

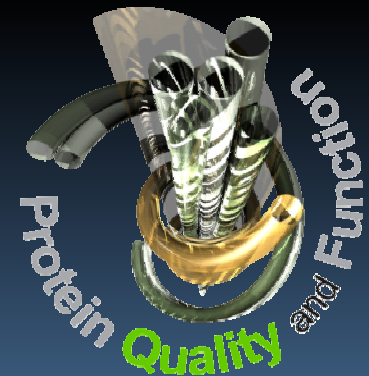
Lipid degradation profiling in packaged meat

Stefan Clerens

Protein Quality & Function Team

AgResearch Meat Industry Workshop

13 October 2010



Outline

Project outline

Technical

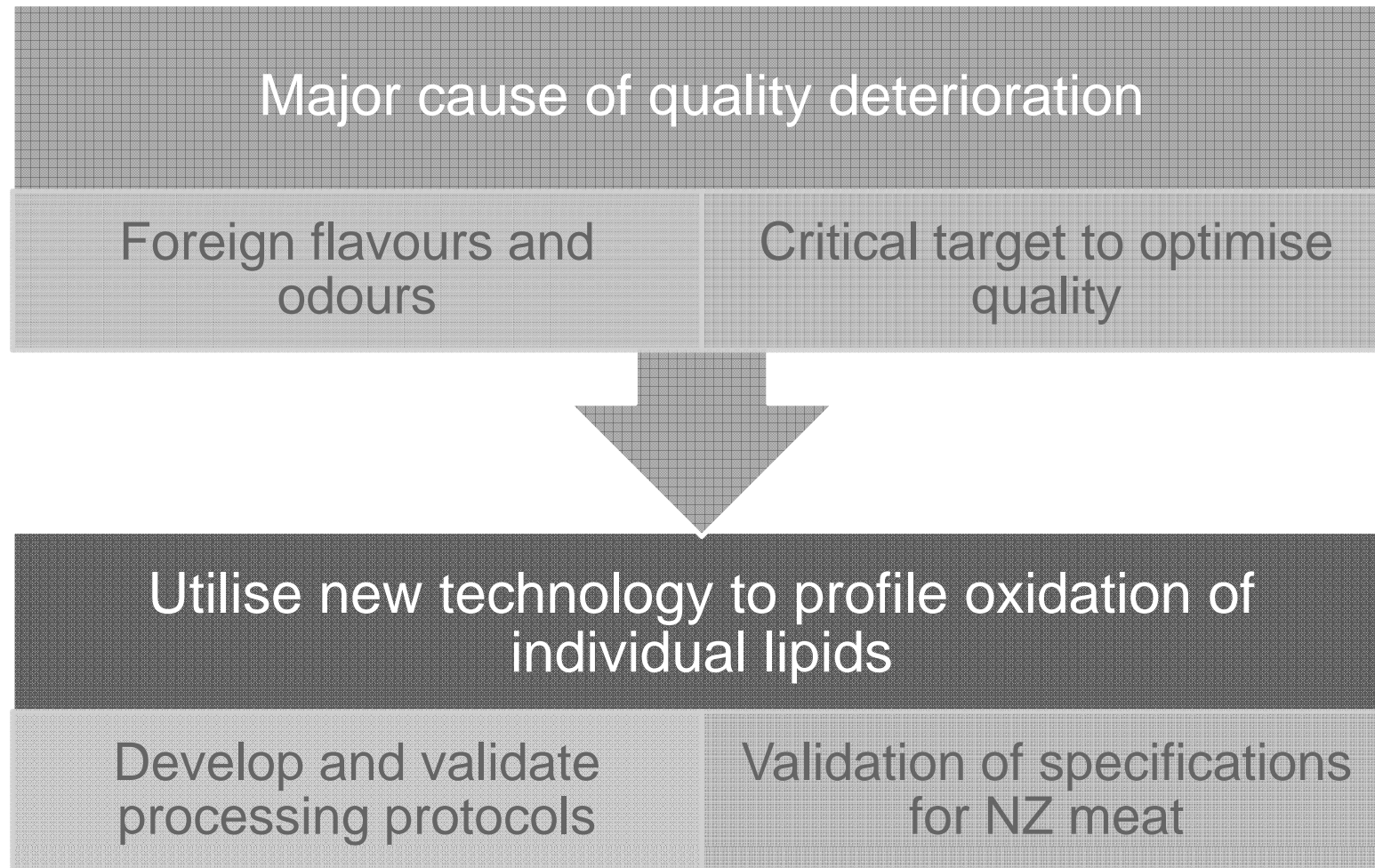
Results

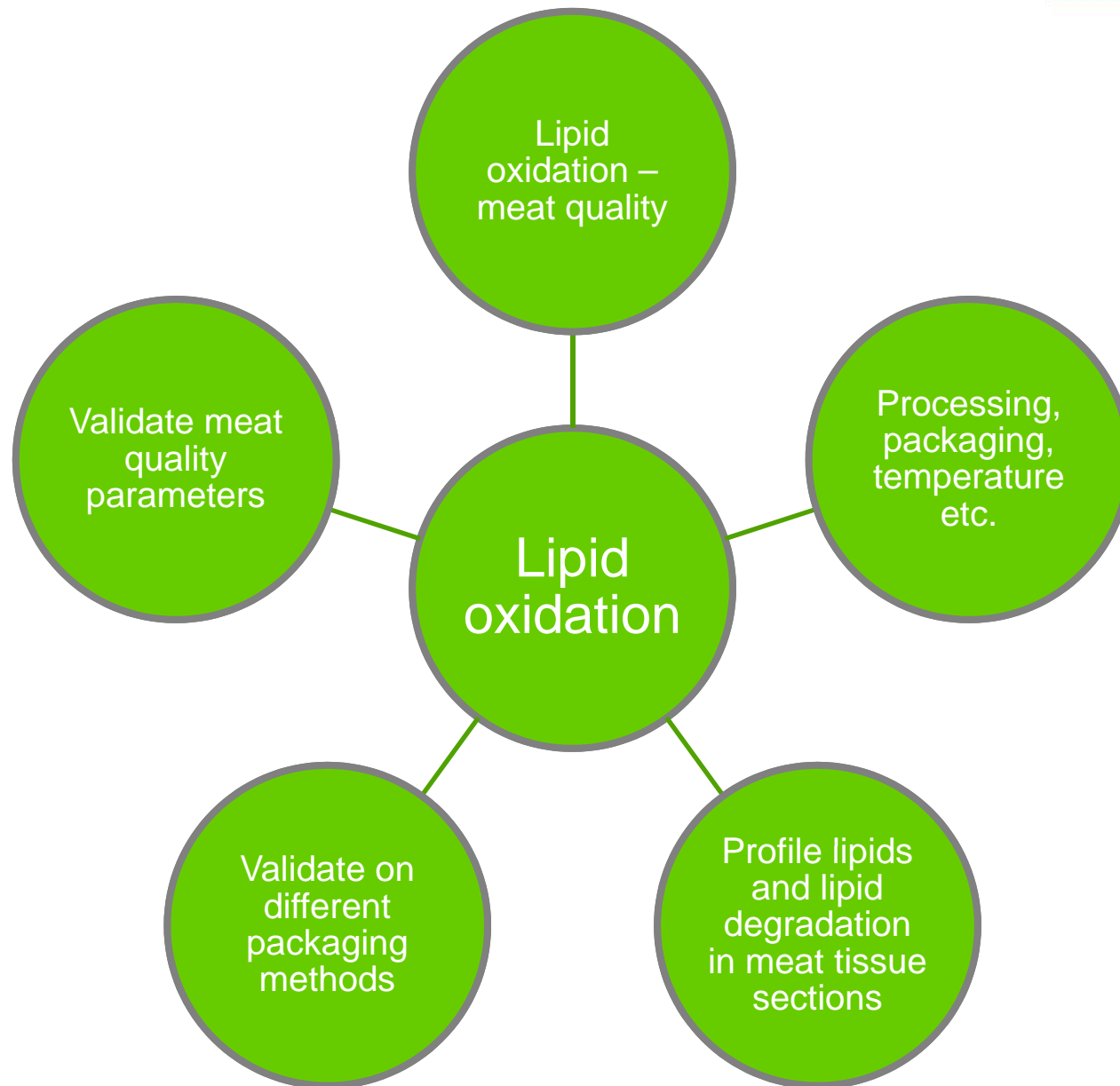
Perspective

Conclusions



Lipid oxidation





Technical

MALDI imaging

