



meatup FORUM

**For the latest in red meat research and development
Northam, WA – 12 August 2026**

Enhanced Feedback – it's getting closer!

Graham Gardner

Outline

- Objective measurement focus – lean meat yield and eating quality.
 1. IMF% trait for Beef.
 2. Microwave deployment for lamb GR and IMF
 3. DEXA update... Lean Meat Yield% and eating quality.

True Carcass Value



$$\text{Carcass value (\$)} = \text{Wt retail cuts (kg)} \times \text{Value of the cuts (\$/kg)}$$

True Carcass Value



Lean Meat Yield



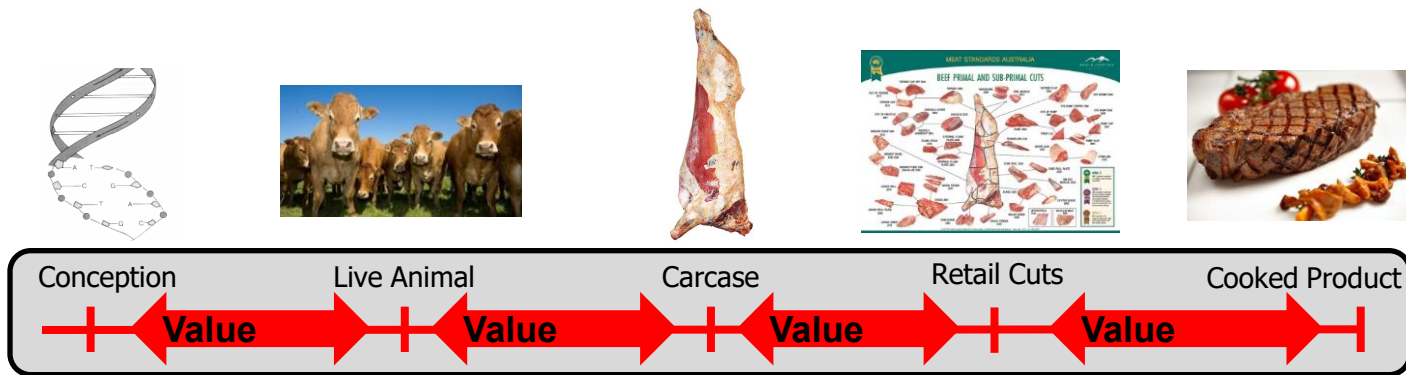
Eating Quality



$$\text{Carcass value (\$)} = \text{Wt retail cuts (kg)} \times \text{Value of the cuts (\$/kg)}$$

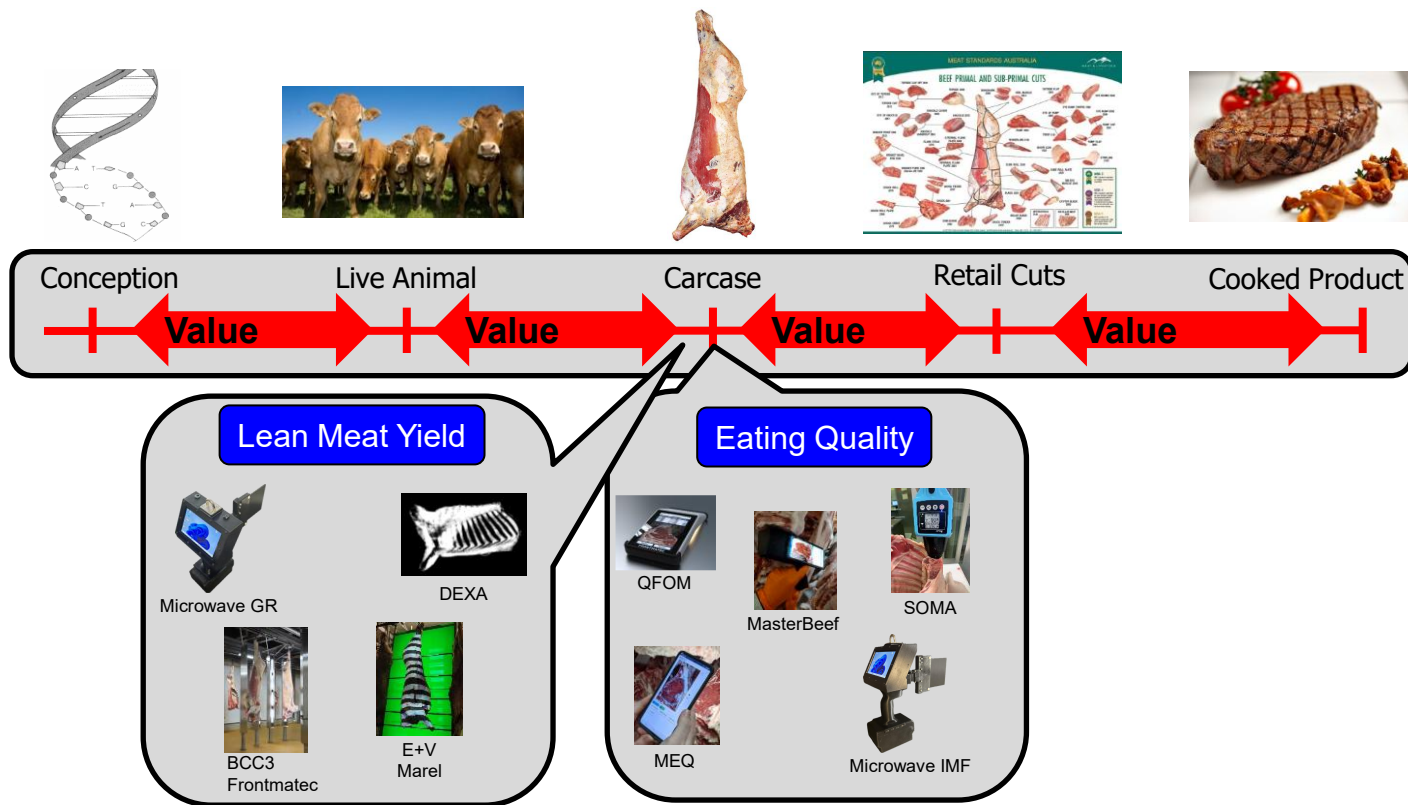
Creating value from better measurement

- Predict quality and amount of final product



Creating value from better measurement

- Predict quality and amount of final product



Creating value from better measurement

- Predict quality and amount of final product



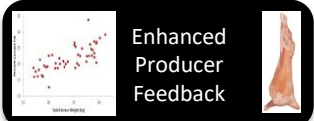
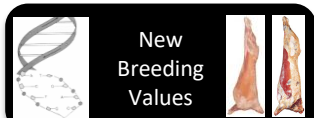
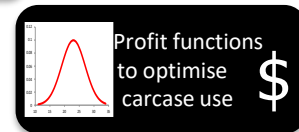
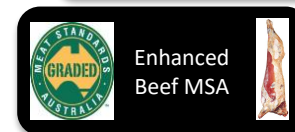
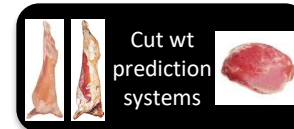
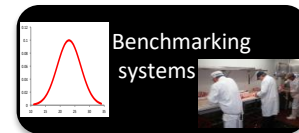
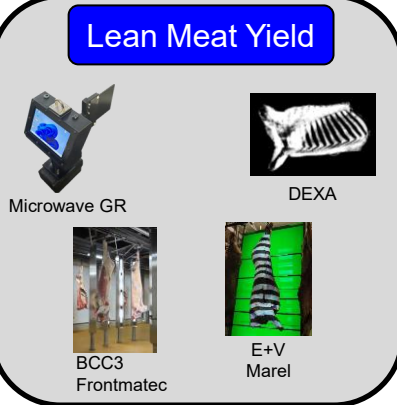
Conception

Live Animal

Carcase

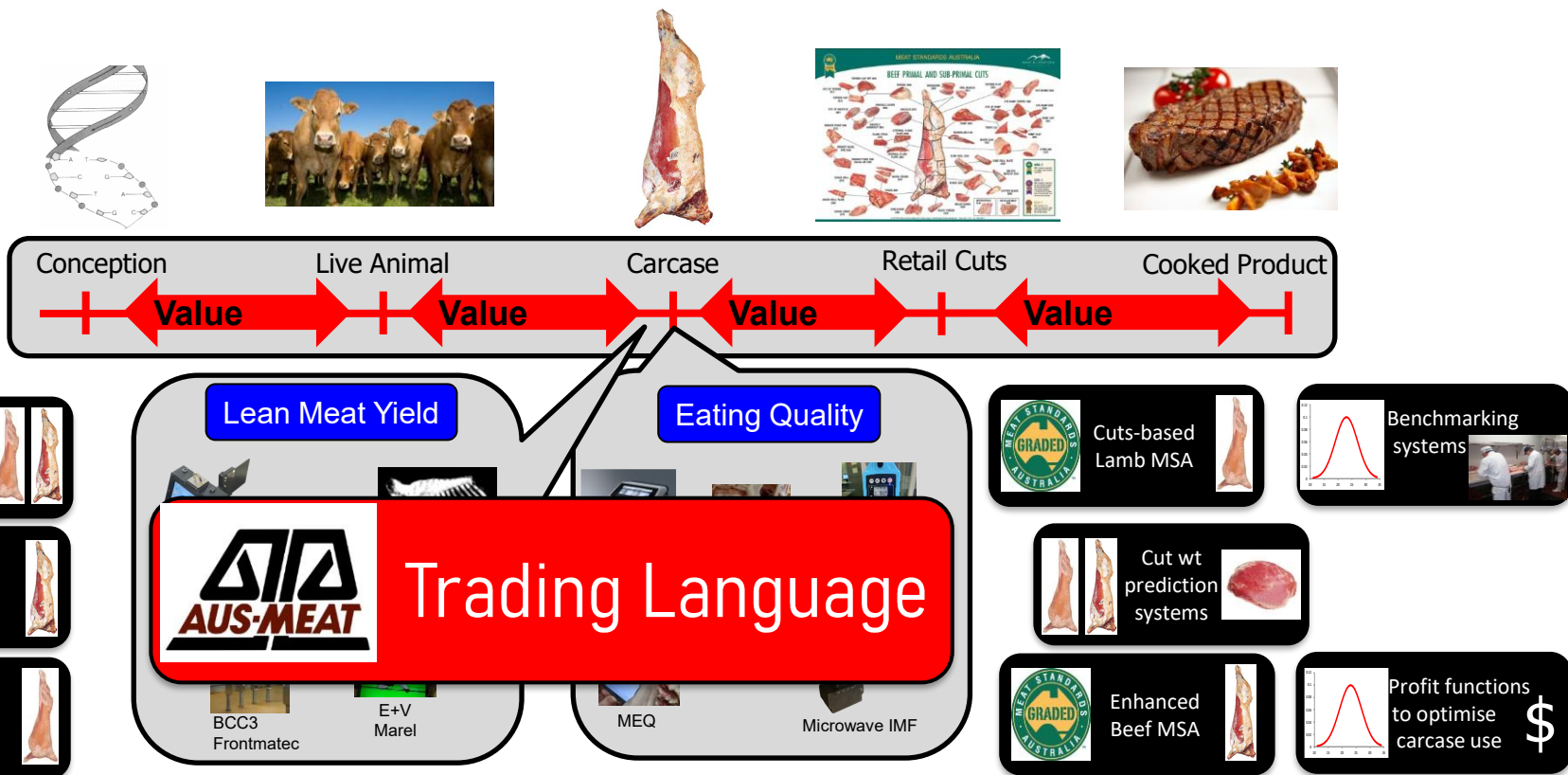
Retail Cuts

Cooked Product



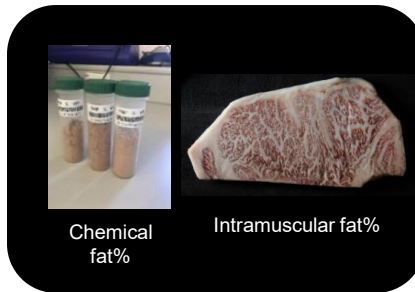
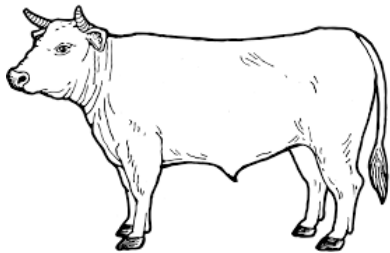
Creating value from better measurement

- Predict quality and amount of final product

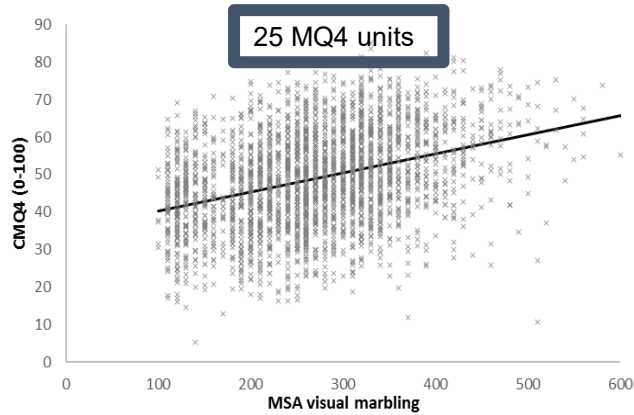


Intramuscular Fat Percentage (IMF%)

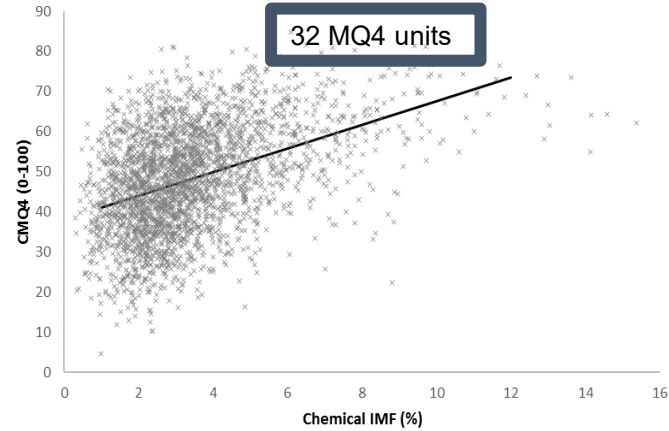
A new trait for beef



MSAmb vs IMF on CMQ4



$R^2 = 0.27$
RMSE =
11.898



$R^2 = 0.32$
RMSE =
11.737

What is IMF%?



