



# 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
  - Saleyards 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 carcasses (grassfed animals)
  - Striploins, rumps and tenderloins were taken from both left and right sides.
  - Meat colour ranged from 1C to 5.
  - Carcasses that had meat colour 3, 4 & 5 had pHu both under and over pHu5.70.
  - Carcasses 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.
- Please go to the XXXXXxxxxx and rank the 8 meat trays to the COLOUR of each sample is to

Please match each ID to the m and then tick one of the boxes

ID

☐ Extremely Unappealing

\_\_\_\_\_

Consumer No. \_\_\_\_\_

Please go to the XXXXX and rank the 8 meat trays to the right on how appealing the MEAT COLOUR of each sample is to you.

Please match each ID to the meat tray, place a mark on the scale and then tick one of the boxes to the right.

ID

Extremely Unappealing Extremely Appealing

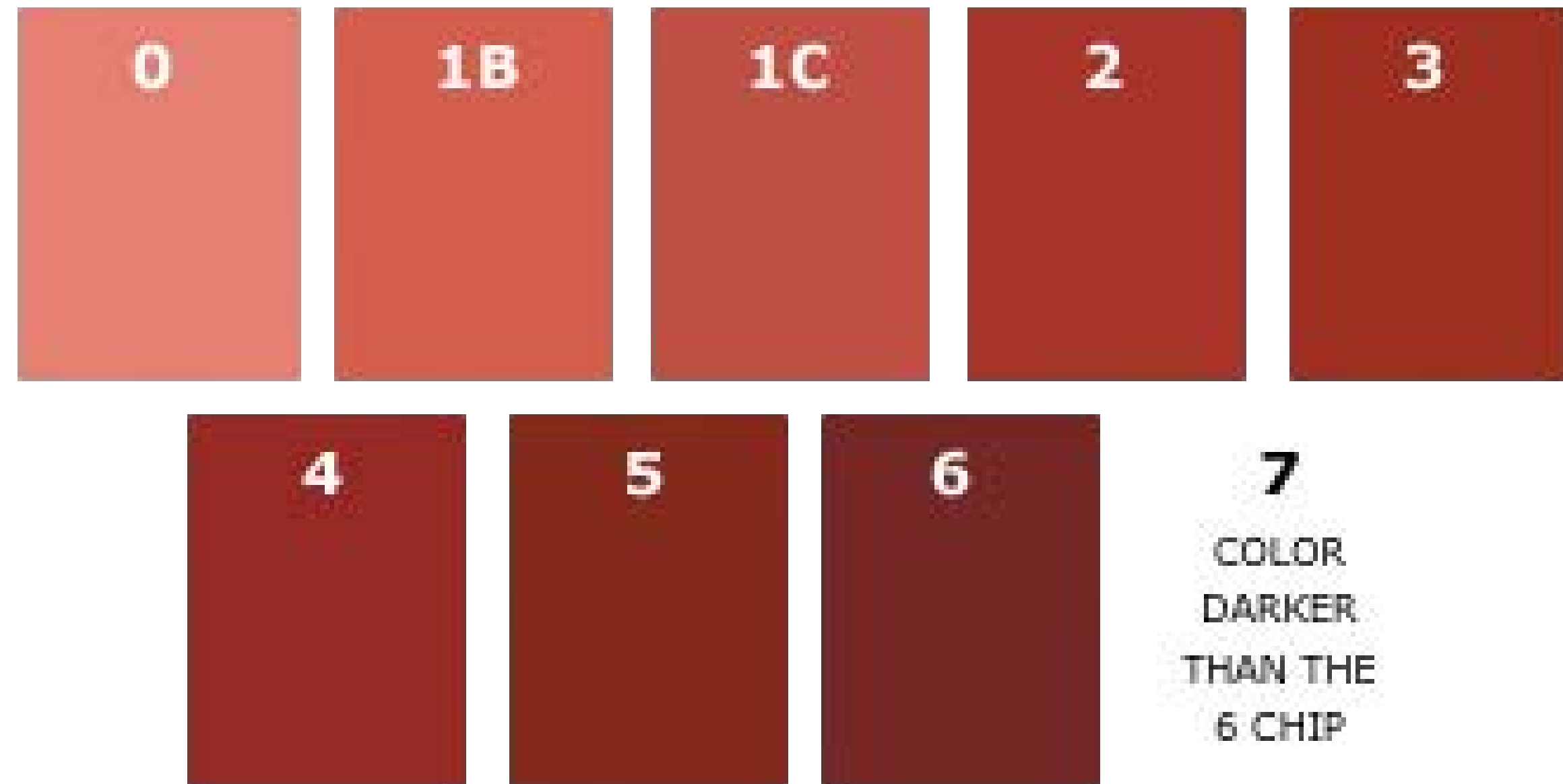
☐ Definitely would buy  
☐ Definitely would buy if discounted  
☐ Definitely would not buy

