Final report

Kilcoy Global Foods Nutraceutical Strategy – Phase 2

Project code:	P.PSH.1472
Prepared by:	Craig Coleby Coleby Process Consulting Pty Ltd
Date published:	26 July 2024

PUBLISHED BY
Meat & Livestock Australia Limited
PO Box 1961
NORTH SYDNEY NSW 2059

This is an MLA Donor Company funded project.

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

Abstract

The recently completed project - P.PIP.0591 - Kilcoy Global Foods (KGF) Nutraceutical strategy, successfully identified and demonstrated the operational feasibility of harvesting organs and glands from the chain, converting the wet materials to dry milled powders suitable as ingredients for the nutraceutical industry.

Further critical work in identifying, establishing relationships with, and understanding the nutraceutical ingredient supply chain was the key focus of this phase 2 project.

The project determined, through plant trials, spray drying of ground organs to be a more cost-effective drying process than freeze-drying, resulting in a fine free flowing powder without milling. Prior to spray drying a hydrolysation step is required.

Drying the offal into powders for the food supplementation and petfood markets can provide a more consistent and reliable outlet, maximising the organs' nutritional benefits, and providing returns 5-15 times that of frozen whole organs and 100 times the value from rendering at a red meat processing site.

Converting wet offal into a dried shelf stable, nutrient dense products allows the wider Australian red meat and livestock industry to play in world markets where traditionally there has been no presence.

The processing of beef offal into hydrolysed spray dried powders requires strong partnerships with food processors willing to invest in and develop technologies that provide optimal processing conditions to maximise the value of the dried ingredients to the food and pet food industries.

Executive summary

Background

The recently completed project - P.PIP.0591 - Kilcoy Global Foods (KGF) Nutraceutical strategy, successfully identified and demonstrated the operational feasibility of harvesting organs and glands from the chain, at the viscera table or from the offal room and converting the wet materials to dry milled powders suitable as ingredients for the nutraceutical industry.

This phase 2 project built and tested business model innovations for KGF to identify and establish key resources and relationships for an Australian Beef nutraceutical ingredient supply chain.

Strategic supply chain opportunities are an important area of focus. Trading relationships are built on key purchase criteria rather than purely priced focus. Recognising the complexity of supplier approval, once gained, business opportunities are longer term. It is vital to better research and understand the value chain across nutraceutical sourcing.

Objectives

- Nutritional Information Panels (NIPs) and Product Information Forms (PIFs) will be generated for: Grainfed & Grassfed Liver, Grainfed & Grassfed Hearts, and Grainfed & Grassfed Lungs**.**
- Establishment of a third-party processor to set up manufacturing protocols that delivery products as per NIP's & PIF's and establish the processes for packing, storage and distribution of these finished products. These specifications are key requirements of food and nutraceutical ingredient declarations to describe typical nutritive values, allergens and other product characteristics.
- Development and testing of preliminary marketing mix assets required to support the Kilcoy Global Food sales and marketing teams with the selling and distribution of the 6 developed nutraceutical products.

Methodology

Spray drying of ground organs was trialled at a third-party processor to determine if a quicker more cost-effective drying process could be achieved with greater capacity. All product and processing were undertaken in a commercial mode with cuts harvested and derived powders sampled from operational batches.

Spray dried products were sent for analytical and microbiological analysis in a NATA accredited testing laboratory to determine information required for nutritional information panels and to determine other nutritional benefits.

Product Specifications including NIP and nutritional analysis and benefits were prepared.

Marketing materials such as product brochures, web page, show banners and informational video were prepared.

Results/key findings

Spray drying of ground organs was trialled by a third-party processor, Bellarine Foods, and determined to be a more cost-effective drying process still resulting in a fine free flowing powder without milling. Prior to spray drying a hydrolysation step is required.

Associated health benefits of beef organs include the abundant source of vitamins, including preformed vitamin A (retinol), B group vitamins, especially B12, highly useable forms of iron and rich amounts of trace minerals including copper, and zinc.

Dried organs are generally produced by freeze-drying. The Kilcoy nutrition range is uniquely produced using a spray dried process. The lower energy and environmental benefits of using spray drying are described in the brochures.

The provenance of the organ powders and product certifications are highlighted in the brochures. These include hormone free, antibiotic free, GMO free, HACCP certified, Halal certified, Livestock welfare.

Benefits to industry

Drying the offal into powders for the food supplementation and petfood markets can provide a more consistent and reliable outlet, maximising the organs' nutritional benefits, and providing returns 5-15 times that of frozen whole organs and 100 times the value from rendering.

Harvesting and drying organs takes a fifth quarter product, maximising its nutritional and sales value, increasing the returns on every slaughtered carcase.

Converting wet offal into a dried shelf stable, nutrient dense products allows the industry to play in world markets where traditionally there has been no presence.

Future research and recommendations

A stable production process will be required to ensure consistent product delivery demanded by ingredient purchasers. Iteratively, these will further validate Bill of materials, yields and standard operating procedures for KGF.