Freeze Dry &
Homogenise



Lab NIR

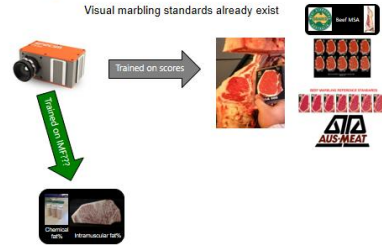


Soxhlet

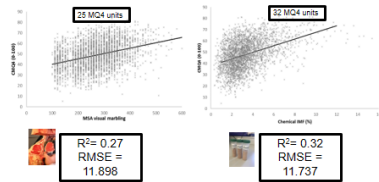
Intramuscular Fat %

A new trait for beef

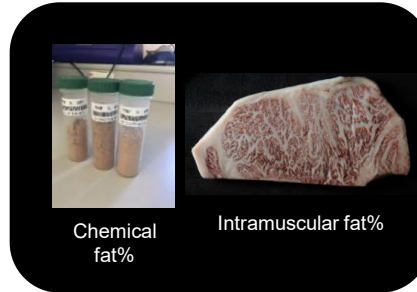
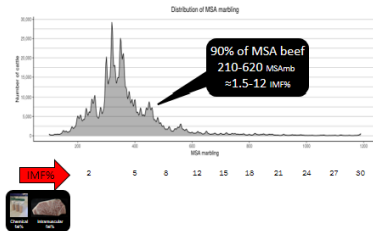
Why do we need a new IMF% trait?



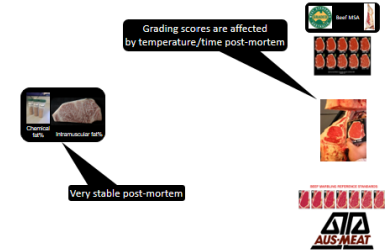
MSAmb vs IMF on CMQ4



IMF% population range (MSA data)



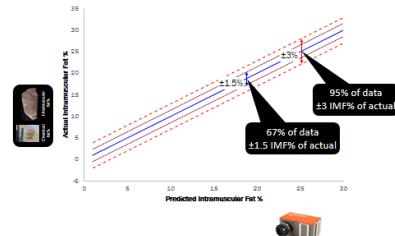
IMF% doesn't change post-mortem



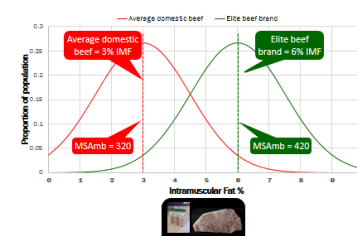
What is IMF%?



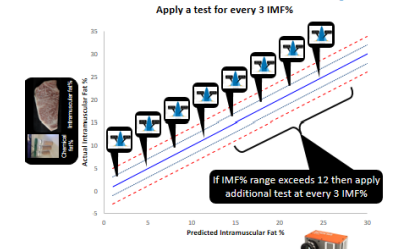
IMF% error tolerance



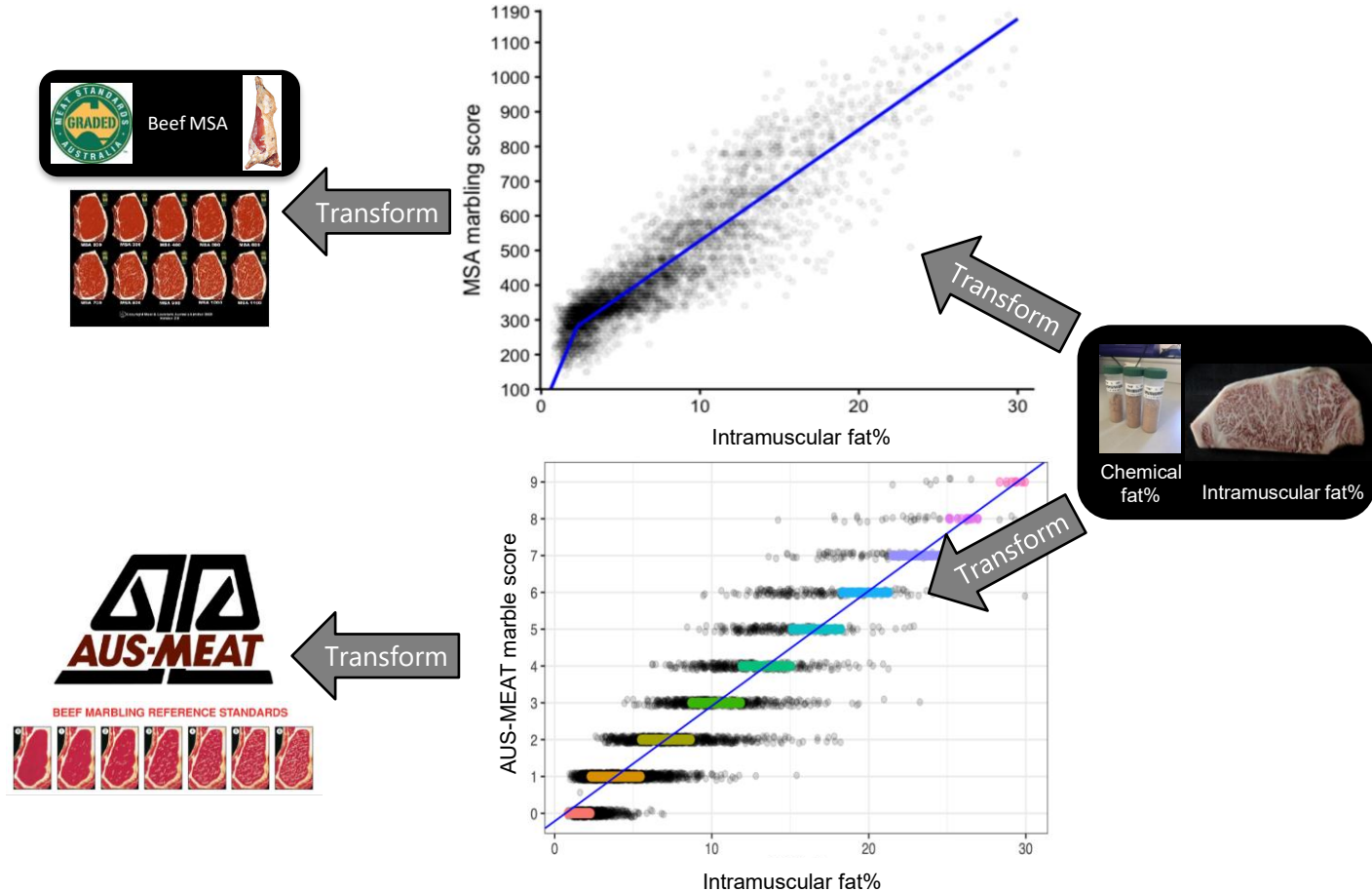
IMF% error tolerance



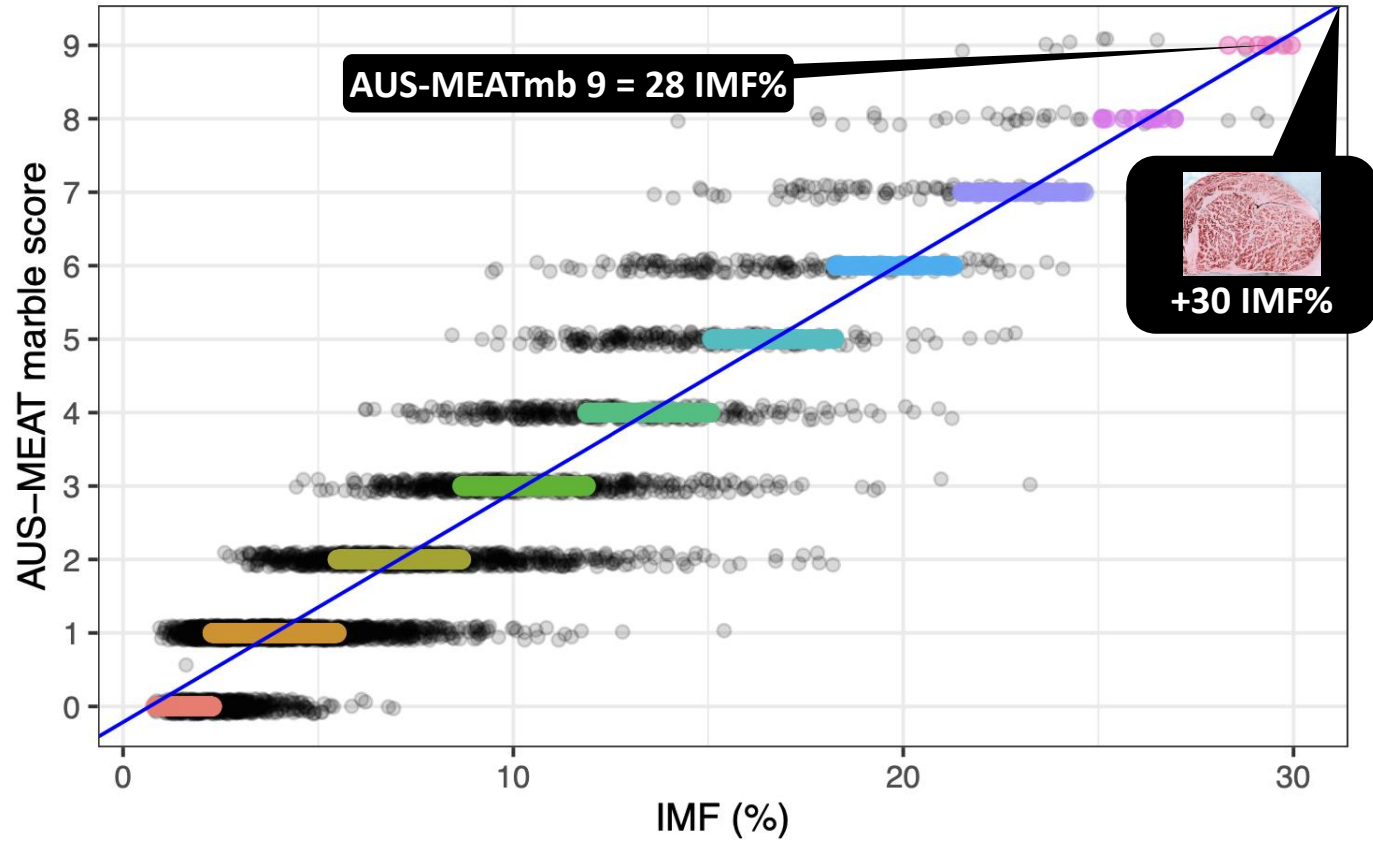
How to assess accuracy?



Convert IMF% into visual marble score



Visual scores don't go high enough!



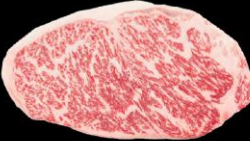
Visual scores don't go high enough!

2023 RESERVE CHAMPION
AWARDED TO SECOND HIGHEST OVERALL SCORE ACROSS ALL CLASSES



WAGYU BRANDED BEEF 2023 COMPETITION
RESERVE
2023 RESERVE CHAMPION WAGYU

WAGYU BRANDED BEEF 2023 COMPETITION
GOLD MEDAL
2023 FULLBLOOD WAGYU



KIWAMI
BY STOCKYARD BEEF
SCORE 999

Breeder Longford Station

Digital Marbling: 52%
Digital Marbling Fineness: 8.8
Eye Muscle Area: 88 cm²

Days on feed (approx): 400
Age at slaughter (approx): 29 months
Target CWL range: 420 kg
Processor: John Dee

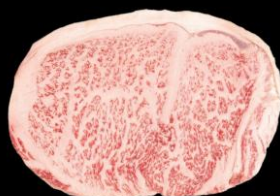
Sire ID: LFDNF0150
Dam ID: LFDNF0078

RESERVE CHAMPION 2024
AWARDED TO SECOND HIGHEST OVERALL SCORE ACROSS ALL CLASSES



WAGYU BRANDED BEEF 2024 COMPETITION
RESERVE
2024 RESERVE CHAMPION WAGYU

WAGYU BRANDED BEEF 2024 COMPETITION
GOLD MEDAL
2024 FULLBLOOD WAGYU



Shiro Kin
BY ANDREWS MEAT INDUSTRIES

Breeder 3D Genetics

Digital Marbling: 71%
Digital Marbling Fineness: 8.7
Unsaturated Fatty Acid: 50%
Eye Muscle Area: 106 cm²

Days on feed (approx): 400 days
Age at slaughter (approx): 32 months
Target CWL range: 400 - 420 kg
Processor: JBS Riverina

Sire ID: WKSPF0100
Dam ID: 3DWFP0050

Melting creamy caramel mouthfeel with rich beefy aromas.

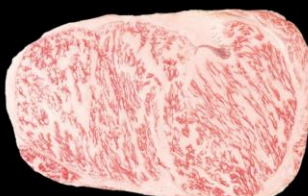
GRAND CHAMPION 2024
AWARDED TO THE HIGHEST SCORING ENTRY ACROSS ALL CLASSES



WAGYU BRANDED BEEF 2024 COMPETITION
TROPHY
2024 GRAND CHAMPION WAGYU

WAGYU BRANDED BEEF 2024 COMPETITION
CHAMPION
2024 FULLBLOOD WAGYU

WAGYU BRANDED BEEF 2024 COMPETITION
GOLD MEDAL
2024 FULLBLOOD WAGYU



Signature Series
BY MAYURA STATION

Breeder Mayura Station

Digital Marbling: 60%
Digital Marbling Fineness: 8.1
Unsaturated Fatty Acid: 62%
Eye Muscle Area: 155 cm²

Days on feed (approx): 300
Age at slaughter (approx): 27 months
Target CWL range: 450 kg
Processor: G & K O'Connor

Sire ID: ADBFN0387
Dam ID: ADBFN1201

Exceptional melt in your mouth juiciness, with lasting umami flavours and a satisfying silky mouthfeel.

