

final report

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Development of commercial prototype Meat Strip Alignment Technology nozzle

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Executive summary

Meat & Livestock Australia (MLA) has undertaken research with Food Science Australia (FSA) over the last 4 years to develop an innovative process to meet the Red Meat Industry issues and new consumer trends. Meat Strip Alignment Technology (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 (shape, size and textures). MSAT equipment and processes had been developed to a point requiring commercial proving (See Photo 1).



Photo 1. Prototype MSAT final assembly and sectional view

Consumer research indicates that there is a gap in the domestic market for value added red meat products, and that the value added products from the initial trials, are well on the way to filling this opportunity. A processor and equipment manufacturer were engaged in the project to validate the process and facilitate the development of MSAT concept product (See Photo 2 - 4).

Some preliminary market feedback was provided from the red meat processor and equipment manufacturer. The outcome of the project was that MLA would develop licence agreements with the processor and equipment manufacturer(s) to complete further commercial trials required in order to market test the MSAT concept products.

Steak - Meal Concepts



Photo 2. MSAT steak product formats

Meat Strips – Meal Concepts



Photo 3. MSAT strips meal concepts

Meat Cubes – Meal Concepts



Photo 4. MSAT cubes meal concepts

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1 Background

Only 18% of a beef carcass constitutes high value primals the remainder drops in value due to size, shape, eat ability and processing costs, the MSAT project looks at improving the return on the carcass and ultimately improve returns to the producer.

Meat & Livestock Australia (MLA) has undertaken research with Food Science Australia (FSA) over the last 4 years to develop an innovative process to meet the Red Meat Industry issues and new consumer trends. Meat Strip Alignment Technology (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 (shape, size and textures). Consumer research indicates that there is a gap in the domestic market for value added red meat products, and that the value added products from the initial trials, are well on the way to filling this opportunity.

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

The MSAT coordinating committee include Peter Jones, Vivienne Todd, David Thomason & David Lachlan have reviewed the commercialisation strategy of this new technology and confirmed that MSAT needs to progress and developed a MSAT Commercial and Development plan.

Thompson Meat Machinery (TMM) is based in South East Queensland and has extensive experience in developing meat processing equipment for both export and domestic markets. Thompson Meat Machinery will contribute expertise, funding, management resources to drive the equipment design and build & sell the MSAT nozzle. TMM has planned to use a "Cut and Modify" approach. During the various development stages where possible they will alter existing components rather than commencing redesigned components from the beginning. Thus reducing costs and shortening the development time table. TMM will be offered first option to manufacture and sell the MSAT nozzle.

FSA is a co investor in the Meat Strip Alignment Technology and will be conducting the product trials. This will ensure a good transfer of knowledge and appropriate scientific discipline to the product trials.

2 Project objectives

The objectives of the project were:

Thompson Meat Machinery

1. Develop a commercial prototype MSAT nozzle which successfully integrates with suitable meat pumps and clipping units and that produces acceptable MSAT quality products.
2. A set of design drawings for commercial prototype MSAT nozzle
3. To generate the MSAT commercial pilot scale filling nozzle manufacturing costs

Food Science Australia

4. Increase the MSAT product development knowledge
5. Develop mechanical tenderness standards utilising the Warner Bratzler system to access MSAT texture for a quality assurance tool.

6. Review of MSAT production costs.
7. Run two lamb MSAT trials utilising meat from Tatiara Meat Company
8. Run two chuck beef MSAT trials utilising meat from Nolan Meats

Processors

9. To conduct MSAT trials on site for a manufacturing service fee: \$1.00/kg subject to a minimum batch of 500 kgs. ie Minimum fee per production run shall be \$500. (The manufacturing service fee shall include all services provided by processors including in-house equipment, labour, water, power and on-site storage. The fee excludes meat, ingredient materials, casing, packing and cartoning materials, off-site storage and special requested equipment or plant (not currently available at processors)
10. To review the manufacturing service fee after 2 successfully run trials and adjust as necessary with both parties approval

3 Methods and Approaches

The following were the milestones ;

