Update of Galloways Australia's Beef Research

Overview

For over 4 years, Galloways Australia has been researching the Eating Quality and Chemical Composition/Nutritional Quality of grass fed and finished Galloway beef. Complimentary research has also been undertaken by other Galloway breeds' associations.

The findings confirm the eating quality of Galloway beef is consistently superior to other breed beef and the chemical composition/nutritional quality of Galloway beef is different especially in fatty acids and minerals promoting health.

This report follows on from the Galloways Australia report presented to the 2014 German World Galloway Congress that included information in the BDG (German Galloway Association) booklet titled GALLOWAY – THE GENUINE ALTERNATIVE published in English, German and Russian The text of the booklet was a joint Georg Menke, BDG (German Galloway Association), Greg Stuart, Galloways Australia collaboration with the assistance of Derrick Webster, Galloways Australia.

Background

A 1994 Canadian Galloway Association study found Galloway and Belted Galloway beef to be low fat, low saturated fat and as healthy as Salmon but was limited because of a non-uniform methodology including feeding conditions. Details on the Canadian Galloway Association website.

A 1996 US Department of Agriculture study published in the Journal of Animal Science (74:1023-1035) confirms Galloway beef is the most flavoursome and second juiciest and tenderest of any breed in the US. A subsequent study undertaken at Texas A&M University for the US Beef Bureau confirms this result although in this study Galloway beef was also the juiciest.

A 2006 German University study published in the Journal of Animal Science (84:1067-1075) found Galloways marbled more than other tested breeds including German Angus. The Galloways were more feed efficient. Note: Marbling gives meat flavour and juiciness.

Galloway Australia's Methodology

Two methodologies are used, one for Eating Quality and one for Nutritional Quality.

Eating Quality Methodology

In Australia, a federal body, Meat Standards Australia (MSA), funded by meat producer's levies assesses, on request, the eating quality of beef. The MSA assessment methodology is based on 700,000 meat samples assessed by 100,000 consumers in order to rank factors determining eating quality. Major factors included mandated low stress cattle handling, pH,

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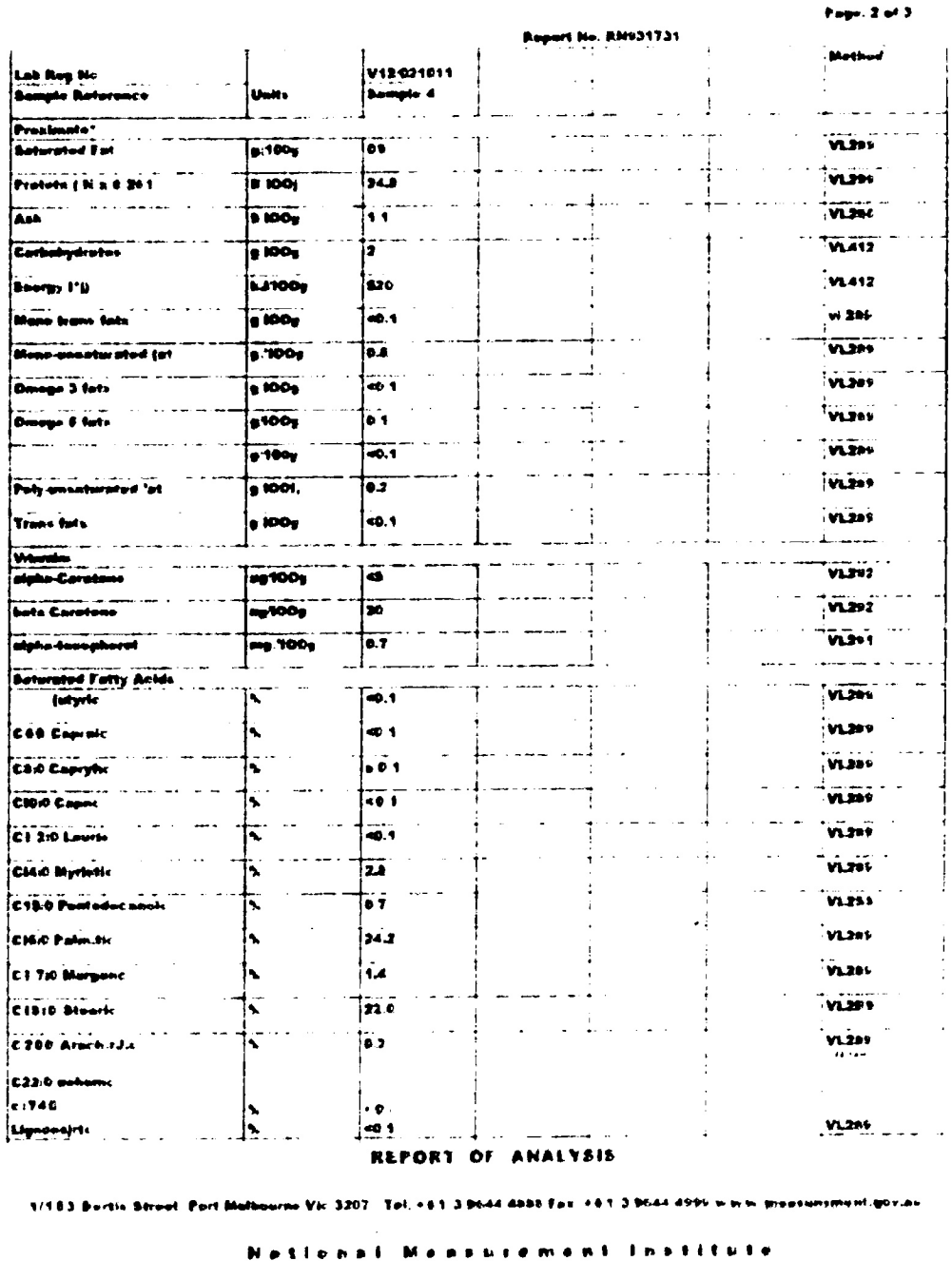
Government's National Measurement Institute. Of relevance to us, FSA tests individual cuts of meat.