2023 GRAND CHAMPION
AWARDED TO THE HIGHEST SCORING ENTRY ACROSS ALL CLASSES



WAGYU BRANDED BEEF 2023 COMPETITION
TROPHY
2023 GRAND CHAMPION WAGYU

WAGYU BRANDED BEEF 2023 COMPETITION
CHAMPION
2023 FULLBLOOD WAGYU

WAGYU BRANDED BEEF 2023 COMPETITION
GOLD MEDAL
2023 FULLBLOOD WAGYU



JADE WAGYU
BY KILCOY GLOBAL FOODS
SCORE 1015

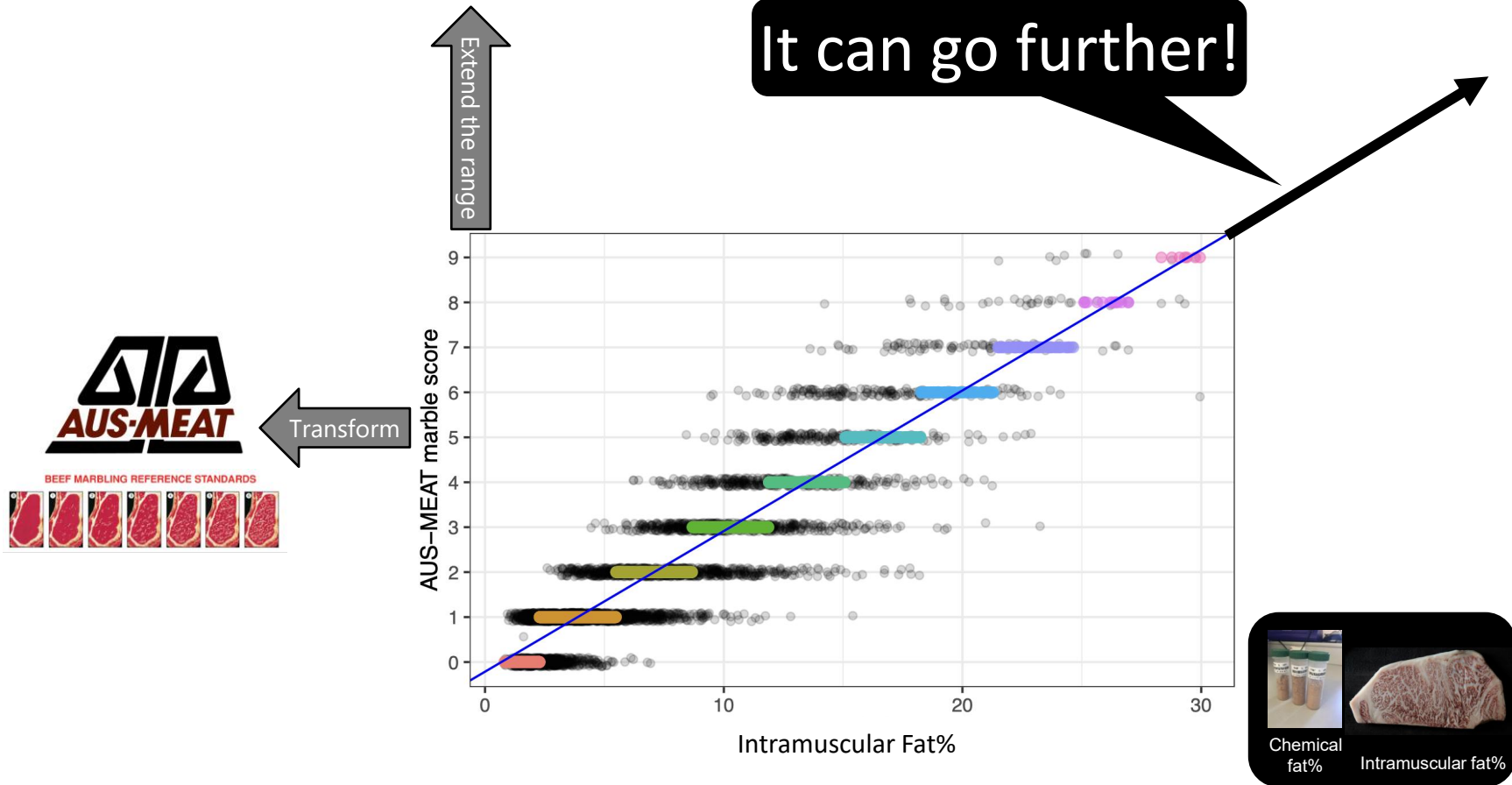
Breeder Arabial Wagyu

Digital Marbling: 58%
Digital Marbling Fineness: 8.6
Eye Muscle Area: 109 cm²

Days on feed (approx): 350+
Age at slaughter (approx): 36 months
Target CWL range: 430 kg
Processor: Kilcoy Global Foods

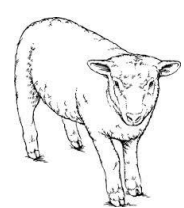
Sire ID: SPWVPP6
Dam ID: SKFM007

Convert IMF% into visual marble score



QFOM - Rib-eye Camera





Microwave tissue depth



Microwave tissue depth



Generation 1



Generation 2



Generation 3

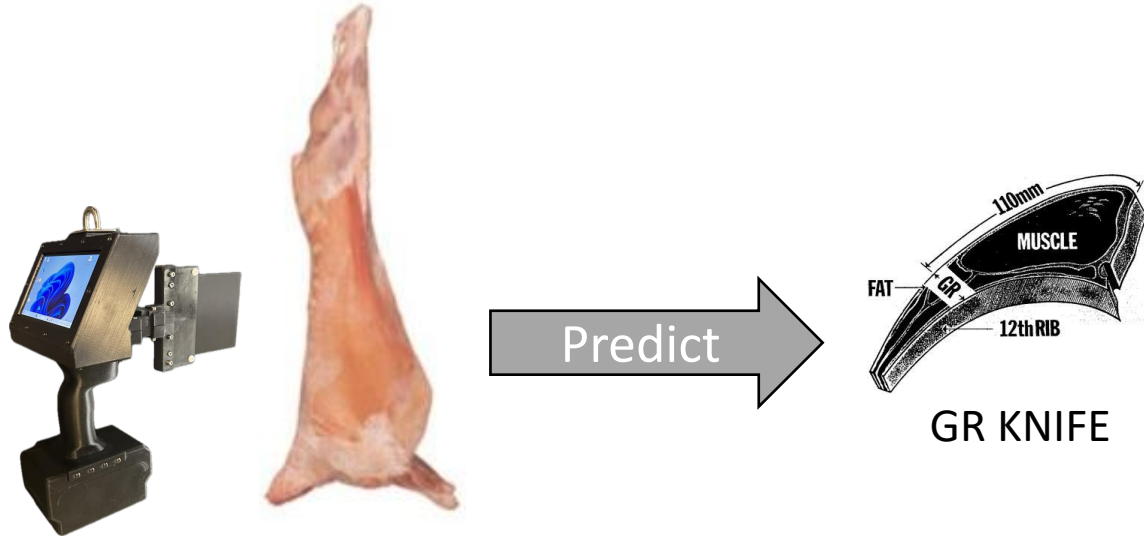


Generation 4



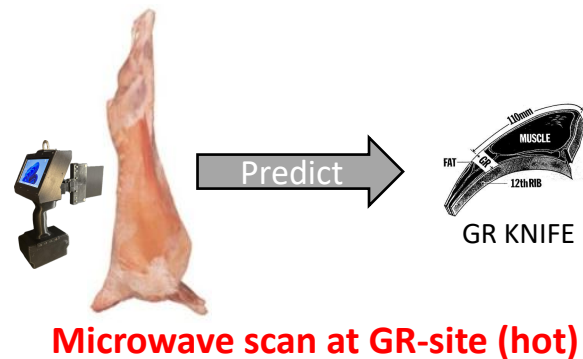
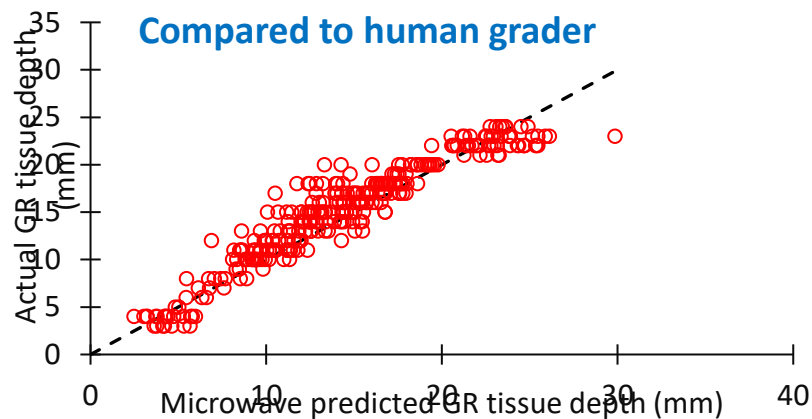
Generation 5

GR tissue depth

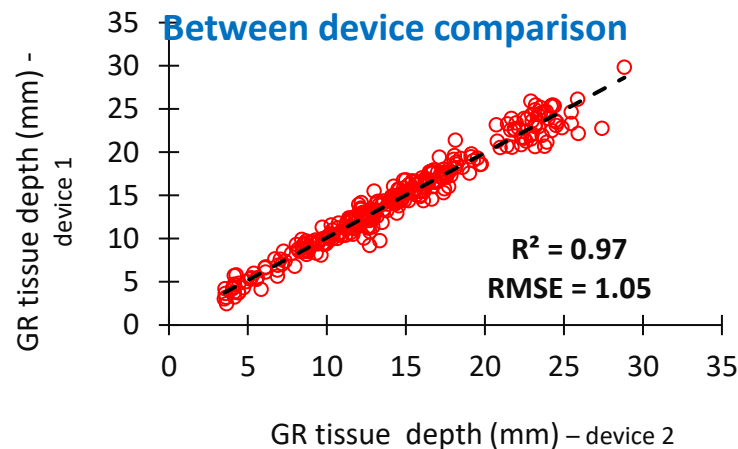
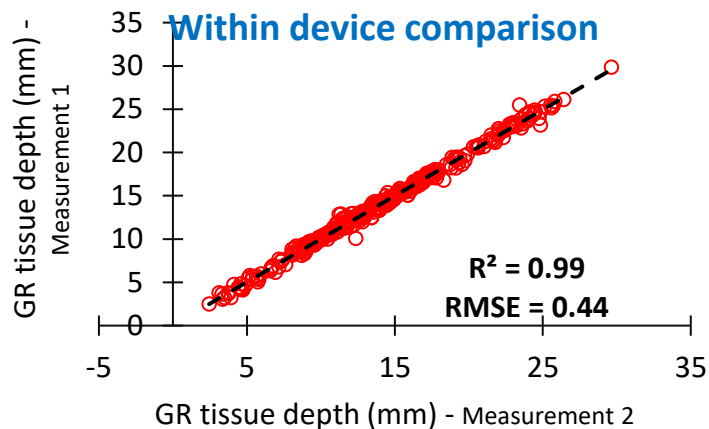
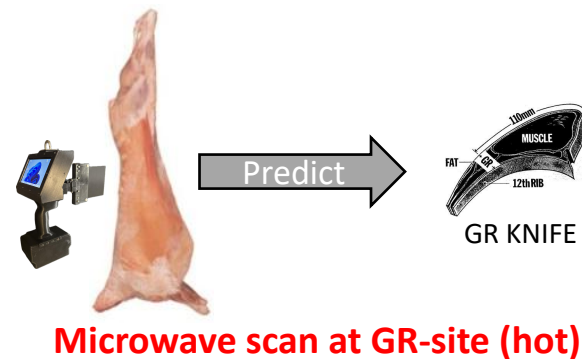
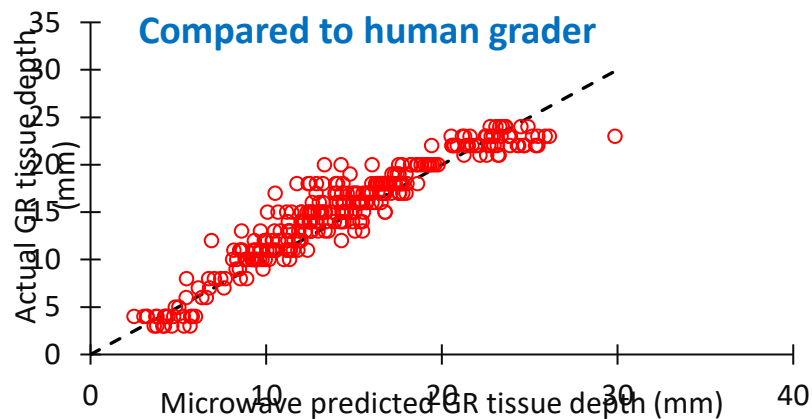


