

## THE RELATIONSHIP BETWEEN SUBJECTIVE RANKING OF STEAKS IN A NATIONAL COMPETITION WITH OBJECTIVE QUALITY MEASUREMENTS

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### Introduction

It is recognised that consumer preferences ultimately determine the economic viability of the meat industry. The meat supply chain, however, consists of the consumer, retailer, processor and producer. All are linked and inter-dependent but research usually concentrates on one component of the supply chain. In this study we have utilised the logistics of collecting steaks to identify the best national eating quality steaks in four categories: Best of European; Best of British; Best of Crossbreeds and Best of Retail Branded. We have obtained additional information on the supply chain and analysed the steaks for specific quality attributes. Integration of this information will contribute to the discussion 'Can producers or retailers claim that their branded steaks match the required preferences of consumers'.

Lincoln University, in conjunction with a large supermarket chain, currently operate a supermarket guaranteed meat quality endorsement programme whereby the branded meat matches the consumer's expectations in regards to tenderness. This is based on our published research on the ability of consumers to differentiate meat with varying levels of tenderness (Bickerstaffe *et al.*, 2001).

The objectives of this research is to test the hypothesis 'Will specific breeds, processing plants, environment or management influence the final eating quality experience of steaks to enable an additional premium price to be claimed by the producer and/or retailer.'

### Materials and Methods

Striploins (*M. longissimus dorsi*) originating from a known breed and producer, were processed at a given date at a specific processing plant and subsequently forwarded to Lincoln University. All striploins were coded and aged under vacuum packed conditions at 3°C for 14-18 days. After ageing, four 2.5 cm thick steaks were removed from the centre of the striploin for analysis and eating quality evaluation.

One steak was analysed for its pH, colour characteristics, intramuscular fat content, tenderness and cooking loss characteristics using standard techniques within the laboratory. From this analysis, the top four steaks in each of the categories; Best of European, British, Crossbreed and Retail Brand were selected based on tenderness values and pH <5.8. Tenderness was determined on steaks from the middle of the striploins.

The sixteen steaks identified as finalists were vacuum packed and frozen prior to being subsequently evaluated by an expert panel of four judges consisting of two experienced chefs and two beef eating celebrities. Prior to judging the steaks were thawed at 4°C. A separate group of sixteen steaks were also evaluated, on an individual basis, by the general public.

### Results and Discussion

Results have been obtained from three national competitions in 2003, 2004 and 2005. The 2006 competition is currently in progress. A complete set of analytical and consumer results are not available for each year due to the variations in organisation of the competition and requirements varying slightly across the years. Data available across the years is breed, processor, ageing period, tenderness values, intramuscular fat content, cooking loss, objective ranking of steaks within a class judged by the panel of experts and overall winner.

In the 2004 and 2005 competitions there were a total of 102 and 195 competitors. In the Best of European there were 10 and 25 competitors, Best of British 42 and 105 competitors, Best of Crossbreed 21 and 20 competitors. In each year, the most competitive class with the largest number of entrants was the Best of British. Each year this class of animals produced the highest number of very tender steaks (<5.0 kg F) and the highest number of steaks which were light to moderate marbled (>39% intramuscular fat). Some steaks which did not reach the final for the 'Best of British' class would have reached the final of the other three classes if they had been judged in that class on tenderness.

In all the three years there was an agreement between the selection of the finalist within a class and the meat quality ranking based on tenderness. This reflects the ability of the judges to accurately assess tenderness. However, there was always a difference in ranking the second, third and fourth in each class between the 'judges and 'machine assessment'. This is probably due to the judges taking into account subtle differences in intramuscular fat, juiciness, taste and appearance of the steaks. Such factors have not been incorporated into the machine assessment' but a computer model programme, with additional data from the 2006 competition will be developed in 2006. In all the three years, the grand finalist was from the 'Best of British' class and, interesting, in all the years the steak was lightly marbled containing between 4-6% intra-muscular fat. Other research has also examined the consumer sensory acceptance of steaks (Sitz *et al.*, 2005).

The results show that all breeds can produce tender meat in New Zealand independently of the processor and environmental region, reflecting the high level of expertise within the domestic supply chains with the ability to produce high quality meat. British breeds, however, produced consistently a higher percentage of steaks perceived by judges to be high quality steaks. Such steaks were characterised by being very tender (<5.0 kg F) and light-moderately marbled (4-6% intra-muscular fat). It is evident that there is a wide variation in tenderness and marbling within any breed and that in the future the selection of steaks, based on eating quality characteristics, needs to take precedence over selecting on productive characteristics if the industry is to move to a supply chain which provides products matching consumer expectations.

#### Conclusion

The competition illustrates that the industry can supply high quality branded products (Nelson *et al.*, 2004) which should capture a premium price providing the supply chain is integrated from producer to retailer and the supply chain is based on specifications provided from research data as outlined.

#### References

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