Extremely Unappealing Extremely Appealing

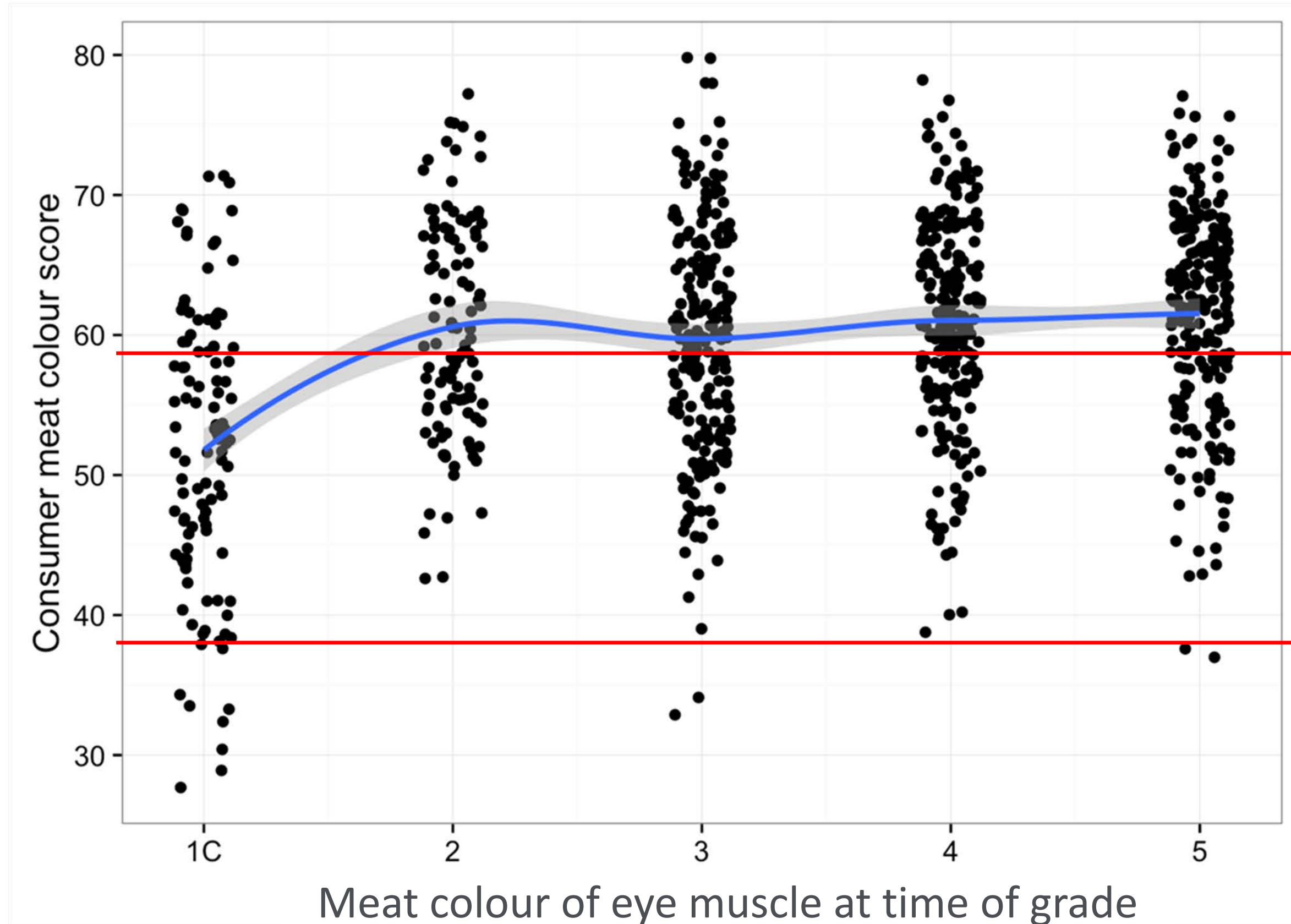
☐ Definitely would buy  
☐ Definitely would buy if discounted  
☐ Definitely would not buy

- 20,000 individual consumer visual observations were made.
- All product was then sensory tested involving 1440 consumers eating 7 samples each.

# How do we measure meat colour?



# How do consumers rate meat colour?

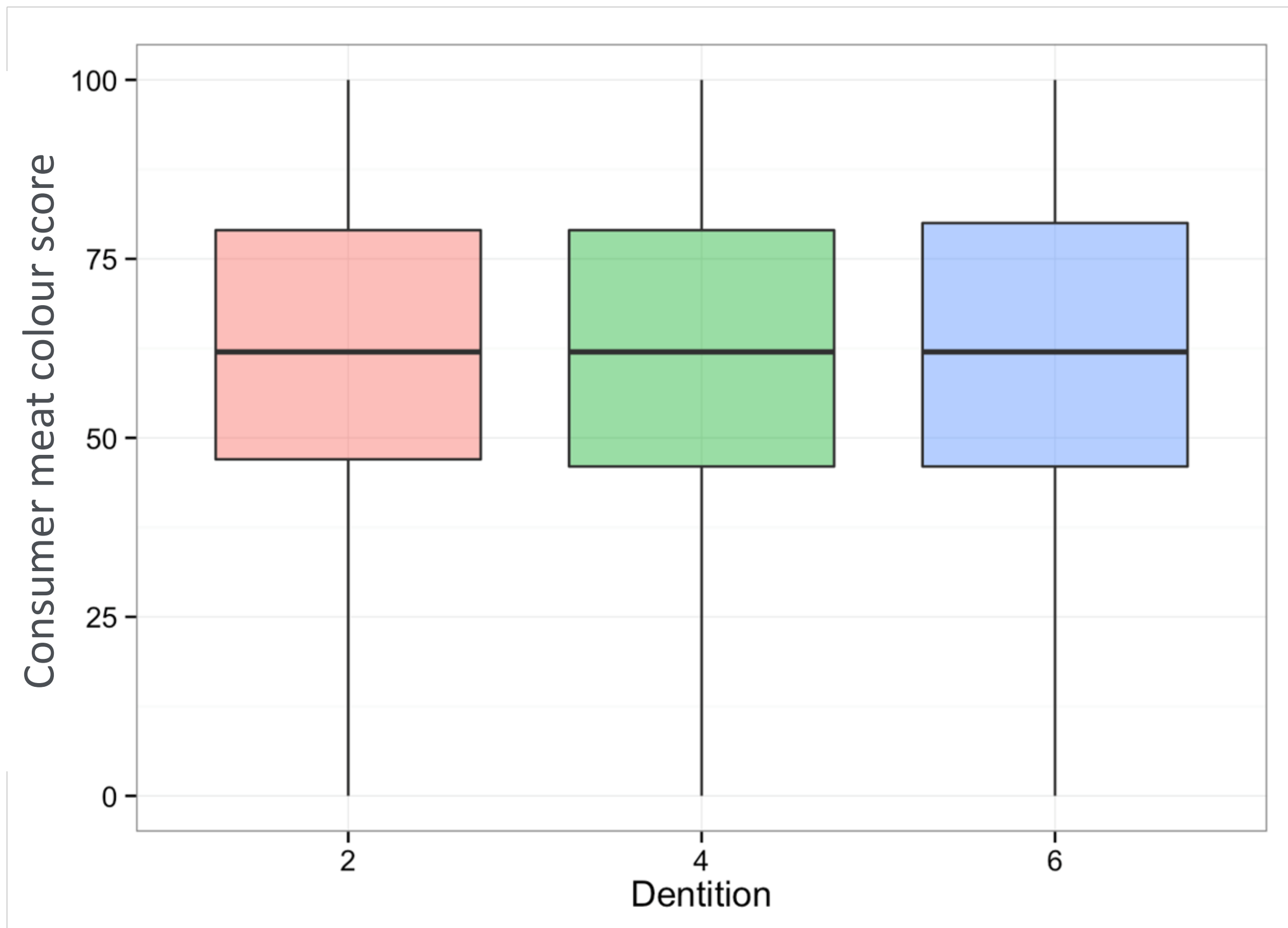


- Consumer do not discriminate between Aus-meat meat colour scores 2 to 5.
- There is a negative trend towards Aus-meat meat colour 1C.
- Position of product on retail shelf have not effect.