- Obtain lipid masses direct from tissue

1 cm steaks

- Beef loin

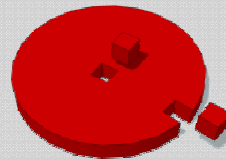
Packaging methods

- High oxygen (80% O₂ : 20% CO₂)
- Vacuum
- Oxygen permeable wrap

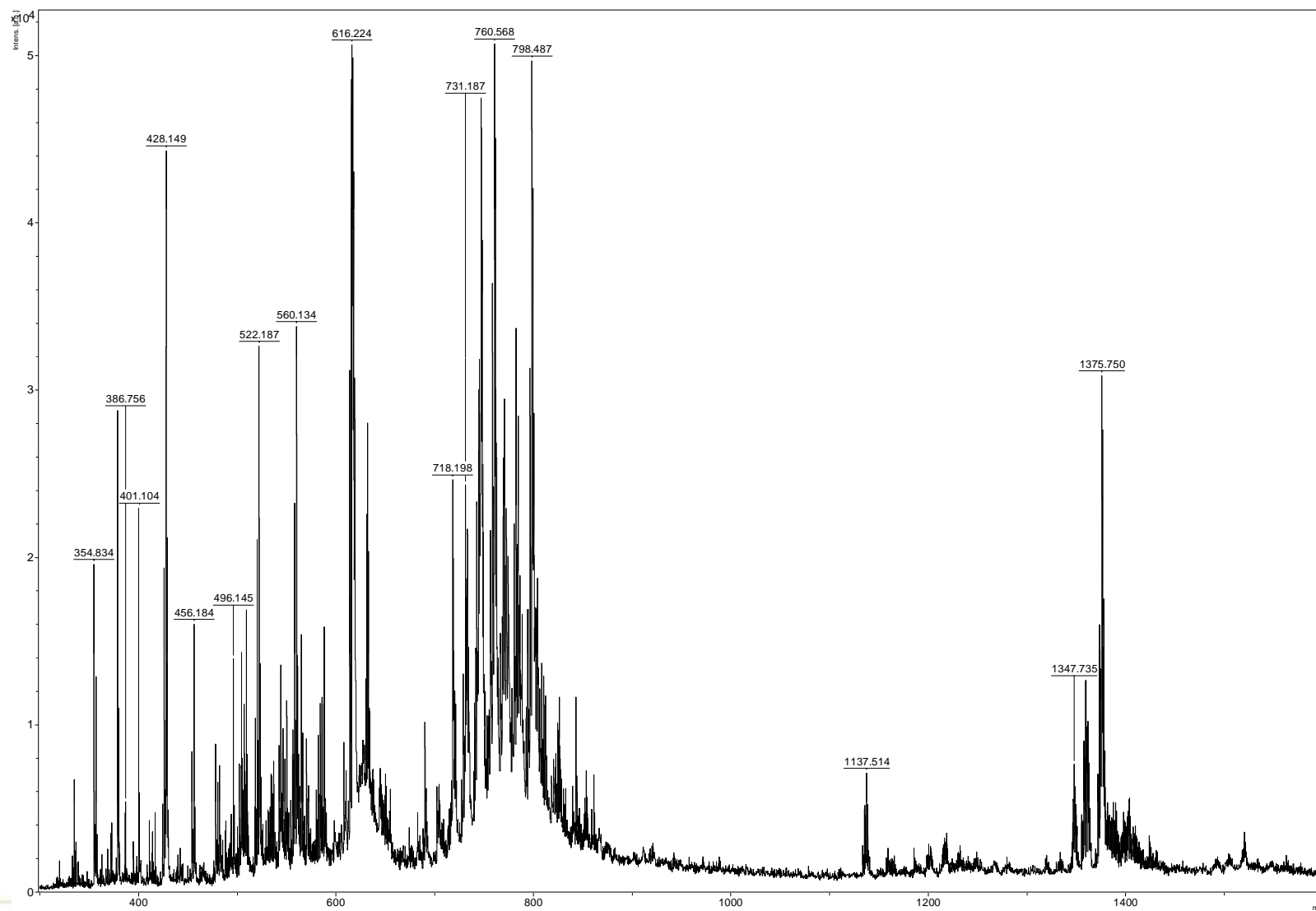