The processing of beef offal into hydrolysed spray dried powders requires strong partnerships with food processors willing to invest in and develop technologies that provide optimal processing conditions to maximise the value of the dried ingredients to the food and pet food industries.

Table of contents

1. Background

1.1 Nutraceutical Strategy

According to the MLA 2025 strategic plan, "Currently, 20% of the carcase delivers 80% of its value, with some parts of the carcase considered as waste, attracting little or no value. A focus on market and product diversification could start to shift this mix. Changes in consumer behaviour and lifestyle choices are affecting how, when and why consumers eat certain foods. Current and emerging global trends around convenience, snacking, personalised nutrition and wellness offer new usages and occasions for red meat beyond the traditional centre of plate protein."

Nutraceuticals is a broad umbrella term that is used to describe any product derived from food sources with extra health benefits in addition to the basic nutritional value found in foods. Nutraceutical products can be considered non-specific biological therapies used to promote general well-being, control symptoms, and prevent malignant processes.

As of 2020, the global nutraceutical market was valued at US$320 billion. Consumers are increasingly seeking health-boosting products. As a result, the global nutraceutical market is expected to grow from US$353 billion in 2021 to $US658 billion in 2028 at a compound annual growth rate (CAGR) of 9.3%.

1.2 Kilcoy Global Foods Previous Work

The recently completed project - P.PIP.0591 - Kilcoy Global Foods (KGF) Nutraceutical strategy, successfully identified and demonstrated the operational feasibility of harvesting organs and glands from the chain, at the viscera table or from the offal room and converting the wet materials to dry milled powders suitable as ingredients for the nutraceutical industry.

Freeze-drying was shown to be an effective means of converting wet materials to dry milled powders suitable as ingredients for the nutraceutical industry. However, for larger volumes, freeze drying capacity and cost was found to be limiting.

It also identified that the value multiplier for wholesale sales to the nutraceutical industry of at least 100 times compared with rendering, and 5-15 times compared with whole frozen sale, should also be applicable across the red meat industry.

1.3 Kilcoy Global Foods Phase 2 Work

This phase 2 project built and tested business model innovations for KGF to identify and establish key resources and relationships for an Australian Beef nutraceutical ingredient supply chain. This included identifying any local partners and if local freeze-dried powder sales are possible or if sales must be to overseas markets in the Middle East, Europe and USA and what is the required value chain design. A preliminary marketing mix was also designed and tested based on an initial 6 beef products.

Strategic supply chain opportunities are an important area of focus. Trading relationships are built on key purchase criteria rather than purely priced focus. Recognising the complexity of supplier approval, once gained, business opportunities are longer term. It is vital to better research and understand the value chain across nutraceutical sourcing.

The marketing and sales processes for dry ingredients is different from sales of red meat and fresh/frozen co products and also from meat and bone meal and tallow. A new understanding and skill set is required to realise the potential value increase to the red meat industry.

2. Objectives

2.1 Product Specifications

NIPS and PIFs will be generated for

- Grainfed & Grassfed Liver

- Grainfed & Grassfed Hearts, and

- Grainfed & Grassfed Lungs

Product specifications for the food ingredient market and the animal nutrition market were prepared for the three spray dried powders and include the Nutritional Panel Information as well as additional nutritional information obtained in the analyses.

2.2 Processing

Establishment of a third-party processor to set up manufacturing protocols that delivery products as per NIP's & PIF's and establish the processes for packing, storage and distribution of these finished products.

Spray drying has been determined as the most effective processing to achieve dried organ powders.

A third-party processor has been identified and engaged to spray dry the beef organs. Manufacturing protocols have been established to allow conversion of the whole organs to a dried powder through spray drying. Processes for packing and storage have been established.

2.3 Marketing Assets

Development and testing of preliminary marketing mix assets required to support the Kilcoy sales and marketing teams with the selling and distribution of the 6 developed nutraceutical products. These assets should include, but not be limited to,

- Brochures / Catalogue (including digital assets)

- Video Files highlighting the range and production processes

- Sample packs to be distributed to potential customers.

- Road Show Assets (banners, flyers, posters, story boards)

Digital Assets to be developed in multiple languages relevant to potential customers for market feedback.

Marketing assets have been developed including brochures, show banner, and web page highlighting the product and processing benefits of the three dried beef organs, heart, liver and lung.

Samples have been sent to potential customers and users.

3. Methodology

3.1 Manufacturing Protocols

3.1.1 Spray Drying

Spray drying of ground organs was trialled at a third-party processor to determine if a quicker more cost-effective drying process could be achieved with greater capacity.

3.1.2 Freeze-Drying

Freeze-drying trials were conducted in phase 1. The costs to harvest, freeze, and dry were determined in Phase 1. Freeze-dried samples were also obtained in phase 1.

3.1.3 Product Analysis

Comparisons were made between the freeze dried and spray dried products.

