2017 MSA Excellence in Eating Quality Awards
The future of MSA: A conversation with the MSA R&D Team

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MSA eating quality research

Objective:

• Accuracy Improve model accuracy – all cows, all cuts
• Expansion Expand into new cook methods – increase product availability
• Execution Industry engagement – making it work

1. Current and recently completed research

2. The Future of MSA R&D

2020 goal to be have all animals eligible for grading
Current and recently completed research

• Industry funded project into meat colour
• Mixing and stress and recovery
  • Transport pathway review
  • Saleyard pathway review
  • Extended ageing beyond 35 days
  • Dry ageing – utilising Australian and Japanese consumers
• MSA Model expansion
Meat colour and packaging

What did we want to know?

• How do consumers rate meat colour?
• Does dentition make a difference to consumer acceptance of colour?
• Did packaging type make a difference?
• Does meat colour effect eating quality?

A joint funded project between Teys Australia and AMPC
What did we do?

- 48 carcases (grassfed animals)
  - Striploins, rumps and tenderloins were taken from both left and right sides.
  - Meat colour ranged from 1C to 5.
  - Carcases that had meat colour 3, 4 & 5 had pHu both under and over pHu5.70.
  - Carcases represented the dentition categories of 0, 2, 4 & 6.
  - 3 ageing periods – 5, 12 & 40 days in cryovac prior to retail display.
  - 3 packaging methods – overwrap, VSP and MAP.
  - Retail cabinet used was a standard retail cabinet.
What did we ask the consumer?

- Consumers rated product from appealing to unappealing.
- They also ticked a box for either:
  - Definitely would buy,
  - Definitely would buy if discounted and
  - Definitely would not buy.

- 20,000 individual consumer visual observations were made.
- All product was than sensory tested involving 1440 consumers eating 7 samples each.
How do we measure meat colour?
How do consumers rate meat colour?

- Consumer do not discriminate between Aus-meat meat colour scores 2 to 5.
- There is a negative trend towards Aus-meat meat colour 1C.
- Position of product on retail shelf have not effect.
How does dentition relate to consumer scores?

- Dentition has no effect on consumer acceptance of retail meat colour.
Does packaging type make a difference?

- Consumers tended to rate the meat colour of the product in the VSP packaging slightly lower, but still acceptable.
Does meat colour effect eating quality?

- There is no relationship between meat colour at time of grading and eating quality.
Summary – meat colour

• Consumers rated MC 1C lower than MC 2 to 5 regardless of packaging type.
• VSP rated slightly lower than OWP and MAP but still acceptable.
• Cabinet position had no effect.
• Dentition had no effect.
• Meat colour does not effect eating quality.

Meat colour was removed as a minimum requirement for MSA on 1\textsuperscript{st} December 2016 and will now be applied as a company specification.

MSA still collects meat colour for feedback.

pHu remains a MSA requirement and carcases must be below 5.71
Mixing and Stress

The desire to be able to MSA grade all cattle;

- Identification of a direct stress measure to replace existing MSA delivery conditions
- Examination of sea transport and potential need for specific Pathway or guidelines
- Review of existing pathways for saleyard cattle
- Collaborative effort between Sydney Uni, Murdoch Uni, Melbourne Uni and MLA.

Additional research linked;

- Extended ageing to 84 days in vacuum packaging
- Dry ageing
Mixing and stress – sea pathway

- FARM 1: STEERS 61hd
- NEVER MIXED STEERS

- FARM 2: STEERS 61hd
- MIXED STEERS

- FARM 3: HEIFERS 61hd
- MIXED SEX

- FARM 4: HEIFERS 61hd
- MIXED HEIFERS

- NEVER MIXED HEIFERS
Mixing and stress – pre treatment recording
Animal temperature variation on farm
Shipping
Mixing and stress – on plant measures

- Thermal images in race to knocking box
- Retinal imaging in knocking box
- Extensive range of blood and tissue samples
- pH and temp decline plus MSA grading
- Collection of tenderloin, striploin, eye round, outside flat and oyster blade each to be aged 7 and 21 days for sensory testing
Saleyard pathway review

**SALEYARD DESIGN (Head per treatment)**

<table>
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- On farm and abattoir measures same as shipping trial
- 2 saleyard systems tested
  - Pre-weigh on day of sale
  - Post weigh on day of sale
Saleyard imaging
Saleyard imaging
Summary – mixing and stress

- Large and complex trail – 480 animals.
- Supply pathways – sea transport and saleyards.
- Can technology assist in identifying stress that is linked to MSA grade outcome?

- 9,360 consumers involved in sensory testing.

All consumer sensory was completed in June 2017.
Results are currently being analysed – due October 2017.
Extended ageing

Extended Ageing

• 5 primals, ageing out to 84 days in 7 day intervals.
• Temperature storage control and sensory effects.

All consumer sensory was completed in June 2017.

Results are currently being analysed – due October 2017.
Dry ageing results

Dry Ageing

- Bone-in and boneless product.
- Ageing under vacuum packaging first.
  - Dry aged for 5 and 8 weeks
- Australian and Japanese consumers.

A joint project between MLA and Top Cut conducted by Melbourne University.
Dry ageing results
MSA Model expansion

Eating quality outcomes for all muscles in the carcase

• Improve accuracy on existing outcomes
• Expand to include new muscles including bone-in options
• Expand to include new cook methods

• 54 animals
• 66 muscles per animal
• 8,900 consumers

Consumer sensory testing is currently underway
MSA model expansion and model accuracy cont.
The future of MSA R&D

- Continual monitoring of consumer behaviour.
- Extension to overseas consumers (we export over 70% of beef).
- Ability to optimise use of the whole carcase.
- Links to genomics.
Other technologies – Cameras for grading

MIJ camera – eye muscle area, marbling, rib fat
Prediction of eye muscle area (EMA)

\[ R^2 = 0.96 \]

- **Y-axis**: MLI Eye Muscle Area (CM²)
- **X-axis**: MSA Eye Muscle area (CM²)
Summary

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