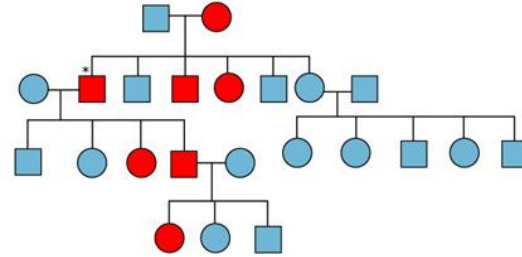


Rapid Evaporative Ionisation Mass Spectrometry – a novel tool for rapid screening of sheep milk composition

Alastair Ross, Ines Weissenbacher, David Stevens,
Marita Broadhurst, Sue McCoard, Linda Samuelsson
AgResearch Lincoln, Grasslands, Ruakura and Invermay

Detailed milk composition measurements: Why measure more than fat, protein and lactose?



Genetics
Farm system
Feed
Environment



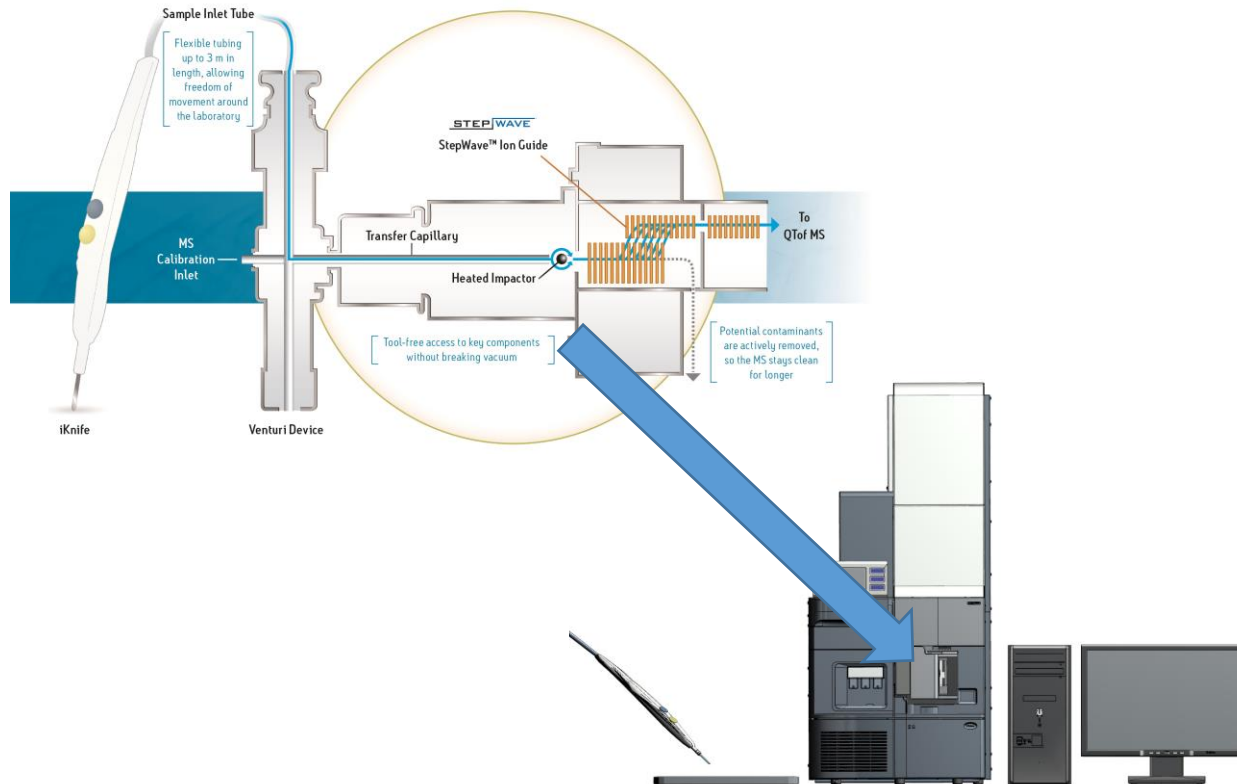
Milk:
Protein
Fat
Lactose
+ thousands of low concentration molecules



