

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

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TABLE OF CONTENTS

ABSTRACT	i
DECLARATION	ii
ACKNOWLEDGEMENTS	iii
CHAPTER 1 - INTRODUCTION	1
1.1 INTRODUCTION	2
1.2 CONSUMER PERCEPTIONS OF AUSTRALIAN BEEF IN KOREA	3
1.3 HANWOO CHARACTERISTICS.....	5
1.4 TREATMENT OF AUSTRALIAN BEEF IN KOREA.....	8
1.5 PROJECT AIMS.....	8
1.5.1 <i>Specific Aims</i>	9
CHAPTER 2 - REVIEW OF LITERATURE	10
2.1 MEAT QUALITY	11
2.2 ODOUR & FLAVOUR PERCEPTION.....	12
2.2.1 <i>Physiology of Taste (Gustation)</i>	12
2.2.2 <i>Physiology of Olfaction</i>	14
2.2.3 <i>Sensory Physiology</i>	15
2.3 BEEF FLAVOUR.....	17
2.4 DESCRIPTION OF MEAT FLAVOUR	28
2.5 ROLE OF LIPIDS, FATS AND FATTY ACIDS - INFLUENCE ON PALATABILITY.....	31
2.5.1 <i>Genetic Differences in Flavour – Fatty Acid Composition</i>	36
2.5.2 <i>Nutrition Effects on Flavour – Fatty Acid Composition</i>	39
2.6 PROCESSING AND COOKING INFLUENCES ON FLAVOUR.....	42
2.6.1 <i>Effect of pH on Flavour</i>	42
2.6.2 <i>Effect of Freezing and Thawing on Flavour</i>	44
2.6.3 <i>Effect of Cooking on Flavour</i>	45
2.7 SUMMARY	47
CHAPTER 3 - MATERIALS AND METHODS	49
3.1 SUMMARY OF MATERIALS AND METHODS.....	50
3.2 EXPERIMENTAL ANIMALS.....	50
3.2.1 <i>Selection of Animals for Preliminary Trial</i>	50
3.2.2 <i>Selection of Animals for Main study</i>	52
3.2.3 <i>Selection of Animals for Odour Assessment using a Chemical Sensor</i>	56
3.3 LABORATORY MEASUREMENT OF FAT TRAITS	56
3.3.1 <i>Muscle Fat Content</i>	56
3.3.2 <i>Melting point of fat</i>	57
3.3.3 <i>Fatty acid composition</i>	57
3.4 CHEMICAL SENSOR ANALYSIS	58
3.5 OBJECTIVE MEASUREMENTS OF TENDERNESS.....	59
3.6 TASTE PANEL EVALUATION	60
3.6.1 <i>Preliminary Study</i>	62
3.6.2 <i>Main Study</i>	65
3.7 STATISTICAL ANALYSIS	67
CHAPTER 4 - EFFECT OF AGING AND REPEATED FREEZING AND THAWING ON THE EATING QUALITY OF BEEF STRIPLOINS	68
4.1 INTRODUCTION	69
4.2 MATERIALS AND METHODS.....	71