Milestones¹
1A – Design and manufacture of second accumulator tank and design of transfer housing
1B(i) – Coordinate and supervise MSAT scale up product trials
1B(ii) – Run pilot plant scale lamb MSAT trials for TMC
1B(iii) – Run pilot plant scale chuck meat MSAT trials for Nolan Meats
1C - MSAT product trial 1 & 2 completed. Review \$1/kg cost and adjust as necessary
Go / No go decision
2A – Design and manufacture connection tubes and transfer housing
2B – Coordinate and supervise MSAT scale up product trials
2C - MSAT product trial 3 & 5 completed
Go / No go decision
3A – Design and manufacture casing nozzle and support frame
3B – Coordinate and supervise MSAT scale up product trials
3C – MSAT product trial 5,6 & 7 completed

¹ Milestones must be achieved to MLA's reasonable satisfaction.

The following methods were used:

Milestone 1 – Design and manufacture of second accumulator tank and design of transfer housing. (31/10/05-16/12/05).

Following the successful trials of the preliminary accumulator tank, this needs to be scaled up resulting in a second accumulator, which will require testing. Also, due to the time lag in ordering the transfer housing this will need to be designed and manufactured ready for milestone 2.

Activities

1A. Thompson Meat Machinery

1. Prepare preliminary and final assembly drawings
2. Capture equipment costings
3. Design transfer housing
Considerations ;
 - a) The housing should be manufactured using an investment casting procedure. There will probably be a number of optimum designs considered and an allowance for at least 2 investment cast prototypes. The casting development costs will be determined by the company capable of manufacturing this component such as weight, size and intricacy.
4. Manufacture purpose built accumulator tank
Considerations;
 - a) The preliminary accumulator uses a 27 kg filler lid the scale up could require a 50kg filler lid this would not be appropriate it would be ergonomically too heavy & cumbersome.
 - b) Extreme pressures generated by a high volume meat pumps (45-60 bar). Clean ability of the accumulator

1B. Food Science Australia (FSA)

1B(i). FSA Technical Supervision two MSAT scale up product trials (31/10/05 – 31/01/06)

1. Trial 1: Trial at Gotzinger premises to assess the second accumulator - batch size between 200kg & 1000kg.
2. Trial 2: Second trial at Gotzinger premises to assess the second accumulator - batch size between 200kg & 1000kg.
3. Scale up of batch size assessment
4. Coordination of all dry goods (premixes, additives)
5. Purchase and preparation of meat and tenderisation into strips
6. Develop appropriate formulation modifications as required
7. Collate information for contract manufacturer for potential rework
8. Prepare samples for informal sensory evaluation
9. Microbiological assessment of MSAT product from Trial 1 and 2
10. Objective assessment of MSAT product from Trial 1 and 2
11. Purchase of all meat raw material (Beef)
12. The hire, modification, transport or servicing of equipment required for MSAT nozzle trials

1B(ii). TMC Lamb Sample Trials - FSA are to carry out two pilot plant scale MSAT trials using lamb as the raw material. The lamb will be provided by Tatiara Meat Company (TMC). (31/10/05 – 30/11/05)

1. Trial 1- conduct pilot plant trial at FSA, Cannon Hill facilities producing 90kg of raw product mix
2. Trial 2- conduct pilot plant trial at FSA, Cannon Hill facilities producing 90kg of raw product mix
3. For each trial FSA has to prepare the following:

P.PIP.0136 - Development of commercial prototype Meat Strip Alignment Technology nozzle

- a. Coordination of meat from TMC
- b. Coordination of all dry goods (premixes)
- c. Develop appropriate formulation modifications as required
- d. Preparation of tenderized lamb strips and lamb emulsion
- e. Conduct the trial, manufacturing 90kg of raw meat mix and packaging
- f. Prepare samples for informal sensory evaluation
- g. Microbiological assessment of MSAT product from trial 1 & 2
- h. Freightling frozen product to TMC in Victoria
- i. Objective assessment of MSAT from trial 2

Note: operating expenses include \$1,000 for cost of meat from TMC

1B(iii). Nolan Meats Beef Sample Trials - FSA are to carry out two pilot plant scale MSAT trials using chuck and/or knuckle as the raw material. The meat will be provided by Nolan Meats (31/10/05 – 30/11/05)