In phase 2 spray dried products were sent for analytical and microbiological analysis in a NATA accredited testing laboratory to determine information required for nutritional information panels and to determine other nutritional benefits.

3.2 Product Specifications

3.2.1 Nutrition Information Panel

Information required for the nutrition information panel were determined on a per 100g basis. As the information was to be supplied to a manufacturer, and not directly used for retail labelling a serving size cannot be determined.

3.2.2 Other Nutritional Information

Further Nutritional information including vitamins, minerals and fatty acids were analysed to provide information on the nutritional benefit of the spray dried organs.

3.2.3 Nutritional Benefits

The analytical information obtained for each of the powders was compared with the Recommended Dietary intakes included in the Food Standards Code.

3.2.4 Product Specifications

Product specifications for distribution to customers were prepared for:

- Grass Fed Beef Heart Powder – Food
- Grass Fed Beef Heart Powder – Petfood
- Grass Fed Beef Lung Powder – Food
- Grass Fed Beef Lung Powder – Petfood

- Grass Fed Beef Liver Powder – Food
- Grass Fed Beef Liver Powder – Petfood

3.3 Marketing Assets

3.3.1 Product Brochure

The information obtained by product analysis on the nutritional properties and nutritional benefits of the dried beef organs was used to develop product brochures for the three beef organ products being liver, heart and lungs. Key messages were developed for both food and pet applications.

3.3.2 Product Show Banner

Product Show Banners were created for use at trade shows to promote premium beef organ food supplements.

3.3.3 Product Web Page

Information prepared for the brochures was adapted for use in a Kilcoy Nutrition web page for food supplements and pet products.

3.3.4 Video Shoot

A storyboard for a video shoot was developed to showcase the KGF MDC collaboration that allowed the development the dried beef organ products. Once approved a video was shot and edited to allow posting on the MLA YouTube site.

4. Results

4.1 Manufacturing Protocols

4.1.1 Spray Drying

Spray drying of ground organs was trialled by a third-party processor, Bellarine Foods, and determined to be a more cost-effective drying process still resulting in a fine free flowing powder without milling. Prior to spray drying a hydrolysation step is required. Minor processing aids and additives are used to stabilise the products. For petfood further adjustments are made to enhance the flavour.

4.1.2 Freeze-drying

Freeze drying was trilled in Phase I. The extensive drying time requires multiple, (>13), freeze dry units and labour to load and unload the drying trays. It is a method of complex drying equipment, the largest energy consumption, the highest cost of drying method. Given the success and quicker dying, and greater throughput achieved with spray drying it was decided not to pursue freeze drying of beef organs.

4.1.3 Product Analysis

Samples of the spray dried powers were analysed by a NATA accredited testing laboratory. Major components such as protein and fat levels were monitored on each run. Once the process had been stabilised more comprehensive testing was conducted. Key results are summarised below in **Table 1** for each powder and presented in full in Appendix 1.

Table 1 Analytical results of powders

Parameter	Units	Liver Powder	Heart Powder	Lung Powder	Adult RDI
Nutrition Panel					
Energy	kJ/100g	1480	1570	1510	
Protein	g/100g	30.7	34.1	6.6	
Fat	g/100g	7.6	11.3	11.7	
Fat, saturated	g/100g	3.0	7.8	6.9	
Carbohydrate	g/100g	40	34	57	
Sugars	g/100g	3.5	11	3.4	
Sodium	mg/100g	2020	2330	4550	
Moisture	g/100g	6.8	5.1	6.2	
Ash	g/100g	14.7	15.2	18.9	
Vitamins					
Thaimin B1	mg/100g	0.12	0.13	0.39	1.1 mg
Riboflavin B2	mg/100g	0.79	1.4	3.2	1.7 mg
Niacin B3	mg/100g	2.6	3.9	5.3	10 mg
Pantothenic acid B5	mg/100g	0.46	0.79	4.3	5 mg
Pyridoxine B6	mg/100g		0.21		
Cobalamin B12	µg/100g	9.5	13.1	53.8	2.0 µg
Ascorbic Acid Vitamin C	mg/100g		1.5		
Retinol, Vitamin A	µg/100g	90	62	4100	750 µg
Minerals					
Phosphorus	mg/kg	47800	40300	33700	1000 mg
Potassium	mg/kg	8950	11200	9280	
Selenium	µg/kg	250	210	390	70 µg
Zinc	mg/kg	36	33	78	12 mg
Iron	mg/kg	190	120	190	12 mg
Copper	mg/kg	3.5	5.3	62	3.0 mg
Magnesium	mg/kg	330	640	620	320 mg

Microbiological analysis was also carried out for the three organ types and summarised below in **Table 2**. Total plate count readings were all low while pathogens were not detected.