Time trial

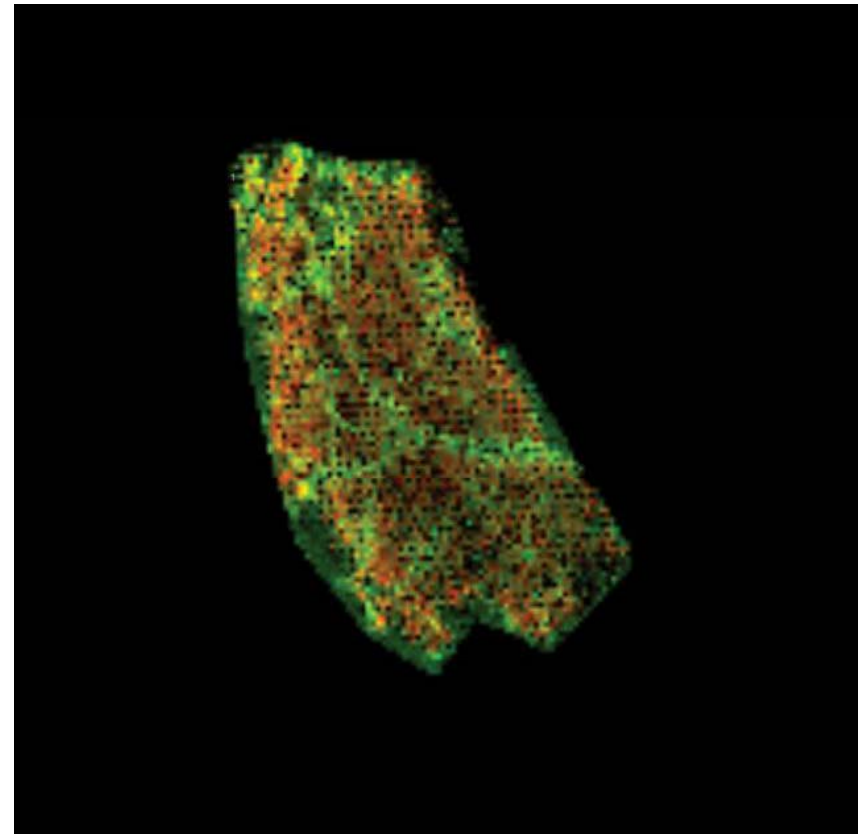
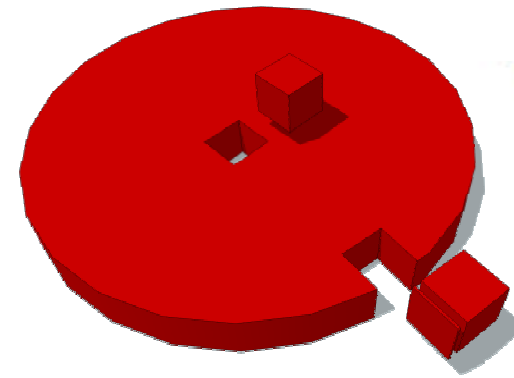
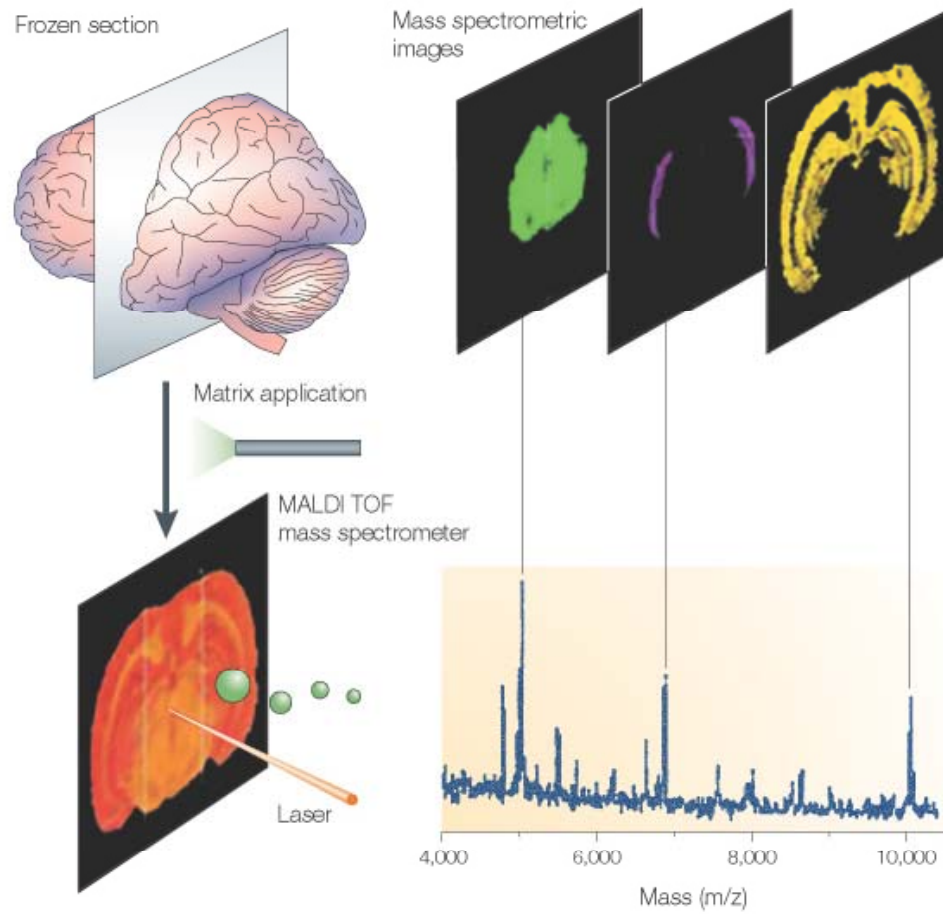
- Days 0, 2, 5, 8, 15
- Stored at 4°C until subsampling

