



Maximising Marketing Opportunities for Buffalo Products

**A report for the Rural Industries Research
and Development Corporation**

by RC Leach
Field Fresh Marketing

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Foreword

The buffalo industry in Australia will not realize its full potential until an orderly process for the marketing of buffalo meat products is developed. In the past, marketing has been on an ‘ad hoc’ and individual basis, which unfortunately has in some cases damaged the reputation of the entire industry.

The project aim was to develop a framework for orderly marketing of buffalo meat on a state by state basis. NSW was chosen to develop the pilot project. Differentiating buffalo meat on the basis of key health benefits was seen as a critical success factor. This formed the core of some commissioned research work.

This report investigates the entire supply chain, from paddock to retail shelf, detailing the supply logistics, packaging, development of new products, promotion and all costs associated with these aspects.

The framework developed in this report will allow the industry to proceed to the next phase in offering buffalo meat products to the market in a controlled and reliable manner.

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Peter Core

Managing Director

Rural Industries Research and Development Corporation

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EXECUTIVE SUMMARY

Buffalo Producers NSW Incorporated (BPNSW) commissioned Field Fresh Marketing (FFM) to develop new marketing opportunities for farmed buffalo. The current market opportunities in NSW do not permit an efficient, growth orientated and profitable industry.

FFM as the consultant, explored past efforts by various entities to develop a significant presence in this market segment. With very few exceptions the activities centered upon the gourmet food service sector. This market is small, fragmented, and prone to fads and only seeks the top end prime cuts from producers. The consultant believes a number of food service distributors do not enjoy a good reputation for promoting products such as buffalo. In the main these food service providers have many and varied products to offer their clients. As such they do not wish to participate in brand development or to control quality. In our opinion this represents an unsatisfactory market situation.

The consultant commenced a fresh approach, using his experience in the retail trade, particularly, supermarkets.

A prime objective was to reveal new ways to maximize the saleable yield from the animal. This was achieved by liaison with quality specialist red meat, value-adding manufacturers. Peppercorn Gourmet and Mulfric Foods in particular played an important part in a “first phase” development of sausages, burgers and mince.

A second objective was to differentiate the product. Specific high quality specification was sought from the producer body. A trial kill and bone out was conducted using two processing channels. Both channels performed satisfactorily. To differentiate the product further, emphasis was placed upon taste test sensory evaluation and superior health benefits. A panel of sensory evaluators was commissioned to undertake this particular research and the results were enlightening. Professor Andrew Sinclair and Jane Barnes collaborated to produce some revealing positive health attributes associated with buffalo. The results in both areas are most encouraging and should, with targeted promotion, assist in the development of “Tender Buff” as a brand that will win market acceptance.

The National Heart Foundation accreditation is considered an important part of the healthy food story. Results to date indicate all products should gain such accreditation.

BPNSW has been made aware that significant promotional activity will be required to achieve sales targets. The minimum activity deemed necessary to succeed is contained in the report. The timing of the promotional activity is considered important and must coincide with market entrance. Brand, logo and label issues must be addressed in the next phase of the project. Recommendations have been made in this regard.

Two specialist service providers were employed to tray pack prime cuts ready for retail sale. The emphasis was on MAP packaged retail packs as we accept the supermarkets have a preference for this type of packaging verses vacuum packing. One provider Beak and Johnston did not achieve their goal, and our expectation in terms of shelf life, in spite of high recommendation from the retail industry. The second operator, Australian Game Meats although willing to be involved has been unable to obtain dispensation from AQIS to permit buffalo meat to be processed and packed at their Dural plant, due to their export license requirements. Alternatively Dubbo Meat Centre have agreed to provide vacuum packed retail packs in sizes to suit the supermarket chains.

BPNSW requested the development of an ancillary market for “second grade” non-specified buffalo. Precooked, skinless frozen sausages produced by Mulfric Foods may provide an answer. The consultant recommends that further development of this particular product is warranted. At the appropriate time, after consideration of packaging and NHF accreditation, submissions can be made to grocery buyers at major supermarkets to permit access to the freezer section of their chains.

Field Fresh Marketing have put forward some distribution options to permit the product to reach the market in an efficient manner. Costings were developed for all phases of the operation from farm gate to retail shelves to determine liveweight return to producers. The costings indicated a return

that may be well in excess of current returns to producers. The low sales volumes in the introductory phase necessitated a simple product range with a low cost distribution network.

The anticipated returns to producers will require careful examination to determine if the industry can be placed on a viable footing and whether further investment capital required can be justified.

Introduction

This work forms the second part of the RIRDC project BUF 1A , “Australian Buffalo Market Research and Industry Feasibility Study”.

As a result of findings in Part 1, published in RIRDC document of the same name, no state or national marketing body has been formed. Therefore, the southern Buffalo Industry aims to:

1. sell prime buffalo meat into the domestic market via a marketing specialist according to the duties outlined in the National Buffalo Meeting Workshop outcomes. i.e.
 - locate buyers
 - create awareness/demand through promotion
 - investigate product development and identification options.
2. develop a framework, at industry level, to maintain orderly marketing.
3. assess Buffalo meat attributes, including omega-3 fatty acids, in an endeavour to improve marketing prospects.
4. produce promotional material under the guidance of a marketing specialist.

This report outlines the findings of work carried out by the chosen marketing consultant and is designed to cover points 1 to 3 of the above aims.

Consultant’s Brief

The consultant will:

1. Meet with BPNSW to confer and agree on objectives.
2. Visit selected abattoir/s to view all procedures including QA programme. Review aspects that require improvement.
3. Arrange and oversee trials for the conversion of trim into processed products.
4. Review and develop costings for all cuts. Liaise with BPNSW and targeted supermarkets to reach pricing agreement.
5. Liaise with nutritionist and laboratory regarding food analysis of Buffalo meat.
6. Confer with nutritionist to determine health attributes.
7. Meet with Government regulatory bodies regarding recommendations from points 5 and 6.
8. Investigate packaging options.
9. Liaise with graphic artists regarding labelling options.
10. Meet and discuss recipes with culinary experts.
11. Review promotional opportunities for inclusion in Marketing Plan.
12. Explore possible uses and outlets for processing quality, cull stock.
13. Meet with supermarket buyers to permit review of developing marketing strategy.
14. Complete Marketing Plan.
15. Report to BPNSW twice during the market strategy development and again when Market Plan is complete.
16. Assessment of Market Plan by BPNSW and the consultant.

Mr Ray Leach, Field Fresh Marketing, Sydney, was employed under the above brief and formed the following objectives upon which to base his work:

Objectives

1) **Maximum Saleable Yield:**

A major objective of the BPNSW is to maximise the saleable yield in dollar terms, from each animal processed.

2) **Establish Product Differentiation:**

It is considered a prime objective to differentiate buffalo from competitor products.

Methodology

Investigations Undertaken to Establish Processing Chain – Paddock to Store

1. Target Market

Traditionally, marketers of exotic game meat such as buffalo attempt an entrance to the market via the food service sector (e.g. restaurants). In the past few years buffalo producers have attempted to access this market with limited success. We have identified a lack of control over quality assurance, branding and an inability to use significant portions of the animal as major obstacles in the development of buffalo meat as a profitable, differentiated healthy “gourmet” meat.

A fresh approach was required. Major supermarkets were chosen as a new and distinct distribution channel. The fresh meat department in supermarkets was considered the most suitable location in store. All major supermarket chains are constantly searching for innovative products, provided the products meet current established criteria for success in food retailing.

Supermarkets are now more receptive to low volume lines such as buffalo provided the producer/marketer can convince the buyers (and in turn consumers) that the demand is current or at least can be created by effective promotion and importantly, the product will be profitable to their organisations. We considered supermarkets may hold the key to maximising the use of the animal, with emphasis on further processed products.

The acceptance by supermarket buyers and subsequently consumers could lead to demand being created in the food service area (i.e. restaurants). Supermarkets are placing increasing emphasis on HACCP/QA systems as a major criteria for acceptance to their stores. Supermarkets are increasingly seeking “service providers” who can with a degree of competence and cost control process, pack and distribute the product to their stores in a timely manner. Our early research focused on these points in selecting abattoirs and processing operations to trial kill buffalo.

Discussions with David Beak (Beak & Johnston), Rod McGlure (Australian Game Meats) and Duane Ledbetter (AUSMEAT) in particular, supported the animal kill specifications listed below.

- 1) 350-450 kilo approximate live weight
- 2) 2 year maximum age
- 3) milk teeth only
- 4) electrical stimulation at kill
- 5) pH. max. 5.8
- 6) QA chiller assessment

David Beak suggested a trial for “stretching” the animal post kill. This technique seems to be coming back into favour as a way of obtaining tender beef.

2. Slaughter / Boning Room Options / Costs

A cost efficient abattoir/boning facility combination needs to be found that meets the needs of both producers in terms of transport logistics and customers in terms of QA packaging and the like.

Abattoir options investigated in NSW included Mudgee, Coonabarabran, Scone, Cowra and Wingham. Boning room facilities were assessed at Mudgee (Throsbys), Dubbo (Dubbo Meat Centre), Scone, Cowra and Wellington (Gillins Butchery).

A recommendation will be made based upon the following criteria:

- 1) Accessibility by all producers in NSW to limit transport costs
- 2) QA schemes in place that supermarkets and secondary processors would consider acceptable
- 3) Willingness by operators to co-operate in the project, reflected in their capacity to take on the work should the commercial requirements arise.

A short list of 2 abattoir / boning room combinations have been selected and a trial kill of 6 animals, (3 animals each way) has taken place. Data were collected on cost, bone out and general performance.

3. Further Processing Options

With the supermarket product requirements in mind an extensive search of processors was undertaken, around Sydney and in regional areas, central to producers, to find the best available options. Similar criteria listed above for the slaughter and boning facilities were applied. Other capabilities required were the ability to:

- prepare and present prime cuts to appeal to gourmet markets,
- produce processed products for the gourmet market, and
- produce the best possible product from trim quality meat, enabling whole animal use.

4. Packaging

Discussions were held with supermarkets and processors to determine the most suitable packaging options to present buffalo meat to the public. Processors with these packaging capabilities were sought.

Discussions were held with suitable graphic design companies able to supply logos and the necessary labelling to complete packaging requirements.

5. Product Distribution

Perishable meat products require efficient, refrigerated transport between processing facilities and to their outlets. Not only do the necessary transport links have to exist, but their schedule must also fit with the production schedule. This key transport information was collected from processing plants (e.g. the agents normally used by the palnts), and through industry personnel's prior experience.

6. Product Investigations to Establish Possible Differentiation

1) Omega-3 Fatty Acids/Chemical Analysis. (Appendix 1)

Professor Andrew Sinclair agreed to test for the fatty acid profile in Buffalo meat, at the RMIT University in Melbourne, and to have chemical analysis for moisture, fat, protein, ash, cholesterol, Thiamin and Riboflavin, Niacin, Pyridoxine, iron and zinc done by the Australian Government Analytical Laboratories, South Melbourne.

Six tenderloins, one from each animal in the trial kill (4 males and 2 females) were removed at the boning facilities, frozen and shipped directly to RMIT Uni.

2) Heart Tick Requirements (Appendix 2)

Analysis for sodium and fat, to gain the Heart Foundation's Heart Tick accreditation, was carried out by Pacific Analysis Food Safety Solutions, Chippendale.

Products assessed were: - Peppercorn's mince (burgers) and their plain, and lemon pepper, sausages.
- Mulfric's precooked, skinless sausages.

3) Shelf Life Testing (Appendices 2 & 3)

Shelf life testing was carried out to quantify product attributes for the supermarket, or other, retail outlets. Samples were taken from two Sydney processors (Peppercorn and Beak and Johnson) and assessed for microbes, and sensory acceptance, by Pacific Analysis Food Safety Solutions and Micro Tech laboratories respectively.

4) Sensory Evaluation (Appendix 4)

Two companies were considered on a short list, Smart Foods and Food Factotum. Food Factotum was selected.