Table 2 Microbiological results of powders

Parameter	Units	Liver	Heart	Lung
Total Plate Count	CFU/g	1500	50	50
E. coli	MPN/g	<3	<3	<3
Staphylococcus (coag. positive)	CFU/g	<100	<100	<100
Salmonella	In 25g	Not detected	Not detected	Not detected

4.2 Product Specifications

4.2.1 Nutrition Information Panel

Analysis of the spray dried powders has allowed the completion of the information for a Nutrition Information Panel as required by the (Food Standards Australia New Zealand, n.d.) Chapter 1.2.8-6.

This information can be seen in the product specs, Appendix 2 and **Table 1**

The provision of this information is necessary for customers to calculate nutrition information data for the panels required for their formulated or retail products.

4.2.2 Other Nutritional Information

Associated health benefits of beef organs include the abundant source of vitamins, including preformed vitamin A (retinol), B group vitamins, especially B12, highly useable forms of iron and rich amounts of trace minerals including copper, and zinc. The analyses include levels of these vitamins and minerals, as shown in **Table 1**. The Recommended Dietary Intake, RDI, or Estimated Safe and Adequate daily intake, ESADDI, levels are included in **Table 1** for the vitamins and minerals found in the spray dried organs. These intakes are taken from the (Food Standards Australia New Zealand, n.d.) S1-2 and S1-3.

A food is a good source of a vitamin or mineral if a serving of the food contains no less than 25% *RDI or *ESADDI for that vitamin or mineral.

4.2.3 Nutritional Benefits

While the intended inclusion of the organ powders by customers is not known, and therefore the intended serving size is not known, if we assume a serving includes 10g of the beef organ powders we can calculate a comparison against 25% of the RDI. This is shown in **Table 3**

Table 3 Vitamins and minerals in 10g powder

Vitamins	Units	Liver Powder	Heart Powder	Lung Powder	25% of RDI
Thaimin B1	mg/10g	0.012	0.013	0.039	1.1 mg
Riboflavin B2	mg/10g	0.079	0.14	0.32	1.7 mg
Niacin B3	mg/10g	0.26	0.39	0.53	10 mg
Pantothenic acid B5	mg/10g	0. 046	0. 079	0.43	5 mg
Cobalamin B12	µg/10g	0.95	1.31	5.38	2.0 µg
Retinol, Vitamin A	µg/10g	9.0	6.2	410	750 µg
Minerals					
Phosphorus	mg/10g	478	403	337	250 mg
Potassium	mg/10g	89.5	112	92.8	
Selenium	µg/10g	2.50	2.10	3.90	17.5 µg
Zinc	mg/10g	0.36	0.33	0.78	3 mg
Iron	mg/10g	1.90	1.20	1.90	3 mg
Copper	mg/10g	0.035	0.053	0.62	0.75 mg
Magnesium	mg/10g	3.30	6.40	6.20	80 mg

So, while the spray dried powders do contain useful amounts of vitamins and minerals, at a serving of 10g, only the lung powders can be stated as a good source of Cobalamin B12, providing more than 25% of the RDI, and all powders can claim to be a good source of phosphorus.

Vitamin and mineral levels are lower than freeze dried whole organs. Some of this may be due to the processing steps and spray drying process. Future batches will be retested.

4.2.4 Product Specifications

Product specifications provided by food ingredient suppliers were reviewed to determine the information required by customers on a spray dried powder ingredient specification. Learnings from Phase 1 were also used in the development of the specification template. The developed specifications were assessed by potential customers and accepted.

Specifications for the food ingredient market and animal nutrition market were prepared for the three spray dried powders and include the Nutritional Panel Information as well as additional nutritional information obtained in the analyses. These are included as Appendix 2.

- **Grass Fed Beef Heart Powder**
  Australian Spray Dried Grass fed & Grass Finished Beef Heart Powder. Hormone free, Halal Certified
- **Grass Fed Beef Lung Powder**
  Australian Spray Dried Grass fed & Grass Finished Beef Lung Powder. Hormone free, Halal Certified
- **Grass Fed Beef Liver Powder**
  Australian Spray Dried Grass fed & Grass Finished Beef Liver Powder. Hormone free, Halal Certified

4.3 Marketing Assets

4.3.1 Product Brochure

Two tri-fold product brochures were prepared for Food supplements and Pet Nutrition. Both brochures detail the nutritional properties and health benefits of spray dried beef liver, heart and lung. The state-of-the-art processes used to assure the highest product quality are described.

Dried organs are generally produced by freeze-drying. The Kilcoy nutrition range is uniquely produced using a spray dried process. The lower energy and environmental benefits of using spray drying are described in the brochures.

The provenance of the organ powders and product certifications are highlighted in the brochures. These include hormone free, antibiotic free, GMO free, HACCP certified, Halal certified, Livestock welfare.

Kilcoy Nutrition have created the slogan “The Essence of Nutrition” for the products to be marketed in their range.

The target markets are Australia and USA so only English versions are required at this stage.

Copies of the two completed brochures are included in Appendix 3

4.3.2 Product Show Banner

Two pullup show banners were created highlighting the slogan “The Essence of Nutrition” and showcasing Kilcoy’s premium beef organ food supplements.