59

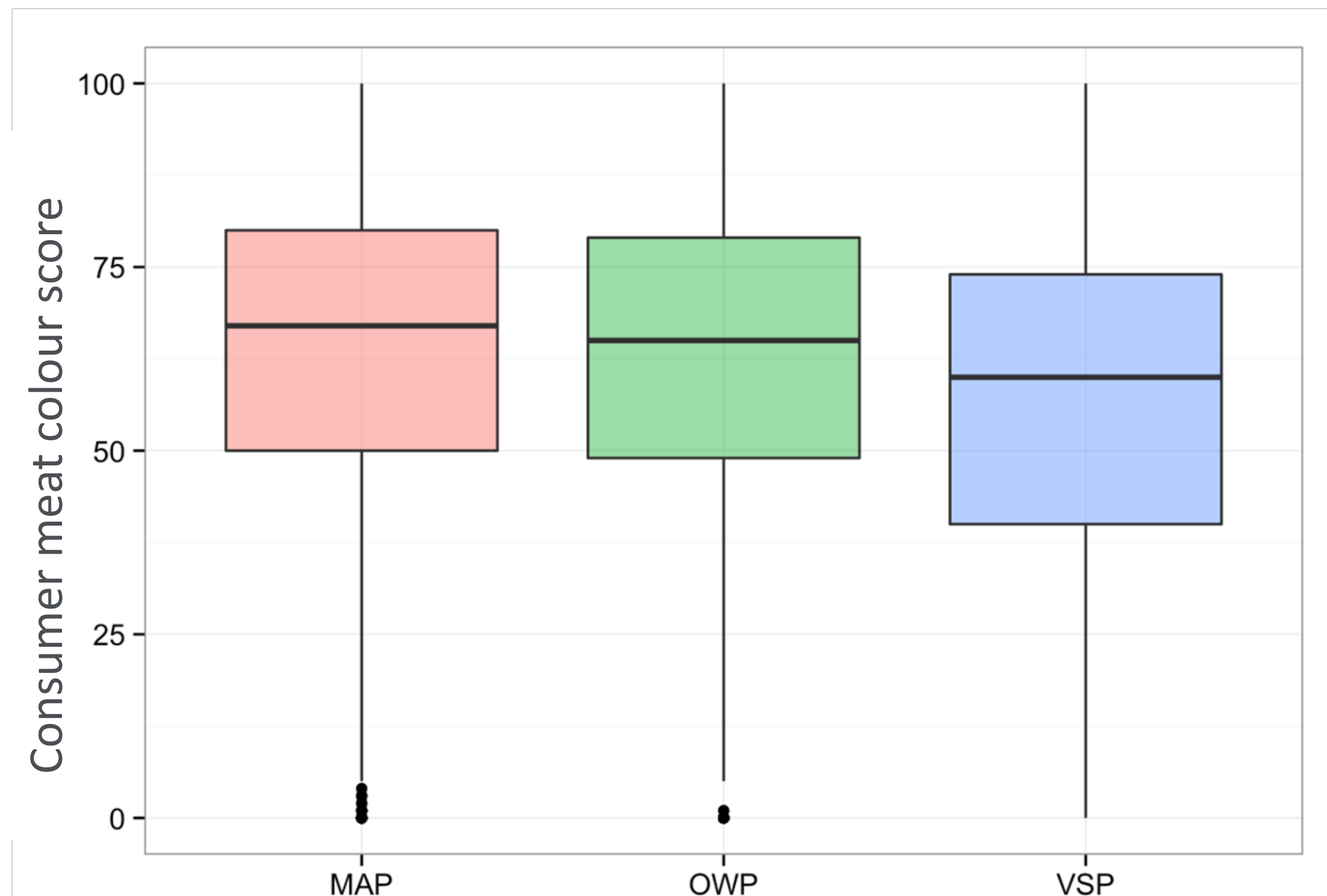
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# How does dentition relate to consumer scores?



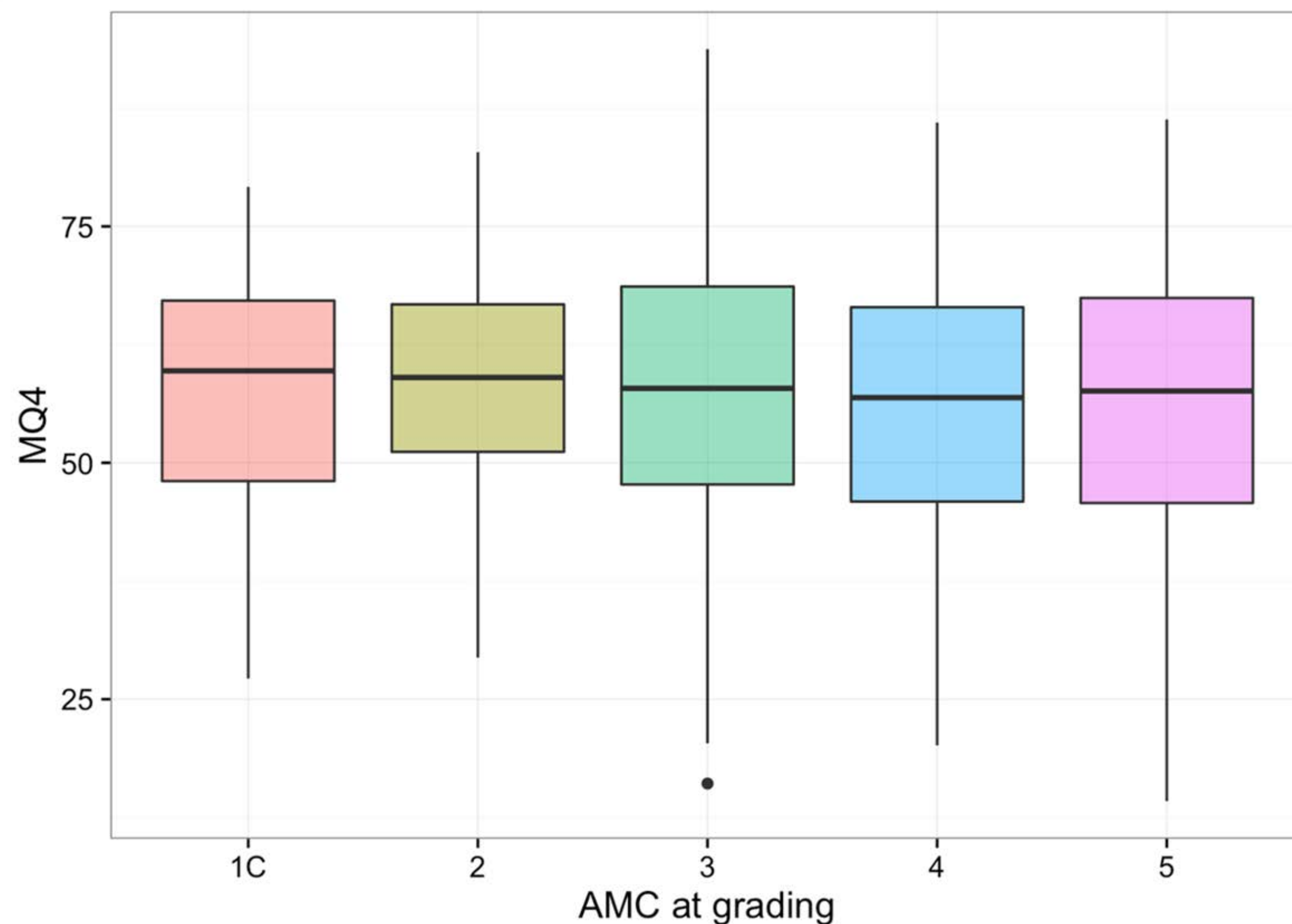
- Dentition has no effect on consumer acceptance of retail meat colour.

