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# Eating Quality and Sensory Acceptability of A New Lean Beef Product

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# INTRODUCTION

In 1995, an extra lean beef grade was introduced in New Zealand. If this beef has a low ultimate pH and is processed correctly, it is suitable a lean table meat. The project reported here tested the eating quality and acceptability of the new lean beef, as assessed by 15 chefs, who used the mean beef, as assessed by 15 chefs, who used the mean beef as a second by 15 chefs. to prepare meals from their own menus, and 96 consumers in Singapore. The trial product was produced to meet animal age, tenderness and providentians specifications.

All the attributes tested-tenderness, juiciness, texture, flavour and overall acceptability - were scored very favourably by the majority assessore

## **METHODS**

The animals selected for this trial were processed to ensure certain specifications were met, such as correct animal age range (no more that permanent incisors erupted), and the test product meeting a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging, the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging, the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging, the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging, the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging, the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging, the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging, the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging, the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging, the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging, the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging, the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging, the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging, the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging at the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging at the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging at the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging at the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging at the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging at the method is a standard of 95% of tenderness values being less than 8 kgF after 4 weeks aging at the method is a standard of 95% of tenderness values being less than mortem). Striploin and rump were used for the assessment. All product was vacuum packed and the chilled at below 0°C until sensory evaluation

All carcasses chosen for this trial were graded as having a fat cover of less than 3 mm and a carcass weight between 220 - 300 kg. Following a Hall carcasses were subjected to 55 seconds of his have been a start of the second slaughter, carcasses were subjected to 55 seconds of high voltage electrical stimulation approximately 10 minutes after slaughter, and were dress according to the meat plant's normal procedure. The carcasses were placed in a chiller at 10°C for 24 hours.

## pH and Meat Colour

Chiller assessment was carried out 24 hours post mortem, when ultimate pH and visual meat colour in the striploin were measured. The pH we measured in the microsoft of the physical action of the physical ac measured in the *m longissimum dorsi* muscle at the point of quartering of each carcass, using an Orion Ross spear electrode (81-63) attached of Orion SA 250 meter. Colour construction of the point of Orion SA 250 meter. Colour assessment was carried out using AUSMEAT colour standards.

# Tenderness

Samples were cooked in a 100°C water bath in weighted Tuflex bags (Trigon, Hamilton, New Zealand) to an internal temperature of 75 (Graafhuis et al. 1991). Samples were then pleased on invente the placed on internal temperature of 75 (Graafhuis et al., 1991). Samples were then placed on ice and once chilled, ten 10 mm x 10 mm square cross-section samples (long axis approximately 30 mm) were cut parallel to the muscle fibre. The shear force (kgF) was determined using a MIRINZ tenderometer (Frazerhurst MacFarlane, 1983). The tenderness of each striploin was calculated as the mean of the values obtained for each of the 10 bites.

Temperatures during carcass chilling and subsequent product chilled storage were monitored using MIRINZ/Delphi data loggers (Model and programmed to take a recording every 15 minutes. Logger probes were inserted in the carcass deep leg as soon as possible at chiller entry. Temperatures were monitored through boning and carton chilling, and subsequent cold storage, air-freight and storage in Singapore. temperatures were also monitored during the same period.

# Sensory Evaluation of the Trial Product in Singapore

On arrival in Singapore all the cartons were opened for inspection by health authorities at a chilled storage facility. The cartons were then delive to a hotel and kept in their chiller( $5 \pm 1^{\circ}$ C) until required for evaluations on a daily basis. Two equivalent beef striploins were purchased from local supermarket to provide a comparative method. local supermarket to provide a comparative product.

# Consumer evaluation

Recruitment of consumers The panel consisted of 96 consumers from a range of socioeconomic groupings, age and gender. Panellists were screen to ensure they were regular meat eaters in hotels or restaurants.

Sample preparation The striploins were prepared in a carvery style by the chefs at the hotel used. Each panellist was served two half meals, with trial product and the other with the locally purchased product. Each meal consisted of two slices of meat with pasta in a light sauce, vegetables. The sample order for the two beef servings was randomised between the six sessions used. Consumers assessed each product for the flavour, tenderness, juiciness and overall acceptability. Tasters were select to react the six sessions used. flavour, tenderness, juiciness and overall acceptability. Tasters were asked to score each attribute on a hedonic 9-point scale where 1 = dislike extremely and 9 = like extremely.

Chef evaluation Fifteen restaurants were visited. Eight were steak houses, of which two were also catering companies. The other seven restaurant and an and a seven restaurant and a se served cuisine from a wide range of cultures including Japanese, Italian, Brazilian, Muslem and Mexican. On arrival at the restaurant, the manufer and or chefs were presented with the three beef cuts and osked to present and the restaurant of the manufer of the second and/or chefs were presented with the three beef cuts and asked to prepare one, two or all of the cuts in a dish that they would typically serve in the restaurant. The meat was rated on a 9-point hedonic Scale as for the computer one in the cuts in a dish that they would typically serve in the cuts i restaurant. The meat was rated on a 9-point hedonic Scale, as for the consumer panel and also as to whether attributes were "just right" or too full or too little (e.g. flavour was just right, too weak or too strong). or too little (e.g. flavour was just right, too weak or too strong).

