final report

Project code: P.PIP.0144

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Development of MSAT Research Samples for the Japanese market

Executive summary

This report reviews work associated with final production trials, and export and evaluation of MSAT Lamb product samples from Tatiara Meat Company, Laverton, Victoria. The purpose of the current project was to develop MSAT research samples from final production trials to present to Japan chef groups for feedback.

Final production trials, export of samples and evaluation of production MSAT lamb samples have been completed. Market assessment of MSAT samples was conducted in Australia by 13 Japanese chefs from various market sectors at Tatiara Bordertown. These chefs ranged from fine dining restaurants to Quick Service Restaurants (QSR's). MSAT product (using shoulder meat trimmings) produced. Product Format: Cooked round MSAT Lamb steaks, approximately 100gms net weight (120gms raw weight).

Japanese Lamb Steak

Code: Tatiara SC100.01	Carcase Specification Carcase type: Australian lamb Carcase weight/size: TBC
Primal Specification : Product is prepared from lamb shoulder after removal of the bones. All bones to be removed manually (No tunnel boning). All cap fat to be removed to trim specifications.	Portion Cut: Square Cut Shoulder H.A.M No. 4990 Shoulder fat trim specification on primals to be maximum of 10mm.
Processing: Per MLA MSAT Technical Processing Specifications.	Ingredients: Per MLA MSAT Technical Processing Specifications.
Portion/Size: TBC subject to customer May vary between 60, 90 and 120 grams unit weight. Packaging: TBC subject to customer.	Shelf life: 12 months frozen at 0°C.

Steps to Cook / Heat & Serve

Specifications for Cooked Product

i) TBC subject to customer.
ii) Note there may be several customers/specifications.

Feedback on pricing, eating quality including fat content and markets was inconclusive.

Early project termination was recommended by the technical project consultative group prior to the final reporting stage due to inconclusive feedback from the evaluation process. Exclusivity rights for manufacture of lamb MSAT by Tatiara will be reviewed. Planning is currently underway to identify additional MLA co-ordinated feedback sessions in Australia, Japan and abroad using existing stored samples of lamb MSAT within its designated shelf-life and production of new product. This next phase of research will identify price points, quality characteristics and supply chain logistics to meet potential food service and QSR markets expectations for lamb MSAT product.

Contents

1 Background

Less than 50% of a lamb carcass constitutes high value primals, and the remainder drops in value due to size, shape, eat ability and processing costs. The Meat Strip Alignment Technology (MSAT) aims to utilise lower value primals and improve the return on lamb carcasses.

Meat & Livestock Australia (MLA) has undertaken research with Food Science Australia (FSA) over the last 4 years to develop the innovative MSAT process to meet the Red Meat Industry issues and new consumer trends. MSAT was developed as a new product platform which utilises low value red meat primals and trims, to generate a versatile value added red meat products.

Consumer research and costing models indicate that MSAT products have a significant potential to meet shifting consumer demands whilst delivering improved returns to Value adders, Processors and Producers.

Tatiara Meat Company (TMC) has had recent enquiries from Japanese customers for lamb steak products. These potential customers recently visited Tatiara's plant in an effort to develop the product.

As a result, MSAT was recently trialled with lamb meat from TMC to assess its technical feasibility as a lamb steak. While the trials showed that texture and flavour issues require to be developed further, Tatiara believe that the MSAT product has potential in a lamb steak format for Japan.

The priority now is to develop research samples to send to Japan in order to further develop product specifications and identify further commercialisation issues. This shall then enable further trials to focus upon flavour, texture and costing issues for MSAT. This project builds upon development of MSAT lamb steak research samples for the Japanese market.

The purpose of this project was to develop value-added product for the Japanese market using MSAT technology.

2 Project objectives

The objectives of the project were :

1. Develop research samples of MSAT lamb steaks for the Japanese market.
2. Obtain feedback and evaluation of the research samples from Japan.
3. Prepared a project report and reviewed with MLA the priorities for commercialisation and/or further research

3 Methods and Approaches

The Meat Strip Alignment Technology (MSAT) was trialled out at Tatiara Meat Company (TMC) factory at Laverton, using lamb shoulders as the sole raw material. TMC had hired the most of the equipment required for the trial except, the alignment device and the accumulator which was sent from Food Science Australia (FSA) in Cannon Hill, QLD.