The Sensory Evaluation was held at Restaurant Mosaic, Sydney on 2 May 2000

Sensory Evaluators:

Lyndey Milan - Food Director, Woman's Weekly Magazine
Max Lake - sensory expert/author
Margurite Morgan – Max Lake's assistant
Sally Hammond – The Sun Herald
Maureen Simpson - Food Writer, House & Garden
Tania Campbell – Food Factotum
Mary Atkins – Food Factotum
Karen & Greg Giblett – Buffalo Producers NSW Inc
Jan & Doug Robertson – Buffalo Producers NSW Inc

Invitees: (Did not attend but were interested in the product)

Helen Greenwood –Writer The Sydney Morning Herald
Jane Barnes – Nutritionist
Anneka Manning – Food Editor Australian Good Taste
Jan Purser – Nutritionist Australian Good Taste
Janelle Bloom – Food Presenter “ Whats Cooking”
Peter Howard – Food Editor Todays Show – Channel Nine
Christine Salims – Canberra Times
Sheridan Rogers – The Sunday Magazine – Sun Herald
Scott Bowles – The Sun Herald
Margaret Fulton – New Idea

7. Marketing Management Options

A proper marketing system is critical to the long term success of the buffalo industry.

In this report I will investigate four options for the marketing of buffalo meat.

- 1) BPNSW to perform all marketing functions. This is an option to contain overhead costs.
- 2) Field Fresh Marketing to act in contract capacity providing services including buyer presentations, labelling, packing, phone orders etc on an hourly basis.
- 3) Field Fresh Marketing to provide marketing function.
- 4) Other organizations to provide marketing function.

Results and Discussion

1. Slaughter / Boning Room Options / Costs

The process of finding suitable and willing abattoir / boning room facilities proved to be quite difficult.

- 1) Abattoir – The abattoir needed to be centrally located in the state and willing or experienced in handling buffalo. Wingham, although experienced in killing buffalo was discounted as a viable option because of its poor geographic location. Scone abattoir / Strathfield processing was placed in receivership during the investigation period and hence eliminated from consideration. The three remaining abattoirs Coonabarabran, Mudgee and Cowra were all located reasonably centrally in NSW and had extra capacity to kill buffalo if requested. Mudgee abattoir and Bunganbah abattoir (Coonabarabran) were chosen for the trial kill on the basis of reputation and willingness to take part. Cowra should not be discounted as an option in the future as it may provide a good kill service / boning room centre for producers in the southern part of the state.
- 2) Boning Rooms – Abattoir selection has a major bearing on the boning rooms that may be used. Dubbo Meat Centre is close to Bunganbah abattoir and already has some experience in handling buffalo meat so is an obvious combination. The boning room associated with Mudgee abattoir, Throsbys, unfortunately was not in a position to undertake extra work, and so had to be excluded. The only remaining boning room option was Gillins butchery at Wellington. Consultations with AUSMEAT representatives (Duane Ledbetter and Rod Murphy) and Peter Evans from Meat and Livestock Authority revealed that Mudgee abattoir & boning centre enjoyed higher QA status or reputation than either Cowra abattoir, Dubbo Meat Centre or Bunganbah abattoir.

The trial kill of 6 Tender Buff specification animals (4 bulls and 2 heifers) supplied by Doug & Jan Robertson took place in March 2000. Three animals went to each abattoir / boning room combination. The total 3 animal live weights and boneout % are given in the table below.

	Bunganbah	Mudgee
Live Wt	1274	1302
Dead Wt	651.7	669.0
Bone out	51.2%	51.4%

Both abattoir / boning room combinations proved to be very comparable in terms of efficiency and meat presentation. Slaughter fees were similar at both abattoirs but boning room costs at Gillins were too high and weigh heavily on the 'bottom line'. Gillins butchery would need to complete their refurbishment to a QA status that would be acceptable to our various markets to be considered as a real option. Installation of suitable vacuum packing machinery would be mandatory.

A summary of the transport, kill and boning room cost / head for a 400 kg live animal are given below.

	Mudgee / Gillin	Bunganbah / DMC
Slaughter Fee	\$61.50	\$65.00
Slaughter Levy	\$10.33	\$10.33
Transport to Boning Room	\$30.00	\$30.00
Boning Room Costs	\$164.00	\$140.00
Total Cost	\$265.83	\$245.33

The investigations into the most feasible abattoir / boning room combination has shown that the Bunganbah / DMC option is probably the best. Bunganbah may fall short on some QA areas but importantly are experienced with buffalo and have excess kill capacity. Dubbo Meat Centre enjoys a good relationship with the abattoir and can provide an acceptable vacuum-packed product for the market. Cowra may warrant further investigation in the future.

2. Further Processing Options

Four options were considered for further processing:

- 1) Peppercorn at Artarmon - fresh smallgoods manufacturer
- 2) Mulfric Foods at St. Marys - specialist precooked/frozen manufacturer
- 3) Australian Game Meats at Dural - specialist boning room-export
- 4) Beak & Johnston at Greenacre - specialist processor to food service & supermarkets

In detail:

Peppercorn has established a presence in an increasing number of supermarket stores in NSW for gourmet sausages. The proprietor at Peppercorn is professional and willing to be involved in the buffalo project. However, he has made it clear that he does not wish to fully market the product range (he sees the product as a competitor) and insists that buyer representation, teleordering and branding be at arms length to his business. Peppercorn can process a variety of high quality, gourmet sausages, burgers and mince if required. Peppercorn have added benefits; speedy efficient distribution –three times per week, strong HACCP/QA systems in place, invoicing facility.

Products developed by them for this trial were Plain Sausages, Lemon Pepper Sausages, Sun-Dried Tomato sausages and a quality burger patty. All product is made from fresh ingredients and delivered fresh into the market place. All of these products (except the Sun-Dried Tomato Sausage) were tested at the sensory evaluation. Results in Appendix 4

Mulfric Foods are well established as low cost, efficient producers of skinless, precooked flavoured sausages. They have in place adequate QA systems. For this trial they developed a skinless buffalo sausage, suitable to be marketed as a frozen product. Its sensory evaluation also appears in Appendix 4

This organisation could be ideal for the development of “new products” for non-Tender Buff animals in the freezer cabinets of major supermark.

Australian Game Meats have an excellent processing room based at Dural with Cryovac facilities. It was our intention to use this facility for vacuum-packed prime cuts. This facility is export established and at this stage is not able to play any further part in the program unless we guarantee an export accredited abattoir to supply buffalo to AGM.

Contact should be continued with this organisation with a view to long term export contracts to Europe.

Beak and Johnston are the only known red meat processing operation in NSW, with MAP (Modified Atmosphere Packaging). We pursued Beak and Johnston because they are well accepted suppliers to major supermarket chains for prime, tray packed cuts of meat. Long shelf life expectancy was a major consideration in choosing this company for the trial work.

It is disappointing to report that Beak & Johnston failed to perform to their, and our, expectations. They were considered an important part of the possible marketing plan. Shelf life tests failed to meet expectations. Due to unexplained anomalies in the trial product processing, B & J have agreed to a no cost retest. A decision will need to be made on this issue.

Range of Processed Products Considered:

Product	Destination	Processor
Tender Buff Tenderloin	Restaurant	Dubbo Meat Centre Gillins Butchery Beak and Johnson Clayton Wright
Tender Buff Steaks (comprising Cube Roll, Sirloin and Rump)	Fresh Meat Supermarket	Dubbo Meat Centre Beak and Johnson
Tender Buff Sausages	Fresh Meat Supermarket	Peppercorn
Buff Burgers	Fresh Meat Supermarket	Peppercorn
Fresh Buff. Low Fat/Low Cholesterol/High Iron Mince	Fresh Meat Supermarket	Peppercorn
Pre cooked Frozen Tender Buff. Sausages	Freezer Cabinet Supermarket	Mulfric

3. Packaging

Supermarkets have expressed a preference for tray packed or MAP packed products. They believe these two options lend themselves toward better presentation in the fresh meat departments of their stores. Vacuum packing is not out of the question as an option but would be their second preference. We believe sausages and burgers should be tray packed, film wrapped and delivered as short shelf life products, three times per week.

We recommend **pack** unit sizes be kept to:

- 1) 600 g or less for prime cuts
- 2) 500g or less for sausages
- 3) 400g for burgers

We recommend simplicity in labelling:

- 1) Tender Buff Steak-all prime cuts.
- 2) Tender Buff Burger – one grade-low fat/low cholesterol/high iron
- 3) Tender Buff Sausages – one grade – low fat/low cholesterol/high iron

Our experience demonstrates that customers look at unit price long before they look at the price per kilo, therefore, our recommendation to keep the “pack unit” sizes small.

Attached is a submission from Front Design (Appendix 5) who are experts in the field of logo design and label packaging options. We have no hesitation in recommending this company and they are our preference for a professional long term brand, logo, promotional, packaging development.. Less expensive options can be submitted to the association from Project Packaging and Ka-boom, if cost is a consideration in this area (approximate cost \$1500 for either party).

4. Product Distribution

Abattoir to Boning Room. Transport from “Bunganbah”, Coonabarabran to Dubbo Meat Centre is via the abattoirs standard transport link and costs 15 cents per kg hot carcass weight.

Boning Room to Sydney (to Flash Transport and Peppercorn). Transport of large volumes of meat, from Dubbo Meat Centre to the Sydney destination of our choice, costs 6 cents per kg for 1 tonne pallets. (This price per kg rises if the pallet is only partially filled.) Smaller volumes e.g. tray packed product, can be shipped by Des Hargraves Refrigerated transport, Dubbo. Price unknown.

Dubbo Meat Centre will vacuum pack into shipper cartons, which will be delivered to Flash Transport at St. Marys. **For distribution of product not requiring further processing in Sydney**, Flash Transport is our preferred general refrigerated freight option to retail outlets. They operate a fleet of 12 temperature controlled chiller vans (chiller at less than 4 degrees C) to all supermarket stores at least twice per week. They have a certified HACCP plan in place. The other option is for the product to go direct to Woolworths Meatex at Blacktown. The distribution cost from Meatex to store is approximately 40 cents per kilo. The barcode labels are a critical part of all supermarket sales. They may or may not be completed at Dubbo. If the product has to be labelled at St. Mary's then the Flash option will probably be exercised. We believe the cost can be contained to 40 cents per kilo.

Distribution from Smallgoods Processor to Retail Outlets. Peppercorn -have quoted on a delivered price to store for the processed products originating in their facility only. Refer to Appendix 6. **Mulfric** product can be distributed via their own network at \$60 per 2 pallets. As it would be a frozen product, it can be delivered much less often and in greater volumes.

5. Product Investigations to Establish Possible Differentiation

1) Omega-3 Fatty Acids/Chemical Analysis. (Appendix 1)

Buffalo nutrient analysis yield significant nutritional points that could be used effectively in promotions.

The analysis of buffalo meat indicates that it is what is termed a "nutrient dense" meat. That is, its total fat content, and therefore energy level per 100 grams is low compared to other "red meats", while each 100grams contains significant amounts of vital nutrients.

Regarding fat content buffalo meat not only has a low fat content, but also the types of fat are significant. It can be stated that Buffalo meat -

- is almost the lowest fat domestic animal protein source, containing only 1.8 grams of fat per 100 grams product.
- has the lowest cholesterol value of all domestic animal protein sources at 46 mg per 100 grams.
- contains less saturated fat (the ones thought to stimulate coronary artery disease) than beef or lamb.
- contains significant amounts of the important omega-3 polyunsaturated fats, thought to be protective against heart disease and now believed to be important in protecting against other inflammatory type disorders.

As it is suggested that individuals should consume at least 210mg of the specific longer chain omega-3 fats a 100-gram serve would supply over 20% of the daily requirement. As many peoples do not like to consume fish (the most concentrated source of these fats) products such as buffalo meat could play a very important role in providing this elusive nutrient.

- Further of note are the high levels of the important minerals, iron and zinc. Buffalo contains the highest iron level of any of the commonly consumed domestic animal protein foods (beef, lamb, pork, poultry and fish). Iron is now recognised by the public as a necessary mineral. Buffalo contains significant amounts of zinc necessary for a strong immune response.

2) Heart Tick Requirements, (Appendix 2)

The three products originating from Peppercorn (mince, plain and lemon/pepper sausages) all fell well inside the Heart Foundations limits to be eligible for Heart Tick Approval. The Mulfric precooked sausage, was slightly high for sodium, a problem which Mulfric is adamant can be rectified by a slight adjustment to the recipe.

3) Shelf Life Testing, (Appendix 2 and 3)

In this trial, two sets of shelf life analyses were carried out by two different laboratories on samples from two processors. While one set of results was well above expectations (Appendix 2), the second was not satisfactory (Appendix 3). Bearing in mind that the meat used in both samples had been through exactly the same supply chain, from paddock until delivery to the processors, it would be reasonable to assume that the breakdown of product quality occurred at some point following delivery. Further investigations will need to be carried out to ascertain the point of failure, so that it can be avoided in future.