Centre and edge sample



Mass spectrometry





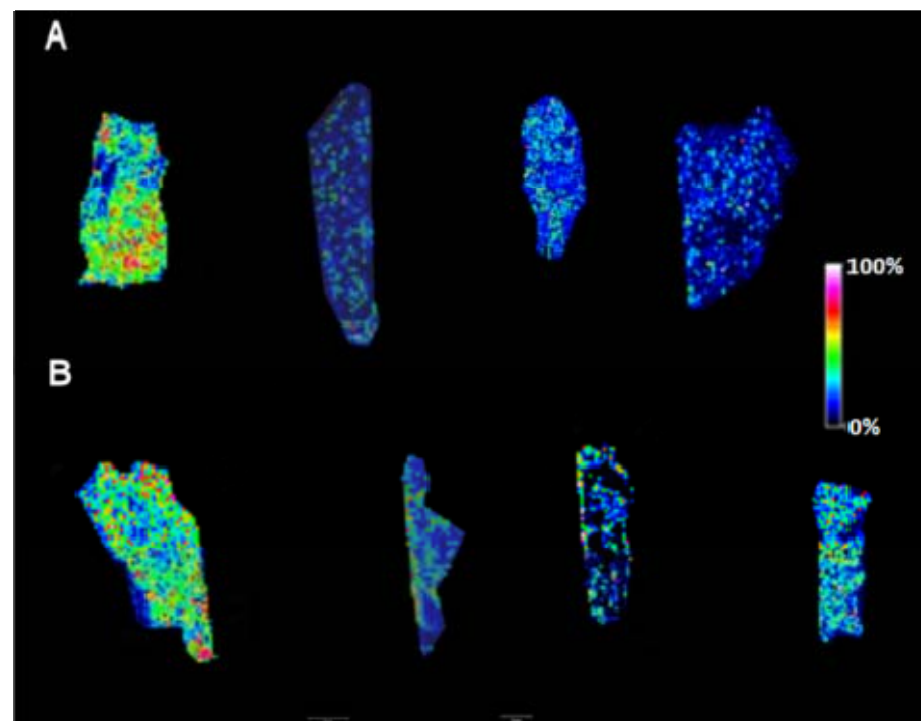
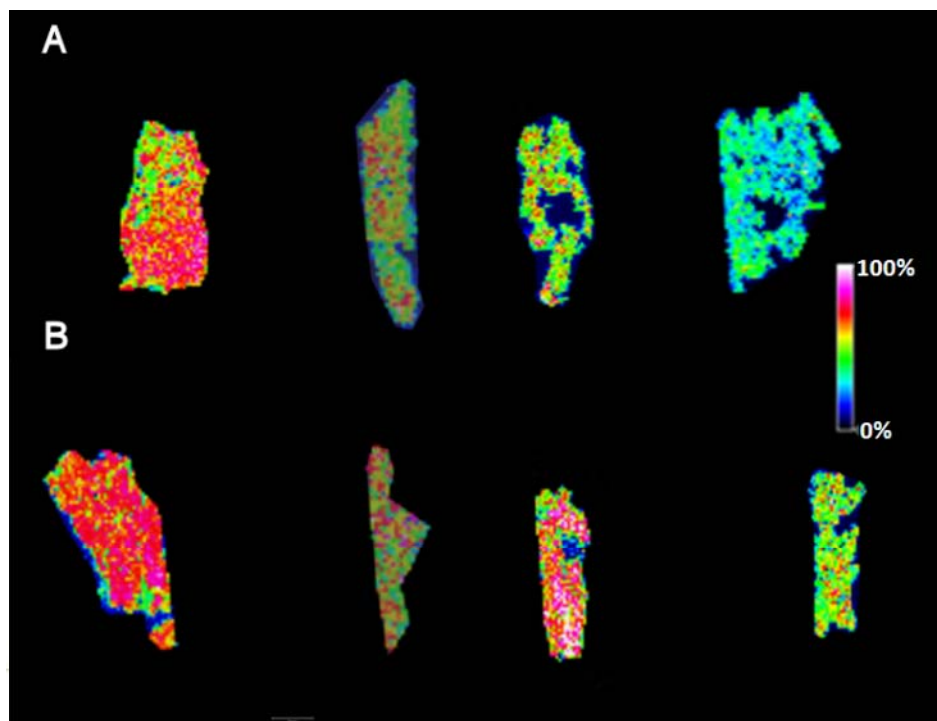
Lipid mapping

