

In-plant, non-invasive spectral imaging for the prediction of lamb meat quality attributes



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Masters in Food Technology Supporters



MASSEY UNIVERSITY
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Objective

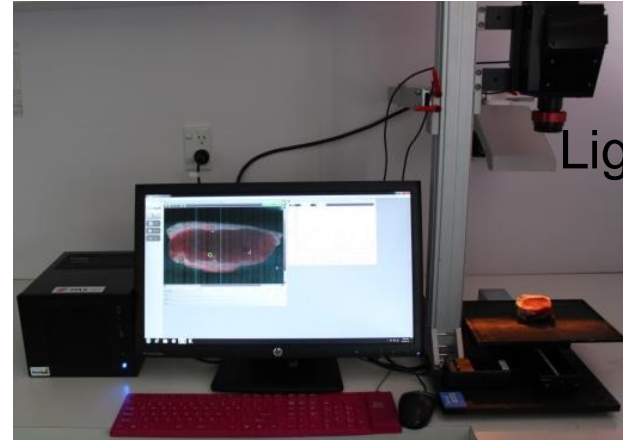
Proof-of-concept evaluation of Hyperspectral Imaging and Near Infrared Spectroscopic technologies for use in an in-plant system for assessment of lamb meat quality on a typical production line

Non-invasive assessment of meat quality

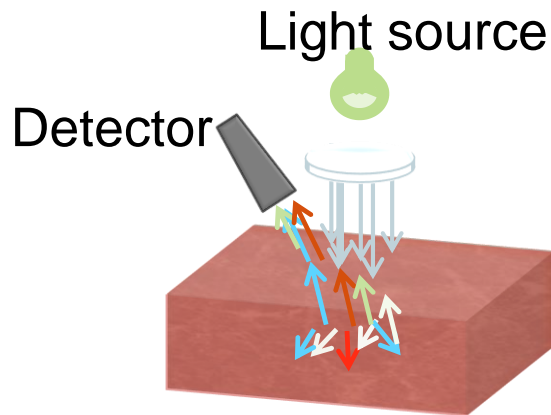
- Cost effective (eliminate the need for 'wet chemistry' testing)
- Every animal scanned at time of production
- Known attributes by the time boxes are put in the chiller
- Allow to match markets or value added products best suited

Vis-Near Infrared

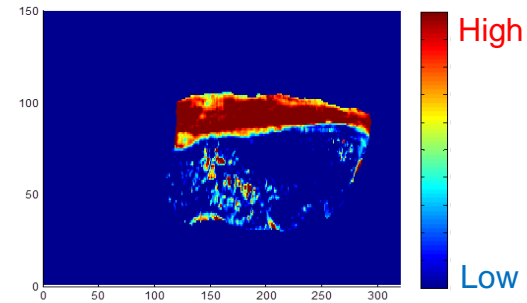
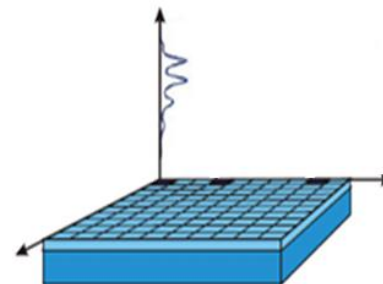
Chemical and structural information



Detector
Light source



Fat content



Materials and Methods

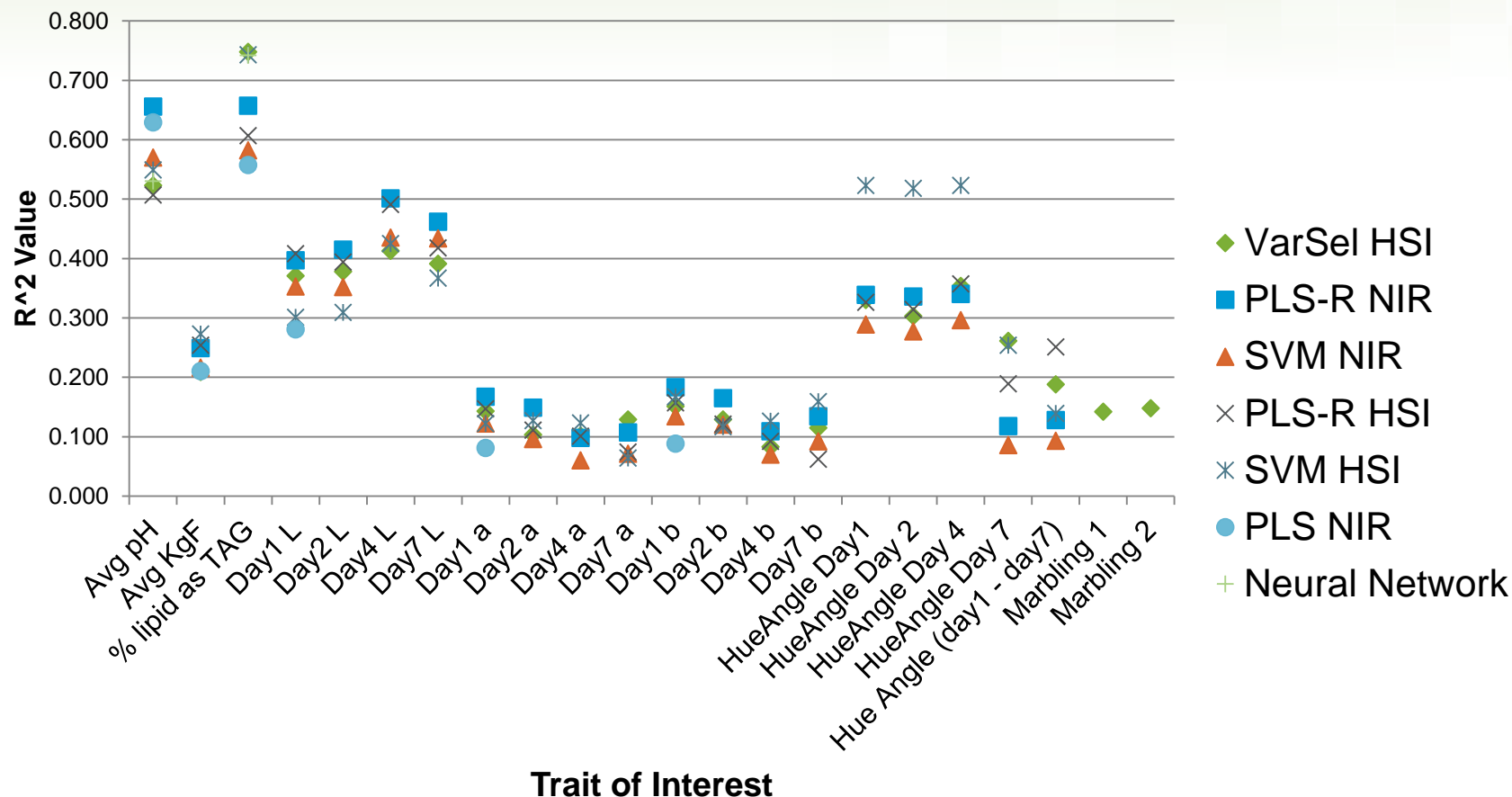
Total Animals	2500
Kills	10
Abattoirs	3
South Island	2
North Island	1