Microwave Scan at GR-site

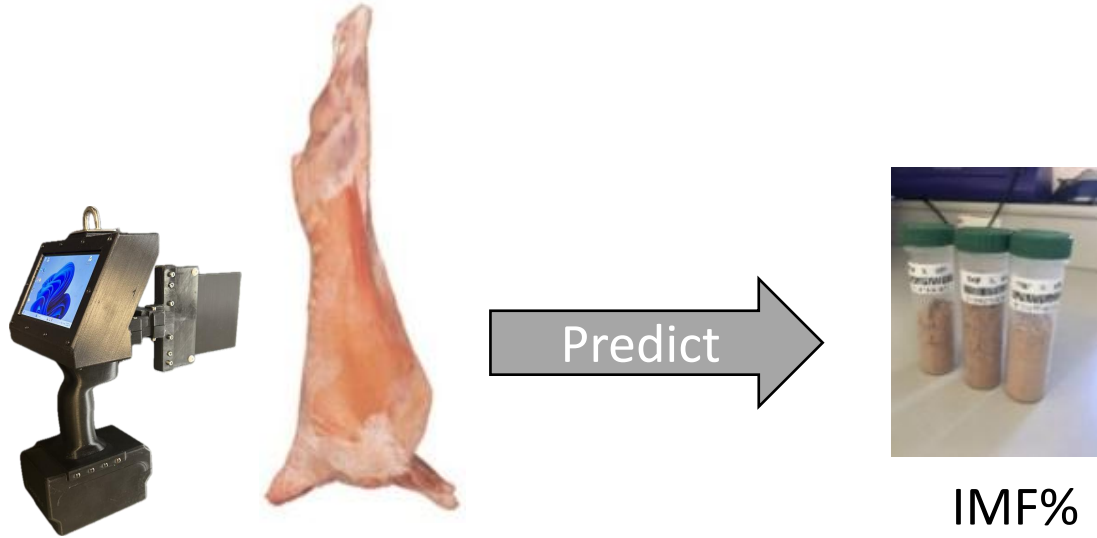
Microwave GR tissue depth



Microwave GR tissue depth



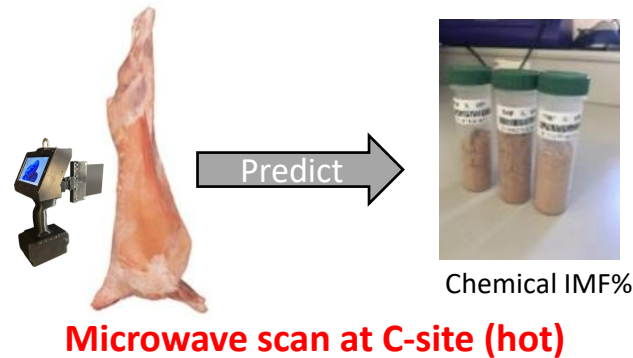
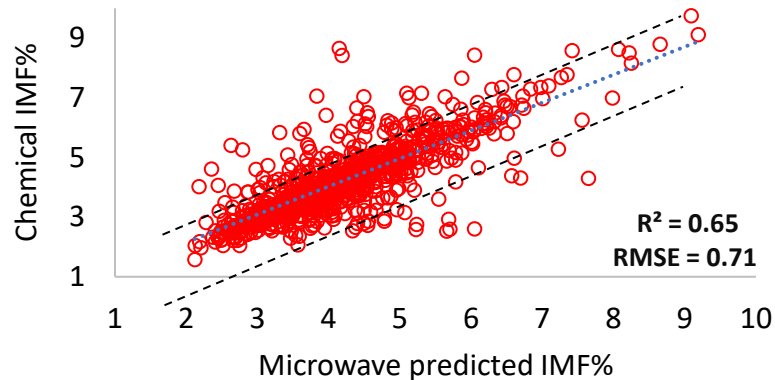
Microwave predicted IMF%



Microwave Scan at C-site

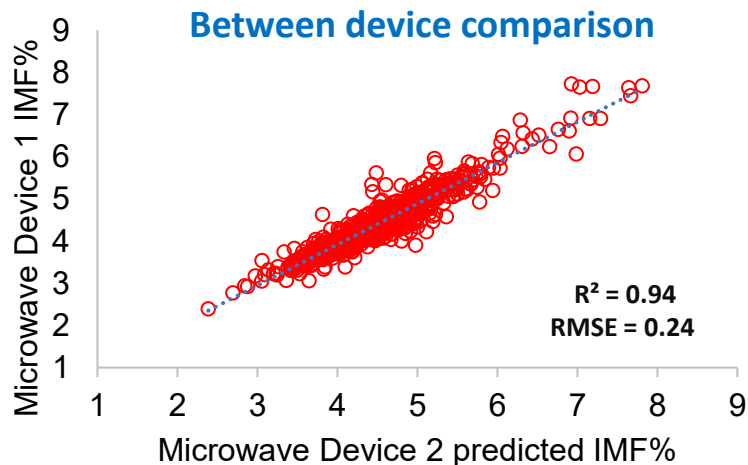
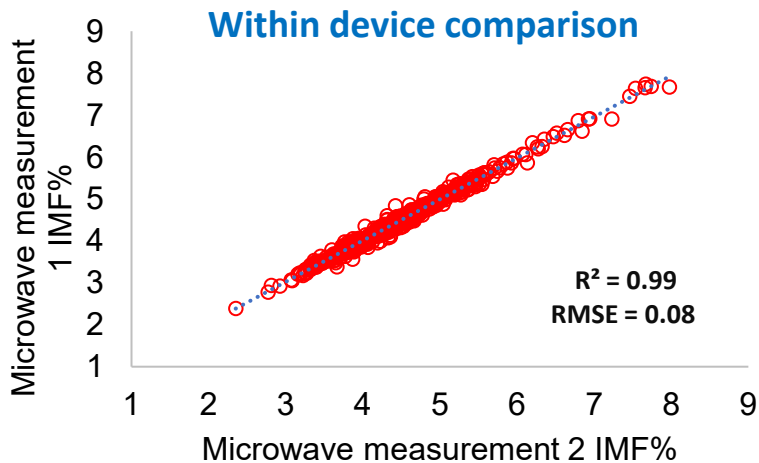
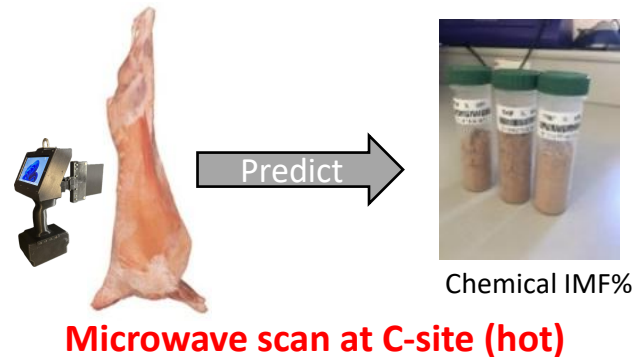
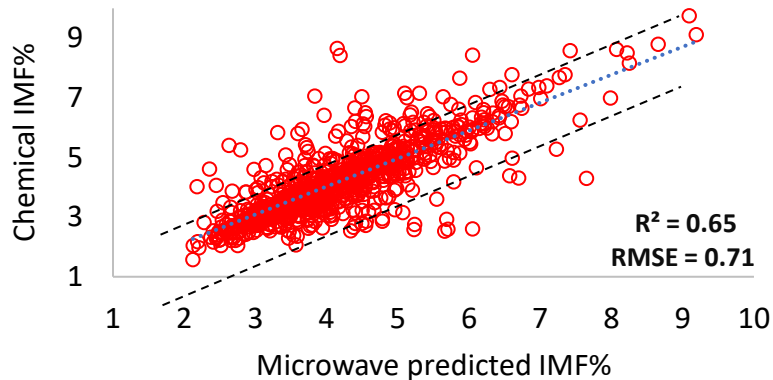
Microwave predicted IMF%

Compared to lab IMF%



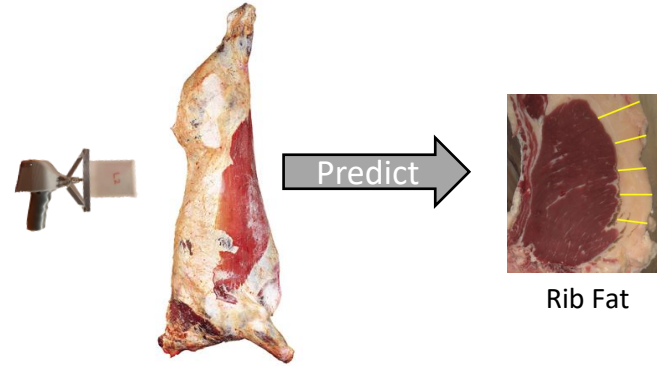
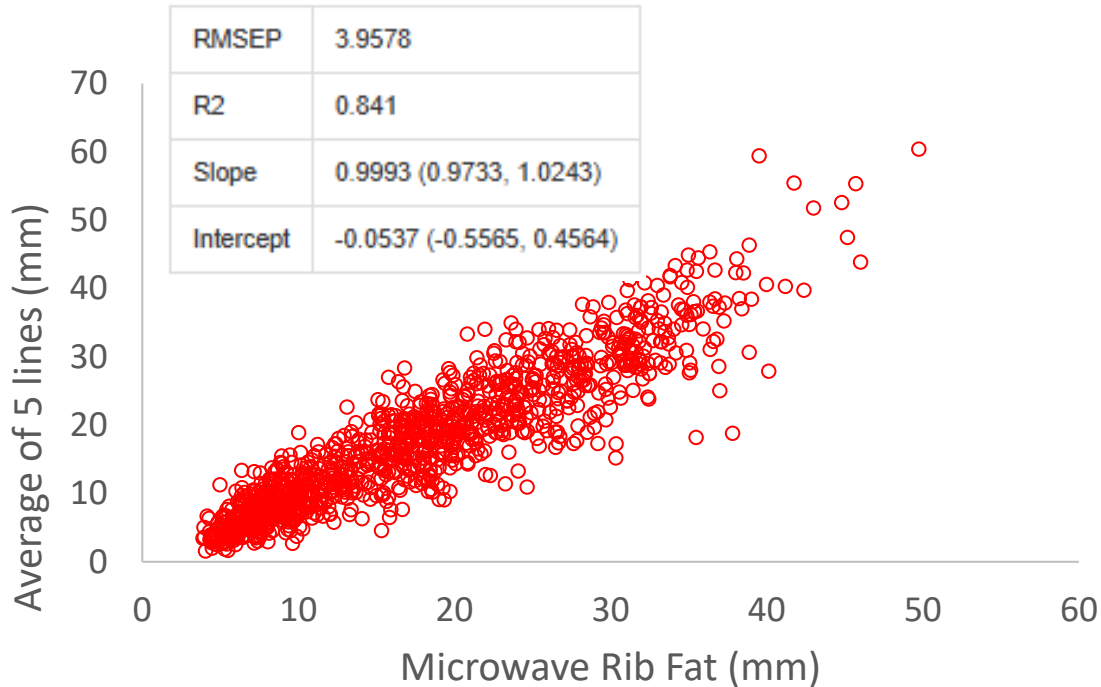
Microwave predicted IMF%

Compared to lab IMF%



Microwave predicting rib fat depth

Alternative measure of rib fat



Microwave commercialisation



V&V Walsh
(Lamb IMF & GR)

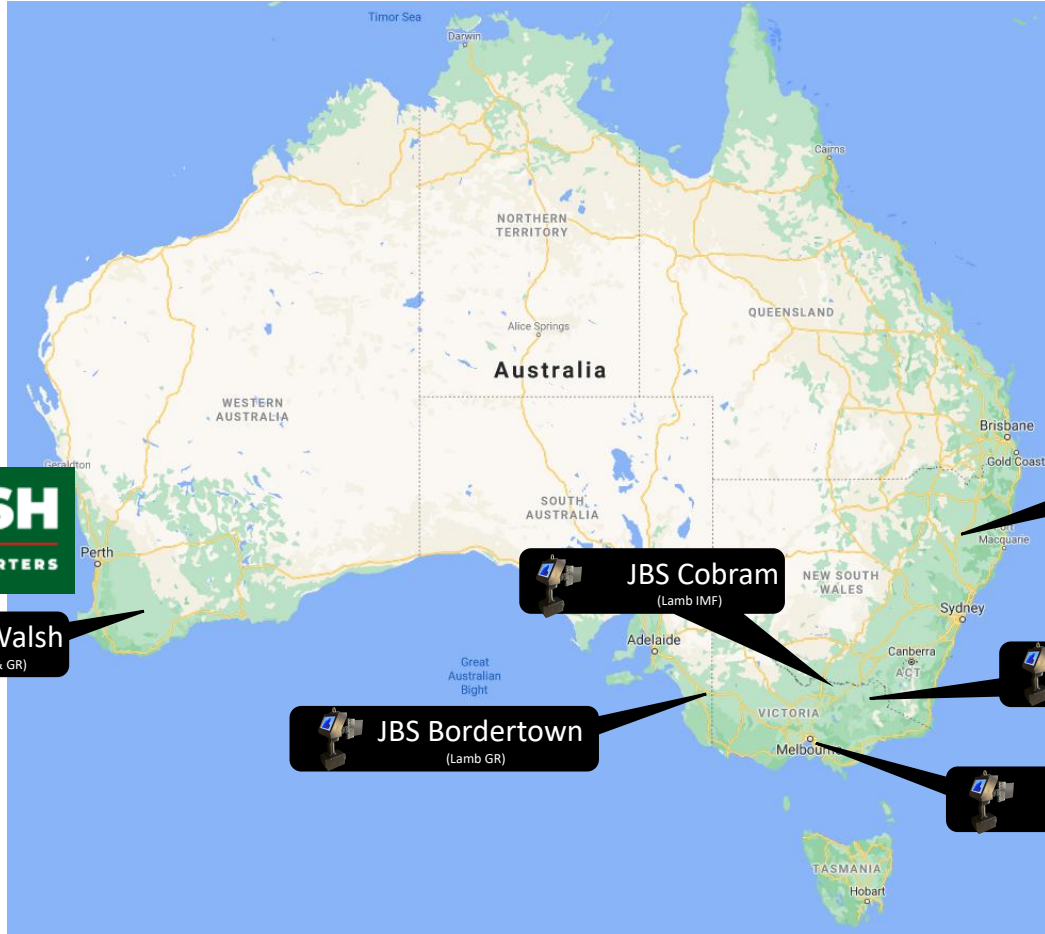
JBS Cobram
(Lamb IMF)

TFI Tamworth
(Lamb GR/IMF)

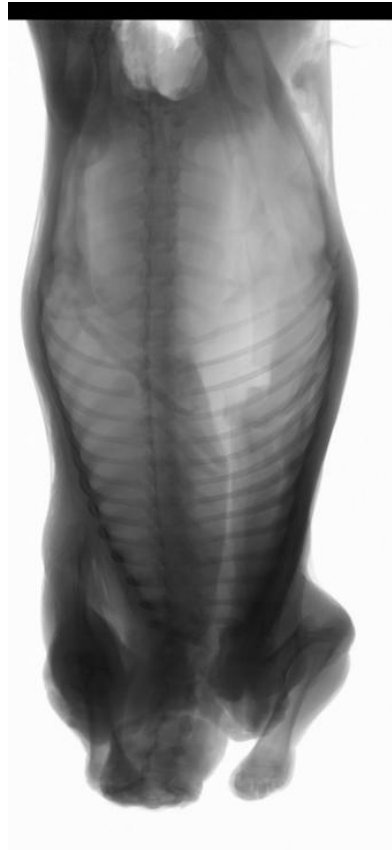
JBS Bordertown
(Lamb GR)