A critical part of supermarket work is to attain consistent shelf life standards. This is vital in any presentation to supermarket buyers. The mince (burger) and sausages exceeded our expectations. We should attempt to stretch the boundaries a little further. Every day is important in a low volume product such as buffalo. At this stage we should have no problem going with 2 days for burgers (Peppercorn), 7 days with sausages (Peppercorn) and 10 days vacuum pack prime cuts (Dubbo)-to be tested.

4) Sensory Evaluation, (Appendix 4)

The sensory evaluation confirms that the QA system currently used by BPNSW, and the processing chains trialled here, yield quality buffalo products and that adhering to these specifications will be important in marketing buffalo products.

6. Marketing Management Options

The best marketing system is obviously dependent on the product volumes and target markets. The best system today may need re-evaluation in the future. The marketing process can be very expensive and eat heavily into producer's returns. A system needs to be developed that enables producers to achieve a sustainable price for animals while at the same time delivering customers what they want. The marketing options are discussed in order of increasing cost.

- 1) If BPNSW were able to perform the marketing function then the overhead cost would be minimized. This option is important in the establishment phase of the market due to the low volume of business envisaged. One major disadvantage would be the lack of time and probably marketing expertise available among BPNSW members.
- 2) Field Fresh Marketing could provide the following services as required:
 - Buyer presentations @ \$80 / hr and travel and accommodation. This would be a minimum requirement for success.
 - Other duties; labelling, packing, phone orders etc @ \$25 / hr particularly on prime cuts.
- 3) Full marketing services provided by Field Fresh Marketing as detailed below:

Expense Estimates	Cost Per Week \$	Cost Per Annum \$
Labour Packing & Labelling for Prime Cuts	60.00	
Labels (2 labels/barcode +info)	12.00	
Teleordering	30.00	
Invoicing	7.20	
	109.20	
Marketers Est. Costs		
Sup. Mark. buyers presentations		2700
Liaise with packaging co.		600
Liaise with chef		320
Liaise with nutritionist		500
Liaise with processor		500
		4620
Marketing cost/wk	88.85	
Manag't fee including ph/f/net	65.00	
Total cost	263.05	

This option will reduce the estimated liveweight return, at the farm gate, to \$1.13 per kilo, provided we do not attempt to increase the retail sell price. (See budget for Supermarket Retail Pricing in Recommendations P14)

- 4) Beak & Johnston, Australian Game Meat and Peppercorn were three companies investigated to perform the marketing role. Australian Game Meats at Dural are well positioned to distribute buffalo products. They have an excellent processing and packaging facility and are currently actively distributing other products both domestically and internationally. As mentioned earlier, the stumbling block with the option is being able to provide meat from an export accredited abattoir. This is very difficult in NSW. Beak & Johnston are a very professional processing facility at Greenacre in Sydney. They distribute prime tray packed cuts to all major supermarkets. Unfortunately meat processes by the company failed to perform to their, and our, expectations in the shelf life trial. Beak & Johnston have offered a re-trial at no cost to BPNSW. Should the company perform up to expectations after the second trial processing, then it would remain an important marketing avenue for BPNSW. Peppercorn are willing to co-operate with the development of the buffalo products, but have stressed that they wish to keep the buffalo marketing at “arm’s length”.

There is really only one Sydney based company, which is able to complete the processing/marketing task in its entirety. **i.e. The Game Farm.** We believe they may demand compensation that will overload the pricing/profitability

7. Promotional Activities

The success or failure of a new venture is very dependent on the promotional strategy used. Many options have been considered for this project and they have been divided into those activities that are considered essential for the success of the Market Action Plan, which follows, and those that are worthy of consideration at a later time.

Volume/Promotional Constraints: It is apparent that the volume in year 1 will inhibit profitability and critical promotional activity. Our estimates are for a wholesale turnover of \$130,000 on Tender Buff animals in year one. It is recommended that BPNSW secure approximately \$15,000 as start up promotional funds to permit a chance of success.

1) Market Action Plan Promotional Activities

a) Pick the Tick: National Heart Foundation

We consider this a critical success factor. The results thus far indicate BPNSW could attain accreditation from the National Heart Foundation for sausages and mince and prime cuts. The fat and sodium levels are well below the NHF requirements. Christine Dowdall from Gareth Hughes and Associates has agreed to a \$2000 entry level fee, per annum with a blanket cover for all products. This concession is made to encourage smaller manufacturers to join the NHF scheme. Once wholesale turnover exceeds \$400,000 per annum this arrangement will be reviewed

b) Comparative Promotions:

We urge BPNSW to consider using comparative health data versus competitors on all packaging and promotional material.

c) Magazines:

Sydney Morning Herald - Good Living in Tuesday’s edition. Advertisement cost is estimated at \$1000. We would expect an advertorial in return. Outlets are to be nominated in the advertisement. This medium is selected because demographics suggest strong readership in target market areas. Good Taste Magazine is also a good media to carry this product promotion and stores should be nominated.

d) In-store Demonstrations.

At least one demonstration is required in each store to introduce the new product to customers.

e) Recipe Development:

Scott Webster at the Mosaic is prepared to create two recipes for use in promotional activity. Cost \$ 500 + associated costs (i.e. photography if required)

2) Further Promotional Discussion Points

Price Promotion:

No allowance has been made for price promotions in the budgets. This requires further discussion with BPNSW. Obviously, price promotions in store in the first few months would assist the introduction of the product, however we consider this optional.

Packaging:

It is important to put significant effort into logo design, that has the ability to flow through all packaging in a consistent manner, that conveys a “ new, exciting, well differentiated, healthy product”. (See Appendix 5.)

Health claims:

BPNSW should consult with NSW Health Dept. and ACCC regarding any health claims on packaging and media presentations before going to print.

Info Line:

Set up an Info line at a call centre, or engage someone in the Association to be available to take calls and direct potential clients to nominated outlets. This Info line must appear on all promotional literature.

Web Site:

Set up a low cost, non interactive web site. Cost \$1000. Again this web site must appear on all promotional literature. The web site may have outlets listed, recipes and dietary benefits.

Television:

Jane Barnes to appear on as many TV shows as possible.
Estimated cost \$1000.

Recommendations

General Recommendations

1. Objectives

- 1) A major objective of the BPNSW is to **maximise the saleable yield** in dollar terms, from each animal, processed. The supermarket sales channel is considered one way to achieve such an objective.

We consider the supermarket trade represents the favoured distribution channel for several reasons:

- Superior branding opportunities
 - Product differentiation by health benefits incorporating complimentary packaging
 - More even weekly sales channel, than alternative distribution channels.
 - An effective way to establish and importantly control Tender Buff which in turn will create awareness and build goodwill in the food service route and in turn lead to profitable sales through that distribution channel.
- 2) **Product differentiation:** It was considered a prime objective to differentiate buffalo from competitor products.

The sensory evaluation tests will go some way towards achieving this goal. Equally important are the results achieved by the Sinclair-Barnes team, which show superior health benefits in key areas such as fat, cholesterol and iron. It will be important to retain Jane Barnes to refine the Sinclair results to permit a simple but powerful selling message for supermarket prime cuts, sausages, burgers and possibly mince at a later stage.

2. Marketing Structure – Prime Product

To maximise returns (and spread the marketing opportunities and obtain promotional benefits) from the animal, we may have complicated the business somewhat.

Some distribution channel options are:

- Tenderloins – restaurant
- Prime cuts - supermarkets
- Sausages & mince – supermarkets
- Skinless cooked sausages – food service
- Alternate Wholesalers

With due regard to the low volume attainable in year one and possibly year two, we consider the retail channels should be simplified to:

- 1) Prime cuts – supermarkets.
- 2) Sausages & burgers –supermarkets

Our preferred processing options for the recommended retail channel are:

- 1) Dubbo Meat Centre – prime cuts on tray, vacuum packed & labelled. Flash of St. Marys would be our preferred distribution company. They are a specialist short shelf life distribution company. Alternatively, the product could be delivered direct to Blacktown meat centre , who in turn forward to 12 select **Woolworths** stores. (Listed below.)
- 2) Peppercorn – tray sausages and possibly burgers to **12** select Woolworths retail outlets, delivered direct to store by Peppercorn. would supply promotional attachments and Trade Marked Labels.

The recommended outlet OPTIONS are:

- Woolworths** * Neutral Bay
 Newtown
 * Northbridge
 * St. Ives
 * Balmain
 * Bondi Junction
 * Dee Why
 * Double Bay
 * Mona Vale
 * Warringah
 * Arndale-Frenchs Forest
 Baulkham Hills
 * Top Ryde
 * Carlingford

Select ACT Woolworths stores(nominate)

- Coles:** Bondi Junction
 Manly
 Chatswood
 Castle Hill
 Leichardt
 Norwest

- David Jones:** Market St.
 Bondi Junction

The 12 stores marked with an * are the FIRST CHOICE.

Exclusivity:

Due to the lack of volume we recommend an exclusive offer be made to Woolworths NSW to supply these **12** stores only, in Year 1. Woolworths is the supermarket chain of choice because it has the right stores with the right demographics. The selected stores have volume as well, well in advance of other store options listed. There are sufficient alternative stores to permit a successful introduction if Woolworths decline the offer. i.e. Coles, David Jones and Franklins. Woolworths has a select number of stores that can do the job in a professional manner, permitting focused promotional activity.

Quantity (Units) of Prime Cuts and Processed Product Going into Supermarket per Week.:

CUT	200k Carc	Product Name	3 animals Total kg/week	12 stores Kg/Store	Units/store
Tenderloin	2.8	Tenderloin			
Striploin(Porter)	5.2	Buff. Steaks			
Scotch(Cube Roll)	4.4	Buff Steaks			
Oyster Blade	3	Buff. Stew			
Rump	8.8	Stir Fry			(600g Av)
Topside	10.6	Stir Fry	104.4	8.7	15
Round	9.6	Sausages			
Blade	12	Sausages			(500g Av)
Chuck	15.2	Sausages	110.4	9.20	18
Silverside	13.2	Burgers			(400g Av)
Brisket	7.8	Burgers	63	5.25	13
Trim	47.6	Waste			
	140.2				

Critical Success Factor:

It is important that the chosen outlets be requested to take **all** product for the trial period of 3 months.

Expansion:

There is no question that increased volume would permit a wider range of sales channels, which in turn would increase the sales revenue yield. The major constraint on this opportunity may be increased overheads.

Initial Buyer Submission:

We propose that BPNSW process one animal through Coonabarrabran and then bone out at Dubbo Meat Centre to “maximum specification” standards. Dubbo Meat Centre be asked to vacuum pack and tray pack prime cuts. FFM will take select cuts to Woolworths buyers. Keep some select cuts in freezer as back up, in case Woolworths does not exercise the “exclusive” option. Send limited product to Peppercorn and Mulfric Foods for refining for fat and sodium and taste combinations, in view of previous work. Objective is to maximise taste but obtain NHF “Pick the Tick” accreditation. BPNSW will be up for FFM costs @ \$80 per hour + fresh tests for fat and sodium on both Mulfric and Peppercorn. You may care to consider fresh tests on shelf life in the light of good results already obtained.

3. Profitability:**1) Processing Budgets for A) Prime and B) Second Grade Products.****a) Supermarket Retail Pricing (Prime Fresh Meat Trade):**

The retail prices as detailed below are considered the maximum that can be achieved in the introductory phase. Virtually all products listed are at a premium to competitor products. Important proviso: Supermarket buyers will have to agree to the proposed retail prices.