1. Trial 1- conduct pilot plant trial at FSA, Cannon Hill facilities producing 90kg of raw product mix
- 2.. Trial 2- conduct pilot plant trial at FSA, Cannon Hill facilities producing 90kg of raw product mix
3. For each trial FSA has to prepare the following:
 - a. Coordination of meat from Nolan Meats
 - b. Coordination of all dry goods (premixes)
 - c. Develop appropriate formulation modifications as required
 - d. Preparation of tenderized beef strips and beef emulsion
 - e. Conduct the trial, manufacturing 90kg of raw meat mix and packaging
 - f. Prepare samples for informal sensory evaluation
 - g. Microbiological assessment of MSAT product from trial 1 & 2
 - h. Freightling frozen product to Nolan Meats in Qld
 - i. Objective assessment of MSAT from trial 2

Note: operating expenses include \$1,000 for cost of meat from Nolan Meats

1C. Commercial Prototype Trials (31/10/05 – 31/01/06)

1. MSAT product trial 1 & 2 completed on processor's premises
2. The manufacturing service fee shall include all services provided by processors including in-house equipment, labour, water, power and on-site storage. The fee excludes meat, ingredient materials, casing, packing and cartoning materials, off-site storage and special requested equipment or plant (not currently available)
3. Review \$1/kg costing and adjust as necessary

Outcomes

The products and process will be assessed to ensure;

1. MSAT product quality (laboratory scale samples) can be maintained during the equipment scale up.
2. Any issues with the equipment scale up are identified and are reasonably resolvable.
3. Design drawings for milestone 1
4. Objective assessment of MSAT samples for reference in further trails
5. Completion of two pilot scale trials using lamb from & brief report
6. Completion of two pilot scale trials using chuck & brief report
7. Review processor trial costings and update as necessary

This is a GO/NO GO decision point.

Milestone 2 – Design and manufacture connection tubes and transfer housing

Activities

2A. Thompson Meat Machinery (1/02/06-15/05/06)

1. Prepare preliminary and final assembly drawings
2. Capture equipment costings
3. Manufacture purpose built connection tubes
Considerations;
 - a) Extreme pressures generated by a high volume meat pumps (45-60 bar).
 - b) Altogether there is approximately 3 meters of hoses tubes & flights and section of nozzle. This makes the apparatus extremely long. Design focus to decrease this length. The tubes will be reduced in size in either 2 or 3 stages. At this stage additional length will be added to the manufactured length of the existing tubes. This is in consideration of removing the segmented tube that follows the transition segment.
4. Cleanability of the connector tubes - quick release system enabling easy assembly and dismantling for cleaning after use.
5. Assemble transfer housing

2B. Food Science Australia (1/02/06-30/06/06)

Technical Supervision of two MSAT scale up product trials

1. Trial 3: Trial at processor's premises to assess connection tubes and transfer housings - batch size between 200kg & 1000kg.
2. Trial 4: Second trial at premises to assess connection tubes and transfer housings - batch size between 200kg & 1000kg.
3. Scale up of batch size assessment
4. Coordination of all dry goods (premixes, additives)
5. Purchase and preparation of meat and tenderisation into strips
6. Develop appropriate formulation modifications as required
7. Collate information for contract manufacturer for potential rework
8. Prepare samples for informal sensory evaluation
9. Microbiological assessment of MSAT product from Trial 3 and 4
10. Objective assessment of MSAT product from Trial 3 and 4
11. Purchase of all meat raw material (Beef/Sheep)
12. The hire, modification, transport or servicing of equipment required for MSAT nozzle trials

2C. Processor (1/02/06-30/06/06)

1. MSAT product trial 3 & 4 complete on premises
2. The manufacturing service fee shall include all services provided by processor including in-house equipment, labour, water, power and on-site storage. The fee excludes meat, ingredient materials, casing, packing and cartoning materials, off-site storage and special requested equipment or plant (not currently available)

Outcomes

The products and process will be assessed to ensure;
MSAT product quality (laboratory scale samples) can be maintained during the equipment scale up.

1. Any issues with the equipment scale up are identified and are reasonably resolvable.
2. Design drawings for milestone 2.
3. Production cost review

This is a GO/NO GO decision point.