Tenderness	MIRINZ Tenderometer
pH	Eutech pH meter
Colour	Minolta colorimeter
Colour display	80% O ₂ /20% CO ₂ gas packaging
IMF	GCFID (gas chromatography)
Marbling	trained expert

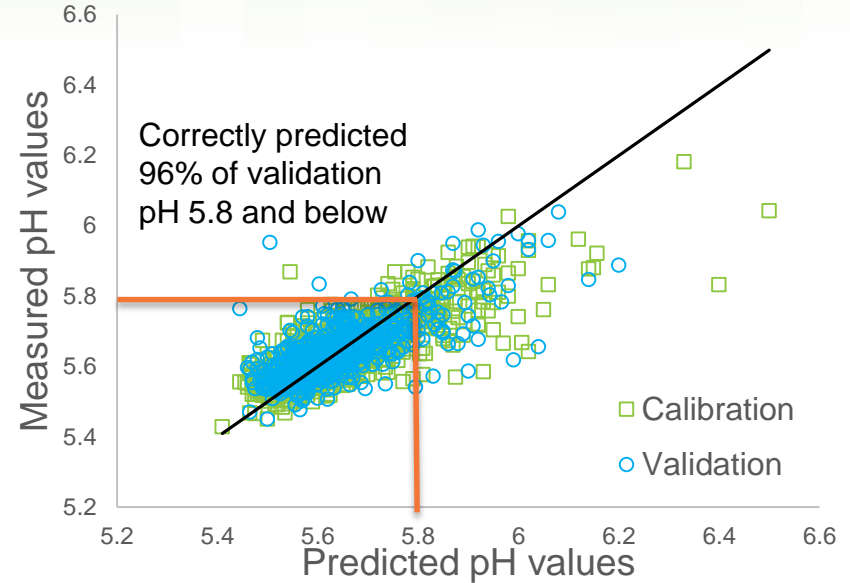
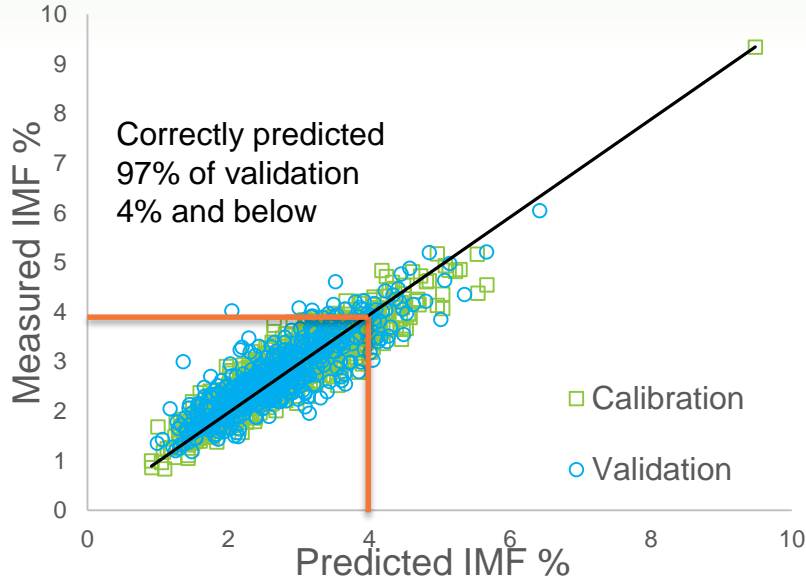
Modelling of meat quality measurements

- Physical results modelled against NIR and HSI spectrum using:
 - Partial Least Squares Regression (PLS)
 - With and without pre-processing
 - Support Vector Machine (SVM)
 - PLS Variable Selection
 - Neural Network

Combined results



Improving efficiency



Variable selection and Neural Network

15 specific variables could be used instead of 235

- Minimises processing time allowing for faster results
- Improve ability to keep up with production lines

Future directions

- Collect samples with greater variation in pH and IMF
- Test models with this years kills
- Implement HSI cameras into the production line
 - Minimal human interaction
 - Automated packing lines

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