CUT	Price \$/kg	Wt/200 kg Carc	\$ Value per Anim	Product Name	Manuf. Expenses	Frts.	Total Cost/kg	Retail Price/kg
Tenderloin	22	2.8	\$61.60	Buff Steaks	3.50	0.40	25.90	36.26
Striploin(Port)	18	5.2	\$93.60	Buff. Steaks	3.50	0.40	21.90	30.66
Scotch(C.Roll)	18	4.4	\$79.20	Buff Steaks	3.50	0.40	21.90	30.66
Oyster Blade	8	3	\$24.00	Buff. Stew	3.50	0.40	11.90	16.66
Rump	8.5	8.8	\$74.80	Stir Fry	3.50	0.40	12.40	17.36
Topside	8.5	10.6	\$90.10	Stir Fry	3.50	0.40	12.40	17.36
Round	5.5	9.6	\$52.80	Sausages	5.50	0.00	11.00	15.40
Blade	5.5	12	\$66.00	Sausages	5.50	0.00	11.00	15.40
Chuck	5.5	15.2	\$83.60	Sausages	5.50	0.00	11.00	15.40
Silverside	5.5	13.2	\$72.60	Burgers	4.38	0.00	9.88	13.83
Brisket	5.5	7.8	\$42.90	Burgers	4.38	0.00	9.88	13.83
Trim	2	47.6	\$95.20	Waste				
		140.2	836.40					

Other Expenses	Per Head 200kg Carc
Expenses	Per Head
Stock Transport	25.00
Slaughter Fee	65.00
Slaughter Levies	10.33
Transport to DMC	28.00
Boneout Primals	150.00
Transport to Sydney	20.00
Total	298.33

N.B. All figures in these tables are based on a 200 kg carcass.

b) Seconds, or Non Prime, Sales. (Destination - Supermarket Freezer Cabinet.)

BPNSW have requested that we consider a viable marketing option for the sale of non prime buffalo animals. i.e. those that do not meet “ the Tender Buff” specifications. This option can also deal with surplus production, another critical success factor, which can arise when problems occur, matching production to orders.

The Precooked Skinless Sausage, with NHF “Pick the Tick”, is a suitable product to permit the processing and sale of the **whole** of these “ non prime” animals. Mulfric Foods will perform this task to both the association’s and supermarket standards. The product received a good response at our sensory evaluation (Appendix 4). It is recommended that the product be tray packed in units of approximately 500 grams, film wrapped and then placed in a coloured cardboard sleeve, with colourful graphics, emphasizing taste, convenience and the NHF accreditation. This product could be offered to **ALL** major supermarket chains, in bulk, pallet lots. Introduction of new frozen products depend upon chain and buyer acceptance of “new product” and can command a “new line fee” for freezer space as high as \$20000 (maximum).

CUT	Price \$/kg	200k Carc	Sale Value per animal	Product Name	Manuf Expen \$	Freight	Sleeve	Market Mark Up	Total Cost per kg	Retail Price per kg
Whole carcass Used for Processing	5.00	140	\$700	Frozen Sausages	2.70	0.20	0.15	0.81	8.86	11.51

2) Price to Growers:

Prime Product: This budget indicates growers may receive approximately \$1.35 per kilo liveweight. If economies of scale can be achieved (i.e. an increase in volume by say 4), then costs may be reduced prior to processing.

Non-Prime Product: The saleable revenue yield of \$700 per animal would net \$401.87 per animal with the deduction of direct processing expenses of \$298.33. This would result in a net liveweight return of approximately \$1-00 per kilo.

3) By-products

At this stage there is no revenue being produced from by-products. By-product (hides, horns etc.) sales need to be investigated. Often by-products can be the difference between success and failure in a venture such as this.

4) Future Prices

If sales success can be achieved (i.e. demand exceeding supply in the small number of stores) then when volume can be increased there is the possibility of a price increase but we would suggest this would be confined to 10-15%. The result may be to bring the price to approximately \$1.50 per kilo liveweight.

4. Supply Logistics

IMPORTANT. Do not commence production/marketing until BPNSW can guarantee 6 animals per fortnight.

Timing of Supply

- We recommend that 6 animals be processed once per fortnight (in one process).
- All product to be vacuum packed as primals.
- All primals destined for processing to be delivered once per fortnight to Peppercorn as soon as practicable after boning. That company then stores and utilizes the vacuum packed product as required over the fortnight
- All primals destined for retail prime cuts to be aged at DMC in Dubbo to 14 days post slaughter. Half of this product is then to be cut and packaged retail ready, for shipment to Flash, Sydney or Meatex, Blacktown for the first week's fresh supply. At Day 21 post slaughter, the remaining half of the fresh product is cut, packaged and sent for the second week's fresh supply. (It is envisaged that the processing primals and one week's retail prime cuts will be transported together to make use of bulk refrigerated carrier rates. The alternate week's fresh cuts will incur higher transport cost per kilogram.)

5. Other General Recommendations

Brand Name registration:

We advise BPNSW to register the *brand* name "Tender Buff" immediately in NSW as a minimum. At an appropriate time they may care to consider registering the logo and brand as a trademark.

Product Substitution:

BPNSW must be prepared to take legal action against any substitution discovered.

QA Protocol to Permit Supply to Major Supermarket Chains

The supermarket chains are becoming more involved in their supplier HACCP/QA programs. For example Woolworths now make it mandatory that all food suppliers achieve WVQMS (Woolworths Vendor Quality Management Systems) accreditation. A twelve month period of grace is permitted once "gap analysis" is conducted. Coles currently will accept Woolworth's accreditation and surely Franklins will not be far behind.

The consultant's recommendation is to use the accreditation of the end manufacturer/packer i.e. Peppercorn and Field Fresh. At this point in time these service providers are themselves required to be satisfied with the HACCP/QA status of the abattoir and boning rooms. (This may change in the future.)

Recommendations – Market Action Plan

October 2000

- 1) BPNSW to organise and control the kill of one animal at Coonabarabran and DMC.
- 2) BPNSW to organise and control vacuum packed tray pack, shelf ready prime cuts and dispatch a small quantity to Ray Leach @ Flash. St. Marys.
- 3) BPNSW to send small quantity of select cuts to Beak and Johnston. This product to be shelf life tested by Micro tech. \$400.
- 4) Beak and Johnston product to be sent to lab. for fat and sodium tests. \$400
- 5) Ray Leach to prepare and make a submission to Woolworths stores as listed under Recommendations – Market Structure. Products are to include prime cuts, sausage and burgers.
Estimated time 8 hours @ \$80 per hour. \$640
- 6) Sufficient prime cut product be kept in storage (frozen) in case we require a submission to be made to Coles, D.J.s, Franklins. If required, a fresh quote from FFM will be required to permit such submissions to take place in a professional manner.
- 7) BPNSW organize the dispatch of a small quantity of select non prime cuts to Peppercorn and Mulfric. Both companies to prepare fresh product samples. We expect a nil cost for these services.
- 8) Peppercorn to attempt to increase moisture content, whilst still achieving fat and sodium levels that permit NHF accreditation. Fresh samples to Pacific Laboratories for shelf life, fat and sodium. \$500

- 9) Mulfric to attempt to reduce fat and sodium levels whilst still retaining flavour.
Laboratory testing. \$200
- 10) Front Design be commissioned to make ‘mock up samples’ for Tender Buff sleeve for frozen sausages.
\$1000.
- Ray Leach to consult 2 hours @ \$80 per hour. \$160

November 2000

- 1) FFM to prepare and make submissions to Woolworths and Franklins, specifically to grocery buyers for the freezer section. 10 hours @ \$80 per hour \$800
If submission is unsuccessful then Coles in Melbourne would be approached at a further cost of \$1000
Provided Woolworths accept submission then conduct the following activities.
- 2) Commission Front Design to design full logo, pack and label. Quote: \$2700.
- 3) Commission Scott Webster at Mosaic Restaurant to prepare two “prime cut” recipes.
\$800.
- 4) Commission Jane Barnes to be involved in all nutritional label claims. \$500.
- 5) Develop licensing/marketing arrangement with FFM to permit control and coordination of marketing activities. Legal fees:
\$500.
- 6) Seek advice from NSW Health Dept. and ACCC as to label claims. They will never give an affirmative response in writing. The best you can expect is for these organisations to highlight any potential challenges to the claims.
FFM to assist. \$250

February 2001

- 1) Organise promotional activities, FFM to co-ordinate \$ 800.
In-store promotion 12 Stores @ \$150 \$1800
Sydney Morning Herald Good Living Magazine \$1000
Good Taste Magazine \$1000
Heart Tick \$2000

March 2001

- 1) Fresh product to market via Dubbo, vacuum packed product product and Peppercorn tray packed sausages and burgers.

May 2001

- 1) Frozen product to market if buyer acceptance. FFM will need to report back on cost of shelf space introduction to freezer cabinets. This will depend upon chain and buyer acceptance of “new product” or simply replacing an existing product. Could be as high as \$20000 (maximum) for new line fees.

Note: The total Stage 2 commercialization costs are estimated at approximately \$15,000

**Maximising Marketing Opportunities
for Buffalo Products.**

APPENDIX 1

**Buffalo Meat
Omega 3 Fatty Acids and
Chemical Analysis Results**

**A Sinclair
RMIT University
Melbourne, VIC
May 2000**

The nutrient composition of Buffalo meat

REPORT May 2000
Professor Andrew Sinclair



FOOD SCIENCE

Composition of Red Meat

In recent years, there has been a perception amongst health professionals that "red meat" is "bad for you". This arose because of advice from various public health agencies to eat less red meat and consume less fat in order to prevent cardiovascular disease and cancer (Briggs and Schweigert, 1990). Animal fats such as those in meat have been equated with saturated fats, which have been linked with atherosclerosis and heart disease (Reiser and Shorland, 1990). However, meat fat contains not only saturated but also monounsaturated and polyunsaturated fatty acids, including essential fatty acids and omega-3 fatty acids. The omega-3 fatty acids are considered desirable because they make up one of the two essential groups of polyunsaturated fatty acids for humans and appear to reduce the risk of heart disease (GISSI 1999). It has been shown that the omega 3 fatty acids in red meat are incorporated into the blood plasma of humans (Sinclair et al 1994) and the University of Wollongong, in a small pilot study, has reported that red meat contributes about 1/3rd of the omega 3 intake in humans.

The development of significantly leaner cuts of beef and lamb in Australia in the last decade means that new-style beef and lamb are nutrient-dense, providing a range of vital nutrients without excessive total fat content or kilojoules. The aim of the present study was to compare the nutrient profile of buffalo meat with other common protein sources consumed in Australia.

Samples analysed

Six vacuum packed samples of buffalo meat (tenderloin) were delivered to RMIT University in April 2000. The samples were in a frozen state on arrival and were maintained this way until they were thawed overnight prior to sub-sampling, fat and gristle removal, mincing and analysis. Each fillet was cut into 1/3rd and the middle section was trimmed of visible fat and the lean portion and fat (very small amount) were individually cut up into very small pieces and then, in the case of the meat, the pooled samples from the six cuts were minced in an industrial mincer. From this mixture three samples of approx. 750 grams were taken, two of which, together with a sub-sample of mixed fat, were sent off to AGAL (Melbourne) for analysis, while the third sample was retained at RMIT University. Sub-samples were taken from this third sample of lean meat and a sub-sample of fat was also taken for fatty acid analysis at RMIT University.

Methods

The AGAL laboratory used the following methods for analysis: Moisture (VL-298-1), Fat (VL-300-1), Protein (VL-299-1), Ash (VL-286-1), Cholesterol (VL-288-1), Thiamin & Riboflavin (VL-290-1), Niacin (VL-293-2), Pyridoxine (VL-319-1). These are also indicated on the report from AGAL included in the Appendix to this report.

The fatty acids were analysed by standard methods used at RMIT University as reported in detail by Li et al (1998).

Samples selected for comparison with Buffalo meat (tender loin)

The samples selected for comparison with the buffalo meat were based on [a] samples considered representative of the protein source, [b] pooled samples which would represent a broader range of nutrient compositions than a single cut, [c] two samples of fish which were representative of the range of fish available for sale (low and high in fat to cover the range of fat contents of fish), and [d] samples for which there were comparable analytical data available which were measured by the same method (fatty acids by concentration) - see Tables 3 and 4.

- **Comparison of Nutrient Composition of Different Sources of Meat Protein**

Table 1 shows the nutrient composition of different sources of meat protein commonly consumed in Australia, together with the data from the analysis of the buffalo meat. Samples of chicken, pork, fresh fish (sand flathead), canned fish (red salmon packed in brine), beef and lamb are used for comparison. Data for the meats other than fish were obtained from analyses of raw samples of lean tissue only, with all separable fat removed. The fresh flathead was analysed raw with skin attached, as it would probably be cooked in this way. The canned red salmon was simply drained before analysis.

Protein, Fat and Energy

The meats shown all contained a similar amount of protein, with a range of 20.4 g/100 g edible portion (EP) (chicken and lamb) to 21.9 g/100g EP (canned salmon); buffalo meat had a value of 21.1 g/100g EP. Fat content differed more noticeably, with fresh fish having the lowest levels (1.0 g/100g EP) and canned red salmon the highest fat levels (12 g/100g EP). The buffalo, beef and pork were very similar in terms of fat content (1.7 to 1.8 g/100g EP), while lamb was relatively higher at 4.2 g/100g EP. The energy contents of the meats essentially reflected their fat levels, with the buffalo having the lowest value of all samples except for the flathead.