4.3.3 Product Web Page

Information prepared for and included in the product brochures was adapted and presented in a web page format with the same key topics presented.

4.3.4 Video Shoot

A story board capturing the key messages, presenters and locations was prepared and approved by MLA.

The final edited video, at 3:38 in length, introduces Kilcoy Nutrition and the new range of premium beef organ supplements. The project to identify alternate ways to utilise beef offal and capture the organ nutritional benefits is discussed.

The importance of the partnership with Bellarine Foods to achieve an efficient cost-effective process for drying the wet offals and producing a nutritional dried organ powder is highlighted, as are the benefits of using the state of the art spray drying process.

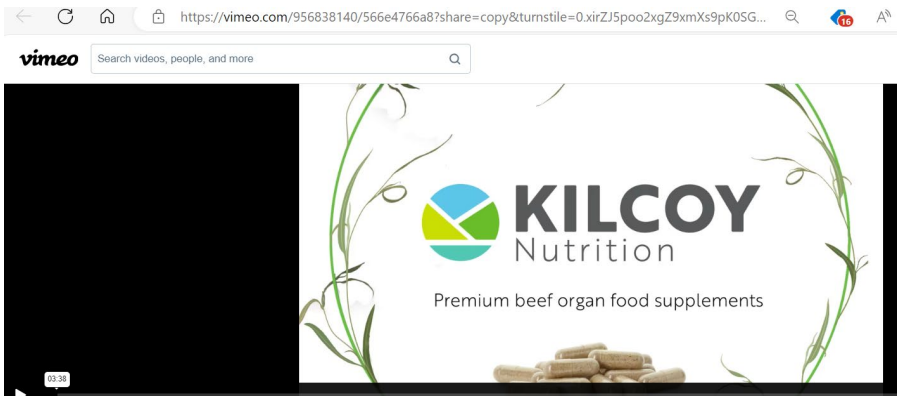
Further emphasising the importance of partnerships in the beef organs project the partnership with MLA Donor Company and the support provided is described and highlights the MLA focus on the fifth quarter, which includes adding value to organs.

As well as highlighting the value adding opportunities with spray dried beef organs, the commitment to sustainability and environmental performance is also emphasised.

The benefits of the spray dried organs as a nutritional ingredient in food supplements as well as in pet nutrition is explored in the video.

The new sales pathways for dried nutritional ingredients, beyond the traditional red meat pathways, is explored as a means to value add and increase processor returns.

The final KGF Nutrition video is currently available at
https://vimeo.com/956838140/566e4766a8?share=copy



5. Conclusion

5.1 Key findings

Freeze-drying provides a convenient means of drying whole organs or small quantities of organs. However, for larger volumes, and where a powdered product is required, the complexity and cost of freeze-drying wet offal makes freeze-drying less desirable.

Spray drying was determined to be the most effective and efficient method to obtain dried organ powders with consistent quality, good mixing ability and nutritional bioavailability.

Spray drying requires hydrolysis of the wet organs to a sprayable solution. Concentration of the hydrolysate reduces the energy and amount of water to be removed during the drying step.

While the vitamin and mineral levels of spray dried powders are lower than for freeze dried organs, the powders do contain useful amounts of vitamins and minerals with lungs being a good source of Cobalamin B12 and all powders are a good source of phosphorous.

Harvesting of wet organs for spray drying is no more onerous than harvesting for whole frozen organ sale. Processing wet offal into dried powders provides an alternative way to utilise offal into value-add products for nutritional supplementation in the food and pet food sectors.

Prepared specifications for spray dried organ powders, and associated product information brochures met the requirements of wholesale purchasing customers.

The marketing materials answer consumer questions on product provenance, sustainability, cost effectiveness and commitment to quality and food safety.

The importance of partnerships with other food processing companies to achieve a commercially viable manufacturing process for new products has been demonstrated in this project.

The marketing and sales processes for dry ingredients is different from sales of red meat and fresh/frozen co products and also from meat and bone meal and tallow. A new understanding and skill set is required to realise the potential value increase to the red meat industry.

5.2 Benefits to industry

Depending on market demand, beef organs can be harvested and sold as frozen whole organs. However, demand can vary and does not offer a consistent lucrative market for beef offal. When demand is low, offal is included in rendered meat and bone meal for its protein value alone.

Drying the offal into powders for the food supplementation and petfood markets can provide a more consistent and reliable outlet, maximising the organs' nutritional benefits, and providing returns 5-15 times that of frozen whole organs and 100 times the value from rendering.

Harvesting and drying organs takes a fifth quarter product, maximising its nutritional and sales value, increasing the returns on every slaughtered carcase.

Converting wet offal into a dried shelf stable, nutrient dense products allows the industry to play in world markets where traditionally there has been no presence.