# 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<sup>st</sup> December 2016 and will now be applied as a company specification.**

**MSA still collects meat colour for feedback.**

**pHu remains a MSA requirement and carcasses must be below 5.71**

# Mixing and Stress

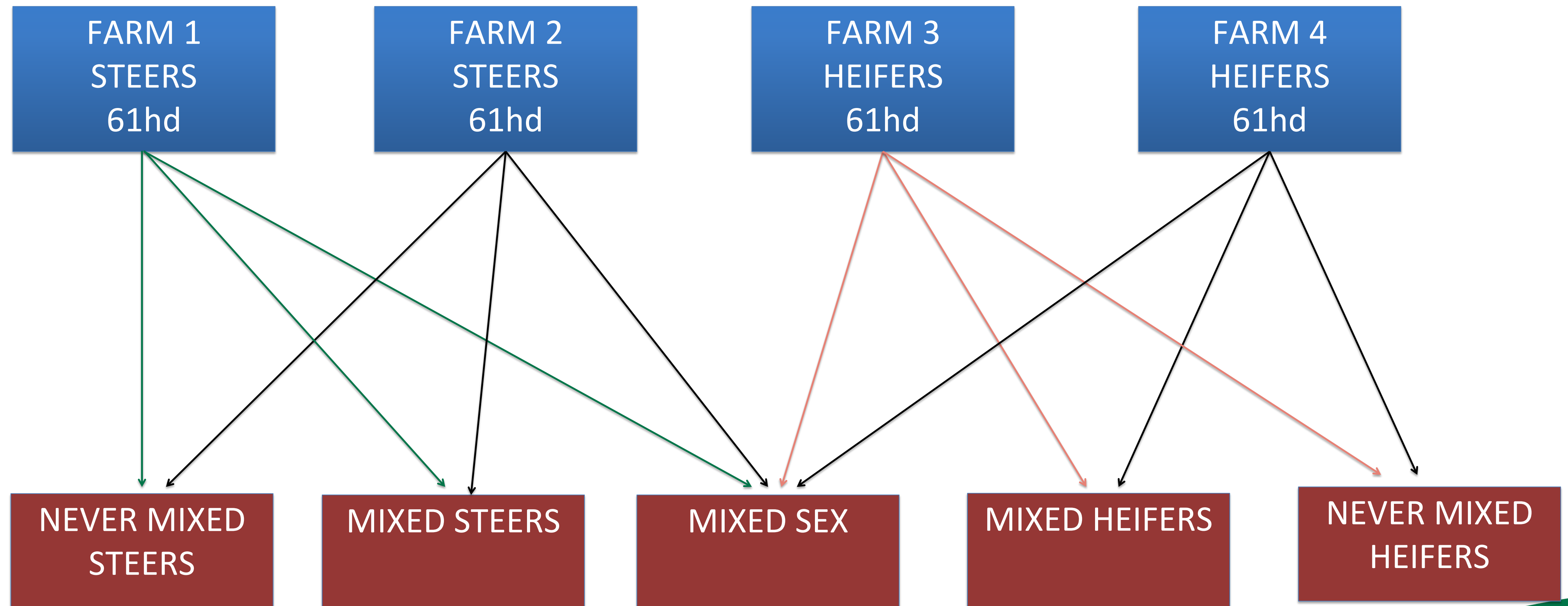
The desire to be able to MSA grade all cattle;

- 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.