The following were the milestones ;

1.1. Co-ordinate the development of MSAT Lamb Product and Manufacturing Specifications
For MSAT lamb product research samples:
• Define research product specifications.
   o Portion size and weight
   o Portion shape
   o Raw material specifications for visual/chemical lean
   o Ingredients
• Define evaluation criteria (by Japan market).
• Development of process for manufacturing of research product samples.
   o Confirm export accredited pilot site for manufacturing
   o Define processing specifications and manufacturing process flow for up to 40 kgs of samples.
   o *   Verify commercial viability

1.2 Develop MSAT Lamb Product and Manufacturing Specifications
For MSAT lamb product research samples:
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   o Portion size and weight
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• Define evaluation criteria (by Japan market).
• Development of process for manufacturing of research product samples.
   o Confirm export accredited pilot site for manufacturing
   o Define processing specifications and manufacturing process flow for up to 40 kgs of samples.
   o Verify commercial viability

2.1. Co-ordinate the manufacture of Research Meat Samples Products
2.2 Manufacture of Research Meat Samples Products Confirmation of Laverton site facilities to manufacture research meat samples. Manufacture MSAT lamb steak product. • Process two three 40 kgs of deboned lamb forequarter with lamb trim, shank or other meat for use in emulsion. • Manufacture MSAT logs and steaks Conduct internal evaluation of research samples. • Conduct microbiological and sensory evaluation. • Retain samples as required for export evaluation. • Verify commercial viability.
2.3. Co-ordinate the manufacture of additional Research Meat Samples Products
2.4. Manufacture of additional Research Meat Samples Products Manufacture additional MSAT lamb steak product. • Process two three 40 kgs of deboned lamb forequarter with lamb trim, shank or other meat for use in emulsion. • Manufacture MSAT logs and steaks Conduct additional internal evaluation of research samples. • Conduct microbiological and sensory evaluation. • Retain samples as required for export evaluation. • Verify commercial viability.
3.1. Co-ordinate the export and evaluation of Meat Products
3.2. Export and Evaluation of Meat Products. Export samples to Japan for evaluation of market acceptability re: tenderness, texture, binding, cooking and cook losses. Seek Japan industry feedback based upon presentation of research samples.

4.1. Co-ordinate and assist with project report - TERMINATED Project report.   Review with MLA Outcomes: • Evaluation of MSAT lamb research samples in terms of functionality, sensory and cooking measures. • Identification of priorities for commercialisation and/or further research
4.2. Project report - TERMINATED Review with MLA • Evaluation of MSAT lamb research samples in terms of functionality, sensory and cooking measures. • Identification of priorities for commercialisation and/or further research

4 Key Findings

This report reviews work associated with final production trials, and export and evaluation of MSAT Lamb product samples from Tatiara Meat Company, Laverton, Victoria.

Under Project P.PIP.0144, Tatiara Meat Company trials conducted final lamb project trials during November 2007. These final trials produced MSAT samples assessed by Tatiara to be acceptable for export and market assessment by Japanese users.

However, as Tatiara was hosting 13 Japanese chefs at Bordertown during March, Tatiara recommended and conducted the market assessment of MSAT samples during this visit to Australia by these chefs.

The MSAT lamb steak samples were presented to 13 Japanese chefs at Tatiara Bordertown. These chefs ranged from fine dining restaurants to Quick Service Restaurants (QSR's)

MSAT product (using shoulder meat trimmings) produced with product formats being cooked round MSAT Lamb steaks, approximately 100gms net weight (120gms raw weight).

4.1 Sensory
Eating Quality - The chefs were mixed with their feedback. Some considered the samples very good meat eating quality while others considered that it had 'mince' type eating qualities.
Fat Content - Similarly, some chefs considered that the samples were acceptable in terms of leanness while others considered that the samples were too fatty.

4.2 Pricing
An indicative pricing of A$8-9/kg FOB was provided and all the chefs considered that the pricing was unacceptably high for a processed meat product.

5 Commercial outcomes

The following were the project outcomes:

• Specifications for MSAT research samples for technical evaluation
• Evaluation criteria for MSAT samples 1, 2
• Specifications of manufacturing processes for research samples
• Verification of commercial viability
• Co-ordinate the export and evaluation of Meat Products

- Evaluation of MSAT lamb research samples in terms of functionality, sensory and cooking measures
- Revision of product specifications and commercial viability

6 Conclusion

Final production trials, export of samples and evaluation of production MSAT lamb samples have been completed. Market assessment of MSAT samples was conducted in Australia by 13 Japanese chefs from various market sectors. Feedback on pricing, eating quality including fat content and markets was inconclusive.

The main conclusions were:

1. The feedback is unclear and inconclusive at this stage. This may be due to the chefs having a wide range of backgrounds from higher end restaurants to QSR's with ground meat products. Thus the opportunity for MSAT meat products on their menu's may vary considerably. For example, it would be expected that MSAT would have limited opportunity if the Japanese QSR chef is comparing MSAT to a 'hamburger patty' product.

2. It would appear that some chefs were initially unaware that MSAT was a processed meat product. However, once informed that MSAT was a processed meat product, they appear to have lower 'price' expectations of the product. Price should be considered in the context of specific markets or market segments and their product specifications or requirements of MSAT 'type' products.