4.2.1	<i>Carcase characteristics</i>	71
4.2.2	<i>Treatment allocation</i>	71
4.2.3	<i>Other Measurements</i>	73
4.2.4	<i>Taste Panel Evaluation</i>	74
4.2.5	<i>Statistical Analysis</i>	74
4.3	RESULTS	76
4.4	DISCUSSION	82
4.5	CONCLUSIONS	87
CHAPTER 5 - CHARACTERISATION OF THE FLAVOUR OF BEEF FROM THE NATIVE KOREAN BREED, THE HANWOO, IN RELATION TO THE FLAVOUR OF BEEF FROM AUSTRALIAN BREEDS.....		88
5.1	INTRODUCTION	89
5.2	MATERIALS AND METHODS.....	90
5.2.1	<i>Selection of Animals for study</i>	90
5.2.2	<i>Other Measurements</i>	91
5.2.3	<i>Statistical Analysis</i>	91
5.3	RESULTS	93
5.4	DISCUSSION	110
5.5	CONCLUSIONS	115
CHAPTER 6 - RELATIONSHIP BETWEEN FLAVOUR AND FATTY ACID COMPOSITION		116
6.1	INTRODUCTION	117
6.2	MATERIALS AND METHODS.....	118
6.2.1	<i>Selection of Animals for study</i>	118
6.2.2	<i>Fat Measurements</i>	118
6.2.3	<i>Taste Panel Evaluation</i>	118
6.2.4	<i>Statistical Analysis</i>	119
6.3	RESULTS	119
6.4	DISCUSSION	131
6.5	CONCLUSIONS	137
CHAPTER 7 - CHARACTERISATION OF THE FLAVOUR OF KOREAN AND AUSTRALIAN BEEF USING A CHEMICAL SENSOR.....		138
7.1	INTRODUCTION	139
7.2	MATERIALS AND METHODS.....	139
7.2.1	<i>Selection of Animals for study</i>	139
7.2.2	<i>Fat Measurements</i>	140
7.2.3	<i>Taste Panel Evaluation</i>	140
7.2.4	<i>Chemical Sensor</i>	140
7.2.5	<i>Statistical Analysis</i>	141
7.3	RESULTS	141
7.4	DISCUSSION	153
7.5	CONCLUSIONS	154
CHAPTER 8 - DEVELOPMENT OF AN EQUATION TO PREDICT FLAVOUR.....		155
8.1	INTRODUCTION	156
8.2	MATERIALS AND METHODS.....	156
8.2.1	<i>Selection of Animals for study</i>	156
8.2.2	<i>Fat measurements</i>	156
8.2.3	<i>Taste Panel Evaluation</i>	157
8.2.4	<i>Chemical Sensor</i>	157
8.2.5	<i>Statistical Analysis</i>	157

8.3 RESULTS	159
8.4 DISCUSSION	172
8.5 CONCLUSIONS	174
CHAPTER 9 - GENERAL DISCUSSION AND CONCLUSIONS	175
APPENDICES.....	183
BIBLIOGRAPHY.....	195