Milestone 3 – Design & manufacture casing nozzle and support frame

This milestone builds upon milestone 2, starting the final phase of the commercial prototype MSAT nozzle development. The completed equipment costings and MSAT design drawings. Also, an operating commercial prototype MSAT nozzle ready for further product trials, commercial partnerships and demonstrations.

Activities

3A. Thompson Meat Machinery (1/04/06 – 30/06/06)

1. Prepare preliminary and final assembly drawings
2. Prepare equipment manufacturing costing
3. Manufacture purpose built casing nozzle and support frame.
Considerations;
 - a. Cleanability of the casing nozzle and support frame
 - b. The casing nozzle design needs to address the potential impact of rapid uncontrolled expansion generated by high volume meat pumps which could cause misalignment of the meat strips. A potential solution is to taper the casing nozzle.
 - c. Occupational Health and Safety assessment of MSAT commercial prototype nozzle
4. Confirmation by TMM to take up first option, to manufacture and sell the MSAT nozzle.

3B. Food Science Australia

Technical Supervision three MSAT scale up product trials (1/7/06 – 31/08/06)

1. Trial 5: Trial at processor premises to assess the commercial prototype MSAT nozzle - batch size between 200kg & 1000kg.
2. Trial 6: Second trial at premises to assess the commercial prototype MSAT nozzle - batch size between 200kg & 1000kg.
3. Trial 7: Third trial at premises to assess the commercial prototype MSAT nozzle - batch size between 200kg & 1000kg.
4. Scale up of batch size assessment
5. Coordination of all dry goods (premixes, additives)
6. Purchase and preparation of meat and tenderisation into strips
7. Develop appropriate formulation modifications as required
8. Collate information for contract manufacturer for potential rework
9. Prepare samples for informal sensory evaluation
10. Microbiological assessment of MSAT product from Trial 5, 6, and 7
11. Objective assessment of MSAT product from Trial 5, 6, and 7
12. Purchase of all meat raw material (Beef/Sheep)
13. The hire, modification, transport or servicing of equipment required for MSAT nozzle trials
14. Ensure TMM has resolved to take up first option, to manufacture and sell the MSAT

3C. Processor (1/7/06 – 31/08/06)

1. MSAT product trial 5,6 & 7 completed on processor's premises
2. The manufacturing service fee shall include all services provided by processor including in-house equipment, labour, water, power and on-site storage. The fee excludes meat, ingredient materials, casing, packing and cartoning materials, off-site storage and special requested equipment or plant (not currently available)

4 Key Findings

The products and process will be assessed to ensure:

- Design drawings for milestone 3
- Commercial prototype MSAT nozzle suitable for high volume meat pump and provision for clipper attachment
- Manufacturing costing for commercial prototype MSAT nozzle.
- MSAT product quality (laboratory scale samples) can be maintained during the equipment scale up.
- That TMM has exercise its rights of first option to manufacture and sell the MSAT nozzle.

The MSAT process is documented in Appendix A. A processor and equipment manufacturer were engaged in the project to validate the process and facilitate the development of MSAT concept product (See Photo 5 & Appendix B).



Photo 5. Prototype MSAT final assembly and sectional view

Some preliminary market feedback was provided from the red meat processor and equipment manufacturer (see Photos 5-10). FSA produced a summary of the report findings in the form of a presentation (See Appendix C).