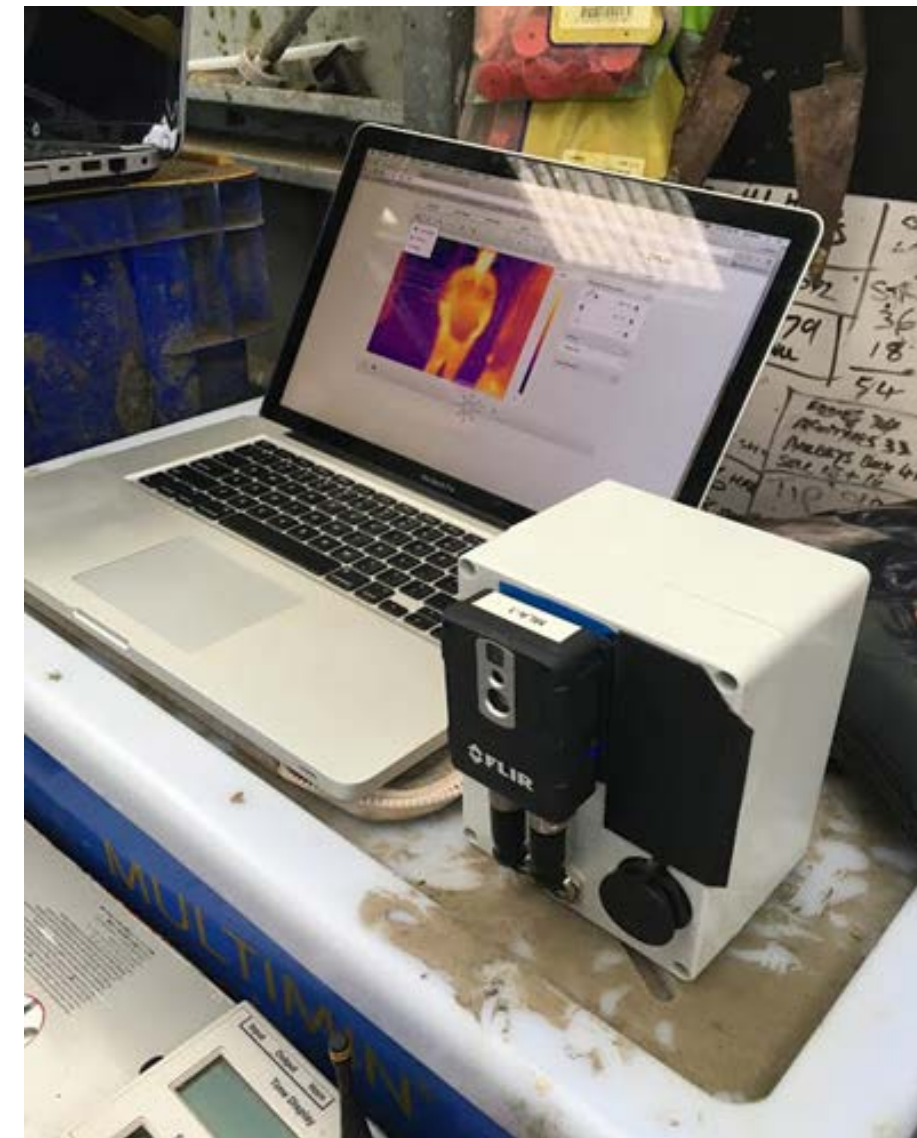
Additional research linked;

- Extended ageing to 84 days in vacuum packaging
- Dry ageing

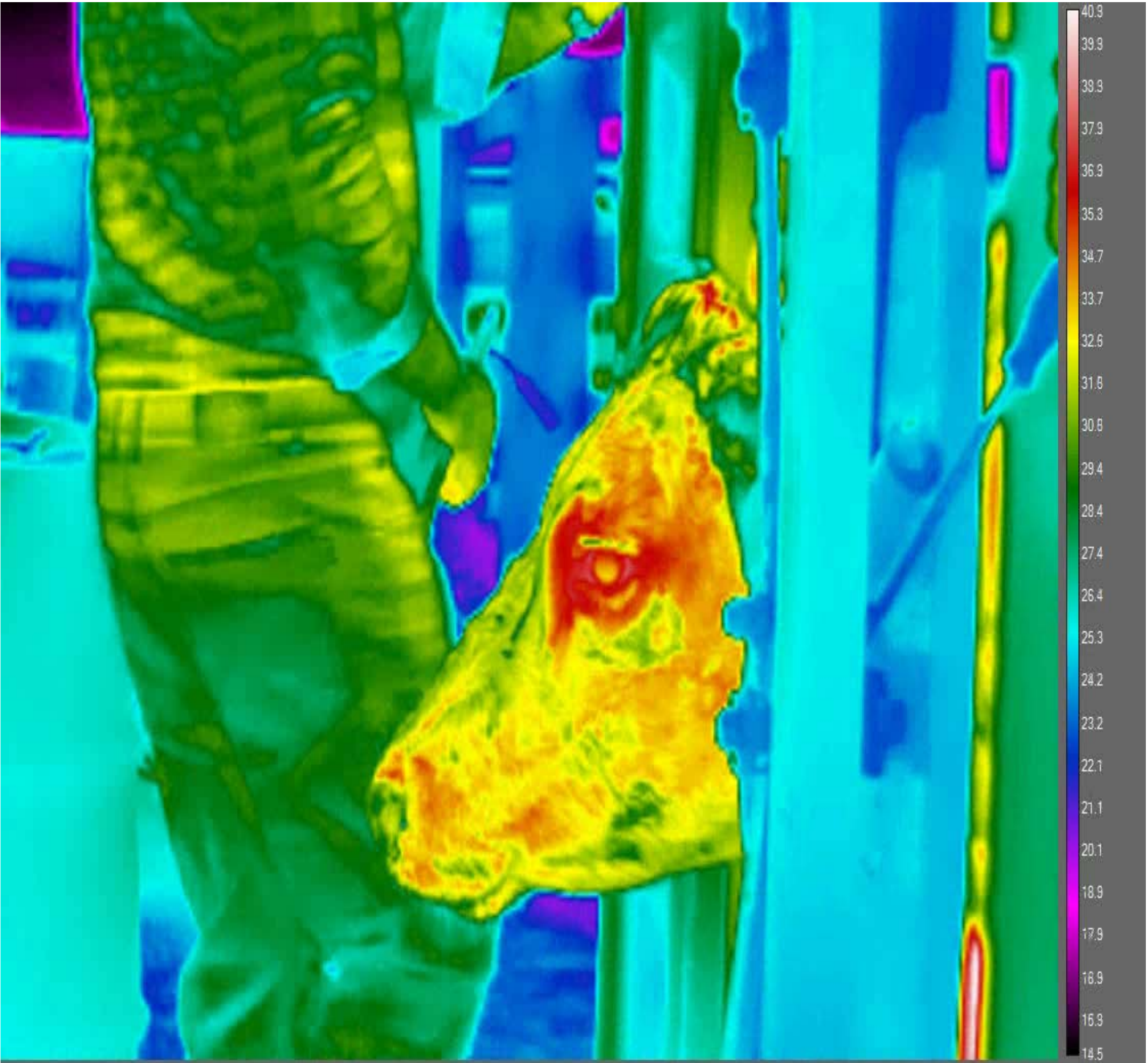
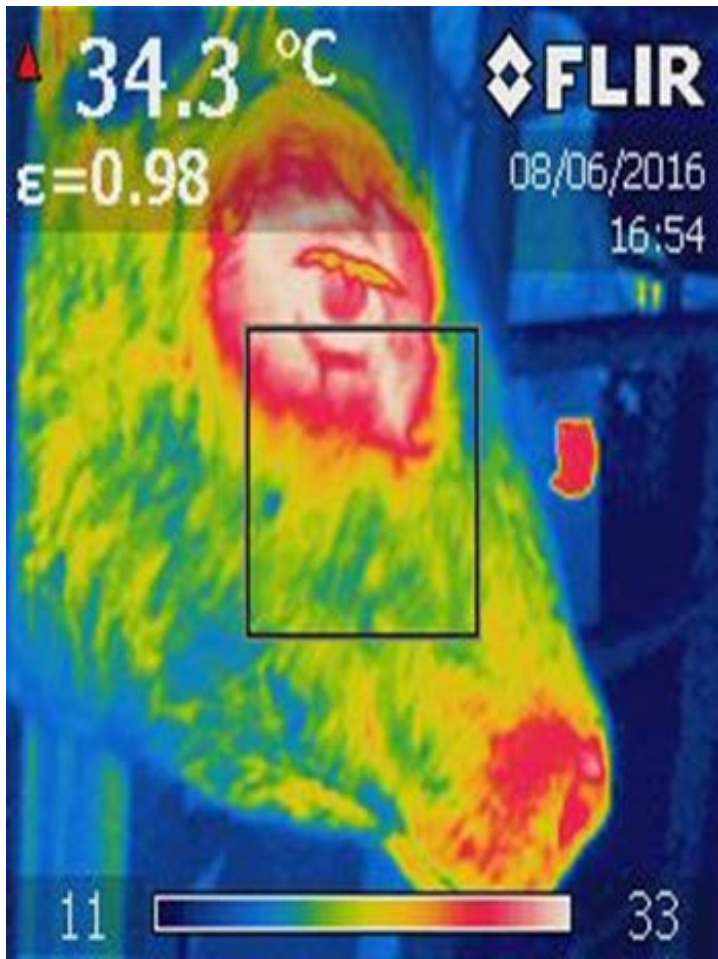
# Mixing and stress – sea pathway