Tallangatta
(Lamb IMF)

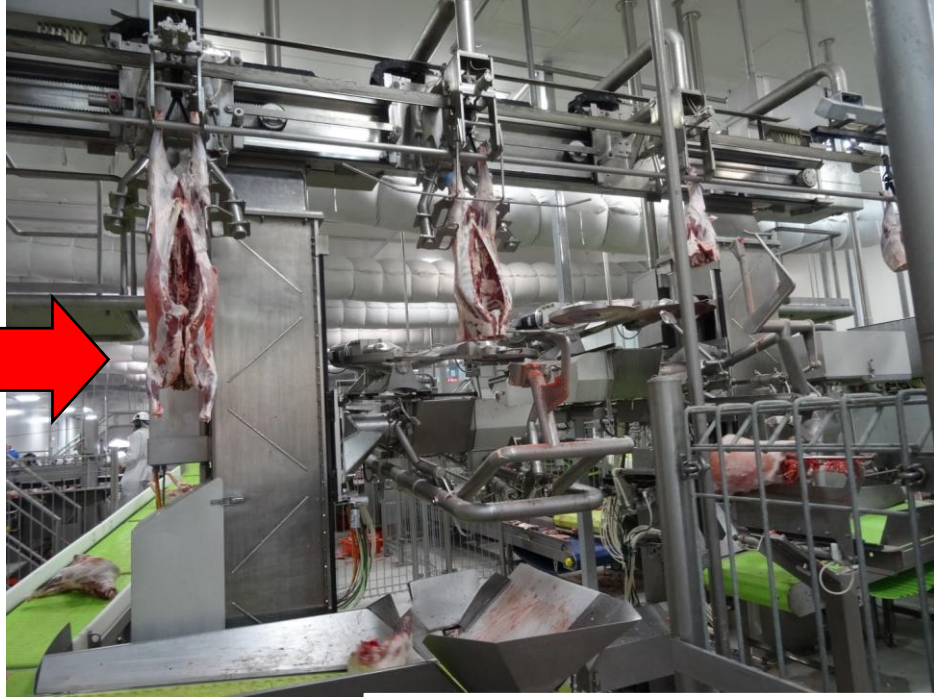
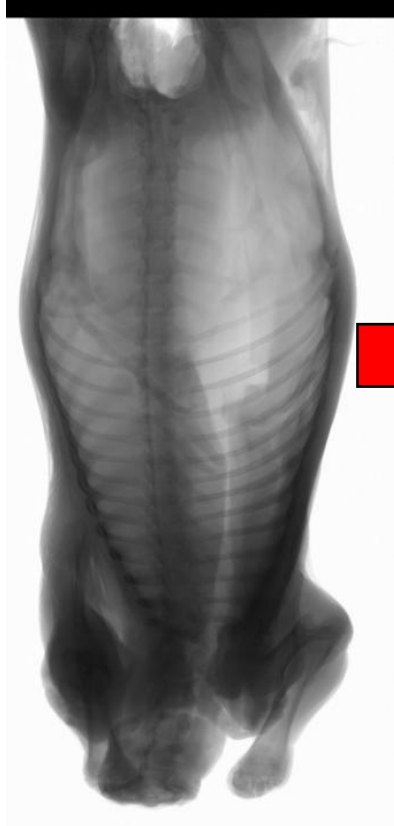
JBS Brooklyn
(Lamb IMF)



DEXA for carcass composition



DEXA images for driving robots



DEXA calibration – nucleus flock

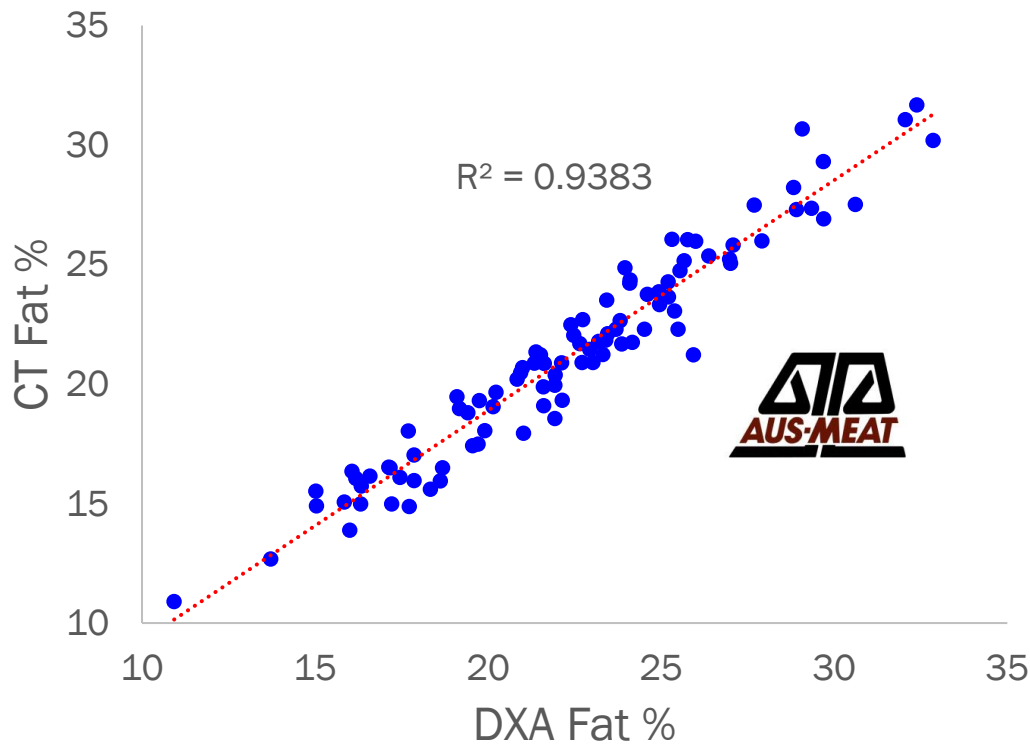
Fat score predicting carcase fat percentage

Computed Tomography
“the gold standard”



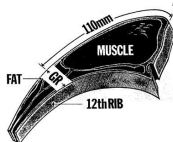
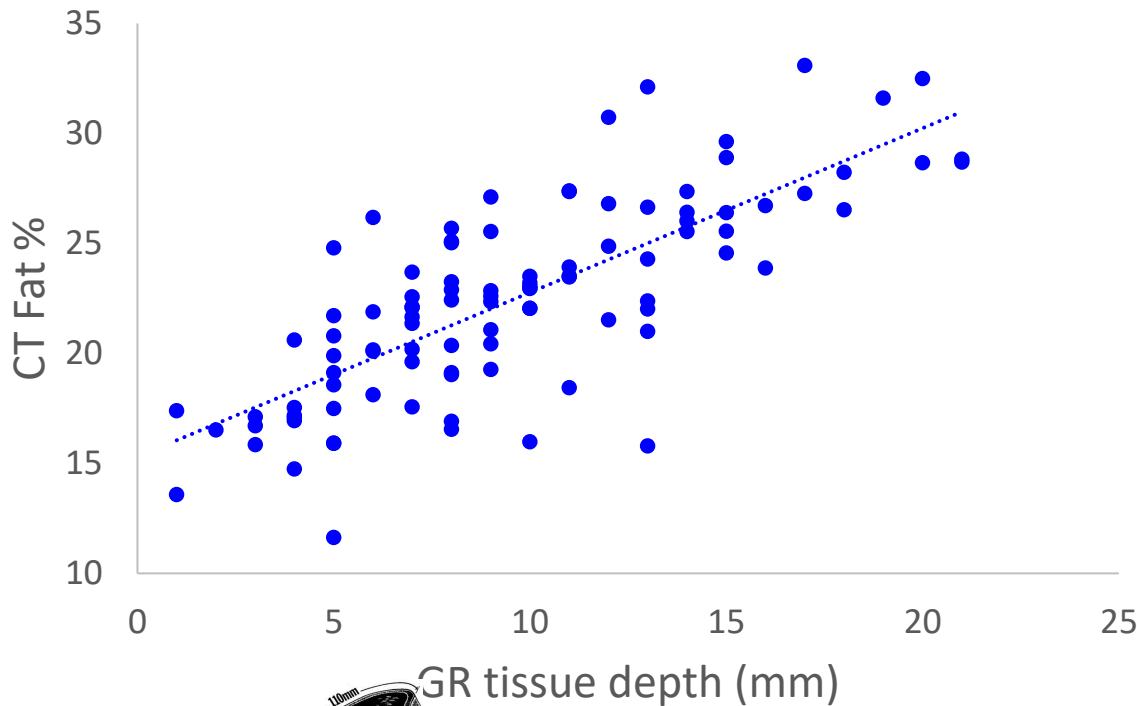
WAMMCO calibration

DEXA predicting carcass fat percentage



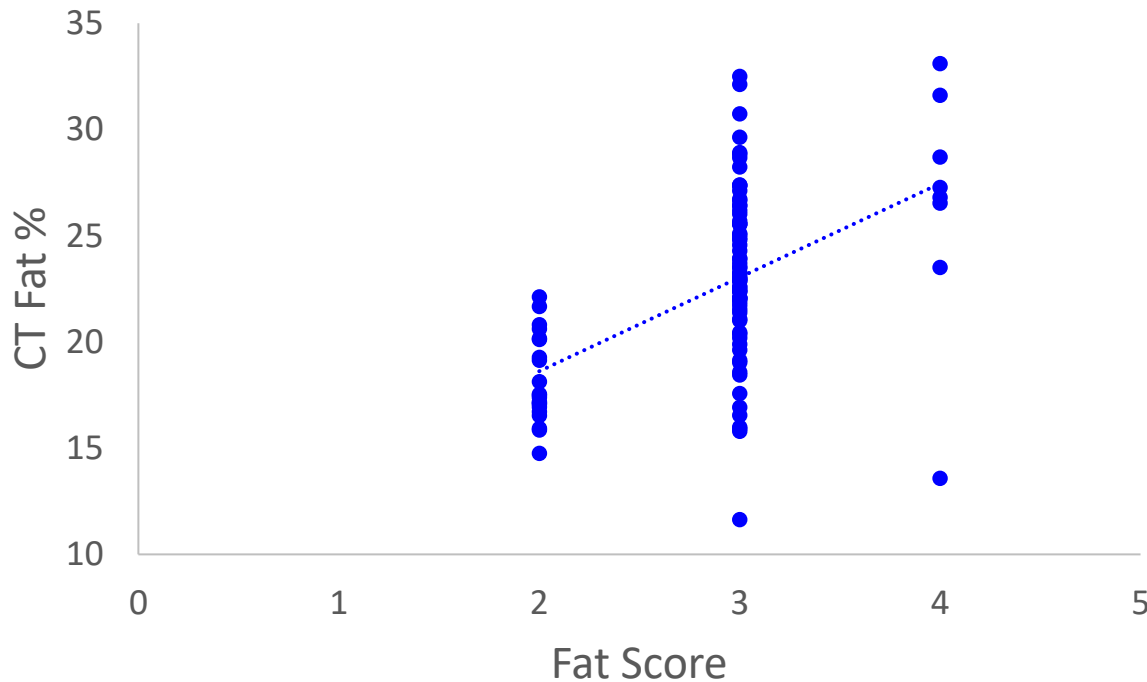
WAMMCO calibration

GR predicting carcase fat percentage

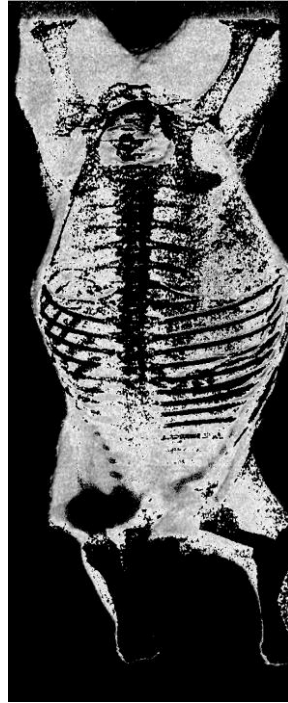


WAMMCO calibration

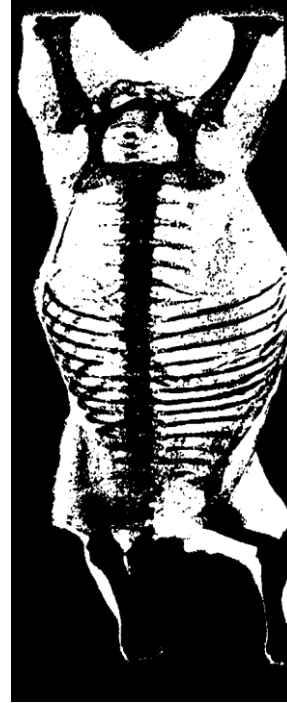
Fat score predicting carcass fat percentage