Data acquisition

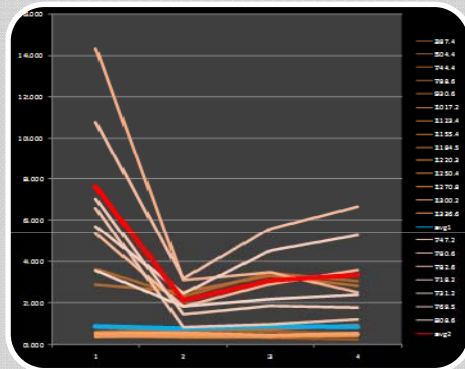
- (mass spectrometry)
- Centre, edge; 3 packaging methods; days 0, 2, 8, 15

Data analysis

- Compile list of tracker lipids
- Extract images
- Extract, normalise summed intensities

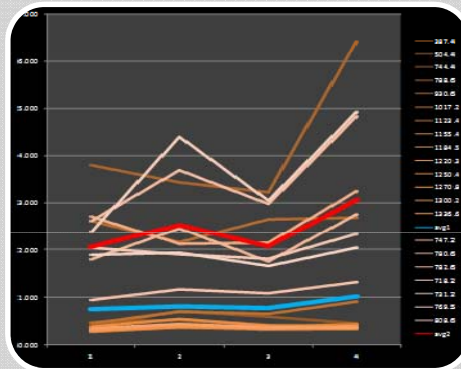


Summary findings



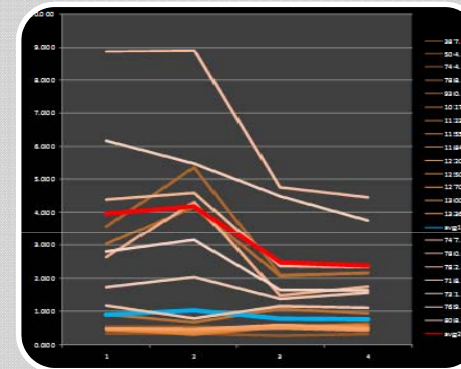
High oxygen

- Strong lipid degradation from Day 2
- Some remain stable



Vacuum

- Fluctuations but reasonably stable
- For both categories



O₂ permeable wrap

- Lipid degradation from Day 8
- Some remain stable

Perspective

First direct meat lipid profiling

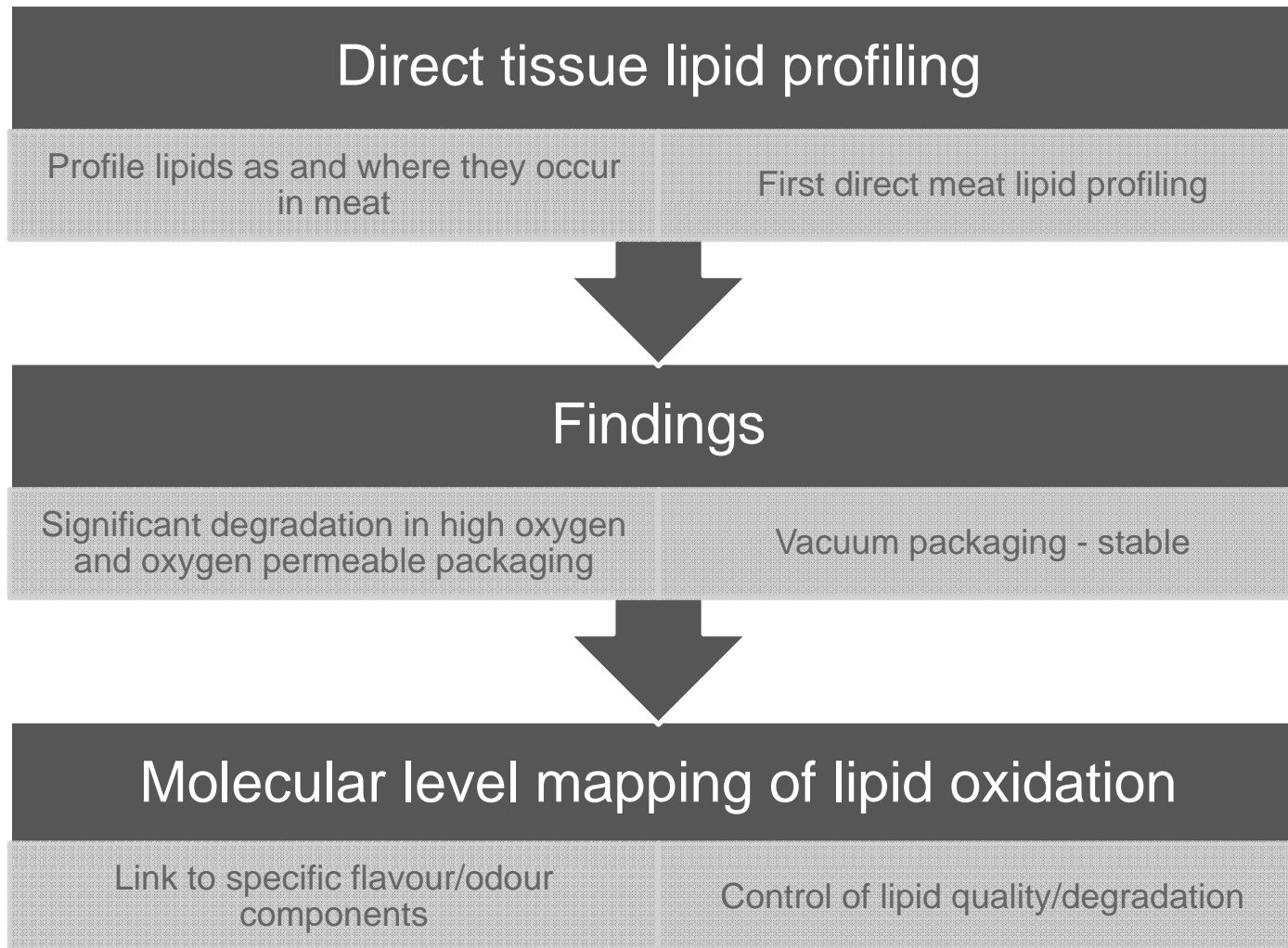
Tool for validation of meat quality parameters

- Application to processed meat products
- Optimise packaging/storage protocols

Molecular level correlation of degradation with taste profile

- Correlation of specific lipids with specific eating characteristics
- Matching to specific markets / taste profiles
- Breed animals with highly specified lipid composition

Conclusions



Outlook

Lipid mapping

- Identify and characterise lipids and degradation products
- Track abundance under different scenarios

Control/assurance

- Mitigation strategies
- Optimal shelf life
- Validation

Transformation

- Match to markets