TABLE OF FIGURES

<i>Figure 1.1 - Important Factors from Korean Organisations Perspective – For Customers (MRC Channel Research, CSIRO, 1995).....</i>	<i>4</i>
<i>Figure 1.2 - Korean Native Cattle (Hanwoo) in a Korean Feedlot.....</i>	<i>6</i>
<i>Figure 1.3 - Marbling Score.....</i>	<i>6</i>
<i>Figure 2.1 - Diagrammatic representation of a section through human nasal and buccal cavities.....</i>	<i>14</i>
<i>Figure 2.2 - Compounds Possessing meaty aromas (MacLeod, 1986).....</i>	<i>20</i>
<i>Figure 2.3 - Flavour Wheel (Kuentzel and Bahri, 1991).....</i>	<i>29</i>
<i>Figure 3.1 – Striploin treatment allocation for the main study</i>	<i>55</i>
<i>Figure 3.2 - Taste Panellist’s conducting tastings for the trial</i>	<i>63</i>
<i>Figure 3.3 - Taste Panellist rating samples.....</i>	<i>63</i>
<i>Figure 4.1 - Australian Quarter beef destined for the Korean Market.....</i>	<i>69</i>
<i>Figure 4.2 - Australian quarter beef being prepared for freezing.....</i>	<i>70</i>
<i>Figure 4.3 - Aging and Thawing treatments applied to striploins.....</i>	<i>73</i>
<i>Figure 4.4 - Striploin treatment allocation.....</i>	<i>74</i>
<i>Figure 4.5 - Correlation between sensory tenderness scores & objective Warner Bratzler shear values.....</i>	<i>78</i>
<i>Figure 5.1 - Breed LSMEANS for Initial Juiciness.....</i>	<i>96</i>
<i>Figure 5.2 - Breed LSMEANS for Sustained Juiciness.....</i>	<i>96</i>
<i>Figure 5.3 - Breed LSMEANS for Beef Flavour</i>	<i>97</i>
<i>Figure 5.4 - Breed LSMEANS for Corn Flavour.....</i>	<i>98</i>
<i>Figure 5.5 - Breed LSMEANS for Beef Fat Flavour, Oily Flavour and Buttery Flavour.....</i>	<i>99</i>
<i>Figure 5.6 - Breed least square means for Intra-muscular Fat percentage</i>	<i>102</i>
<i>Figure 5.7 - Breed LSMEANS for Flavour Acceptability</i>	<i>103</i>
<i>Figure 5.8 - Relationship between breed-sex class least square means for ^bIMF% and ^cFlavour Acceptability</i>	<i>104</i>
<i>Figure 5.9 - Breed LSMEANS for PRIN1 (Calculated using Model 1 and 2).....</i>	<i>107</i>
<i>Figure 5.10 - Breed LSMEANS for PRIN3 (Calculated using Model 1 and 2).....</i>	<i>108</i>
<i>Figure 6.1 - Breed Least squares means (%) for Stearic acid and Oleic acid.....</i>	<i>122</i>
<i>Figure 6.2 - Breed Least squares means (%) for Myristic acid and Myristoleic acid.....</i>	<i>123</i>
<i>Figure 6.3 - Breed Least squares means (%) for Palmitic and Palmitoleic acid</i>	<i>124</i>
<i>Figure 6.4 - Breed Least squares means for monounsaturated fatty acids (MUFA’s%) & Melting Point (°C)..</i>	<i>125</i>
<i>Figure 6.5 - Breed Least Squares means for trans-vaccenic and vaccenic acid.....</i>	<i>126</i>
<i>Figure 7.1 - Ionic abundances for Australian animals shown as a % of Hanwoo.....</i>	<i>145</i>
<i>Figure 7.2 - Breed Comparison of Ion abundances (I40* & I44*)</i>	<i>151</i>
<i>Figure 7.3 - Breed Comparison of Ion abundances (I41^{ns}, I42*, I43* & I45*).....</i>	<i>152</i>
<i>Figure 7.4 - Breed Comparison of Ion abundances (I47**, I48** & I60***).....</i>	<i>152</i>
<i>Figure 8.1 - Average Linkage Cluster Analysis for Breed – Fatty Acids.....</i>	<i>161</i>
<i>Figure 8.2 - Average Linkage Cluster Analysis for Breed – Flavour</i>	<i>162</i>
<i>Figure 8.3 - Average Linkage Cluster Analysis for Project by Country – Fatty Acids.....</i>	<i>163</i>
<i>Figure 8.4 - Average Linkage Cluster Analysis for Breed – Flavours.....</i>	<i>164</i>
<i>Figure 8.5 - Average Linkage Cluster Analysis for Breed – Principal Component 1-10</i>	<i>166</i>
<i>Figure 8.6 - Average Linkage Cluster Analysis for Project – Ions I35 to I180</i>	<i>167</i>