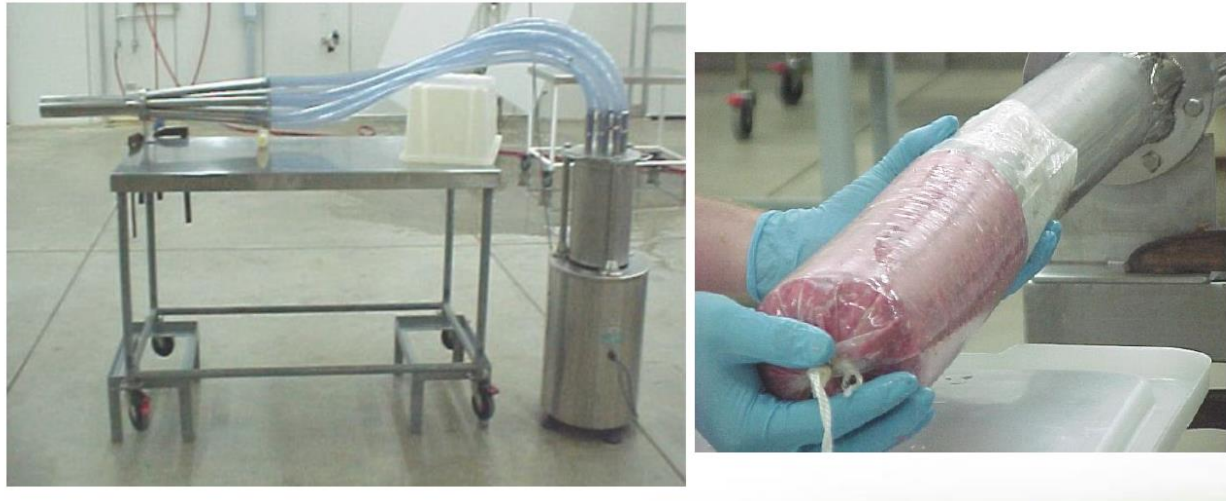


Photo 6. Prototype development of MSAT final assembly and sectional view

■ Potential products from the log

- Roasts
- Steaks
- Strips
- Cubes



Photo 7. MSAT final product formats

Steak Products

- Frozen steaks 15mm thick cut from meat log
- Two formats:
 - Round
 - Rectangular
- Can be cooked from frozen in 10 minutes



Photo 8. MSAT steak product formats

Meat Strips

- Strips 15 – 20mm thick with varying lengths cut from frozen meat log
- Retain shape, texture and meaty bite after cooking
- Ideal for HMR use or finger food
- Able to be reheated in microwave – remains tender and juicy



Photo 9. MSAT strips product formats

Cubed Products

- Cubes 10 – 20mm square cut from frozen meat log
- Retain shape, texture and meaty bite after cooking in sauce
- Ideal for HMR use or Heat and Eat meals.
- Able to be cooked in sauce, chilled, and reheated in microwave



Photo 10. MSAT cubed product formats

5 Commercial outcomes

The following were the project outcomes:

- Update business strategy plan
- Equipment marketed and supported through Thompson Meat Machinery
- E Brochure for launch
- Exhibit MSAT products and equipment at appropriate trade shows (AIFST etc)
- First option to manufacture and sell the MSAT nozzle resolved between MLA & TMM

6 Conclusion

The conclusions of the project were :

- Generally processor had a good understanding of reformed products and technology, and are familiar with Philadelphia Cheesesteak type applications in the US.
- Apart from pump filler and bandsaw slicer, processor had all the necessary equipment for MSAT including a needle tenderizer and 3D slicer.
- Overall, processor considered that the MSAT had good texture, flavour and tenderness. The only adverse comment was that the product was dry and too lean.
- Processor's view that the product would be of interest to the US customers and wants to show MSAT samples to US customers during their future Australian visit.
- Processor unable to comment on their preferred raw material primals for MSAT.

7 Recommendations

The following was recommended :

- MLA to provide processor with a written proposal letter for processor to become the beef industry adopter for MSAT.
- The aim would be to provide processor with commercial prototype samples for future US visitors and commercial sample trials.

8 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 triphosphate, 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 triphosphate 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 been 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	Batch Size	TOTAL REQUIRED	
	Percentage	Weight (kg)	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	Batch Size	TOTAL REQUIRED	
	Percentage	Weight (kg)	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)