# RESULTS

### Tenderness and ultimate pH

The test beef product had a mean tenderness of  $6.1 \pm 1.2$  kgF. The tenderness results of the individual striploins were all within the requirements in 25% of shear force values were law than 21% by the product had a mean tenderness of  $6.1 \pm 1.2$  kgF. specifications, i.e., 95% of shear force values were less than 8 kgF. Ultimate pH values ranged from 5.34 to 5.65.

Both the test product and the locally purchased product had mean scores well above 4 for all attributes tested (Table 1) indicating that consult the attributes as being acceptable. (A score of 4 would be used to be used rated the attributes as being acceptable. (A score of 4 would be neutral - neither like nor dislike.) The acceptability of the test product was influenced by consumer age, ethnic group, gender, income or the taster's occupation. For all attributes tested, the test product and locally purchase product were significantly different.

Table 1.   Mean consumer acceptability scores. Attributes were scored on a 9-point hedonic scale where 1 = dislike extremely and 9 = like extremely.				
	MIRINZ test product		Comparative product	
Attribute	Mean	S.D.	Mean	S.D.
Flavour	6.26	1.35	6.45	1.58
Tenderness	5.80	1.62	6.61	1.52
Juiciness	5.88	1.46	6.62	1.55
Overall	6.09	1.59	6.69	1.50

# Chef evaluation

Chefs at all 15 restaurants prepared the striploin cut, and two of the chefs prepared more than one dish from this cut. Chefs at six of the restaurants also pre $a_{s_0}^{lso}$  are all 15 restaurants prepared the striploin cut, and two of the chers prepared more than one distribution this cut. Chers a curve of the striploin cut, and two of the chers prepared more than one distribution this cut. Chers a curve of the striploin cut, and two of the chers prepared more than one distribution the cut of the curve of the striploin cut, and two of the chers prepared more than one distribution the cut of the curve of the striploin cut, and two of the chers prepared more than one distribution the cut of the curve of the cut of the cu dishes.

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 $M_{Ost chefs}$  thought the aroma was very acceptable and hence many scored the aroma intensity as 'just right'; some other chefs thought the aroma  $W_{As a line}$ 

The flavour the product was considered most acceptable at steak houses. The flavour acceptability was spread over a range from 'neither like nor disjue', while 25% found it 'slightly  $\frac{d_{s}}{d_{s}}$  to 'like very much'. This was reflected in the fact that 46% of the chefs thought the flavour was 'just right', while 25% found it 'slightly  $1_{00}$  Weak' and the remaining 29% thought the flavour was too strong.

The steak houses all rated the juiciness as highly acceptable, whereas juiciness acceptability for other eating houses varied over a greater range. The range of Tange of tenderness scores almost covered the whole spectrum. This latter result illustrates the importance of knowing the customers and their requirements is a score almost covered the whole spectrum. The second tenderness scores almost covered the whole spectrum. This latter result inustrates the importance of knowing the quality restaurants. In general, steak houses found the meat tenderness of the trial product to be more acceptable than chefs in higher quality restaurants. Trespective of this, all chefs were in very close agreement about the level of product tenderness, with scores ranging from 'moderately tough' to

With the exception of one steak house and one restaurant chef, all restaurant assessors rate the overall acceptability of the trial as very acceptable. The survey results suggested that there is a "healthy" beef alternative market niche in Singapore, which may also exist in other Asian markets..

## DISCUSSION

Some chefs and restaurant managers down rated the tenderness of the trial product, although others found it to be "just right". Tenderness can be <sup>hpproved</sup> through changes to the chilling and aging regimes.

This project was aimed at improving the diversification of New Zealand beef by showing what can be done with "manufacturing meat" and well as by denote the diverse range of restaurants cannot be <sup>project</sup> was aimed at improving the diversification of New Zealand beef by showing what can be done with manufacturing the diverse state of the and users and what they perceive to be quality attributes of a product. <sup>v developing</sup> niche opportunities in Asia. The knowledge of product qualities gained from visiting the diverse range of resultance of a product. <sup>v developing</sup> niche opportunities in Asia. The knowledge of product qualities gained from visiting the diverse range of resultance of a product.

The trial results highlighted specific areas where product improvement was required to what extent.

The survey results suggested that there is a "healthy" beef alternative market niche in Singapore, which may also exist in other Asian markets. This study shows the survey results suggested that there is a "healthy" beef alternative market niche in Singapore, which may also exist in other Asian markets. This <sup>survey</sup> results suggested that there is a "healthy" beef alternative market niche in Singapore, which may also cats in our constraint of the start study should be a starting point for similar market surveys in other parts of South East Asia. The benefits to producers, processors and exporters would be <sup>1</sup> should be a starting point for similar market surveys in other parts of South East Asia. The benefits to produce of product will offer an ultra-lean liternation a true 'pasture to plate' assessment of a meat product relating to meat quality principles. The extra lean beef product will offer an ultra-lean alternative to venison.

# CONCLUSIONS

Changes in the New Zealand beef classification grading system have introduced an extra lean beef grade. This grade requires process specifications  $h_{ensure a}^{auges in the New Zealand beef classification grading system have interesting the system have inter$ 

here is a window of opportunity in the Asian cuisine scene that should be exploited. It is important that the initiative taken to date is continued with a feat with a follow-up by the meat industry. The results from the Singaporean consumer panel confirm that the trial lean beef product, which was produced to particular specifications, is of very acceptable eating quality

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