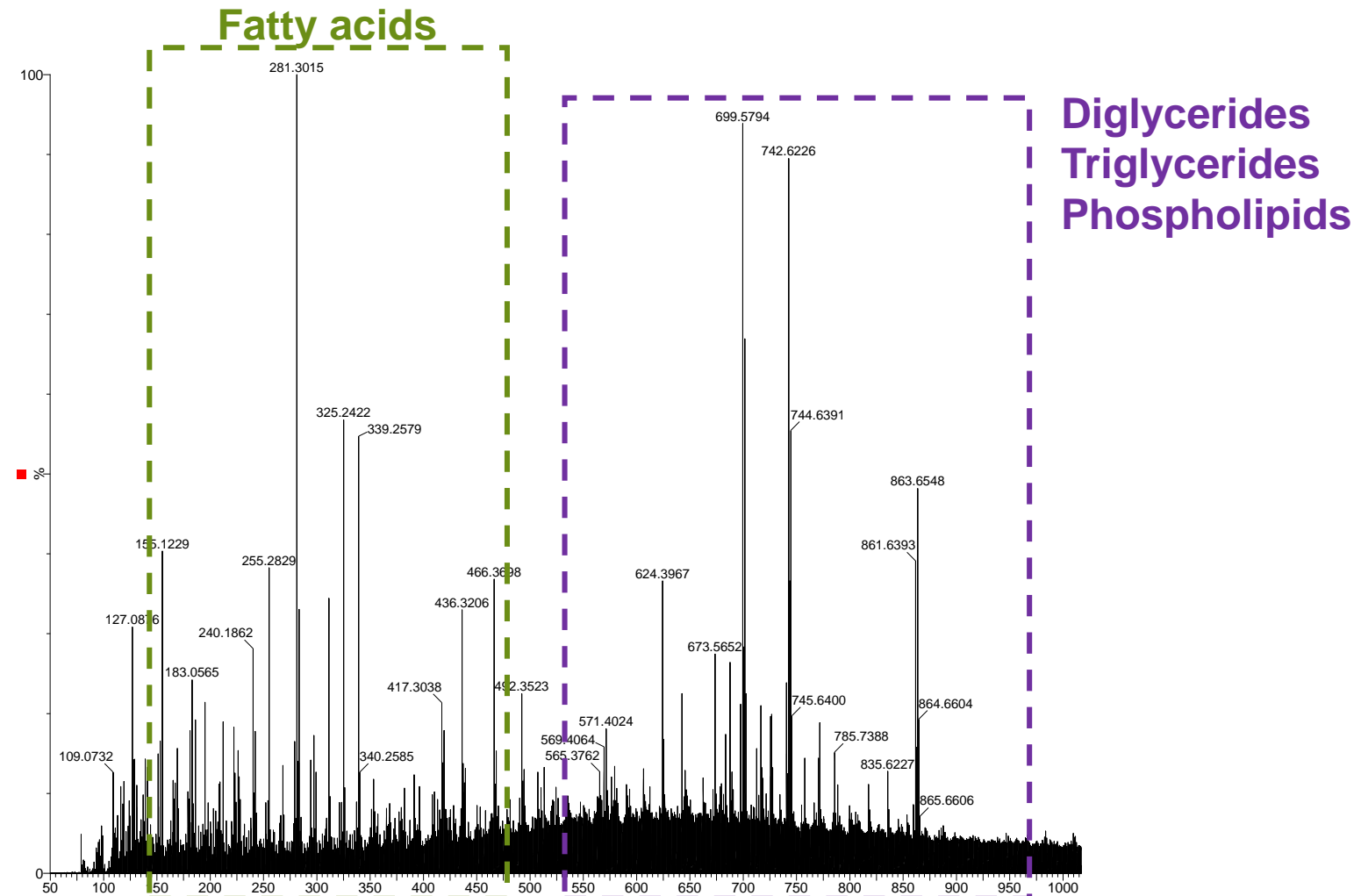
Flavour
Processability
Micronutrient composition
Origin/terroir
Fraud