Improved DEXA bone detection



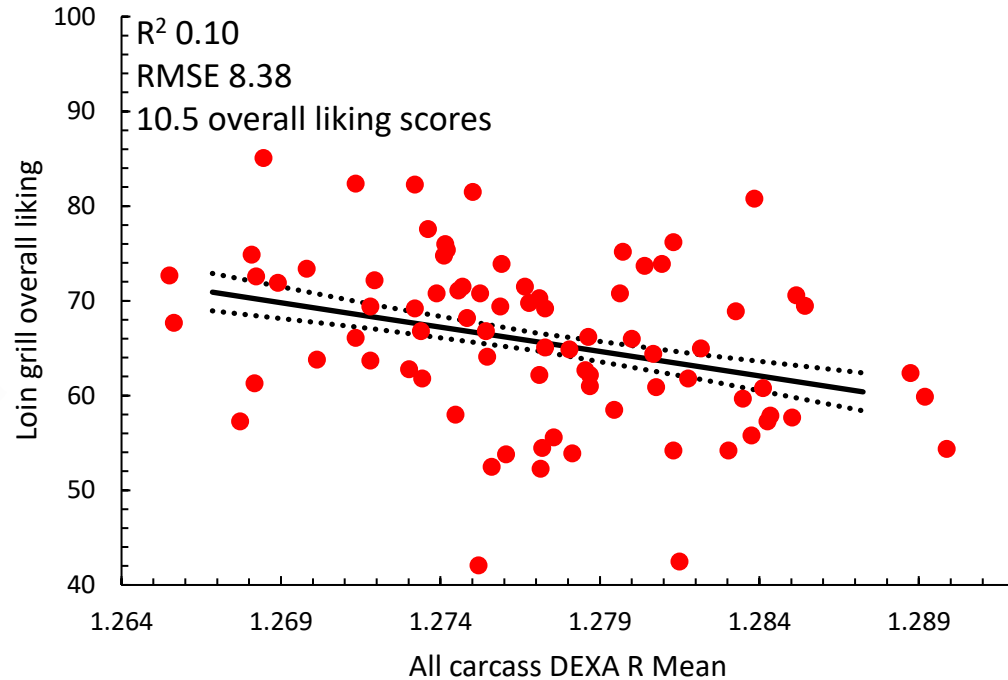
Before



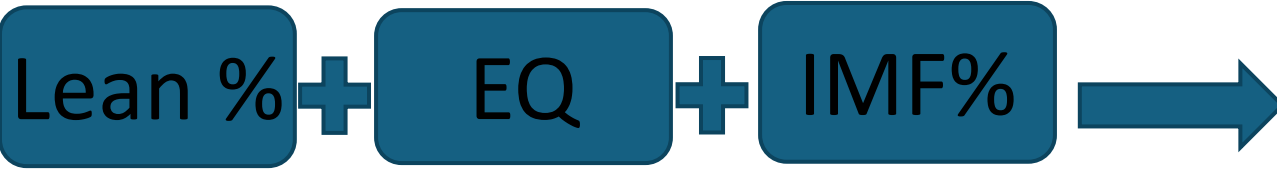
After



Bone R-values predicting eating quality



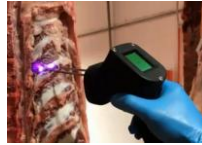
Cuts-based lamb MSA



DXA lean



DXA bone ± HCWT



MEQ Probe



NIR probe



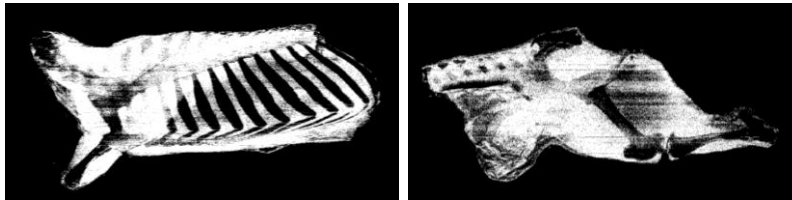
Microwave IMF



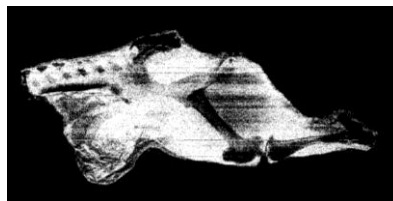
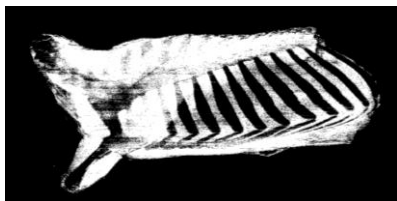
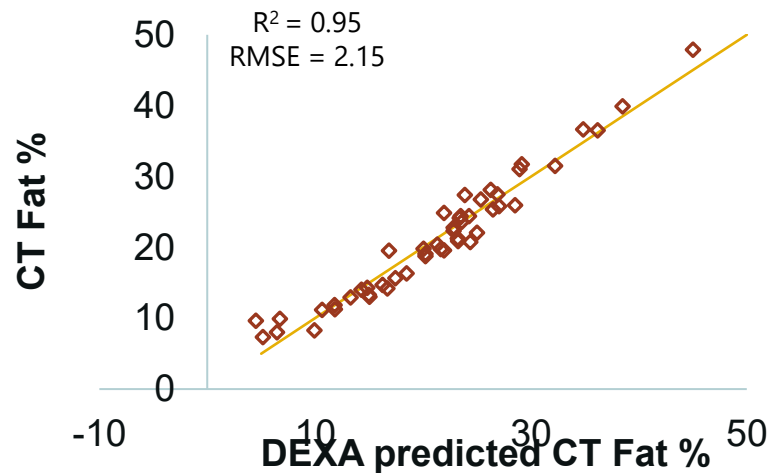
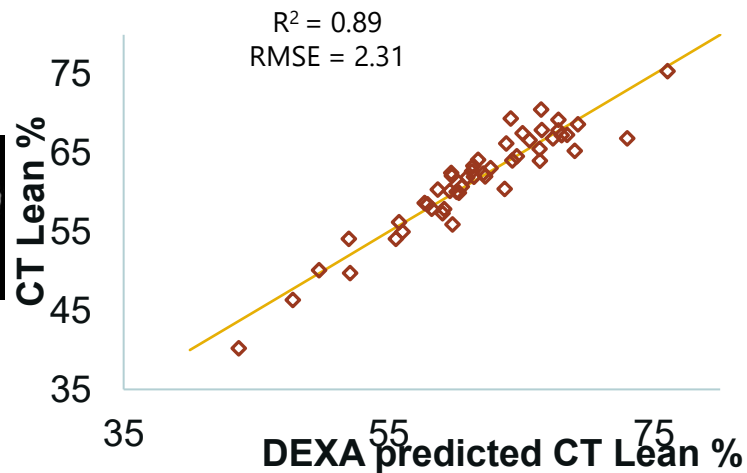
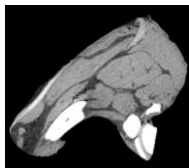
EQ

Beef DXA

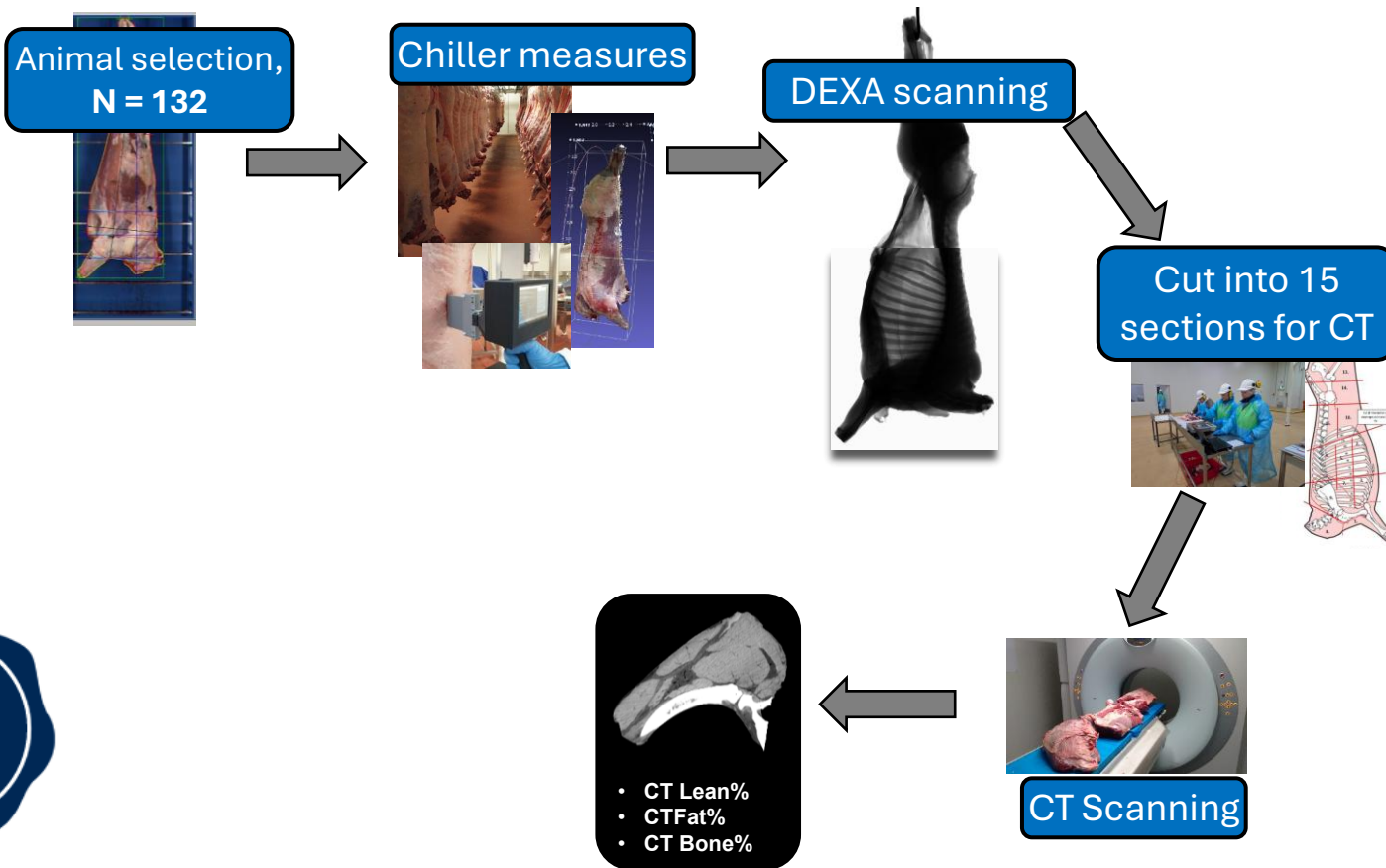
We were confident it'd work....



DEXA predicting beef CT LMY



DEXA data – Teys Lakes Creek



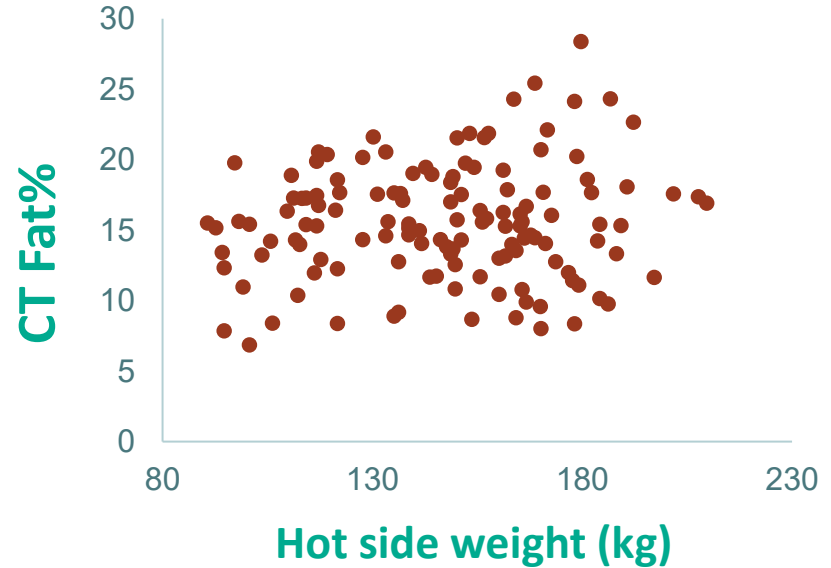
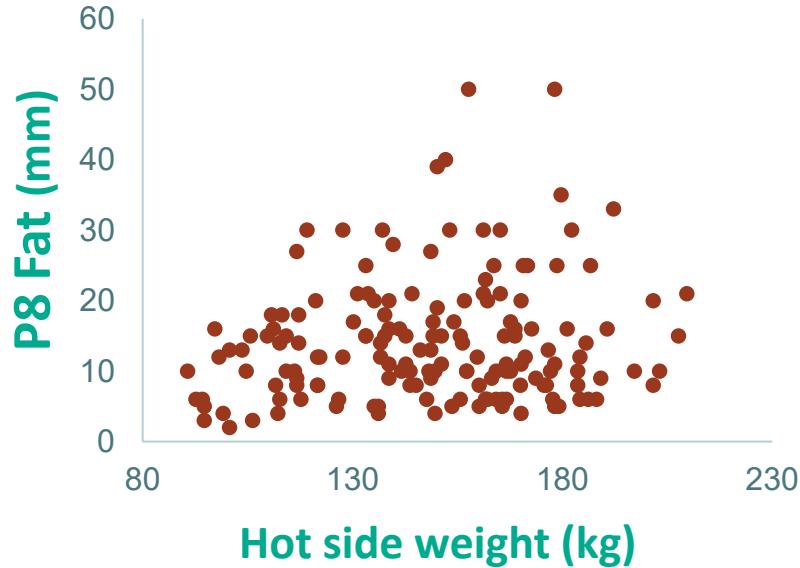
CT LMY Trait in Beef