TABLE OF TABLES

Table 2.1 - Chemical Classes Reported in Cooked Beef (Mottram, 1991)	18
Table 2.2 - Some reactions generating the meaty aromas of Figure 2.2 (MacLeod, 1986).....	19
Table 2.3 - Compounds of Cooked Beef Aroma Possessing Relatively High Flavour Dilution Factors	27
Table 2.4 - Common descriptors of meat flavour characteristics.....	30
Table 2.5 - Names and Numeric Symbols of some common Fatty Acids in Bovine Adipose and Muscle Tissues ..33	
Table 2.6 - Correlations between long-chain fatty acids with sensory characteristics of <i>m. longissimus dorsi</i> (LD) of crossbred feedlot steers (Camfield et al., 1997).....	34
Table 2.7 - Correlations between fatty acids and flavours (Melton et al., 1982a)	34
Table 2.8 - Correlations between individual fatty acids and flavour score in neutral and polar lipid fractions (Melton et al., 1982b) and in SC & IM fat (LD) samples (Westerling & Hedrick, 1979).....	34
Table 2.9 - MUFA % differences between Japanese Wagyu (produced in Japan) and American Wagyu and Angus beef (fed for 524 days in America). Boylston et al. (1995).	38
Table 2.10 - Sensory attributes and pH of meat cooked at different pH values.....	43
Table 3.1 - Means, standard deviations and ranges (minimum and maximum) for carcass measurements for 10 Angus and Angus cross pasture fed steers	51
Table 3.2 - Carcass Characteristics of '96 drop SXB Heifers	54
Table 3.3 - Carcass Characteristics of '95 drop SXB Steers	55
Table 3.4 - Carcass Characteristics of '95 drop DGM Steers.....	55
Table 3.5 - Carcass Characteristics of '97 drop Hanwoo Steers	55
Table 3.6 - HP 4440 Chemical Sensor Headspace Autosampler Parameters	59
Table 3.7 - Meat Tasting Score Sheet for Preliminary Trial	64
Table 3.8 - Meat Tasting Score Sheet for Main Trial	66
Table 4.1 - Main effects and interactions tested in the initial model - GLM (SAS, 1996).	75
Table 4.2 - Tests of Significance for all attributes tested by the taste panel.	77
Table 4.3 - Least squares means and standard errors for each treatment as reported by taste panel ratings and tenderness objective measurement.....	78
Table 4.4 - General Linear Models Procedure – Residual Correlations between palatability attributes	79
Table 4.5 - Least squares means and standard errors for percentage moisture loss for each treatment	80
Table 4.6 - Tests of Significance for meat colour and pH attributes.	81
Table 4.7 - Least squares means and standard errors for Meat Colour (CIE L*, a*, b*), Fat Colour (CIE L*, a*, b*) and pH for each aging and thawing treatment.	81
Table 4.8 - Means and standard deviations for fatty acid composition for the two extreme treatments F1 (frozen, one thaw) and A3 (aged, 3 thaws).	82
Table 5.1 - Main effects and interactions tested in the basic model using the GLM procedure (SAS, 1996).	92
Table 5.2 - Analysis of Variance Table for the Basic Model ^a	93
Table 5.3 - Analysis of Variance for the different models (1-4) fitted to the flavours ^a	94
Table 5.4 - Least Square Means for IMF ^b , Tenderness ^c , pH ^c and individual Flavours ^c	100
Table 5.5 - Least Squares Means for Flavours which were significant for breed by sex class for Model 2 (IMF% fitted as covariate).	101
Table 5.6 - Estimate of the Slope for IMF%.....	102
Table 5.7 - Principal Component Eigenvectors and variation accounted for	106
Table 5.8 - Analysis of Variance Table for Breed Sex Class for Principal Components.....	106
Table 5.9 - Residual Correlations ^a between Flavours	109
Table 6.1 - Analysis of Variance Table - the effect of sex and breed on fatty acids.....	120
Table 6.2 - Least Squares Means for Breed Sex Class ^b	127
Table 6.3 - Correlations between fatty acids	128
Table 6.4 - Correlations between fatty acids and residual flavours	130

<i>Table 7.1 - Ions significant for country, project or breed</i>	142
<i>Table 7.2 - LSMEANS for Ions significant for country x project</i>	144
<i>Table 7.3 - LSMEANS for Ions significant for breed x country x project</i>	145
<i>Table 7.4 - Variation accounted for by each Principal Component</i>	148
<i>Table 7.5 - Principal Components which were significant for breed</i>	148
<i>Table 7.6 - Correlation between fatty acids and flavours with the Principal Components that were significant for breed</i>	150
<i>Table 8.1 - Prediction of flavours using fatty acids</i>	168
<i>Table 8.2 - Prediction of flavours using principal components from the chemical sensor data</i>	169
<i>Table 8.3 - Prediction of flavours using principal components in addition to fatty acid data</i>	171

TABLE OF APPENDICES

<i>APPENDIX 1 - Preliminary Trial</i>	184
<i>Figure 1 - Ambient chiller temperature and mean chilling rate of carcasses throughout 21 hour period</i>	184
<i>Figure 2 - Ambient chiller and freezer temperatures during initial freezing and aging of samples (4 days)</i>	184
<i>Table 1 – Treatment allocation for Preliminary Trial</i>	185
<i>APPENDIX 2 - LSMEANS for Ions significant for country</i>	186
<i>APPENDIX 3 - Correlations of Ions with fatty acids and flavours</i>	187
<i>APPENDIX 4 - Eigenvectors from the Principal Components Analysis showing the amount of variation explained by each ion making up Principal components 1 to 10</i>	192

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.

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Elke. M. Stephens

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