6. Future research and recommendations

Powder testing of initial spray dried runs returned results of nutritional values lower than for corresponding freeze-dried organs. As the pre-processing of organs for spray drying becomes more optimised and delays between process steps minimised, further testing of the resultant powders should continue to determine if these differences continue. Further research into minimising degradation of nutrient values may be required.

A stable production process will be required to ensure consistent product delivery demanded by ingredient purchasers.

The processing of beef offal into hydrolysed spray dried powders requires strong partnerships with food processors willing to invest in and develop technologies that provide optimal processing conditions to maximise the value of the dried ingredients to the food and pet food industries.

7. References

Food Standards Australia New Zealand, n.d. *Food Standards Code.* [Online]
Available at: https://www.foodstandards.gov.au/food-standards-code/legislation
[Accessed 2024].

8. Appendix

8.1 Specifications for Beef Heart, Beef Lung and Beef Liver Powders

KILCOY Global Foods

Product Specification

Edible Grass-Fed Beef Heart Powder

DESCRIPTION	Australian Spray Dried Grass Fed & Grass Finished Beef Heart Powder, Hormone Free, Halal Certified

INGREDIENTS	Grass Fed Beef Heart 95%, Antioxidant 5%
COUNTRY OF ORIGIN	Made in Australia from at least 95% Australian Beef Heart

KILCOY Global Foods

Product Specification

Edible Grass-Fed Beef Heart Powder

PACKAGING 20kg heat sealed polyethylene bag.

NUTRITIONAL INFORMATION

Parameter	Units	
Total Sugars	g/100g	1.1g
Moisture	g/100g	5.1g
Fat	g/100g	11.3g
Saturated Fats	g/100g	7.8g
Poly-unsaturated fats	g/100g	0.5g
Mono-unsaturated fats	g/100g	2.9g
Trans fats	g/100g	<0.2g
Protein	g/100g	34.1g
Ash	g/100g	15.2g
Carbohydrates	g/100g	34g
Energy	kJ/100g	1570kJ
Thiamin (Vitamin B1)	mg/100g	0.13mg
Riboflavin (Vitamin B2)	mg/100g	1.4mg
Niacin (Vitamin B3)	mg/100g	3.9mg
Retinol (Vitamin A)	ug/100g	62ug
Pantothenic Acid (Vitamin B5)	mg/100g	0.79mg
Cobalamin (Vitamin B12)	ug/100g	13.1ug
Pyridoxine (Vitamin B6)	mg/100g	0.21mg
Ascorbic Acid (Vitamin C)	mg/100g	1.5mg
Sodium	mg/100g	2330mg
Copper	mg/kg	5.3mg
Iron	mg/kg	120mg
Magnesium	mg/kg	640mg
Phosphorus	mg/kg	40300mg
Potassium	mg/kg	11200mg
Selenium	mg/kg	0.21mg
Zinc	mg/kg	33mg

MICROBIOLOGICAL INFORMATION

Parameter	Units	Limit
Total Plate Count	CFU/g	<5000
E. coli	MPN/g	<3

Staphylococcus (coag. positive)	CFU/g	<100
Salmonella	In 25g	Not detected

STORAGE CONDITIONS	Store in cool dry place, out of direct sunlight
SHELFLIFE	(Best before 24 months from date of manufacture).

KILCOY Global Foods

Product Specification

Edible Grass-Fed Beef Lung Powder

DESCRIPTION	Australian Spray Dried Grass Fed & Grass Finished Beef Lung Powder, Hormone Free, Halal Certified

INGREDIENTS	Grass Fed Beef Lung 95%, Antioxidant 5%,
COUNTRY OF ORIGIN	Made in Australia from at least 95% Australian Beef Lung

KILCOY Global Foods

Product Specification

Edible Grass-Fed Beef Lung Powder

PACKAGING 20kg heat sealed polyethylene bag.

NUTRITIONAL INFORMATION

Parameter	Units	
Total Sugars	g/100g	3.4g
Moisture	g/100g	6.2g
Fat	g/100g	11.7g
Saturated Fats	g/100g	6.9g
Poly-unsaturated fats	g/100g	0.4g
Mono-unsaturated fats	g/100g	4.1g
Trans fats	g/100g	<0.3g
Protein	g/100g	6.6g
Ash	g/100g	18.9g
Carbohydrates	g/100g	57g
Energy	kJ/100g	1510kJ
Thiamin (Vitamin B1)	mg/100g	0.39mg
Riboflavin (Vitamin B2)	mg/100g	3.2mg
Niacin (Vitamin B3)	mg/100g	5.3mg
Retinol (Vitamin A)	ug/100g	4100ug
Pantothenic Acid (Vitamin B5)	mg/100g	4.3mg
Cobalamin (Vitamin B12)	ug/100g	53.9ug
Sodium	mg/100g	4550mg
Copper	mg/kg	62mg
Iron	mg/kg	190mg
Magnesium	mg/kg	620mg
Phosphorus	mg/kg	33700mg
Potassium	mg/kg	9280mg
Selenium	mg/kg	0.39mg
Zinc	mg/kg	78mg

MICROBIOLOGICAL INFORMATION

Parameter	Units	Limit
Total Plate Count	CFU/g	<5000
E. coli	MPN/g	<3
Staphylococcus (coag. positive)	CFU/g	<100
Salmonella	In 25g	Not detected

STORAGE CONDITIONS	Store in cool dry place, out of direct sunlight
SHELFLIFE	(Best before 24 months from date of manufacture).