# 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)

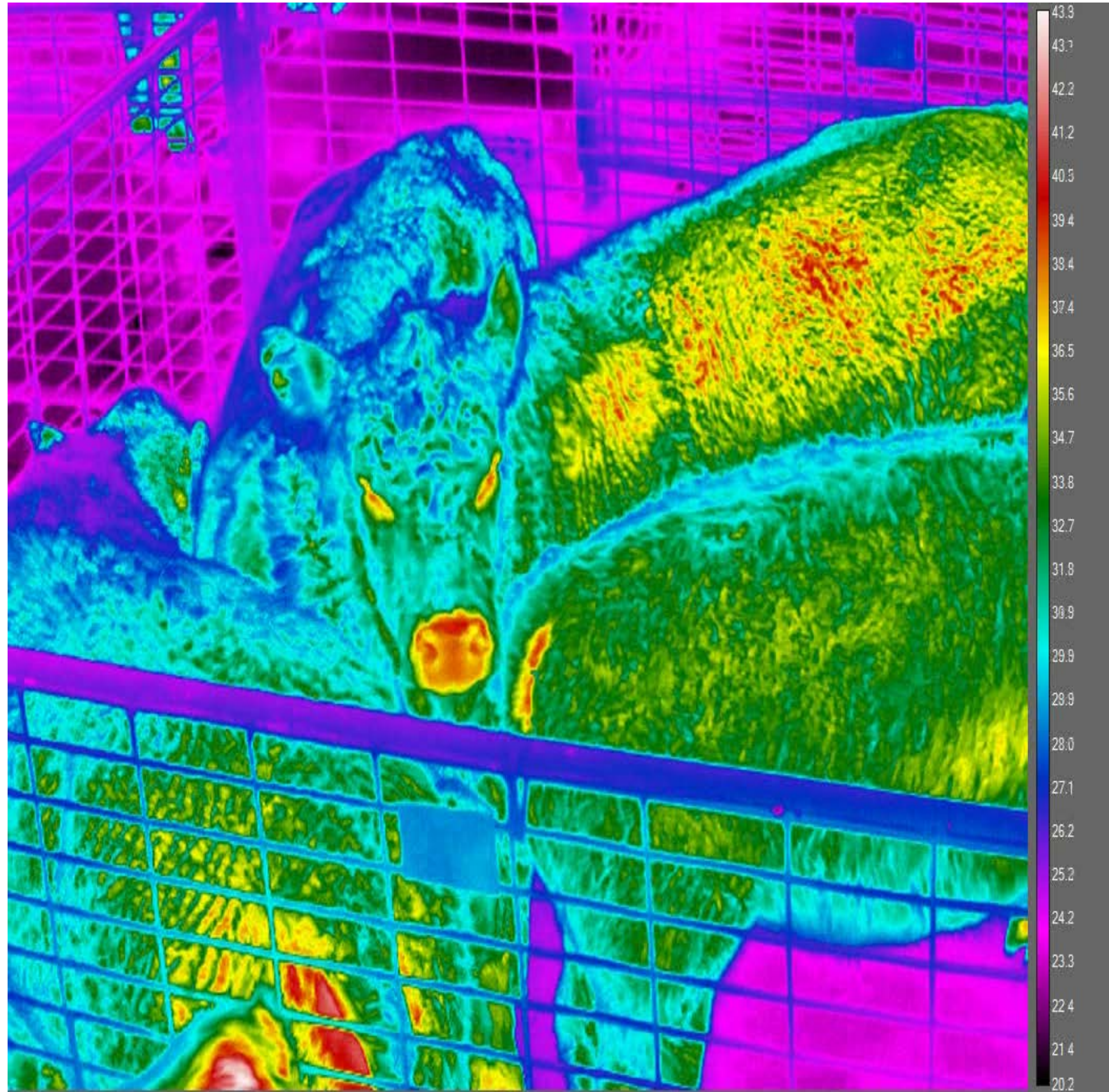
|           | DIRECT TO SLAUGHTER |             |            |             | POWRANNA SALEYARD |             |               |             |            |             | QUOIBA SALEYARD |             |               |             |            |             | REPLICATE<br>TOTAL |
|-----------|---------------------|-------------|------------|-------------|-------------------|-------------|---------------|-------------|------------|-------------|-----------------|-------------|---------------|-------------|------------|-------------|--------------------|
|           | Steers              |             | Heifers    |             | MIXED STEERS      |             | MIXED HEIFERS |             | MIXED SEX  |             | MIXED STEERS    |             | MIXED HEIFERS |             | MIXED SEX  |             |                    |
|           | Kill day 1          | Kill day 14 | Kill day 1 | Kill day 14 | Kill day 1        | Kill day 14 | Kill day 1    | Kill day 14 | Kill day 1 | Kill day 14 | Kill day 1      | Kill day 14 | Kill day 1    | Kill day 14 | Kill day 1 | Kill day 14 |                    |
| Farm 1    | 12                  | 12          |            |             | 6                 | 6           |               |             | 3          | 3           | 6               | 6           |               |             | 3          | 3           | 60                 |
| Farm 2    | 12                  | 12          |            |             | 6                 | 6           |               |             | 3          | 3           | 6               | 6           |               |             | 3          | 3           | 60                 |
| Farm 3    |                     |             | 12         | 12          |                   |             | 6             | 6           | 3          | 3           |                 |             | 6             | 6           | 3          | 3           | 60                 |
| Farm 4    |                     |             | 12         | 12          |                   |             | 6             | 6           | 3          | 3           |                 |             | 6             | 6           | 3          | 3           | 60                 |
| TREATMENT | 24                  | 24          | 24         | 24          | 12                | 12          | 12            | 12          | 12         | 12          | 12              | 12          | 12            | 12          | 12         | 12          | 240                |