Early project termination was recommended by the technical project consultative group prior to the final reporting stage due to inconclusive feedback from the evaluation process. Exclusivity rights for manufacture of lamb MSAT by Tatiara will be reviewed. Planning is currently underway to identify additional MLA co-ordinated feedback sessions in Australia, Japan and abroad using existing stored samples of lamb MSAT within its designated shelf-life and production of new product. This next phase of research will identify price points, quality characteristics and supply chain logistics to meet potential food service and QSR markets expectations for lamb MSAT product.

7 Commercial Implications

Tatiara have successfully completed their production trial work under this project but have limited resources to continue with further market assessments of the MSAT product.

However, there is a need to assess the Japanese food service market opportunity for MSAT in more detail. The food service market in Japan consists of a number of market segments ranging from QSR's and mid-tier restaurant chains to high end dining. In the QSR segment, these range from well-established Japanese chains such as Lotteria through to western chains such as McDonald's.

Each segment needs to be assessed in terms of their market share and menu opportunity for MSAT. Market research should determine:
- Market size
- MSAT product opportunity (eg, core menu items or Limited Time Offer (LTO))
- Sensory, appearance and eating quality feedback
- Other product specification (technical) issues

- Price point issue
- Other commercial issues
- Short-term or longer term opportunity?

This market research is important to determine the market segment which warrants the most priority and focus for further development.

8 Recommendations

The following are the recommendations :

Recommendation 1. MLA to accept this report as completion of lamb MSAT project work with Tatiara Meat Company.

Recommendation 2. MLA to review further market development research options for MSAT including research of the various segments of the food service market in Japan.

9 Appendix A – Meat Strip Alignment Process

Meat Strip Preparation
- whole bone-in shoulders were boned out for the MSAT trial. (There was no neck muscle in the shoulder as the neck muscle was being used for shoulder racks.)
- Fat cap was removed from the shoulders, and the shoulder was cut using the strip cutter.
- Steaks were passed through the tenderizer once.

Comments
- There was large variation in strip sizes
- There was also some evidence of some connective tissue not being cut by the strip cutter.

Emulsion Preparation
One batch of emulsion was prepared from the meat left over after the steak preparation from the shoulder meat.

Procedure for emulsion preparation using the 40L Stephan Bowl Cutter
1. Add meat to the bowl cutter and cut for 10secs – scrape the bowl.
2. Add salt, sodium tripolyphosphate, caramel colour 602, sugar, starch, gum and sodium erythorbate and ½ the ice into the bowl cutter and cut until mixture reaches 5°C. Scrap down bowl.
3. Add remaining ice and cut until mixture reaches 6°C. Scrap down bowl.
4. Cut further until the emulsion temperature reaches 8 - 10°C. If mixture does not appear smooth enough cut until emulsion reaches a maximum of 12°C.
5. Store chilled (0°C) in moistened covered tubs until required.

Procedure for Brine Preparation
1. Chill water to 4°C.
2. Add sodium tripolyphophate and mix until dissolved
3. Add salt and sugar and mix until dissolved.
4. Store chilled until required
5. Just prior to use, add the Erythorbate and mix until dissolved.

Final Product Mix
One batch of MSAT product was prepared.
1. Standard formulation with shoulder meat trimmings in the emulsion
90kg batch of final product mix was prepared for the product.
Meat strips   - 60.7kg
Brine   - 11.2kg
Emulsion   - 18.0kg
Total   - 90kg

Procedure for final product using the mixer/grinder
1. Attach the grinder plate to the mixer/grinder.
2. Add meat strips to the mixer and start the mixing.
3. Slowly add the brine through the grills on the mixer and mix for 5 minutes.
4. Check that the brine has being absorbed and the meat strips are tacky. If not mix for further 2 minutes.
5. Stop the mixer and pull any strips that might have wrapped around the paddles in the mixer.
6. Add the emulsion and mix for 4 minutes. Stop the mixer.
7. Start the mixer using the mixer/grinder switched to push through any strips and brine that might have got caught on the screw portion of the mixer/grinder.

8. Keep pushing the meat through the mix the grinder plate until meat strips covered in emulsion start coming through.
9. Pull any strips that might have wrapped around the paddles in the mixer.
10. Mix for further 2 minutes.
11. Remove the product from the mixer and keep it chilled until required.