Galloways Australia has been undertaking testing of various cuts of Galloway beef using the National Measurement Institute and Food Standards Australia's protocols in order to make direct comparisons of results

Today each tests costs around A$1,500.00 or 700 UK pounds. Each test looks at five sugars, 10 minerals, a number of vitamins, energy, carbohydrates, protein, 23 fatty acids and cholesterol. A part example of a test of Galloway rump steak (Pope's Eye steak in Scotland) is:



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Lab Reg No Sample Reference	Units	V12-021011 Sample 4	Method
Proximate			
Saturated Fat	g/100g	09	VL295
Protein (N x 6.25)	g/100g	24.8	VL296
Ash	g/100g	1.1	VL297
Carbohydrates	g/100g	2	VL412
Energy (kJ)	kJ/100g	620	VL412
Mono trans fats	g/100g	<0.1	VL295
Mono-unsaturated fat	g/100g	0.8	VL295
Omega 3 fats	g/100g	<0.1	VL295
Omega 6 fats	g/100g	0.1	VL295
	g/100g	<0.1	VL295
Poly-unsaturated fat	g/100g	0.2	VL295
Trans fats	g/100g	<0.1	VL295
Vitamins			
alpha-Carotene	ug/100g	<5	VL292
beta Carotene	ug/100g	20	VL292
alpha-tocopherol	mg/100g	0.7	VL291
Saturated Fatty Acids			
(dutyric	%	<0.1	VL295
C6:0 Caproic	%	<0.1	VL295
C8:0 Caprylic	%	<0.1	VL295
C10:0 Capric	%	<0.1	VL295
C12:0 Lauric	%	<0.1	VL295
C14:0 Myristic	%	2.8	VL295
C15:0 Pentadecanoic	%	0.7	VL295
C16:0 Palmitic	%	24.2	VL295
C17:0 Margaric	%	1.4	VL295
C18:0 Stearic	%	22.0	VL295
C20:0 Arachidic	%	0.3	VL295
C22:0 eicosanoic			
c:24:0	%	<0.1	
Lignoceric	%	<0.1	VL295

REPORT OF ANALYSIS

1/183 Bertie Street Port Melbourne Vic 3207 Tel. +61 3 9644 4999 Fax +61 3 9644 4998 www.measurement.gov.au

National Measurement Institute

Galloways Australia's Results

Eating quality

First, the results as presented at the 2014 German Galloway World Congress. When these results were undertaken the results were presented as 18 Grades with Grades 1 and 2 being the highest eating quality levels, called MSA Gold Quality. The comparison available then was for the State of New South Wales (NSW) only.