Cholesterol, Sodium, Potassium

The buffalo meat had the lowest cholesterol values while chicken was highest, followed by the canned salmon. Fresh flathead and lean beef also showed low values. The various meats were fairly similar in sodium content with the exception of the red salmon, which had been packed in brine and had more than six times the sodium level of the other samples. However, all the meats were similar in their potassium levels, with pork highest in the order. The sodium and potassium levels of buffalo were not measured but would be expected to be in the same range as the beef and lamb.

Iron and Zinc

There was notable variation in the mineral content of the compared meats. The richest source of iron was buffalo meat (3.3 mg/100g EP), which contained more than ten times as much as the lowest source (fresh fish, 0.2 mg/100g EP). Beef and lamb contained approx. 2.4 mg/100g EP and pork, chicken and canned red salmon contained approximately half the levels of beef. Beef and lamb contained the most zinc, with chicken and pork containing approximately half the amounts of the red meats. The fish contained about one-quarter of the zinc levels found in beef and lamb. Buffalo had the third highest level of zinc.

B vitamins: Thiamin, Riboflavin, Niacin, Vitamin B6 , and Vitamin B12

Pork was particularly high in thiamin, providing around eight times as much as chicken, lamb, beef and buffalo, in contrast with the fish, neither of which supplied measurable amounts of this vitamin. Buffalo, lamb, beef, salmon and pork provided twice as much riboflavin than chicken and flathead. All meats contained similar levels of niacin (3.4-5.6 mg/100 g EP). The B6 levels were similar in buffalo, beef and chicken and higher levels than in lamb. The B12 levels were not measured in buffalo since the method is not available and in addition, it is a complex assay to interpret when it is available. Beef had the highest B12 level, although values for this vitamin were only available for three of the seven meats.

In summary:

- Lean buffalo is a rich source of iron, containing more than ten times the content of the lowest meat protein source (fresh fish), twice that of pork, chicken or canned red salmon and more than beef and lamb.
- Lean buffalo provides about the same amount of zinc, riboflavin, niacin, B6 and thiamin as beef.
- Lean buffalo contains relatively little fat and cholesterol and has a low energy content while having a similar protein content to the other meats.

• Comparison of the Fatty Acid Content of Different Meat Protein Sources

The fatty acid content of the same set of meat protein sources (buffalo, chicken, pork, fresh flathead and canned red salmon, beef and lamb) is shown in Table 2.

Saturated Fatty Acids

The saturated fatty acid content of the various meats closely resembled the pattern for their total lipid content. Buffalo had the lowest total saturated fatty acid content. Canned red salmon had the highest content of myristic acid (C14:0) and palmitic acid (C16:0). Lamb was second highest of the other meats in levels of these acids, and contained the most stearic acid (C18:0). The buffalo, salmon and beef contained similar quantities of stearic acid, about 70% of the content of lamb. In comparison, fresh flathead contained around one-sixth the levels of stearic acid in lamb.

Monounsaturated Fatty Acids

Of the different meats, buffalo had the second lowest monounsaturated fatty acid content (behind flathead). Canned red salmon contained the highest levels of each of palmitoleic (16:1) and oleic acid (C18:1). The next most plentiful source of oleic acid was lamb, with about two-thirds the content of the red salmon. Beef contained slightly more than half the levels of the canned fish. However, both lamb and beef had a palmitoleic acid content of around one-quarter that of the red salmon. The fresh flathead contained quite similar levels of palmitoleic acid to the red meats, but only about one-sixth the oleic acid content of lamb. Chicken had markedly lower levels of palmitoleic acid compared with the other meats. Another major monounsaturated fatty acid, C20:1, was much higher in the canned salmon

(0.289 g/100g edible portion, EP) than in other meats such as lamb (0.048 g/100g EP) or chicken (0.01g/100g EP).

Polyunsaturated Fatty Acids

The canned red salmon, with its greater total lipid content, was much higher in polyunsaturated fatty acids (PUFAs) than the other meat protein sources. At over 2.69 g/100g EP, the salmon contained around five times the amount of the next highest source of PUFAs, the fresh flathead (0.516 g/100g EP). However, chicken contained around 80% of the content of fresh fish, with buffalo, lamb and pork around 60% and beef approximately 40% of fresh flathead PUFA content.

In terms of particular polyunsaturates, chicken was highest in linoleic acid (C18:2), and the fresh flathead was the lowest. Buffalo, beef and lamb both contained less of this acid than did the pork or salmon. Linolenic acid (C18:3) levels, on the other hand, were highest in the red salmon, about three times the amount in beef and twice that in buffalo and lamb. The arachidonic acid (C20:4) content of the meats was much more similar, with pork slightly higher and chicken slightly lower than the other samples. The content of eicosapentaenoic acid (EPA), C20:5 ω 3, one of the omega 3 (ω 3 or n-3) fatty acids, was highest by a very significant margin in the canned red salmon, at approximately ten times the content of buffalo, beef, lamb or fresh fish and twenty times that of pork or chicken. Another omega-3 fatty acid, docosahexaenoic acid (DHA), C22:6 ω 3, was once again highest in the salmon, which contained three times the amount in fresh flathead but more than one hundred and thirty times as much as chicken, pork and lamb and about four hundred and thirty times the amount in buffalo and beef. The other long chain omega-3 PUFA (22:5n-3) was about the same in buffalo, beef, lamb and flathead and this was about 8 x lower than the value in salmon.

A recent report from the UK recommended that the intake of long-chain omega-3 polyunsaturated fatty acids (such as EPA or DHA) be at least 210 mg daily to promote cardiovascular health (UK Department of Health, 1997). Total levels of omega-3 fatty acids in the different meats indicated that buffalo, beef and lamb could contribute greater than 21% and 29%, respectively, of this intake in a single 100g serve of lean meat. This is substantially more than either chicken or pork, although much less than fresh or canned fish. When the ratio of ω 3 to ω 6 fatty acids is calculated, the value is by far the highest in canned red salmon, followed by fresh flathead. Of the remaining meats, lamb has the highest ratio followed by lean beef and buffalo, which is around 4.5 times that of chicken or pork.

In summary:

- The overall fat content of lean buffalo is very low (1.7%), around one-sixth that of canned red salmon.
- On a per-edible-portion basis, the amount of saturated fat present in buffalo is less than in chicken, canned red salmon, beef or lamb.
- Of the polyunsaturated fatty acids, more is in the form of ω 3 fatty acids in buffalo, beef and lamb than is present in either pork or chicken.
- More than one-third of saturated fatty acids in buffalo was stearic acid. Stearic acid, although a saturated fatty acid, does not appear to increase plasma cholesterol levels (Reiser R and Shorland FB, 1990).

- **Composition of the fat trimmed from buffalo tenderloin**

The fat content of the trimmed fat was 80% and the moisture content was 21.6%. No other measurements were conducted on this sample apart from an analysis of the fatty acids. This revealed that the sample contained 63% saturated fatty acids, 24% monounsaturated fatty acids and 3% polyunsaturated fatty acids with the balance being made up of branched and odd chain fatty acids. Since there was so little fat on the samples examined, no further comment is required.

- **Conclusions:**

Buffalo meat is a low fat, low saturated fat and low cholesterol meat with a higher content of iron than beef.

In relation to other important nutrients in meat, such as zinc and the B-group vitamins, buffalo meat compares very favorably with fat-trimmed lean beef.

Table 1 Macronutrient Composition of Commonly Consumed Raw¹ White and Red Lean Meat and Fish

NUTRIENTS PER 100 G EDIBLE PORTION: RAW, LEAN ONLY	CHICKEN	PORK	FISH 1 FRESH FLATHEAD	FISH 2 CANNED RED SALMON	BEEF	LAMB	BUFFALO
Moisture (g)	75.7	75.1	76.6	66.3	74.4	73.8	75.6
Protein (g)	20.4	21.6	21.1	21.9	21.6	20.4	21.1
Fat (g)	3.3	1.7	1.0	12.0	1.8	4.2	1.8
Energy (kJ)	466	438	395	815	450	501	430
Cholesterol (mg)	89	66	57	71	58	67	46
Sodium (mg)	82	60	97	655	54	64	na
Potassium (mg)	319	405	400	230	360	343	na
Iron (mg)	0.95	1.0	0.2	1.2	2.4	2.3	3.3
Magnesium (mg)	25	24	29	26	27	24	na
Zinc (mg)	1.4	2.2	0.6	0.9	3.6	3.4	3.1
Thiamin (mg)	0.07	0.86	tr	tr	0.09	0.12	0.09
Riboflavin (mg)	0.10	0.21	0.11	0.22	0.32	0.26	0.26
Niacin (mg)	4.0	5.5	3.4	4.5	4.8	5.6	4.1
Niacin equ.	10.7 ²	9.1	6.9	8.2	na	9.0	na
Vitamin B6	0.42	na	na	na	0.52	0.10	0.36
Vitamin B12	0.41	na	na	na	2.5	0.96	na

¹ All meats are raw except canned red salmon. ² The sum of niacin and potential niacin from tryptophan. tr = trace amounts.

na = data not available. Buffalo data is the mean of duplicate analyses.

Table 2 Fatty Acid Content of Different Raw¹ Lean Meat Protein Sources (g/100g edible portion)

FATTY ACIDS	CHICKEN	PORK	FISH 1 FRESH FLATHEAD	FISH 2 CANNED RED SALMON	BEEF	LAMB	BUFFALO
C14:0	0.03	0.020	0.034	0.377	0.062	0.122	0.021
C16:0	0.65	0.295	0.238	1.446	0.456	0.714	0.317
C18:0	0.22	0.184	0.076	0.361	0.355	0.511	0.370
C16:1	0.018	0.041	0.053	0.326	0.079	0.081	0.016
C18:1	1.14	0.453	0.236	1.840	0.727	1.286	0.449
C20:1	0.01	0.011	tr	0.289	0.015	0.048	0.010
C18:2 ω 6 ²	0.31	0.257	0.015	0.149	0.089	0.160	0.149
C18:3 ω 3	0.02	0.010	0.020	0.108	0.029	0.065	0.043
C20:3 ω 6	0.01	0.008	nd	nd	0.009	0.004	0.015
C20:4 ω 6	0.02	0.056	0.033	0.037	0.035	0.041	0.050
C20:5 ω 3	-	0.006	0.070	0.888	0.019	0.025	0.020
C22:5 ω 3	0.01	0.011	0.026	0.206	0.022	0.027	0.025
C22:6 ω 3	0.01	0.008	0.317	1.301	0.003	0.008	0.003
g saturated	0.92	0.499	0.356	2.212 ³	0.873	1.348	0.740
g monounsaturated	1.37	0.505	0.290	2.455 ³	0.821	1.414	0.475
g polyunsaturated	0.39	0.363 ³	0.516	2.689 ³	0.210	0.338	0.318
g total unsaturated	1.76	0.868	0.806	5.144	1.031	1.752	0.793
g total ω 3	0.04	0.035	0.433	2.503	0.073	0.125	0.101
g total ω 6	0.34	0.321	0.048	0.186	0.133	0.205	0.217
ω 3/ ω 6	0.12	0.11	9.12	13.46	0.55	0.61	0.45

¹ All raw meats except canned red salmon ² ω = omega ³ The sum of all FAs shown in each category.

Buffalo data are the mean of triplicate analyses. Trans fatty acids not identified in any of the analyses reported in this table.

Table 3 Source of Animal Protein Data Used In Comparisons of Nutrients

MEAT	SAMPLE TYPE AND SOURCE OF DATA
Chicken	Composite of several (skinless) cuts, Gibson J et al (1993) Composition of New Zealand Foods: 4. Poultry
Pork	Mean value of a range of cuts, Barnes JA et al (1996) Composition of New Fashioned Pork
Fish 1: Fresh Flathead	English R & Lewis J. (1989) Dept. of Commonwealth Services and Health, Nutritional Values of Australian Foods
Fish 2: Canned Red Salmon ²	English R & Lewis J. (1989) Dept. of Commonwealth Services and Health, Nutritional Values of Australian Foods
Beef	Composite of rump cuts, AMLC Master Trim Beef Study Mar. 1995
Lamb	Average of all Trim Lamb cuts, Sadler M et al (1993) (AMLC Trim Lamb Study 1992). For potassium only, mean of 7 cuts, AMLC 7-Cut Study Oct. 1996

¹ Niacin equivalents calculated by summing pre-formed and potential niacin ² Canned in brine, drained.