Assembly of the Alignment Device
1. Hose down prototype before assembly using hot water and sanitizer.
2. Bolt together the manifold and manifold cover (It can be advantageous to place the manifold cover in hot water before bolting the MSAT line together).
3. Place lid on Thompson filler.
4. Place 2 hose clips on each of the 8 filler lid protrusions to reduce the chance of the tubes coming off the lid protrusions.
5. Attach hoses to lid (it can be advantageous to flush lines with hot water and to dip the ends in hot water to ensure a easy fit to the MSAT head and manifold).
6. Secure Gatling gun onto bench, using a minimum of 2 clamps, but preferably 3).
7. Place 1 hose clip on each of the prototype manifold tubes.
8. Attach hoses to prototype manifold tubes and tighten hose clips enough to secure the tubes.
9. Tighten hose clips on Thompson filler lid.
10. Adjust hoses to remove crimps etc.
11. Tighten hose clips on prototype manifold tubes.
12. Attach the cone.
13. After product has flowed through for approximately 5 minutes, retighten the hose clips on manifold and lid and the bolts holding the manifold and cone.

Filling of the Product into Casings using the Risco Vacuum Filler
1. Cut the casing to a length that would fit into TMC's cartons.
2. Clip one end of the casing and label the casing with the trial details etc
3. Fill the cone on the filler to the top with the product mix.
4. Slowly allow the product to pass into the filler and through to the accumulator whilst continually topping up the cone on the filler. Slowly fill the tubes and the alignment device – ensuring that the product is flowing through each of the tubes.
5. Fill the product into the casing, ensuring that there are no air pockets in the product.
6. Clip the casing so the casing in firm.
   Note: The pressure at which the product is filled will have an impact on the finished product.
7. Freeze the product in a -20°C freezer for 48 hours.

Formulation used

Pump/Extension Brine Formulation at 18.5%

% pumped product 18.50
Batch Weight 15.00

Ingredients	% in Strip Blend	% in brine	Weight	UOM
STTP	0.25	1.60	240.20	g
Salt	0.75	4.80	720.61	g
White Sugar	0.30	1.92	288.24	g
Sodium Erythorbate	0.17	1.09	163.34	g
Ingredient 1	0.00	0.00	0.00	g
Ingredient 2	0.00	0.00	0.00	g
Water		90.58	13.588	kg
TOTAL		100.00	15.000	kg

NB: Extension/pump rate is based on meat strip weight only **NOT** on the final product blend weight.

Emulsion

Emulsion Parameters

Batch Weight 20

Ingredients	%	Weight	UOM	TOTAL REQUIRED 1	Batches	UOM
Lamb Mince 80-85 CL (5 mm Mince)	68.725	13.745	kg		13.75	kg
Salt	0.750	0.150	kg		0.15	kg
Sodium Tripolyphosphate	0.250	0.050	kg		0.05	kg
White Sugar	0.300	0.060	kg		0.06	kg
Caramel Powder	0.125	0.025	kg		0.03	kg
Carrageenan	0.480	0.096	kg		0.10	kg
Starch	2.400	0.480	kg		0.48	kg
Sodium Erythorbate	0.275	0.055	kg		0.06	kg
Ice	26.695	5.339	kg		5.34	kg
Ingredient 1	0.000	0.000	kg		0.00	kg
Ingredient 2	0.000	0.000	kg		0.00	kg
TOTAL	100.000	20.000	kg		20.00	kg

Final Mix Formulations (Standard Ratio)

Total Batch Size 90 kg

Ingredients	Batch Size Percentage	Batch Size Weight (kg)	TOTAL REQUIRED Batches	Weight (kg)
Meat Strips	84.33%	60.718	1.00	60.718
Brine @ 18.5% extension	15.67%	11.282	1.00	11.282
SUB TOTAL	100.00%	72.000		72.000

Ingredients	Batch Size Percentage	Weight (kg)	TOTAL REQUIRED Batches	Weight (kg)
Meat/Brine Blend	80.00%	72.000	1.00	72.000
Emulsion	20.00%	18.000	1.00	18.000
TOTAL	100.00%	90.000		90.000

(End)

10 Appendix B – Japanese Lamb Steak Specifications

COMMERCIAL-IN-CONFIDENCE

DRAFT TEMPLATE (Rev: 9 February 2007)
PROTOTYPE PRODUCT SPECIFICATIONS

Japanese Lamb Steak

Code: Tatiara SC100.01	**Carcase Specification** Carcase type: Australian lamb Carcase weight/size: TBC
Primal Specification : Product is prepared from lamb shoulder after removal of the bones. All bones to be removed manually (No tunnel boning). All cap fat to be removed to trim specifications.	**Portion Cut: Square Cut Shoulder** **H.A.M No. 4990** Shoulder fat trim specification on primals to be maximum of 10mm.
Processing: Per MLA MSAT Technical Processing Specifications.	**Ingredients:** Per MLA MSAT Technical Processing Specifications.
Portion/Size: TBC subject to customer May vary between 60, 90 and 120 grams unit weight. **Packaging:** TBC subject to customer.	**Shelf life:** 12 months frozen at 0ºC.

Steps to Cook / Heat & Serve

Specifications for Cooked Product

i) TBC subject to customer.
ii) Note there may be several customers/specifications.

Contacts

For further product details contact:
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