KILCOY Global Foods

Product Specification

Edible Grass-Fed Beef Liver Powder

DESCRIPTION	Australian Spray Dried Grass Fed & Grass Finished Beef Liver, Hormone Free, Halal Certified

INGREDIENTS	Grass Fed Beef Liver 95%, Antioxidant 5%
COUNTRY OF ORIGIN	Made in Australia from at least 95% Australian Beef Liver

KILCOY Global Foods

Product Specification

Edible Grass-Fed Beef Liver Powder

PACKAGING 20kg heat sealed polyethylene bag.

NUTRITIONAL INFORMATION

Parameter	Units	
Total Sugars	g/100g	3.5g
Moisture	g/100g	6.8g
Fat	g/100g	7.6g
Saturated Fats	g/100g	3.0g
Poly-unsaturated fats	g/100g	1.5g
Mono-unsaturated fats	g/100g	3.1g
Trans fats	g/100g	<0.1g
Protein	g/100g	30.7g
Ash	g/100g	14.7g
Carbohydrates	g/100g	40g
Energy	kJ/100g	1480kJ
Thiamin (Vitamin B1)	mg/100g	0.12mg
Riboflavin (Vitamin B2)	mg/100g	0.79mg
Niacin (Vitamin B3)	mg/100g	2.6mg
Retinol (Vitamin A)	ug/100g	90ug
Pantothenic Acid (Vitamin B5)	mg/100g	0.46mg
Cobalamin (Vitamin B12)	ug/100g	9.50ug
Sodium	mg/100g	2020mg
Copper	mg/kg	3.5mg
Iron	mg/kg	190mg
Magnesium	mg/kg	330mg
Phosphorus	mg/kg	47800mg
Potassium	mg/kg	8950mg
Selenium	mg/kg	0.25mg
Zinc	mg/kg	35mg

MICROBIOLOGICAL INFORMATION

Parameter	Units	Limit
Total Plate Count	CFU/g	<5000
E. coli	MPN/g	<3
Staphylococcus (coag. positive)	CFU/g	<100
Salmonella	In 25g	Not detected

STORAGE CONDITIONS / SHELFLIFE	Store in cool dry place, out of direct sunlight (Best before 24 months from date of manufacture).

KILCOY Global Foods

Product Specification

Grass-Fed Beef Heart Powder – for Petfood

DESCRIPTION	Australian Spray Dried Grass Fed & Grass Finished Beef Heart Powder, Hormone Free, Halal Certified

INGREDIENTS	Grass Fed Beef Heart 80%, Thickener 8%, Filler, 5% Preservative 5%, Antioxidant 1%, Enzyme 1%
COUNTRY OF ORIGIN	Made in Australia from at least 80% Australian Beef Heart

KILCOY Global Foods

Product Specification

Grass-Fed Beef Heart Powder – for Pet Food

PACKAGING 20kg heat sealed polyethylene bag.

NUTRITIONAL INFORMATION

Parameter	Units	
Total Sugars	g/100g	1.1g
Moisture	g/100g	5.1g
Fat	g/100g	11.3g
Saturated Fats	g/100g	7.8g
Poly-unsaturated fats	g/100g	0.5g
Mono-unsaturated fats	g/100g	2.9g
Trans fats	g/100g	<0.2g
Protein	g/100g	34.1g
Ash	g/100g	15.2g
Carbohydrates	g/100g	34g
Energy	kJ/100g	1570kJ
Thiamin (Vitamin B1)	mg/100g	0.13mg
Riboflavin (Vitamin B2)	mg/100g	1.4mg
Niacin (Vitamin B3)	mg/100g	3.9mg
Retinol (Vitamin A)	ug/100g	62g
Pantothenic Acid (Vitamin B5)	mg/100g	0.79mg
Pyridoxine (Vitamin B6)	mg/100g	0.21mg
Ascorbic Acid (Vitamin C)	mg/100g	1.5mg
Cobalamin (Vitamin B12)	ug/100g	13.1ug
Sodium	mg/100g	2330mg
Copper	mg/kg	5.3mg
Iron	mg/kg	120mg
Magnesium	mg/kg	640mg
Phosphorus	mg/kg	40300mg
Potassium	mg/kg	11200mg
Selenium	mg/kg	0.21mg
Zinc	mg/kg	33mg

MICROBIOLOGICAL INFORMATION

Parameter	Units	Limit
Total Plate Count	CFU/g	<5000
E. coli	MPN/g	<3

Staphylococcus (coag. positive)	CFU/g	<100
Salmonella	In 25g	Not detected

STORAGE CONDITIONS	Store in cool dry place, out of direct sunlight
SHELFLIFE	(Best before 24 months from date of manufacture).