- 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



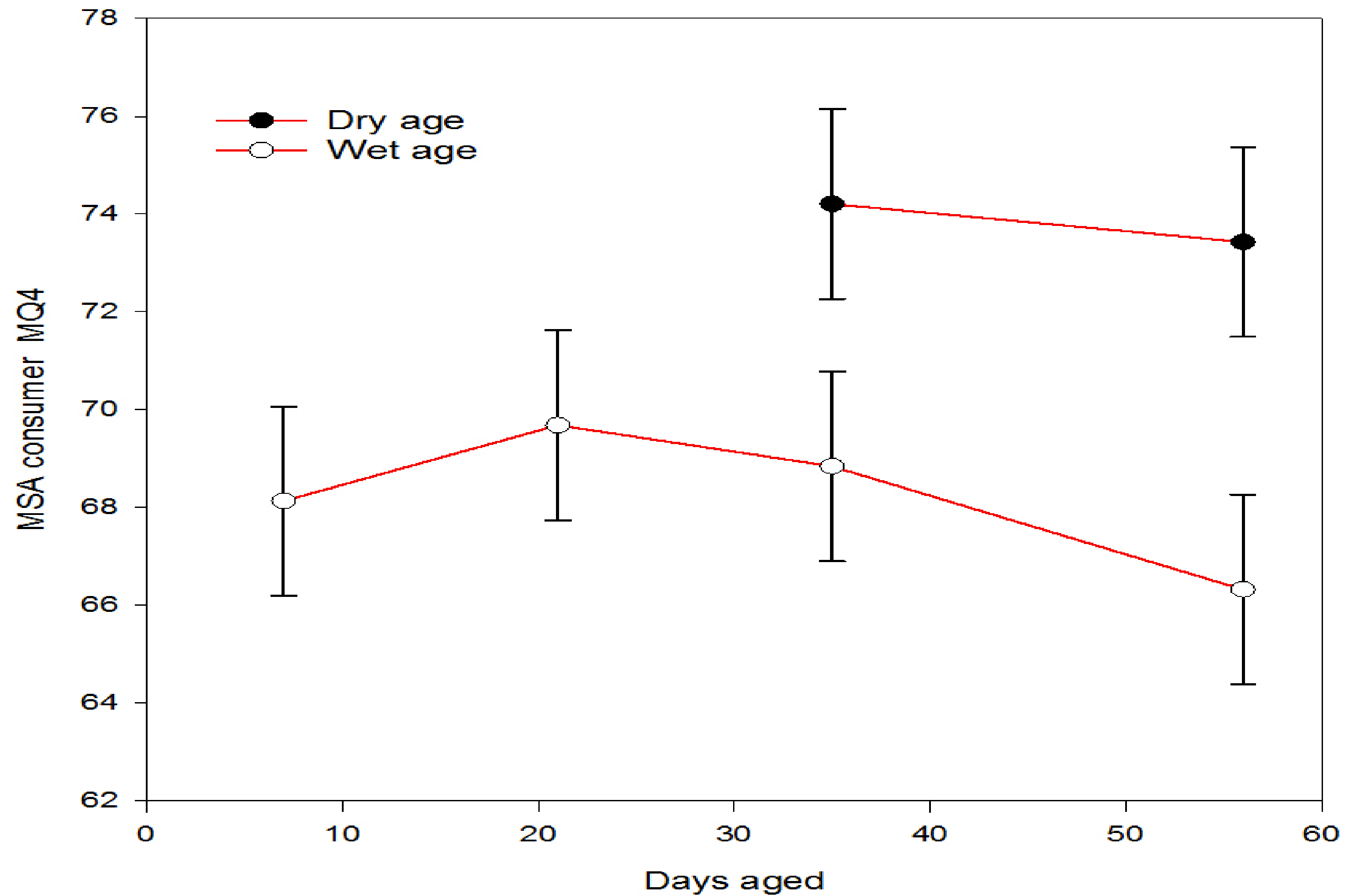
## Dry Ageing

- 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 carcass

- 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.