Rapid Evaporative Ionisation Mass Spectrometry

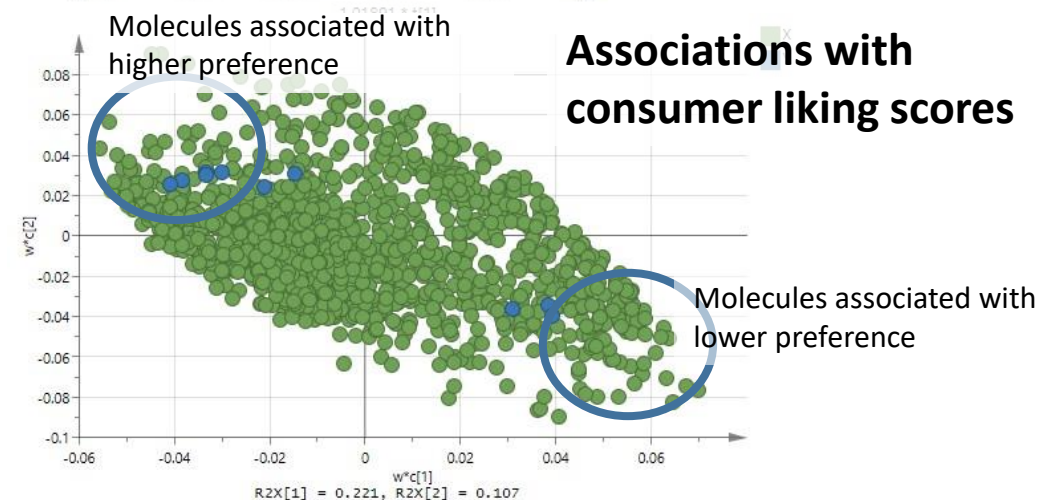
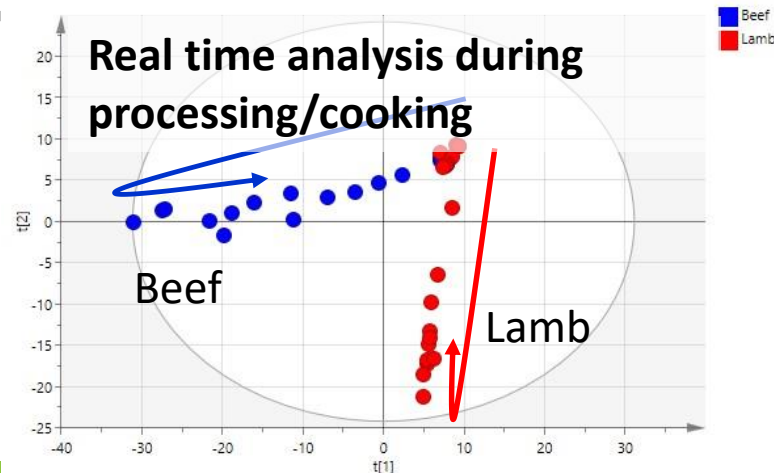
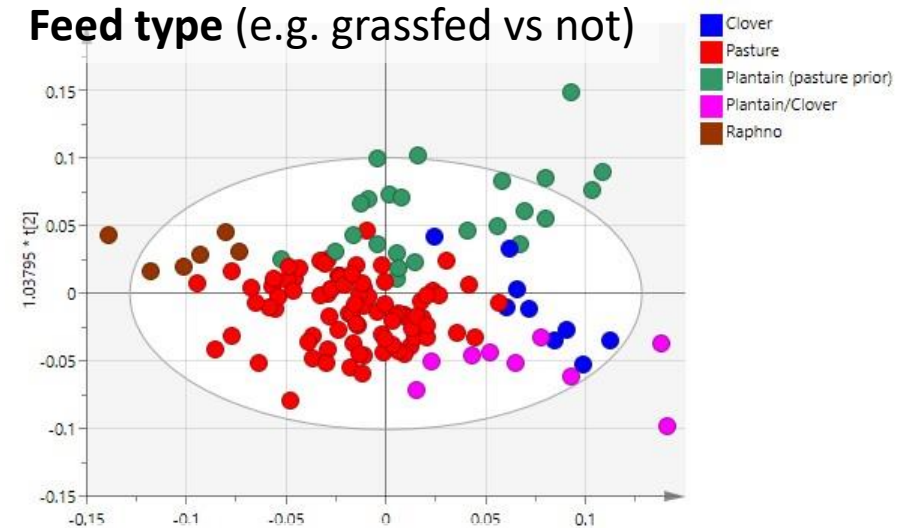
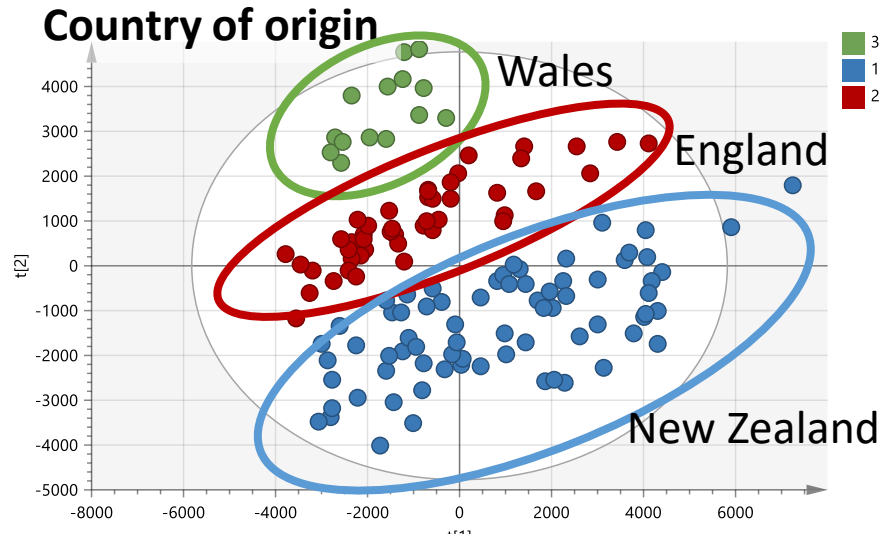
- <https://vimeo.com/flashworksmedia/review/338785333/7d127bd5a7>