Table 4 Source of Animal Protein Data Used In Comparisons of Fatty Acids

MEAT	SAMPLE TYPE AND SOURCE OF DATA
Chicken	Composite of several (skinless) cuts, Gibson J et al (1993) Composition of New Zealand Foods: 4. Poultry
Pork	Leg steak, Mann NJ et al (1995)
Fish 1: Fresh Flathead	Fresh whole (including skin), calculated from Sinclair A et al (1992) using COFA lipid conversion factor (General Appendix 5, Volume 7)
Fish 2: Canned Red Salmon ¹	John West (brand with most similar lipid content -11.1%- to fish analysed for macronutrient composition) Oon KS (1997)
Beef	Rump steak, Mann NJ et al (1995)
Lamb	Leg steak, Mann NJ et al (1995)

References cited

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- UK Department of Health (1997) Report on health and social subjects, No. 46: Nutritional aspects of cardiovascular disease. Her Majesty's Stationery Office, London. P. 132

Appendix (Laboratory report details from AGAL Melbourne)

City Campus
 GPO Box 2476V
 Melbourne 3001
 Victoria Australia
 Tel +61 3 9925 2680
 Fax +61 3 9925 5241
 www.rmit.edu.au/departments/
 fs/foodsci/index.htm




Wendy Dunstan
 AGAL,
 51-65 Clarke Street,
 South Melbourne,
 Vic 3205

3/04/00

Dear Wendy,

Subject: Meat and Fat Analyses
 AGAL Quote 003RMIT1

I would like the following analyses to be conducted on the two samples of minced meat (A and B) and the one sample of fat (C) which are found in the enclosed esky.

- | | | | |
|---|----------|--|-------------------------------------|
| <p>Fat -
 Moisture
 Fat</p> | <p>A</p> | <p>voo </p> | <p>Minced Meat
 Fat</p> |
| <p>Minced meat
 Moisture,
 Protein,
 Fat,
 Energy,
 Cholesterol,
 Thiamine,
 Niacin,
 Riboflavin,
 Vitamin B6,
 Iron,
 Zinc.</p> | <p>B</p> | <p>voo </p> | |
| | <p>C</p> | <p>voo </p> | |

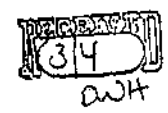
Please can you fax the results and post them with your invoice to me at your earliest convenience.

Yours sincerely,

Split multipart

Andrew Sinclair

Andrew Sinclair, PhD.
 Prof of Food Science



INTERIM REPORT OF ANALYSIS

Page: 1 of 1
Report No. AN164735

Client : RMIT CITY CAMPUS FOOD SCIENCES GPO BOX 2476V MELBOURNE VIC 3001	Job No. : RMIT07/00043 Quote No. : QT-00822 Order No. : Date Sampled : 3-APR-2000 Date Received : 3-APR-2000 Sampled By : CLIENT
Attention : ANDREW SINCLAIR Project Name : Your Client Services Manager : Wendy Dunstan	Phone : (03) 9688 1758

Lab Reg No.	Sample Ref	Sample Description
V00/008700	A	MINCED MEAT
V00/008701	B	MINCED MEAT

Lab Reg No.	Sample Reference	Units	V00/008700	V00/008701	Method
			A	B	
Trace Elements					
Iron		mg/Kg	34	33	VL247
Zinc		mg/Kg	31	31	VL247

Signed:


Roger Cromie, Trace Elements - Vic

Date: 17-APR-2000

Sample/s analysed as received.
This Report shall not be reproduced except in full.

AUSTRALIAN GOVERNMENT ANALYTICAL LABORATORIES
51 - 65 Clarke Street, South Melbourne VIC 3205
Tel: +61 3 9685 1777 Fax: +61 3 9685 1788 www.agal.gov.au

5 / 2 / # 09228888 219 :

4-5-001 5:44PM:

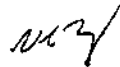
INTERIM REPORT OF ANALYSIS

Page: 1 of 1
Report No. RN157115

Client	: RMIT CITY CAMPUS FOOD SCIENCES GPO BOX 2476V MELBOURNE VIC 3001	Job No.	: RMIT07/00043
Attention	: ANDREW SINCLAIR	Quote No.	: QT-00822
Project Name	:	Order No.	:
Your Client Services Manager	: Wendy Dunstan	Date Sampled	: 3-APR-2000
		Date Received	: 3-APR-2000
		Sampled By	: CLIENT
		Phone	: (03) 9685 1758

Lab Reg No.	Sample Ref	Sample Description
V00/008700	A	MINCED MEAT
V00/008701	B	MINCED MEAT
V00/008702	C	FAT

Lab Reg No.	Sample Reference	Units	V00/008700 A	V00/008701 B	V00/008702 C	Method
Proximates						
	Moisture	g/100g	75.0	78.1	21.8	VL298_1
	Fat	g/100g	1.8	1.7	80.0	VL300_1
	Protein	g/100g	21.5	20.7	Not Tested	VL299_1
	Ash	g/100g	1.1	1.1	Not Tested	VL288_1
	Carbohydrates - Total	g/100g	0.5	0.4	Not Tested	
	Energy (kJ)	kJ/100g	440	420	Not Tested	
	Cholesterol	mg/100g	48	44	Not Tested	VL288_1
Vitamins						
	Thiamin	mg/100g	0.09	0.10	Not Tested	VL290_1
	Riboflavin (Vitamin B2)	mg/100g	0.28	0.25	Not Tested	VL290_1
	Niacin (Vitamin B3)	mg/100g	4.4	3.9	Not Tested	VL293_2
	Pyridoxine (Vitamin B6)	mg/100g	0.34	0.37	Not Tested	VL319_1

Signed: 

Craig Trenerry, Food Composition -Vio

Date: 4-MAY-2000

Sample/s analysed as received.
This Report shall not be reproduced except in full.

AUSTRALIAN GOVERNMENT ANALYTICAL LABORATORIES
51 - 65 Clarke Street, South Melbourne VIC 3205
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Buffalo lean meat and visible fat lipid and fatty acid profiles

Doc ID: 10-04-2000

Buffalo Lean meat Fatty acid concentrations (mg/100g)		Fatty acid chain lengths																				Total SFA
14:0	16:0	16:1	17:0	18:0	18:1	18:2	18:3	CLA	20:0	20:1	20:3n-6	20:4	20:3n-3	22:0	20:5	23:0	24:0	22:4n-6	22:5n-6	22:5n-3	22:6	Total SFA
19.14	304.90	14.59	20.52	35.142	412.46	146.67	41.82	7.49	3.50	8.14	15.44	50.29	1.83	3.37	20.01		nd	1.22	1.22	24.63	3.79	795.05
23.76	322.49	16.50	24.46	385.19	474.98	148.88	42.24	8.54	3.78	13.63	14.81	49.08	1.78	3.69	19.59		nd	1.35	1.22	24.75	2.76	765.37
20.81	324.19	16.80	23.12	372.13	459.67	151.93	43.44	8.82	3.69	8.73	15.74	50.93	1.90	5.73	20.45		nd	1.30	1.03	26.51	2.85	749.65
Mean	21.24	317.20	15.96	22.70	359.58	149.03	42.50	8.27	3.66	10.17	15.33	49.77	1.84	5.66	20.01			1.30	1.12	25.30	2.91	740.03
SD	2.34	10.68	1.20	2.00	17.03	32.59	2.64	0.84	0.72	0.14	3.02	0.47	1.50	0.06	0.43			0.06	0.09	1.05	0.19	32.28

Buffalo fat Fatty acid concentrations (mg/100g)		Fatty acid chain lengths																				Total SFA
14:0	16:0	16:1	17:0	18:0	18:1	18:2	18:3	CLA	20:0	20:1	20:3n-6	20:4	20:3n-3	22:0	20:5	23:0	24:0	22:4n-6	22:5n-6	22:5n-3	22:6	Total SFA
1128.15	12420.28	327.31	1272.48	21728.32	13345.13	950.78	403.02	292.30	257.41	127.75	45.81	29.61	16.26	106.38	31.40		30.87					36913.01

Buffalo lean meat and visible fat lipid and fatty acid profiles

Duo U, 10-04-2000

Total MUFA	Total PUFA	Total n-6	Total n-3
435.19	313.63	214.26	35.67
505.11	314.07	214.35	99.65
485.20	324.90	220.54	103.97
475.17	317.51	216.58	100.83
36.80	6.05	4.76	3.29

		Buffalo Lean meat Fatty acid composition (% of total fatty acid)																					
		14:0	16:0	16:1	17:0	18:0	18:1	18:2	18:3	CLA	20:0	20:1	20:3n	20:4	20:3n	22:0	20:5	23:0	24:0	22:4n	22:5n	22:5n	22:6
Mean	1.20	18.02	0.91	1.28	20.59	25.49	8.48	2.42	0.47	0.21	0.58	0.87	2.53	0.10	0.32	1.14	1.14			0.07	0.06	1.44	0.17
SD	0.10	0.16	0.03	0.07	0.34	0.86	0.25	0.08	0.02	0.00	0.16	0.05	0.17	0.01	0.01	0.05				0.00	0.01	0.06	0.02

Total MUFA	Total PUFA	Total n-6	Total n-3
13800.19	1948.54	1025.20	922.44

		Buffalo fat Fatty acid concentrations (% of total fatty acid)																						
		14:0	16:0	16:1	17:0	18:0	18:1	18:2	18:3	CLA	20:0	20:1	20:3n	20:4	20:3n	22:0	20:5	23:0	24:0	22:4n	22:5n	22:5n	22:6	
Mean	1.97	21.71	0.57	2.22	37.98	23.33	1.56	0.70	0.51	0.45	0.22	0.86	0.05	0.03	0.19	0.05				0.05	nd	nd	0.29	0.02
SD																								

**Maximising Marketing Opportunities
for Buffalo Products.**

APPENDIX 2

Buffalo Meat Sodium/Fat Analysis and Shelf Life Test Results

**Pacific Analysis Food safety Solutions
Chippendale, NSW
April 2000**



**Pacific Analysis
 Food Safety Solutions**

Divisions of Pacific Industry Services Corporation Pty Limited
 AGN 006 872 302
 140 Myrtle Street, Chippendale NSW 2008 Australia
 Telephone: +61 2 9699 0600 Facsimile: +61 2 9319 2672

FIELD FRESH MARKETING
 DERORI PTY LTD
 2 FINLAY RD
 TURRAMURRA
 NSW 2074

Handwritten:
 P.A.S. - J.F.S.
~~94-40-5215~~
 94-40-5215

Certificate of Analysis

Job Number: 00040336
 Sample Origin: R & J FINE FOODS
 Submitted By: Rod Blay
 Client Ref: NIL

Date Sampled:
 Date Rec'd: 13/04/2000

Results of Analysis

These test results apply only to the samples that were tested. Pacific Analysis makes no claim as to their statistical representation of a batch.

Sample ID	Sample Description	UB Date/Code	Date Processed
00040336001	Buffalo Burger		
	<u>Test</u>	<u>Result</u>	<u>Unit</u> <u>Method Code</u>
	Fat	1.3	% (g/100g) 1.3.F1.2
	Sodium	364	mg/100g 1.2.X1.1**
00040336002	Buffalo Sausage		
	<u>Test</u>	<u>Result</u>	<u>Unit</u> <u>Method Code</u>
	Fat	1.2	% (g/100g) 1.3.F1.2
	Sodium	385	mg/100g 1.2.X1.1**
00040336003	Buffalo Lemon & black pepper sausage		
	<u>Test</u>	<u>Result</u>	<u>Unit</u> <u>Method Code</u>
	Fat	2.9	% (g/100g) 1.3.F1.2
	Sodium	351	mg/100g 1.2.X1.1**

Handwritten: P.A.S. ✓

Pacific Analysis - Certificate of Analysis



Client: FIELD FRESH MARKETING

Job Number: 00040336

Sample ID	Sample Description	UB Date/Code	Date Processed
-----------	--------------------	--------------	----------------

Notes

Report To: ROD BLAY - R & J FINE FOODS

Fax No.: 02 9440 6245 OR

CC: File (Chem Lab)

Date: April 28, 2000

Faxed: Date: 1.5.00 Time: 9.45

Posted: 1.5.00

This Report was issued as an Interim Report on.....