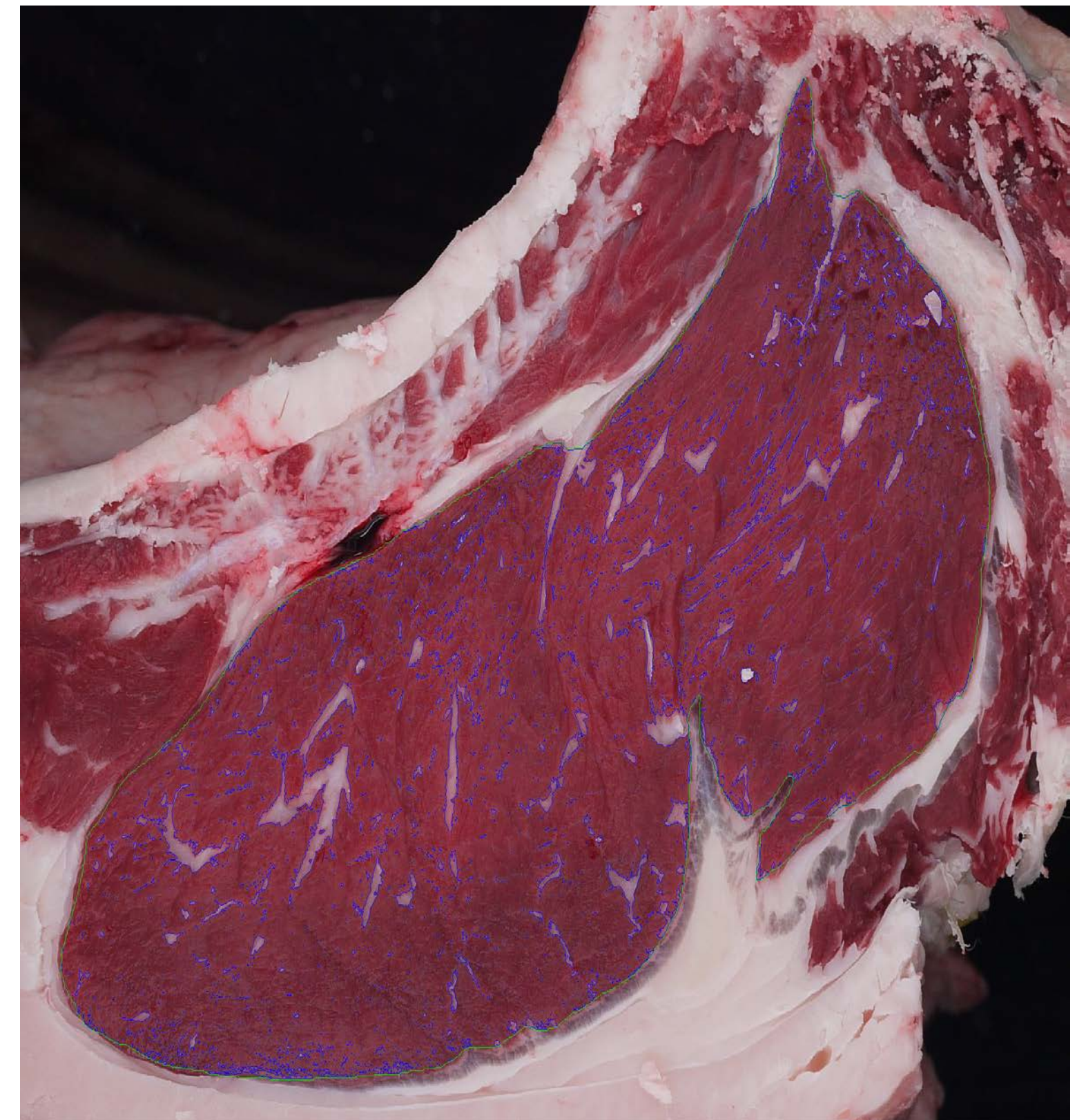


# The future of MSA R&D

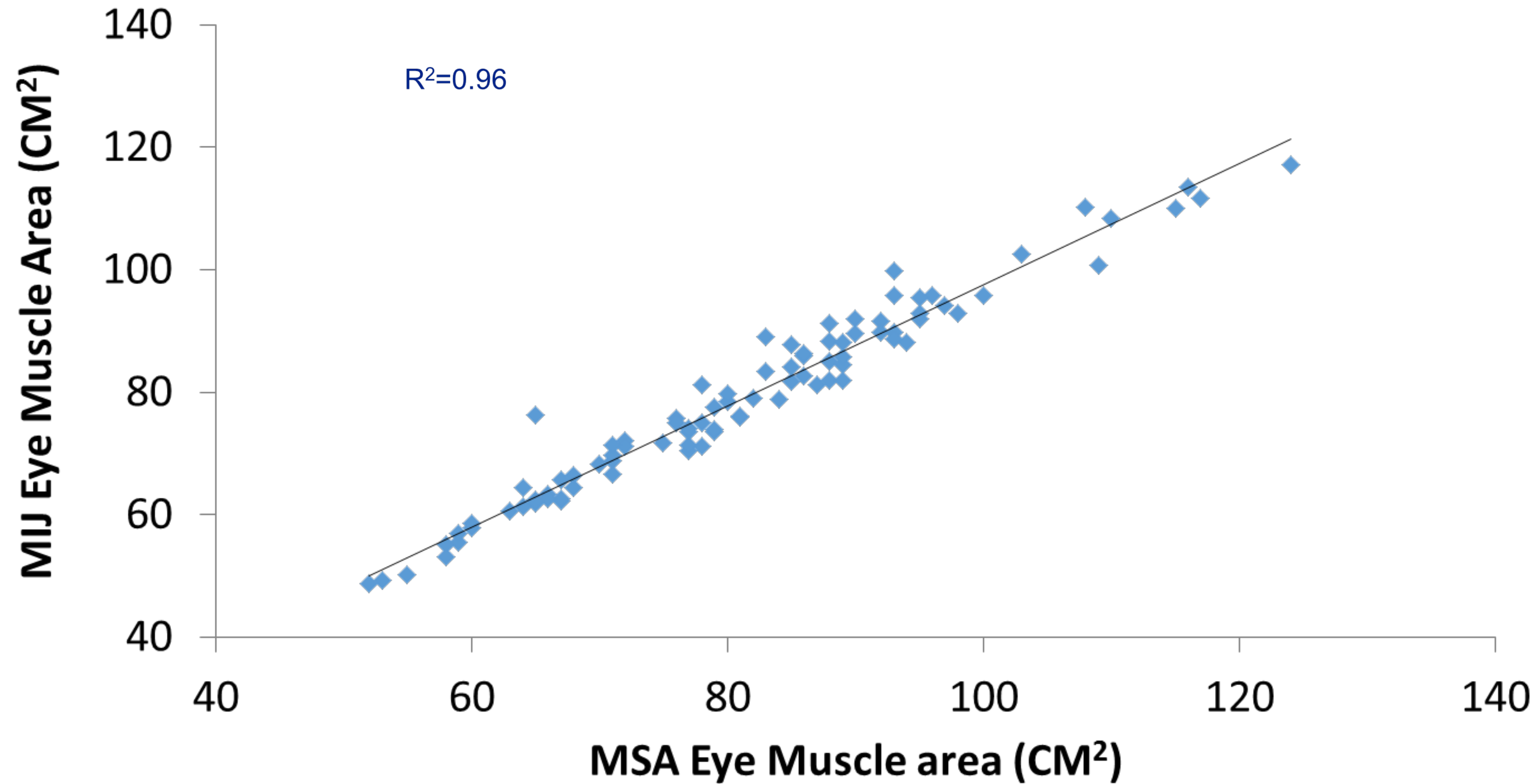
- Continual monitoring of consumer behaviour.
- Extension to overseas consumers (we export over 70% of beef).
- Ability to optimise use of the whole carcass.
- Links to genomics.

# Other technologies – Cameras for grading

MIJ camera – eye muscle area, marbling, rib fat



# Prediction of eye muscle area (EMA)



# Summary

**Accuracy** Improve model accuracy – all cows, all cuts

**Expansion** Expand into new cook methods – increase product availability

**Execution** Industry engagement – making it work

**2020 goal to be have all animals eligible for grading**