

RELATIONSHIP BETWEEN MARBLING SCORE, LIPID CONTENT AND EATING QUALITY OF BEEF

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The relationship between diet and heart disease has become increasingly important to the Australian beef industry and to consumers, resulting in increased demand for lean beef. Research results are equivocal as to whether the palatability of beef is affected by the degree of marbling (Wood 1991) yet grading systems in Japan, USA and NSW, Australia reward carcasses with greater degree of marbling. Cattle fed to achieve a high degree of marbling require high nutritional inputs. The objective of this study was to investigate the relationship between intramuscular fat (marbling score and lipid content of the muscle portion of meat) and eating quality of sirloin steaks.

Sirloin steaks were from vealer, yearling and heavy export steer carcasses (market type) which were bred from Angus, Charolais and Hereford sires on Hereford and first-cross dams (Arthur *et al.* 1992). A standard questionnaire was given to customers who purchased these steaks through Woolworths stores in Sydney, Brisbane and Grafton. They tasted the steaks in their own home and evaluated them for tenderness, juiciness, taste and acceptability. The degree of marbling was scored (AUS-MEAT) on all steaks sold. As well, 1 striploin piece from every carcass was evaluated for marbling (visually by CSIRO Meat Research Laboratory) and for lipid (Sinclair and O'Dea 1987). Responses were received from 830 customers in the 3 cities and each palatability trait was regressed on both marbling scores and lipid content. Regression analyses were done within and across city. The data were also analysed using general linear models to examine coefficient of determination (R^2) values after fitting other effects such as city, sire and dam breeds, market type and degree of cooking.

Within each of the 3 cities there was little or no significant relationship between AUS-MEAT marbling score and the palatability traits; nor between the laboratory marbling score or lipid and the palatability traits. When other factors, such as city, sire breed, dam breed, market type and degree of cooking were included in the model (base model), significant relationships were obtained in some of the analyses. However marbling score or lipid improved the model by up to 1% only (Table 1), with greater degree of marbling being associated with better palatability. Regression analyses of tenderness or taste on marbling score, performed within market type, were significant only for heavy export steers ($R^2 = 3\%$) and yearling heifers ($R^2 = 4\%$) respectively. In conclusion, marbling score or lipid explained only a small percentage of the variation in eating quality of the beef steaks.

Table 1. Coefficient of determination (R^2) values (%) for palatability traits of beef steaks

Effects in model	Taste	Tenderness	Juiciness	Acceptability
Base model	8.6	13.3	6.5	8.4
Base model + AUS-MEAT marbling score	8.7	13.7*	6.7	8.8*
Base model + laboratory marbling score	9.6*	13.6	6.7	9.0*
Base model + lipid	8.8	13.7*	6.9	8.6

*Indicates that marbling score or lipid was significant ($P < 0.05$).

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