9 Appendix B – MSAT Final Assembly & Sectional View



Photo 11. MSAT final assembly and sectional view



Photo 12. MSAT final assembly and sectional view



Photo 13. MSAT final assembly and sectional view

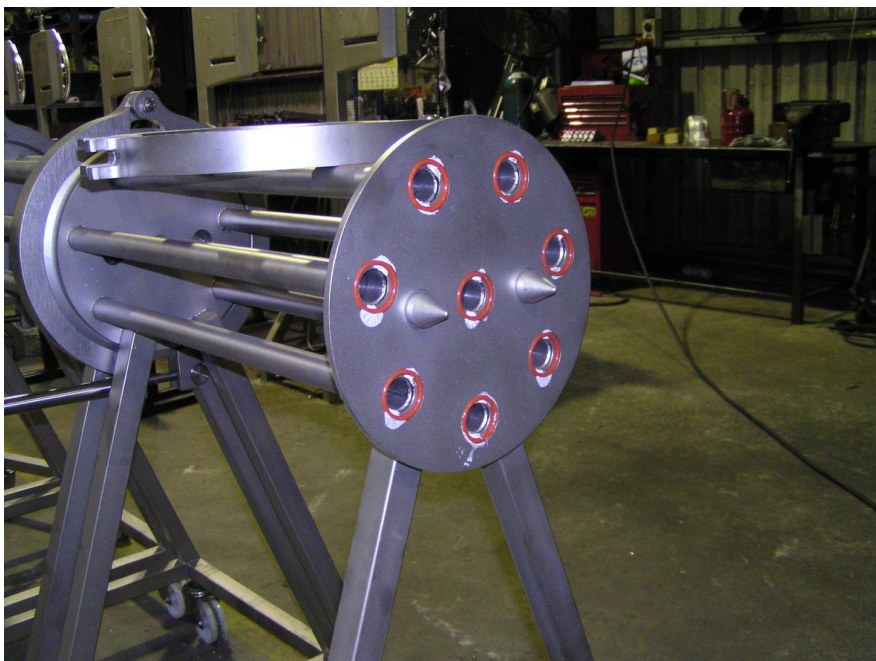


Photo 14. MSAT final assembly and sectional view

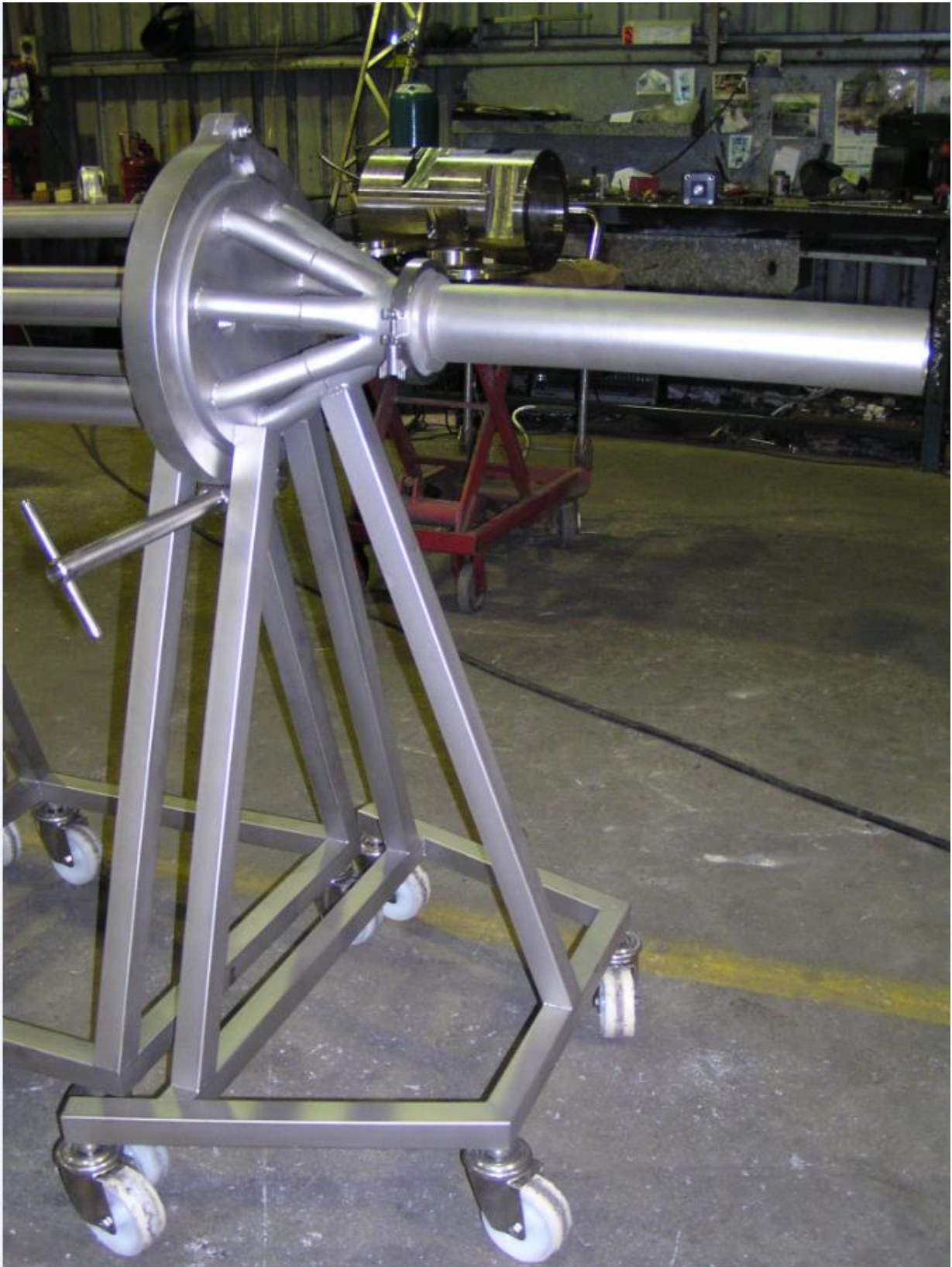
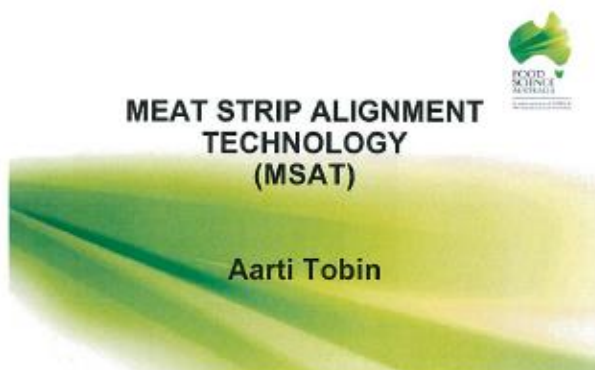