	GALLOWAY	NSW ASSESSED NON-GALLOWAY
Grade 1	28%	2%
Grade 2	34%	10%
Grade 3	15%	8%
Grade 4	12%	4%
Grade 5	10%	20%
Grade 6	1%	25%
Grade 7	0%	12%
Grade 8	0%	9%
Grade 9	0%	1%
Grade 10 – 18	0%	4%
Ungraded	0%	5%

62% of Galloways graded MSA Gold, only12% of non-Galloways graded MSA Gold
100% of Galloways achieved MSA classification, 5% non-Galloways were ungraded.
Most Galloways (34%) assessed as MSA Grade 2, most non-Galloways (25%) assessed as MSA Grade 6.

Quite a shift in eating quality of at least 3 or perhaps 4 grades in favour of the grass fed and finished Galloways (around 5% of these were actually Belted Galloways). It should be noted a high proportion of the non-Galloways would have been grain fed/finished.

The assessed Galloway cattle excelled in marbling and ossification i.e. the outcomes of genetic traits.

Updating the above, MSA has now moved to a numerical assessment called the MSA INDEX, it has to be generated on a computer and the results available are now for all Australian MSA assessed cattle not just NSW cattle as in the German Congress presentation.

Note the following percentage bands relating to the MSA INDEX:

Cattle above an INDEX of 65.75 are the top 1% of assessed cattle for eating quality,
Cattle above an INDEX of 62.37 are the top 10% of assessed cattle for eating quality,
Cattle above an INDEX of 57.61 are the top 50% of assessed cattle for eating quality,
Cattle below an INDEX of 46.6 are the bottom 1% of assessed cattle for eating quality.

Assessed cattle represent around 35% of cattle slaughtered in Australia, around 50% of Galloways slaughtered are assessed.

The average MSA INDEX of the Galloway cattle is 62.00, the minimum MSA INDEX for Galloway cattle is 57.56 and the maximum MSA INDEX for Galloway cattle is 70.11.

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These results show that the tested Galloway beef is exceptionally low in total fat and notably low in saturated fats. Many saturated fats raise harmful Low Density Lipoprotein (LDL) levels and are associated with heart disease. The tested Galloway beef is better for your heart. Having a lower energy level also reduces obesity.

Protein (g/100g)	24.8	20

Proteins are made up of amino acids. These help build and repair cells and tissue, form antibodies, carry oxygen, regulate blood sugar, regulate energy, assist prevention of arterial fat build up. The tested Galloway beef has 25% more protein and is better for sugar and energy regulation and cell repair.

Omega 6:3 ratio	1.9	N/S

FSA not stated. However "normal" beef often has a ratio above 10 i.e.15. The lower the ratio the better. A low ratio is associated with a host of good health benefits. A ratio below 2-3:1 suppresses arthritis inflammation, less than 5:1 benefits asthma sufferers, less than 4:1 decreases the risk of cardiovascular mortality by 70% (Ref www.ncbi.nlm.nih.gov/pubmed/12442909). The Galloway Omega 6:3 ratio is extremely good, even exceptional.

Cholesterol (mg/100g)	46	62

Galloway beef is 25% lower in cholesterol and higher in "good" HDL cholesterols. Again the tested Galloway beef is better for your heart

Conjugated Linoleic Acid (CLA)	11	NS

CLA has been found to be a potent anti-cancer agent in animal experiments, it is found in marbling fat i.e. a Galloway characteristic. It is also considered to assist with weight loss. A level of 11 is very high, the highest level found in the relevant literature is 12.5, most levels are around 2.5-3. A significant potential Galloway health advantage.

Beta-carotene (Vit. A) ug/100g	30	10

Beta-carotene is converted to Vitamin A which is needed for good vision and eye health. It also acts as an antioxidant protecting the body from damaging free radicals, it can help reduce heart disease and cancer. Galloway beef had significantly more beta-carotene.

Zinc (mg/kg)	44	39.5

Zinc is essential for immune functions, protein synthesis, wound healing and cell division. The tested Galloway beef has at least 10% more zinc.

Iron (mg/kg)	28	20.6

Essential for transport of oxygen in the blood, low levels lead to fatigue, tiredness and decreased immune function. The tested Galloway beef is rich in iron.