Legend

- ⊗ = Calculated Result
 - * = See Comments
 - ** = These tests were subcontracted to this Lab:
- PALMS - RNSA
Document ID: pa092500

C. Pellizzer



**Pacific Analysis
 Food Safety Solutions**

Divisions of Pacific Industry Services Corporation Pty Limited
 ACN 068 872 302
 140 Myrtle Street, Chippendale NSW 2008 Australia
 Telephone: +61 2 9699 0500 Facsimile: +61 2 9319 2672

FIELD FRESH MARKETING
 DERORI PTY LTD
 2 FINLAY RD
 TURRAMURRA
 NSW 2074

Certificate of Analysis

Job Number: 00040337 Date Sampled:
 Sample Origin: R & J FINE FOODS Date Rec'd: 13/04/2000
 Submitted By: Ray Leach
 Client Ref: NIL

Results of Analysis

These test results apply only to the samples that were tested. Pacific Analysis makes no claim as to their statistical representation of a batch.

Sample ID	Sample Description	UB: Date/Code	Date Processed
00040337001	buffalo sausage		
	<u>Test</u>	<u>Result</u>	<u>Unit</u>
	Fat	4.9	% (g/100g)
	Sodium	510	mg/100g
			<u>Method Code</u>
			1.3.F1.2
			1.2.X1.1**

Notes

Report To: ROD BLAY - R & J FINE FOODS
 Fax No.: 02 9440 5245 OR
 cc: File (Chem Lab)
 Date: April 28, 2000
 Faxed: Date: 1.5.00 Time: 9.45
 Posted: 1.5.00

Legend

⊗ = Calculated Result
 ^ = See Comments
 - = These tests were subcontracted to this Lab:
 PALS - RNSH
 Document ID: 0042800

C. Pellizzer

C. Pellizzer

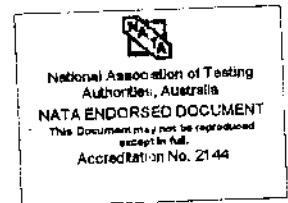
This Report was issued as an Interim Report on.....

PA-1



**Pacific Analysis
Food Safety Solutions**

Divisions of Pacific Industry Services Corporation Pty Limited
ACN 066 972 302
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R & J FINE FOODS
25 HOTHAM PARADE

ARTARMON
NSW 2064

Certificate of Analysis

Job Number: 00040249
Sample Origin: R & J FINE FOODS
Submitted By: ROD BLAY
Client Ref: NIL

Date Sampled: 12/04/2000
Date Rec'd: 12/04/2000
Sampling Temp.:
Arrival Temp.:

Results of Analysis

These test results apply only to the samples that were tested. Pacific Analysis makes no claim as to their statistical representation of a batch

Sample ID	Sample Description	UB Date/Code	Date Processed
00040249001	Buffalo, Lemon & Black Pepper Sausage	DAY 2 13/4/00	11/04/2000
	<u>Test</u>	<u>Result</u>	<u>Method Code</u>
	E. coli /g	<3	2.3.3.C2D
	Organoleptic Evaluation	A	
	Salmonella (Stage 1)	Further Testing Required	2.3.3.S5a
	Salmonella (Stage 2)	Not Detected in 25g	2.3.3.S5a
	Standard Plate Count /g	60,000	2.3.3.1a
	Water Activity	0.958	2.3.W1.1#
	pH	5.49	2.3.1.P1#
00040249002	Buffalo, Lemon & Black Pepper Sausage	DAY 6 17/4	11/04/2000
	<u>Test</u>	<u>Result</u>	<u>Method Code</u>
	E. coli /g	<3	2.3.3.C2D
	Salmonella (Stage 1)	Further Testing Required	2.3.3.S5a
	Salmonella (Stage 2)	Not Detected in 25g	2.3.3.S5a
	Standard Plate Count /g	86,000	2.3.3.1a
00040249003	Buffalo, Lemon & Black Pepper Sausage	DAY 8 19/4	11/04/2000
	<u>Test</u>	<u>Result</u>	<u>Method Code</u>
	E. coli /g	<3	2.3.3.C2D
	Salmonella (Stage 1)	Not Detected in 25g	2.3.3.S5a



Client: R & J FINE FOODS

Job Number: 00040249

Sample ID	Sample Description	UB Date/Code	Date Processed
90040249003	Buffalo, Lemon & Black Pepper Sausage	DAY 8 19/4	11/04/2000
	<u>Test</u>	<u>Result</u>	<u>Method Code</u>
	Standard Plate Count /g	65,000	2.3.3.1a

Report To: ROD BLAY - R & J FINE FOODS

Fax No.: 9437 3355 OR

cc: File(Micro Lab)

Date: April 28, 2000

Faxed: Date 28 / 4 / 00 Time: 11:45

Posted: 28 / 4 / 00

This Report was issued as an Interim Report on.....

Legend

- * = Estimated Count
- # = NATA Endorsement does not cover the performance of this service.
- ^ = See Comments
- > These tests were subcontracted to this Lab.

Document ID:



Pacific Analysis
Food Safety Solutions

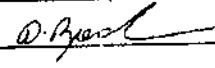
Divisions of Pacific Industry Services Corporation Pty Limited
ACN 068 872 302
140 Myrtle Street, Chippendale NSW 2008 Australia
Telephone: +61 2 9699 0500 Facsimile: +61 2 9319 2672

Analysis Comments

Comments for: Job Number: 00040249

Client: R & J FINE FOODS

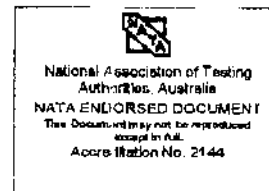
Comment: 1 The product was organoleptically evaluated on each testing day. The Product was microbiologically and organoleptically acceptable through to and including day 8. From this evaluation, the recommended shelf life would be 8 Days at refrigerated conditions of 4Deg celsius.

Name: J. Dzieciuch
Signature: 
Date: 28/4/00



Pacific Analysis Food Safety Solutions

Divisions of Pacific Industry Services Corporation Pty Limited
ACN 068 872 302
140 Myrie Street, Chippendale NSW 2008 Australia
Telephone: +61 2 9588 0500 Facsimile: +61 2 9319 2872



R & J FINE FOODS
25 HOTHAM PARADE

ARTARMON
NSW 2064

Certificate of Analysis

Job Number: 00030423 Date Sampled: 23/03/2000
Sample Origin: R & J FINE FOODS Date Rec'd: 23/03/2000
Submitted By: ROD BLAY Sampling Temp.:
Client Ref: NIL Arrival Temp.: 8.2 °C

Results of Analysis

These test results apply only to the samples that were tested. Pacific Analysis makes no claim as to their statistical representation of a batch.

Sample ID	Sample Description	UB Date/Code	Date Processed
00030423001	Buffalo Topside Mince	29/3/00 TEST 23/3/00	
	<u>Test</u>	<u>Result</u>	<u>Method Code</u>
	E. coli /g	<3	2.3.3.C2D
	E. coli 0157	Not Detected in 25g	2.3.3.C2g#
	Organoleptic Evaluation	^	
	Salmonella (Stage 1)	Further Testing Required	2.3.3.S5a
	Salmonella (Stage 2)	Not Detected in 25g	2.3.3.S5a
	Standard Plate Count /g	25000	2.3.3.1a
	Sulphur Dioxide	Not Detected	1.3.S8 1
00030423002	Buffalo Topside Mince	29/3/00 TEST 25/3	
	<u>Test</u>	<u>Result</u>	<u>Method Code</u>
	E. coli /g	<3	2.3.3.C2D
	Salmonella (Stage 1)	Further Testing Required	2.3.3.S5a
	Salmonella (Stage 2)	Not Detected in 25g	2.3.3.S5a
	Standard Plate Count /g	31,000	2.3.3.1a



Pacific Analysis - Certificate of Analysis

Client: R & J FINE FOODS

Job Number: 00030423

Sample ID	Sample Description	UB Date/Code	Date Processed
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Report To: ROD BLAY - R & J FINE FOODS

Fax No: 9437 3355 OR

CC:

File(Micro Lab)

Date: April 28, 2000

Faxed Date 28/4/00 100 Time: 11:45

Posted: 28/4/00

Legend

- * = Estimated Count.
- # = NATA Endorsement does not cover the performance of this service.
- = See Comments
- = These tests were not contacted to this Lab.

Document ID:

This Report was issued as an Interim Report on.....



Pacific Analysis Food Safety Solutions

Division of Pacific Industry Services Corporation Pty Limited
ACN 068 872 302
140 Myrtle Street, Chippendale NSW 2008 Australia
Telephone: +61 2 9699 0500 Facsimile: +61 2 9319 2872

Analysis Comments

Comments for: Job Number: 00030423

Client: R & J FINE FOODS

Comment: 1 The product was organoleptically evaluated on each testing day. The Product was microbiologically and organoleptically acceptable up to and including 48 hours from receipt. Storage conditions were at 4 deg celsius.

Name: D. Dziedziczak
Signature: *D. Dziedziczak*
Date: 28/4/00

Report: pa/jfu_comm.vpr

2 of 3

Job Number: 00030423

**Maximising Marketing Opportunities
for Buffalo Products.**

APPENDIX 3

Buffalo Meat Shelf Life Test Results

**micro tech Laboratories (NSW)
Sydney, NSW
May 2000**

ATTENTION: Ray Leach
FIELD FRESH MARKETING
PO Box 383
TURRAMURRA NSW 2074

SAMPLE: **SHELF LIFE STUDY ON BUFFALO MEAT**
Samples received 7 April 2000
Testing Commenced on 7 April 2000.

RESULTS: See Over

The data pertains solely to the analytical and sampling procedure(s) used and the condition and homogeneity of the sample(s) as received. The data therefore may not be representative of the lot or batch or other samples. Consequently the data may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or any other legal proceeding. This report does not imply that Microtech has been engaged to comment upon the consequences of the analysis and for any action that should be taken as a result of the analysis.

Date: 4.05.00

Louise Walker B.App.Sc.MASM, AAFST
Consultant Microbiologist

Page 1 of 2 - Lab Ref No: 06325-28BJ

A) Prime Cut

	TVAC @ 25°C M2.4 Cfu/g	TVAC @ 5°C M2.4 Cfu/g	Pseudomonas Count Cfu/g Client Method ALS	Appearance	Odour	Colour
Day 0 - 06216BJ	5,800,000	11,000,000	<100	Acceptable	Acceptable	Acceptable
Day 7 - 06325BJ	180,000,000	130,000,000	16,000	Acceptable	Unacceptable	Marginal
Day 10 - 06326BJ	180,000,000	220,000,000	3,000	Unacceptable	Unacceptable	Unacceptable

(B) Mince

	TVAC @ 25°C M2.4 Cfu/g	TVAC @ 5°C M2.4 Cfu/g	Pseudomonas Count Cfu/g Client Method ALS	Appearance	Odour	Colour
Day 0 - 06327BJ	200,000,000	78,000,000	27,000	Acceptable	Acceptable	Acceptable
Day 7 - 06328BJ	140,000,000	180,000,000	9,300	Marginal	Unacceptable	Marginal

**Maximising Marketing Opportunities
for Buffalo Products.**

APPENDIX 4

Buffalo Meat Sensory Evaluation

**Food Factotum
Birchgrove, NSW
May 2000**

Tania Campbell
part of
the food factotum group

4 ballast point road, birchgrove 2041
t:02 9818 5654 ~ 0414 761 772
f: 9918 4096

FAX TO: RAY LEACH
FAX NO: 94405245
FAX FROM: TANIA CAMPBELL
SUBJECT: SENSORY EVALUATION OF BUFFALO MEAT

Dear Ray,
As promised, I enclose the guest list and cooking methods for each of the selected cuts.

Evaluators:-
Lyndey Milan - Food Director Woman's Weekly Magazine
Max Lake - Sensory Expert/ author
Marguerite Morgan - Max Lake's assistant
Sally Hammond - The Sun Herald
Maureen Simpson - Food Writer House & Garden
Ray Leach - Field Fresh Marketing - Buffalo
Mr & Mrs Greg Giblett - Buffalo Producer
Jan & David Robertson - Buffalo Producer

Invites were sent to the following - all showed interest in the product and I have promised that each of them would receive information when the product is ready for market.:-

Heleen Greenwood - Writer The Sydney Morning Herald
Jane Barnes - Nutritionist with Buffalo
Anneka Manning - Food Editor Australian Good Taste
Jan Purser - Nutritionist Australian Good Taste
Janelle Bloom - Food Presenter 'What's Cooking?'
Peter Howard - Food Editor Today Show - channel nine
Christine Salims - Canberra Times
Sheridan Rogers - The Sunday Magazine - Sun Herald
Scott Bowles - The Sun Herald
Margaret Fulton - New Idea

COOKING METHODS - Ray, these methods would need to be tested and retested before submitting as cooking method for any packaging.