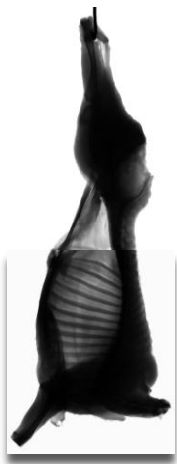


DEXA data – Teys Lakes Creek



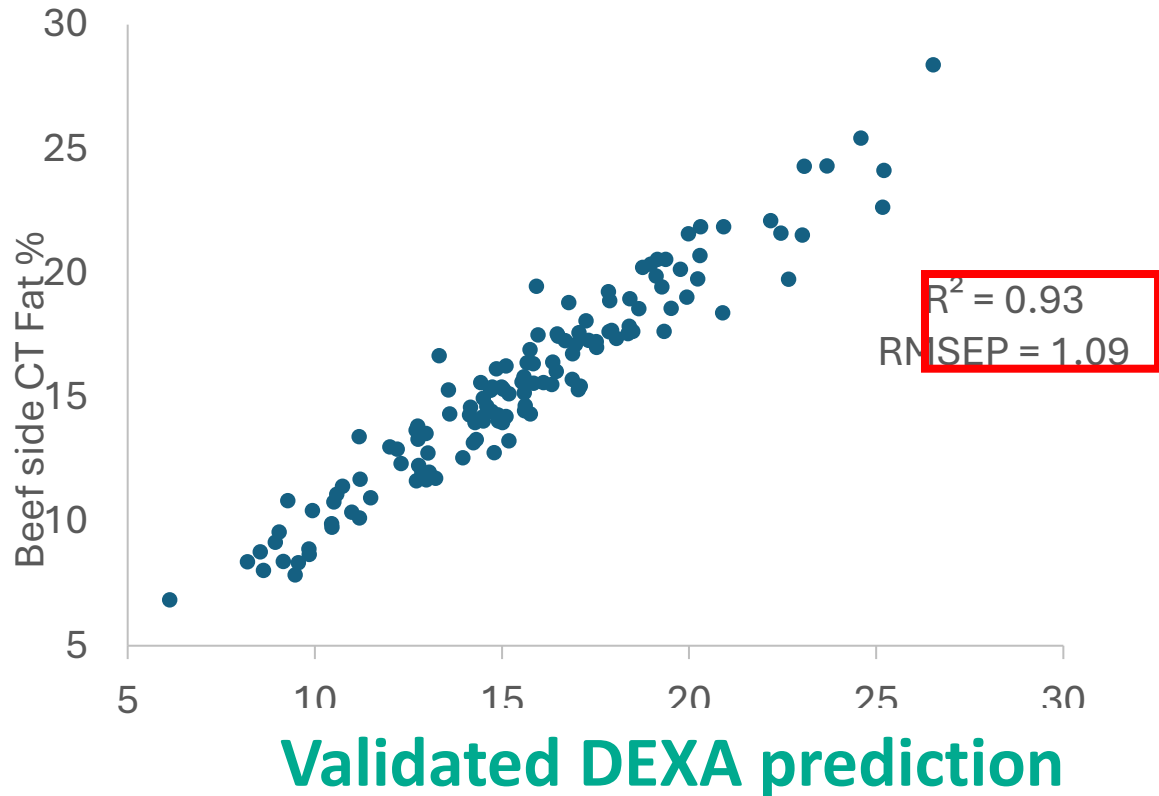
DEXA data – Carcasse selection





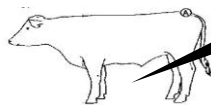
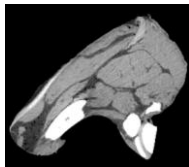
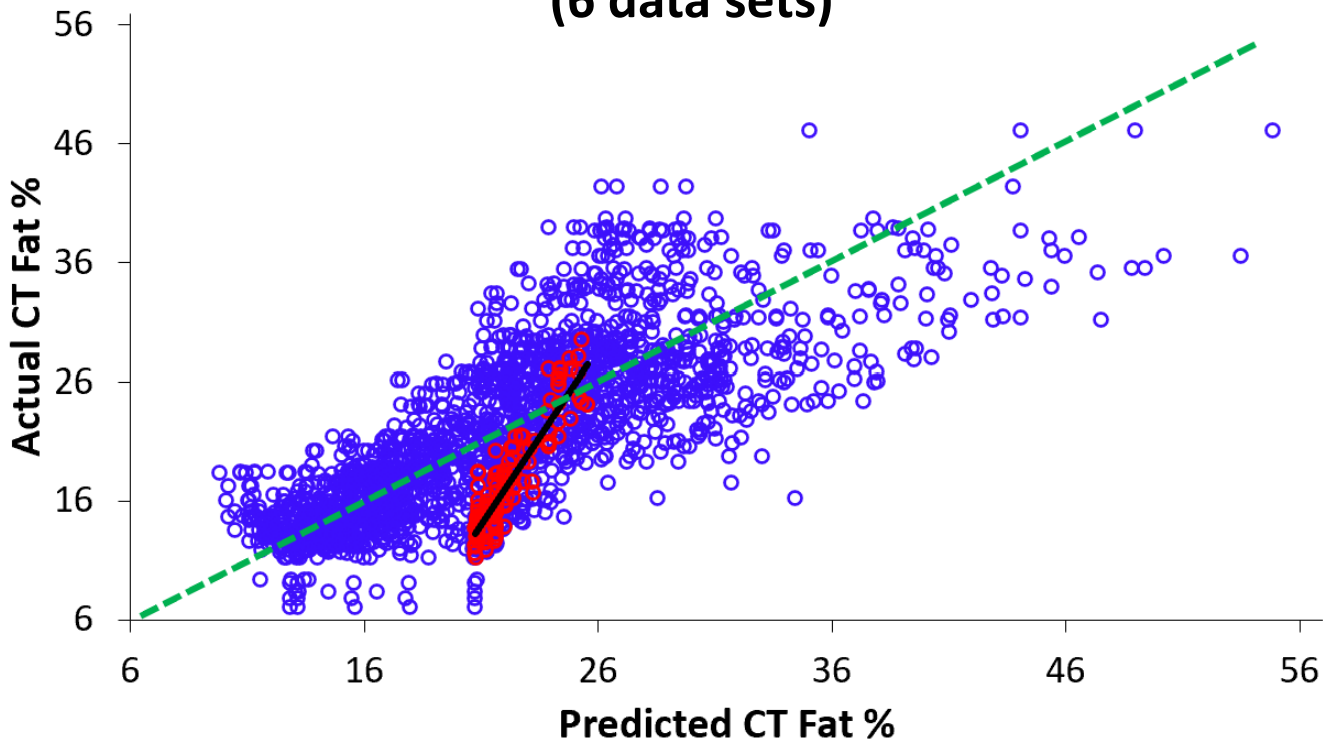
Beef DEXA predicting CT

CT Fat%



Ribfat predicting beef CT Fat%

(6 data sets)

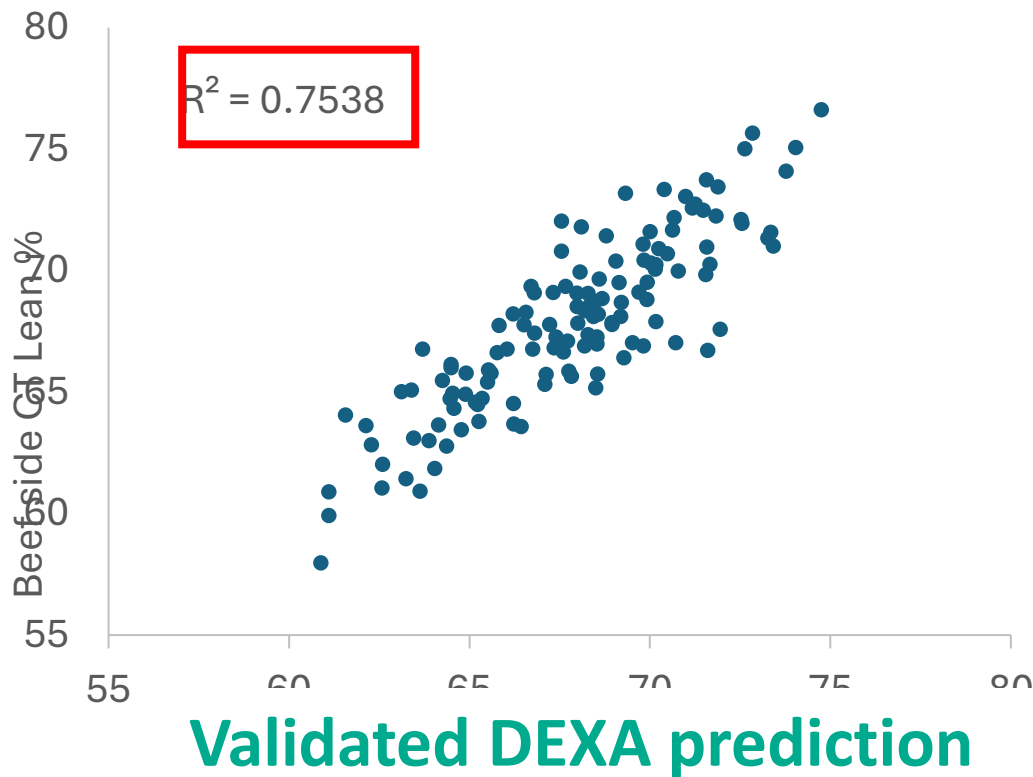


Rib Fat Depth & Carcase
Wt

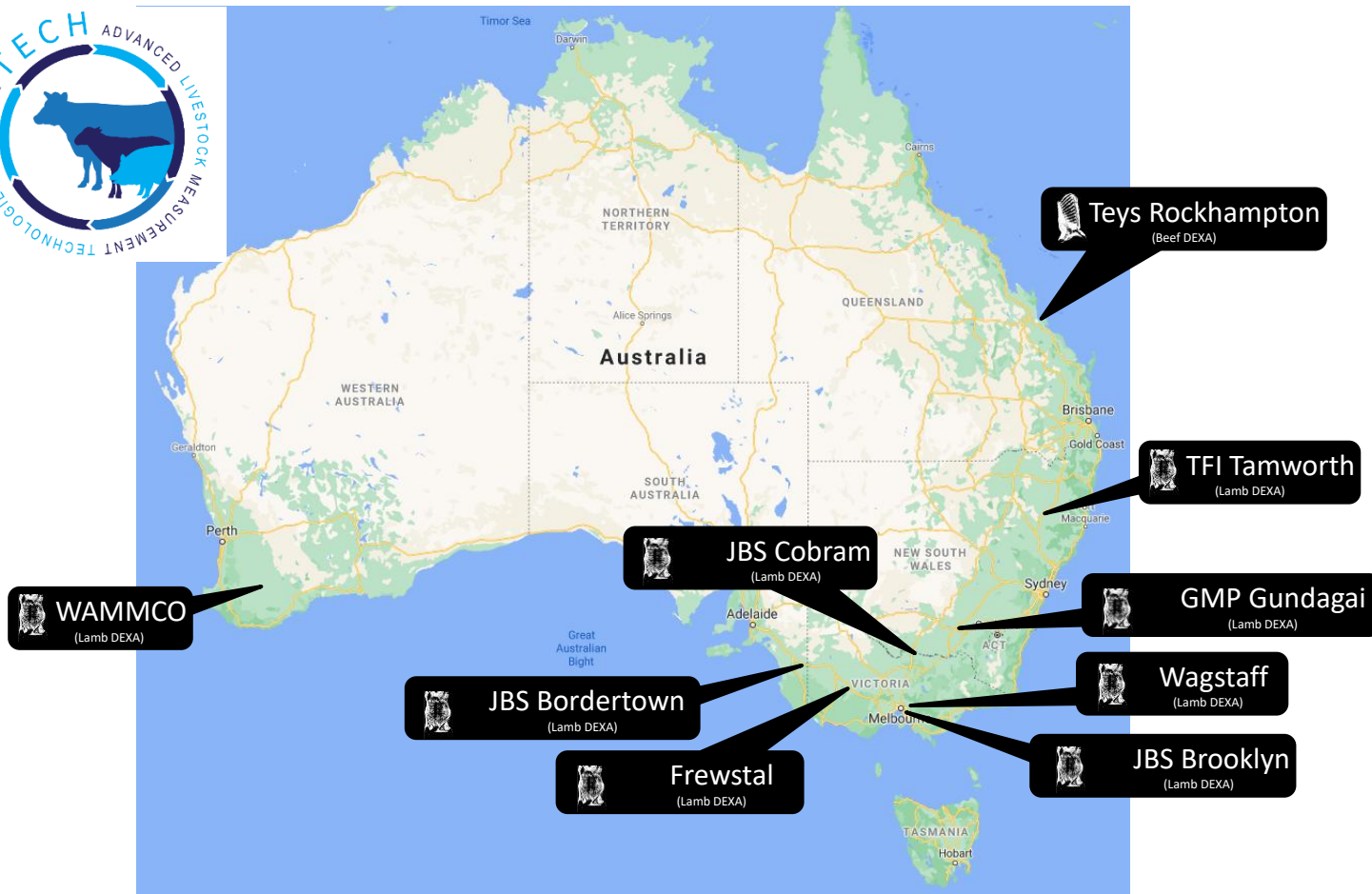


Beef DEXA predicting CT

CT Lean%

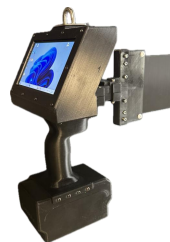
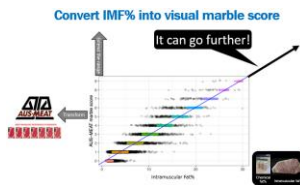


DEXA commercialisation roll-out



Conclusion

1. Enhanced beef marbling trait (IMF%) is coming.
2. Microwave for lamb GR and IMF being deployed in WA
3. Beef DEXA works!
4. DEXA may predict eating quality in sheep.

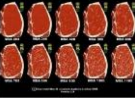
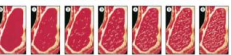
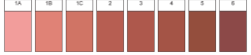
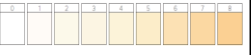
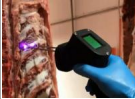




meatup FORUM

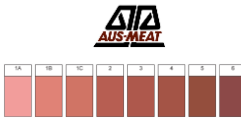
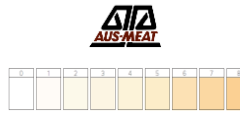
**For the latest in red meat research and development
Northam, WA – 12 August 2026**

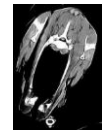
Currently AUS-MEAT Accredited

	  Marbling	 BEEF MARBLING REFERENCE STANDARDS  Marbling	  Meat Colour	  Fat Colour	  Eye Muscle Area	 Intramuscular Fat%
 Q-FOM	 Score 100 - 1190	 Score 0 - 9	 Score 1A - 6	 Score 0 - 6		
 VIAScan	 Score 100 - 1190					
 MasterBeef	 Score 100 - 1190					
 MIJ-30		 Score 7 - 9				
 MEQ Probe	 Score 100 - 1190	 Score 7 - 9				
 MEQ Camera	 Score 100 - 1190	 Score 0 - 9		 Score 0 - 8		



Currently AUS-MEAT Accredited

	 Marbling	 Marbling	 Meat Colour	 Fat Colour	 Eye Muscle Area	 Intramuscular Fat%
 Q-FOM	 Score 100 - 1190	 Score 0 - 9	 Score 1A - 6	 Score 0 - 6		



CT Lean%

DEXA

49 to 65 CT lean%

11 to 37 CT fat%

12 to 25 CT bone%



Microwave

???