Note: The above comments regarding health benefits are taken from the general medical literature and are not meant to refer to individual's circumstances.

The (US) Belted Galloway Society has published nutritional results that follow the above patterns using Belted Galloway beef. Some of the units are different but the outcomes and supporting nature of the results are obvious, the results are based on 100g samples. More details are available on the (US) Belted Galloway Society website.

Attribute	Grassfed Beltie	Grain-Finished Beltie	USDA (General Beef)
Total Calories	119	177	274
Fat calories	27	102	234
Total Fat (g)	3	11	22
Saturated Fat (g)	1	5	9
Cholesterol (m)	11	47	68
Protein (g)	23	19	18
Calcium (mg)	18	16	10
Total Fatty Acids	8	18	20
CLA	0.07	0.11	0.01

All above results speak for themselves and can be used as powerful tools in the marketing of the beef of the Galloway breeds to consumers who are increasingly aware of health and animal welfare issues. The results support what Georg Menke put to the 2014 World Galloway Congress in Germany – **GALLOWAY - THE GENUINE ALTERNATIVE.**

Why are these Galloway and Belted Galloway results different to other cattle breeds?

The answer to that is becoming clearer as more detailed research is undertaken i.e. as published by The Roslin Institute, Edinburgh regarding genetic distances between breeds. The Galloway evolved as a "Landrace" breed of South West Scotland, it developed unique genetic adaptations to prosper in the harsh hill country environment. Just one of the notable genetic adaptations was the double hair coat providing feed efficiency especially in Winter and a different fat distribution within the animal. Many of the genetic adaptations were passed on to the Galloway Lackenvelder cross that we now know as the Belted Galloway.

The Galloway breeds have some unique genetic adaptations. This was also documented during the 2014 White Galloway Conference in Germany.

Such unique genetic adaptions can be easily lost by the introduction of other breed's genetics in an attempt to perhaps "improve" something rapidly rather than the use of slow steady change working within the Galloway breeds. We see examples of breeds that have suddenly jumped in size through say the introduction of Friesian genetics only to lose the qualities they were once known for.

Future Galloways Australia Research

The collection of more MSA Eating Quality data will be ongoing.

Samples of different cuts of meat will be analysed perhaps also looking more closely at the effect of the steer's age on eating quality. Results so far of the effect of age on eating quality have been encouraging.

In Australia, the Government is funding research to increase the level of Omega 3 in feedlot lambs. The basis of the research is to improve the Australian population's intake of Omega 3

noting its health benefits. That research has just released a report showing an increase was achieved. The increase was significant and a level of 0.03 g Omega 3 per 100g of meat was achieved. Galloways Australia's research shows that grassfed and finished Galloways achieve 0.1g Omega 3 per 100g of meat in some cuts of meat. Further research to better define the Galloways Omega 3 component levels could be a positive marketing attribute to an increasingly health conscious population.

As Galloways Australia's White Galloway numbers increase, Galloways Australia will undertake eating Quality and Nutritional Quality testing on White Galloway carcases.

Further research into the timing of Galloway conception heats needs to be undertaken. Some Scottish/Northern Ireland and German Galloway breeders had indicated Galloways come on heat sooner than other breeds when prepared for Artificial Insemination. A trial was undertaken using two AI sires 6-7 hours apart i.e. each cow was inseminated twice, 6-7 hours apart using two different sires. No difference in conception rates for a particular timing was noted BUT there was a very definite progeny sex linked component to the AI timing. Now a dilemma exists, did the two bulls used have sex linked characteristics relating to progeny sex, was it the result of AI timing or was the result random? More testing needed.

Possible determination, perhaps partial, of the Galloway genome to determine that 100% Galloways are 100% Galloways. Relevant to the above results and more so to Galloways Australia as the only 100% Galloway breed society in Australia.

Visit the Galloways Australia website www.gallowaysaustralia.com.au to check for further research updates.

Galloways Australia agrees to the sharing of elements of this report providing Galloways Australia is clearly acknowledged as the source. Advice of the use of this report would be appreciated. Galloways Australia can be contacted at gallowaysaustralia@gmail.com.

Update prepared for Galloways Australia by Greg Stuart gregnstuart@aol.com

GALLOWAYS

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www.gallowaysaustralia.com.au