Fat colour is commonly evaluated in lotfed and grainfed beef and dairy-beef cattle since it is a major criteria in export and domestic market specifications. The aim of this work was to determine the relationship of objective measurements to subjective AUS-MEAT assessment. Objective measurements of fat colour should enable more standard estimates of colour to be obtained while subjective measures depend on the assessors’ skills and physical environment.

In a lotfeeding trial supported by the Meat Research Corporation, carcasses from 126 Angus, Hereford and Limousin x Angus steers were assessed for fat colour using 2 methods. 1: β-carotene concentration determined from a) subcutaneous fat biopsied from a site near the tail, 24 hours pre-slaughter, b) subcutaneous fat taken from near the biopsy site of the hot carcass, c) intermuscular fat from the AUS-MEAT fat site at the 10th rib of the 24 hour chilled carcass, d) subcutaneous fat from the rib site of the hot carcass (n=60), e) plasma obtained 24 hours pre-slaughter f) plasma obtained at slaughter, and 2: Chromameter (Minolta CR-200) CIE- chroma c* measurements obtained from a) P8, rib, biopsy, forequarter and topside subcutaneous fat sites of the hot carcass b) the same sites on the 24 hour chilled carcass, c) the AUS-MEAT intermuscular fat site. These methods were compared to the Australian industry standard of AUS-MEAT subjective assessment (Anon. 1990).

Subjective AUS-MEAT assessment showed a correlation of $r = 0.69$ (P < 0.001) with chroma c* measurements for the mean of all cold subcutaneous sites, the highest individual site correlations being for the P8 and rib sites ($r = 0.64$ and 0.69 respectively; P < 0.001), while correlations were lower for intermuscular fat ($r = 0.52$; P <0.001), the site for AUS-MEAT assessment. There was a high correlation between chroma c* of the hot and chilled carcass at the P8 and rib sites ($r = 0.94$ and 0.90 respectively; P <0.001), however cold carcass measurements showed a greater fat colour range than hot carcass measurements. This is attributed to surface drying and solidification, resulting in a decrease in fat transparency and intensification of yellow colour during chilling although there is no gain in carotenoids (Morgan and Everitt 1969). The cold carcass measurements are closer to actual observed fat colour at the critical retail stage than hot carcass measurements.

Compared to chromameter measurements, β-carotene levels showed lower correlations with subjective AUS-MEAT scores for subcutaneous (lb) and intermuscular fat (lc) and plasma (le) ($r =0.43$, 0.47, 0.34 respectively; P < 0.001). This is partly due to carotenoids other than β-carotene contributing to fat colour (Forrest 1981). The chromameter measurements more accurately reflect visual appraisal of fat colour than β-carotene concentrations. In contrast subjective AUS-MEAT assessment of intermuscular fat (1d) revealed a higher correlation ($r = 0.76$; P <0.001) with β-carotene levels from the rib fat site (n = 60).

Fat colour assessed by β-carotene concentration in plasma and biopsied fat from the carcass and live cattle is variable, costly, time consuming and stress inducing. Objective chromameter fat colour measurements, preferably on the chilled carcass, may offer industry more accurate product description and a practical alternative to the subjective AUS-MEAT assessment. In particular, the rib or P8 sites are recommended as potential sites for objective chromameter measurement as the need for quartering the carcass would be eliminated and measurements could be taken in the chiller or if necessary, at the kill floor. These sites are also easily defined and accessible and are indicative of total carcass fat colour. The cuts of meat underlying these sites are premium cuts and therefore hold greater economic importance than other sites.