Score 100 - 1190

Score 0 - 9



Microwave

2.0 to 8.0 IMF%

SOMA NIR device

3.5 to 8 IMF%

MEQ Probe

1.7 to 7.5 IMF%



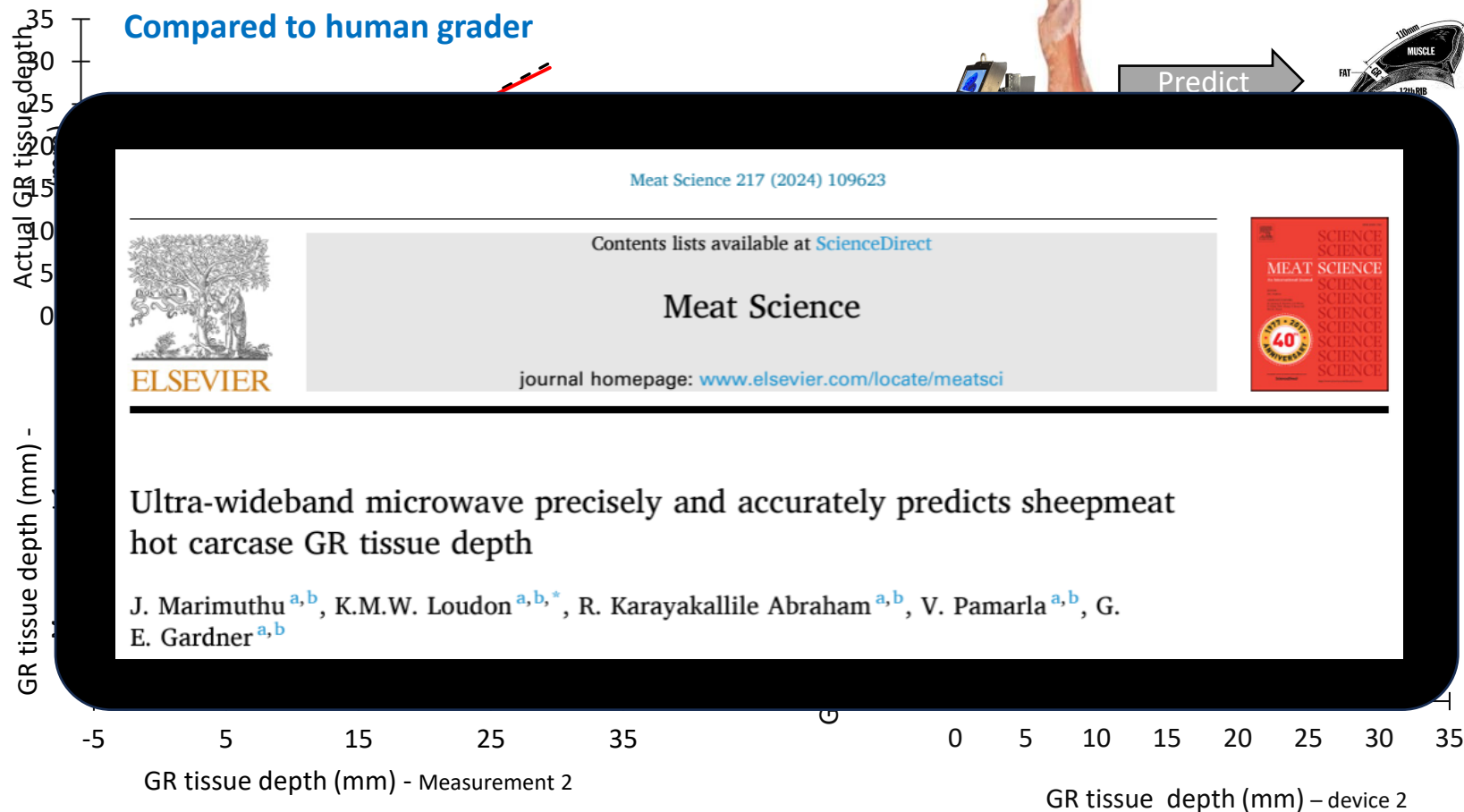


Score 1A - 6

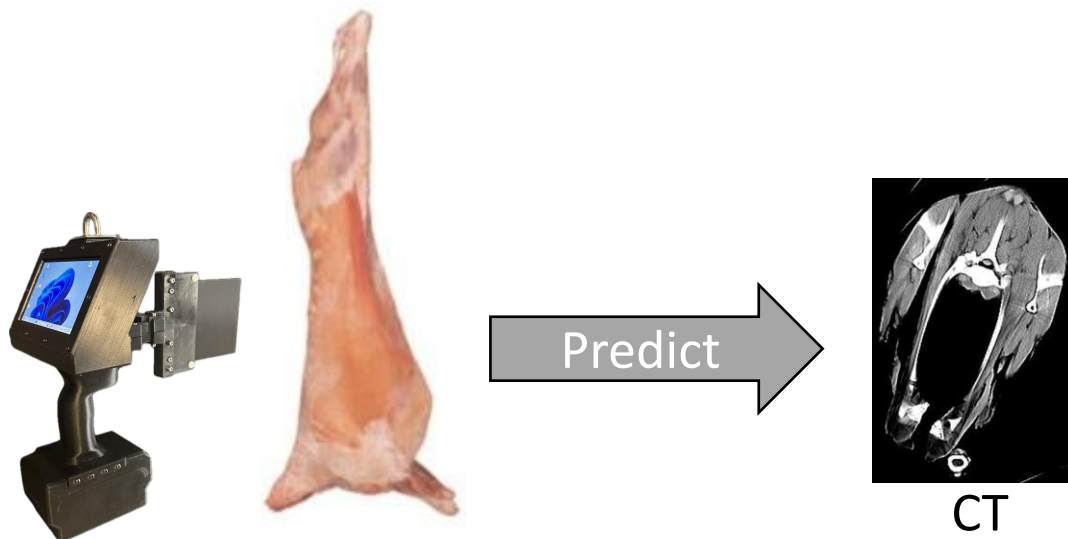
Score 0 - 6

Closing slide

Microwave GR tissue depth



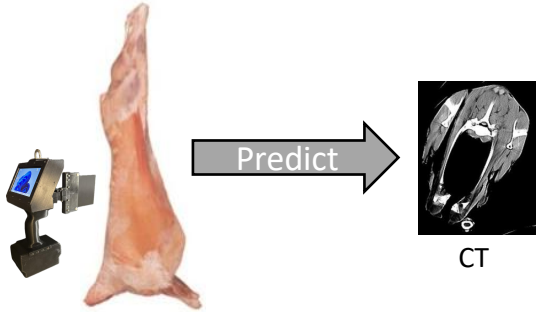
Carcase CT composition



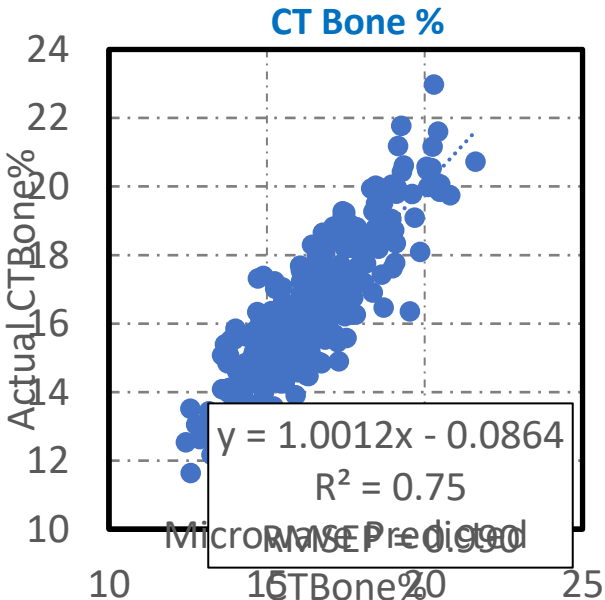
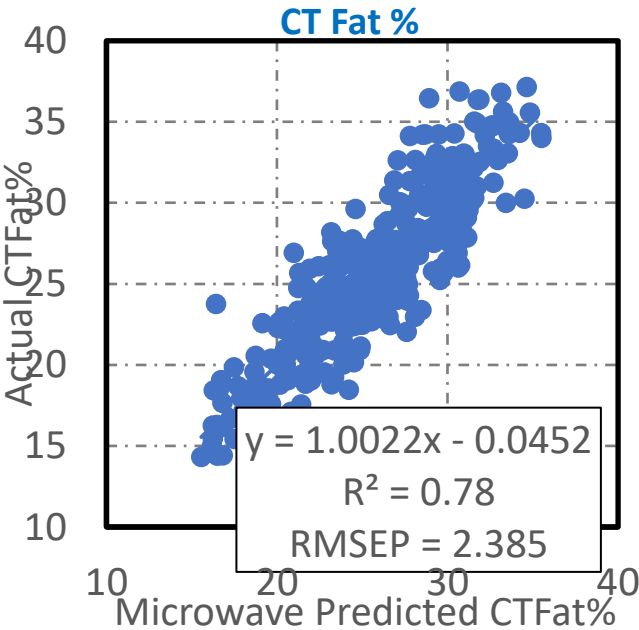
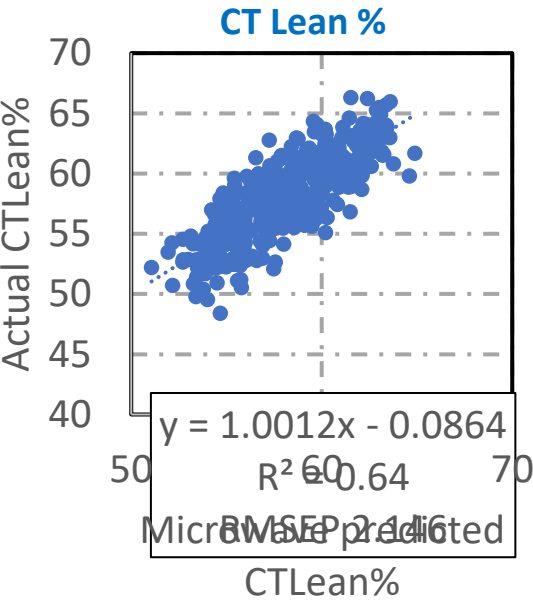
Microwave Scan at C-site

Carcase CT composition

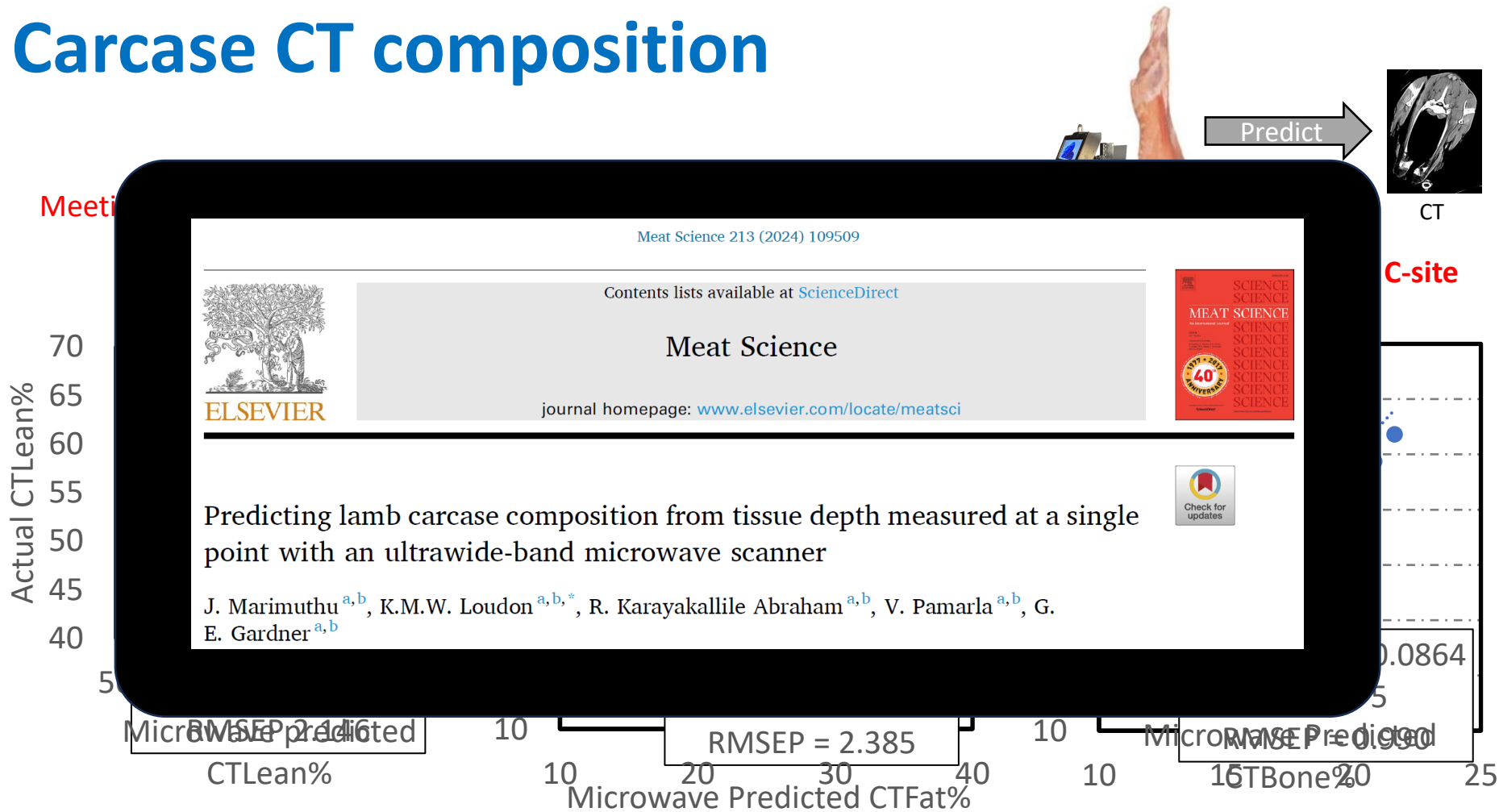
Meeting AUS-MEAT National Accreditation thresholds



Microwave Scan at C-site



Carcase CT composition



Marimuthu et al. (2024). Ultra-wideband microwave precisely and accurately predicts sheepmeat hot carcass GR tissue depth. Meat Science, In Print.