6 | 15.3 | 22.4 | 18.0 | 19.9 | 22.3 |
| | Sale meat | 67.1 | Soft tissue | 80.4 | 84.7 | 77.6 | 82.0 | 80.1 | 77.7 |
| | Fat waste | 5.2 | | | | | | | |
| Piedmontese | Bone | 25.1 | Bone | 18.0 | 14.4 | 20.4 | 16.8 | 18.3 | 21.0 |
| | Sale meat | 70.2 | Soft tissue | 82.0 | 85.4 | 79.6 | 83.2 | 81.7 | 79.0 |
| | Fat Waste | 3.9 | | | | | | | |
| Wagyu | Bone | 26.8 | Bone | 20.3 | 16.1 | 22.7 | 19.3 | 20.3 | 23.3 |
| | Sale meat | 68.3 | Soft tissue | 79.7 | 83.9 | 77.3 | 80.7 | 79.7 | 76.7 |
| | Fat waste | 4.3 | | | | | | | |

Body composition estimates from commercial boning, dissection and CAT-scans indicated that P-sired carcasses had less bone and fat, and more lean, soft tissue content or saleable meat yield than either A- or W-sired carcasses. Detailed comparisons of these results with the CAT-scans and proximate analyses will be used to determine the most effective primal(s) to accurately assess body composition of cattle with diverse muscle and fat characteristics.

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