KILCOY Global Foods

Product Specification

Grass-Fed Beef Lung Powder - for Pet Food

DESCRIPTION	Australian Spray Dried Grass Fed & Grass Finished Beef Lung Powder, Hormone Free, Halal Certified

INGREDIENTS	Grass Fed Beef Lung 80%, Thickener 8%, Filler, 5% Preservative 5%, Antioxidant 1% , Enzyme 1%
COUNTRY OF ORIGIN	Made in Australia from at least 80% Australian Beef Lung

KILCOY Global Foods

Product Specification

Grass-Fed Beef Lung Powder – for Pet Food

PACKAGING 20kg heat sealed polyethylene bag.

NUTRITIONAL INFORMATION

Parameter	Units	
Total Sugars	g/100g	3.4g
Moisture	g/100g	6.2g
Fat	g/100g	11.7g
Saturated Fats	g/100g	6.9g
Poly-unsaturated fats	g/100g	0.4g
Mono-unsaturated fats	g/100g	4.1g
Trans fats	g/100g	<0.3g
Protein	g/100g	6.6g
Ash	g/100g	18.9g
Carbohydrates	g/100g	57g
Energy	kJ/100g	1510kJ
Thiamin (Vitamin B1)	mg/100g	0.39mg
Riboflavin (Vitamin B2)	mg/100g	3.2mg
Niacin (Vitamin B3)	mg/100g	5.3mg
Retinol (Vitamin A)	ug/100g	4100ug
Pantothenic Acid (Vitamin B5)	mg/100g	4.3mg
Cobalamin (Vitamin B12)	ug/100g	53.9ug
Sodium	mg/100g	4550mg
Copper	mg/kg	62mg
Iron	mg/kg	190mg
Magnesium	mg/kg	620mg
Phosphorus	mg/kg	33700mg
Potassium	mg/kg	9280mg
Selenium	mg/kg	0.39mg
Zinc	mg/kg	78mg

MICROBIOLOGICAL INFORMATION

Parameter	Units	Limit
Total Plate Count	CFU/g	<5000
E. coli	MPN/g	<3
Staphylococcus (coag. positive)	CFU/g	<100
Salmonella	In 25g	Not detected

STORAGE CONDITIONS	Store in cool dry place, out of direct sunlight
SHELFLIFE	(Best before 24 months from date of manufacture).

KILCOY Global Foods

Product Specification

Grass-Fed Beef Liver Powder – for Pet Food

DESCRIPTION	Australian Spray Dried Grass Fed & Grass Finished Beef Liver, Hormone Free, Halal Certified

INGREDIENTS	Grass Fed Beef Liver 80%, Thickener 8%, Filler, 5% Preservative 5%, Antioxidant 1%, Enzyme 1%
COUNTRY OF ORIGIN	Made in Australia from at least 80% Australian Beef Liver

KILCOY Global Foods

Product Specification

Grass-Fed Beef Liver Powder – for Pet Food

PACKAGING 20kg heat sealed polyethylene bag.

NUTRITIONAL INFORMATION

Parameter	Units	
Total Sugars	mg/100g	3500mg
Moisture	mg/100g	6800mg
Fat	mg/100g	7600mg
Saturated Fats	mg/100g	3000mg
Poly-unsaturated fats	mg/100g	1500mg
Mono-unsaturated fats	mg/100g	3100mg
Trans fats	mg/100g	<100mg
Protein	g/100g	30.7g
Ash	g/100g	14.7g
Carbohydrates	g/100g	40g
Energy	kJ/100g	1480kJ
Thiamin (Vitamin B1)	mg/100g	0.12mg
Riboflavin (Vitamin B2)	mg/100g	0.79mg
Niacin (Vitamin B3)	mg/100g	2.6mg
Retinol (Vitamin A)	ug/100g	90ug
Pantothenic Acid (Vitamin B5)	mg/100g	0.46mg
Cobalamin (Vitamin B12)	ug/100g	9.50ug
Sodium	mg/100g	2020mg
Copper	mg/kg	3.5mg
Iron	mg/kg	190mg
Magnesium	mg/kg	330mg
Phosphorus	mg/kg	47800mg
Potassium	mg/kg	8950mg
Selenium	mg/kg	0.25mg
Zinc	mg/kg	35mg

MICROBIOLOGICAL INFORMATION

Parameter	Units	Limit
Total Plate Count	CFU/g	<5000
E. coli	MPN/g	<3

Staphylococcus (coag. positive)	CFU/g	<100
Salmonella	In 25g	Not detected

STORAGE CONDITIONS /	Store in cool dry place, out of direct sunlight
SHELFLIFE	(Best before 24 months from date of manufacture).