Photo 15. MSAT final assembly and sectional view



Photo 16. MSAT final assembly and sectional view

10 Appendix C – MSAT Presentation



MEAT STRIP ALIGNMENT TECHNOLOGY (MSAT)

Aarti Tobin

FOOD SCIENCE AUSTRALIA

Project Idea

- Issues with restructured products
 - Looks restructured
 - Meat fibres going in all directions
 - Poor texture
- Processors wanted:
 - "Black box" where pieces of meat restructured itself into a product with texture of whole tissue meat
 - Not labour intensive
- Based on literature search, a method was developed – similar to that of fibreboard manufacture

Results for today Ideas for tomorrow

Product Development

- 3 component system
 - Meat strips
 - Brine
 - Meat emulsion
- Prototype to align the mixture of meat strips, brine and meat emulsion

Results for today Ideas for tomorrow

Product Blend

- Meat and brine is mixed first until all the brine is absorbed
- Emulsion is then added and mixed



- The meat mixture is then filled out through the prototype

Results for today Ideas for tomorrow

Development of Prototype



Results for today Ideas for tomorrow

Final Product

- Potential products from the log
 - Roasts
 - Steaks
 - Strips
 - Cubes



Results for today Ideas for tomorrow

Steak Products

- Frozen steaks 15mm thick cut from meat log
- Two formats:
 - Round
 - Rectangular
- Can be cooked from frozen in 10 minutes



Results for today Ideas for tomorrow

Steak - Meal Concepts



Results for today Ideas for tomorrow

Meat Strips

- Strips 15 – 20mm thick with varying lengths cut from frozen meat log
- Retain shape, texture and meaty bite after cooking
- Ideal for HMR use or finger food
- Able to be reheated in microwave – remains tender and juicy



Results for today Ideas for tomorrow

Meat Strips – Meal Concepts



Results for today Ideas for tomorrow

Cubed Products

- Cubes 10 – 20mm square cut from frozen meat log
- Retain shape, texture and meaty bite after cooking in sauce
- Ideal for HMR use or Heat and Eat meals.
- Able to be cooked in sauce, chilled, and reheated in microwave



Results for today Ideas for tomorrow

Meat Cubes – Meal Concepts



Results for today Ideas for tomorrow