EFFECT OF FATTY ACID COMPOSITION ON THE FLAVOUR OF KOREAN AND AUSTRALIAN BEEF

Elke. M. Stephens
B. Ag. Sc (Hons)

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ABSTRACT

A preliminary trial to determine the effect of repeated freezing and thawing on beef striploins, showed that the effect of thawing on frozen non-aged beef significantly improved tenderness, flavour and acceptability, indicating that thawing had a similar effect to aging.

In the subsequent study, 207 beef striploins were collected from the Southern Crossbreeding Project (SXB: 70 heifers grainfed for 80 days, 70 steers grainfed for 180 days), Davies Gene Mapping Project (DGM: 30 steers grainfed for 180 days) and also 37 Hanwoo striploins imported into Australia from Korea. SXB animals consisted of Hereford cross calves sired by Belgian Blue, Limousin, South Devon, Hereford, Angus, Wagyu and Jersey bulls. DGM animals consisted of purebred Limousins and Jerseys and Limousin by Jersey crosses. Sensory analysis of beef striploins involved semi-trained taste panel assessments, using nine-point category scales for initial and sustained juiciness, beef flavour, beef fat flavour, oily flavour, buttery flavour, chicken-skin flavour, corn flavour, grassy flavour and overall acceptability.

Flavour acceptability was positively enhanced by increased levels of intramuscular fat (IMF%). Significant differences in breed were apparent for juiciness, beef flavour, buttery flavour and flavour acceptability, after adjusting data to a constant level of intramuscular fat, suggesting that some variation in flavour may be genetic. The Korean Hanwoo displayed a numerically higher intensity of chicken score and lower intensity of beef flavour.

Australian cattle breeds differed in fatty acid composition between each other and also to that of the Korean Hanwoo. The latter had 57% mono-unsaturated fatty acids, which was significantly higher (P<0.001) than the Australian breeds (47%). Since IMF% was confounded with breed, breed differences were not significant when adjusted for IMF%. Jersey animals most closely resembled the Hanwoo in fatty acid profile, whilst animals containing Limousin differed markedly from the Hanwoo.

A chemical sensor was able to establish significant differences between Korean Hanwoo and Australian animals and predominantly mirrored differences in fatty acid composition and to some extent flavour.

Development of prediction equations from individual fatty acids was disappointing (R^2< 15%). However, when fatty acid data, IMF% and chemical sensor data were combined to form prediction equations, moderate R^2 values were obtained of (24% to 43%).
DECLARATION

I declare that this work contains no material which has been accepted for the award of any other degree or diploma in any University or other tertiary institution, and that to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference has been made in the text.

I give consent to this copy of my thesis, when deposited in the University Library, being available for loan and photocopying.

Elke. M. Stephens
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