STRIPLOIN - 1 inch thick steaks
Coated in light olive oil and seared on both sides over high heat on stainless steel hotplate, allowed to cook on hotplate for approximately 2-3 minutes- rested for 5 minutes off heat in warm spot.

TENDERLOIN - 1 inch thick steaks
Coated in light olive oil and seared on both sides over high heat on stainless steel hotplate, allowed to cook on hotplate for approximately 2-3 minutes- rested for 5 minutes off heat in warm spot.

SCOTCH FILLET - 756g roast
Coated in light olive oil and seared on both sides over high heat on stainless steel hotplate, placed in 200°C oven for 25 minutes- rested for 20minutes off heat in warm spot.

OYSTER BLADE -
as one piece, coated in light olive oil and seared on both sides over high heat on stainless steel hotplate, then placed in a light veal stock to simmer in 160°C oven for 5 hrs. Remove from liquid allowed to rest 5 minutes

SAUSAGES & BUFF BURGER
Cooked over low heat to cook through and then heat was increased to brown outside.

TANIA CAMPBELL

SENSORY EVALUATION BUFFALO MEAT TUESDAY 2 MAY 2000 RESTAURANT MOZAIC ANALYSIS OF RESULTS

The acceptability rating of buffalo meat as a whole was generally high and was received with great enthusiasm.

Obviously the finest cut, the tenderloin, scored the highest, but surprisingly the ready-made products such as the plain and lemon & black pepper sausages as well as the Buff Burger rated extremely well.

These ready made products makes great use of secondary cuts usually so hard to sell.

Surprisingly the striploin, usually such a commercially viable beef product, rated lower than anticipated.

STRIPLOIN

This product rated a low 65% in the overall acceptability rating.

It was the first tasted and set a bench mark for further sensory tastings. It was commented that people often score lower on the first tasting.

Tenderness and texture both rated lowly with comments such as chewy, slightly coarse and variable between pieces.

Important to note that one evaluator commented that the flavour was slightly tainted with a sour urine flavour - is this hormonal or has the beast been desexed?

TENDERLOIN

This product was by far the best with an overall acceptability rating of 82.5%.

Obviously, as the finest cut, it is hard to improve on.

Again, important to note that one evaluator commented that the flavour was slightly tainted with a sour urine flavour - is this hormonal or has the beast been desexed?

SCOTCH FILLET

This product rated well with an overall acceptability rating of 71%.

This rated highly in flavour, tenderness and appearance, with texture rating slightly lower at 66%.

Some did comment that it was slightly chewy and it has been noted that the taste was somewhat tainted with a sour vacuum pack flavour.

OYSTER BLADE

This product rated highly in the overall acceptability rating of 76%.

It was suggested by nearly all evaluators that this was overcooked - 5hrs instead of the suggested 3hrs. This skewed the result slightly and meant that many commented that the blade was dry and shredded - this is not representative of the product. However, the blade scored highly despite the cooking time.

A good product with loads of potential for winter cooking.

PLAIN SAUSAGE

This product rated well with an overall acceptability rating of 69%.

This rated highly in both flavour and appearance but texture and tenderness seemed to be lacking. Nearly all evaluators suggested the fat levels needed to be increase to improve the dry mouth feel. The addition of chickpea flour, tomato or a mono-unsaturated fat may also improve this.

LEMON & BLACK PEPPER SAUSAGE

This product rated well with an overall acceptability rating of 72.5%.

Again, this rated highly in both flavour and appearance but texture and tenderness seemed to be lacking. Nearly all evaluators suggested the fat levels needed to be increase to improve the dry mouth feel. The addition of chickpea flour, tomato or a mono-unsaturated fat may also improve this.

SKINLESS PAR-COOKED SAUSAGE

This product did not rate highly achieving a low 60% in the acceptability rating.

The concept was seen as having immense possibilities for the food service industry but for a mainstream market such as clubs etc.. rather than restaurants.

The appearance failed - it was seen to be particularly unappealing in raw form - the cooked product was passable.

The texture is a little too smooth and it was commented that "it could be confused with a vegetarian sausage". A coarser grind would eliminate this.

The flavour was quite salty and a heavy curry flavour was detected.

This product would need to be worked on to provide a better appearance in raw form, a tastier flavour and a less smooth mouth feel.

BUFF BURGER

The general consensus was very positive with an overall acceptability rating of 70%.

Reoccurring comments suggested that the texture was a little too solid, to counteract this - addition of chickpea flour or a mono-unsaturated fat would loosen it up as would a coarser grind.

Overall, flavour rated highly, but it was suggested that a little cumin would lift the taste.

**Maximising Marketing Opportunities
for Buffalo Products.**

APPENDIX 5

Graphic Design Quotation

**Ken Foster
Front Design
Chippendale NSW**



1/6/2000

Ray Leach
Field Fresh Marketing
PO Box 383
Turramurra NSW 2074

Front Design Pty Ltd
ACN 901 987 220
Graphic Designers
27-29 Wellington St
Chippendale
Sydney NSW 2008
Australia
Phone 02 9310 3875
Fax 02 9690 1561

Hello Ray,

Following our meeting on Friday 26th May regarding the processing, distribution and marketing of buffalo meat in NSW, I have prepared a proposal detailing Front Design's part in this project. As with our previous proposals I have outlined 3 stages:

Stage 1. Research

Stage 2. Logo Design

Stage 3. Design and production of product labels

The Brief

The Buffalo Producers of NSW are considering marketing buffalo meat to the premium meat market in Sydney. Under the name Tenderbuff, the meat would be marketed to fine restaurants, specialty grocery stores and a limited number of supermarkets. The product range would include fillet steak, striploin, sausages, mince etc and would be packaged in cryovac packs, plastic trays with clear film wrap and plastic bags.

Your investment for Front Design to undertake this project:

Project 20236 - Design of logo and labels	
Stage 1 - Briefing meeting, research stores and supermarkets for premium meat products, gather packaging samples, review	\$500.00
Stage 2 - Design logo ideas, present for review, amend logo ideas if necessary, present final logo design, prepare logo for use on various packaging, liaise with Field Fresh Marketing	\$1,700.00
Stage 3 - Gather all relevant information, design label ideas, present for review, amend label ideas if necessary, apply for barcodes, present final label design, prepare for printing, arrange printing of labels and plastic bags, liaise with Field Fresh Marketing	\$900.00
Expenses - laserprints, colour laserprints, couriers, express postage, email/fax	\$369.00
Expenses - film separations for 1 x 2 colour label and 3 colour print onto plastic bags.	\$287.50
GST on design and expenses	\$375.65
Total	\$4,132.15

Following are ballpark costs for packaging material. When specific bags sizes and quantities are known we can refine these costs.

Internet www.frontdesign.com.au
Email frontdesign@frontdesign.com.au

Packaging Costs – ballpark estimates

Packaging Materials	Estimated cost for each unit	Estimated cost for 1000	Estimated cost for 5000
Black plastic trays – including soaker pad, lidding material (cling wrap) – GST included	.275c	\$275.00	\$1375.00
Label – 85 x 125mm printed in 2 colours on adhesive backed paper – GST included	.49c	\$493.46	\$1072.00
Plastic bags printed in 3 colours – GST included	.45c	\$450.00	\$2250.00

Our Tasks

Front Design will approach this project in stages:

Stage 1 - Research

We would contact and/or visit premium meat retailers and packagers to gather information and samples of:

- packaging and display strategies of similar products
- competitor labels and graphics

Stage 2 – Logo Design

We will present 6-8 logo ideas to Field Fresh and other members of the producers association for review and comment. Our design approaches will:

- explore a logo based on the name Tenderbuff
- explore a logo using a symbol to accompany the word Tenderbuff
- reflect quality, specialty, freshness and health

We anticipate that there will be amendments and revisions required to the logo before the final version is accepted and have allowed for 2 sets of revisions as a part of this proposal.

Stage 3 - Design and production of product labels

Once the logo design is accepted, we will begin work on labels for the trays and plastic bags, including:

- gathering all required text, and nutritional panel information
- arranging the supply of barcodes for the packaged product
- design (2-3) ideas for the label design
- present these with samples of the suggested trays and plastic bags

As with the logo design we anticipate that the label design may require amendments and revisions before the final version is accepted and we have allowed for 2 sets of revisions as a part of this proposal.

Our initial packaging recommendations

At this point we suggest black plastic trays (190 x 144 x 40mm) be used for products suitable for sale in supermarkets and specialty grocers. (sausages, mince, striploin, oyster blade?) These trays are usually sealed with cling plastic with an adhesive label applied on top. Each specific product suited to tray packaging would require its own label if there were 3 to 4 products.

2

label at packing time. This would require further intervention by the processing company and may not result in a high quality label.

The bags could be used for product such as fillets, striploin, oyster blade and sausages sold to restaurants. A shrinkable barrier plastic bag is suggested and it would be printed in 3 colours. Whether the product is cryovaced or simply packed in plastic bags is not clear at this point.

The Fine Print

This proposal is based on my understanding of your requirements; it includes estimates of costs for the undertaking the work described above. Costs for design and expenses may vary by up to 10% without notice. Should the need arise for further meetings or reiterations of designs or authors corrections beyond those that I have estimated for, they will be charged for at a rate of \$100/hour.

Your Assurance

At every stage of production, your project will receive the best care and attention to detail from our creative team.

Your Guarantee

With your input, we will prepare a comprehensive timeline for the completion of your promotion, and we will guarantee completion on or before this agreed date.

Ray, thank you for the opportunity to submit this proposal, I trust I have addressed the brief accurately. I will call you at 1:00pm on Friday 2 June to discuss our proposal and to answer any questions you may have.

Yours sincerely,



Ken Foster

**Maximising Marketing Opportunities
for Buffalo Products.**

APPENDIX 6

Product Marketing Management Quotation

**Rod Blay
R&J Fine Foods
Artarmon NSW**

R & J fine foods

a division of T. Surf Australia Pty. Ltd. acn 066 551 504

26 May 2000

FIELD FRESH MARKETING

FAX: ~~9440 5245~~ 9440 5245

ATTENTION: RAY LEACH

Dear Ray,

RE: BUFFALO PRODUCTS

We would like to thank you for the opportunity to tender our quotation.

The following quotation allows for all ingredients and packing. It does not allow for meat purchasing.

Owing to the variable weight of the products, it is necessary to break the pricing into two categories. The total cost will be a combination of the two.

1. Product cost per KG.
2. Packing, pricing and delivery per carton of 12 of 8.

TO MANUFACTURE PRODUCT

Buffalo Burgers	3.30 per kg
Buffalo Sausages	3.70 per kg
Buffalo, Lemon and Black Pepper Sausages	3.55 per kg
Buffalo, Sundried Tomato and Basil Sausages	3.60 per kg

25 Hitcham Parade, Artarmon NSW 2064
phone: 9440 4200 fax: 9437 3355

R & J fine foods

a division of T. Gird Australia Pty Ltd. acn 066 591 504

TO PACK PRICE & DELIVER

BURGER: To overwrap with 17M meat film, apply one price label, pack in shipping carton with protective packing between layers and deliver to metropolitan stores currently serviced by R & J Fine Foods as discussed.

- Per carton of 12 \$6.50
- Per carton of 8 \$5.50

SAUSAGES: To cut and grade individual sausages, pack into 8 X 5 deep black premium "styrofoam" tray using Dri-loc black soaker, overwrap with 17M meat film, apply one price label, pack in shipping carton and deliver to metropolitan stores currently serviced by R & J Fine Foods as discussed.

- Per carton of 12 \$12.20
- Per carton of 8 \$9.70

I know you are happy with the sundried tomato sausage but I would recommend upgrading a little with the addition of sliced semidried tomatoes. The price would be:

Buffalo, Semidried Tomato and Basil Sausages 4.05 per kg

Ray, if the price meets approval, I can assure you that your product would be treated with the same care and integrity as our own.

Regards,



Rod Blay

25 Hochem Parade, Artarmon NSW 2064
phone: 9966 4808 fax: 9437 3055

5039

669