REIMS detects a wide range of molecules

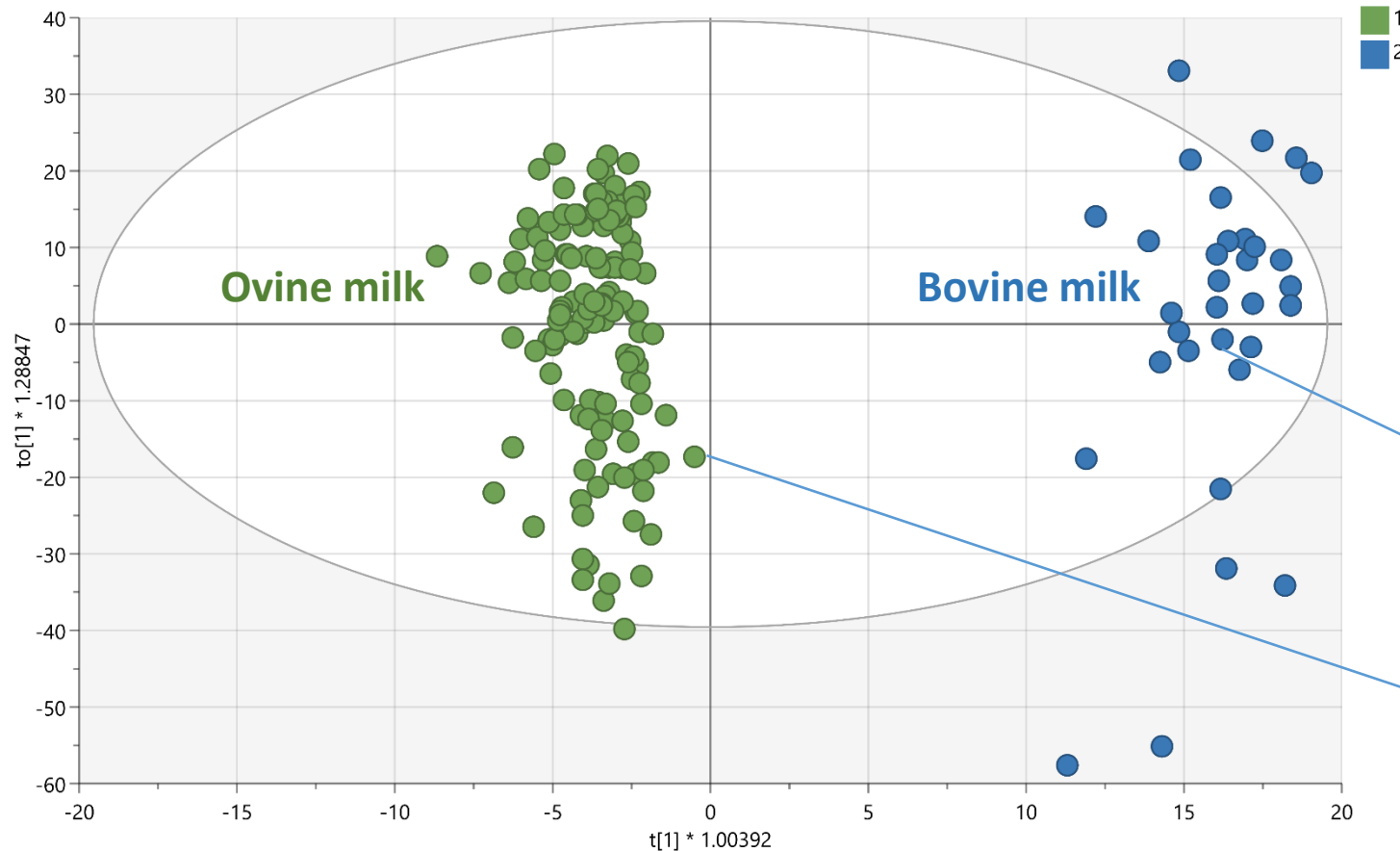


Characterisation of meat using REIMS

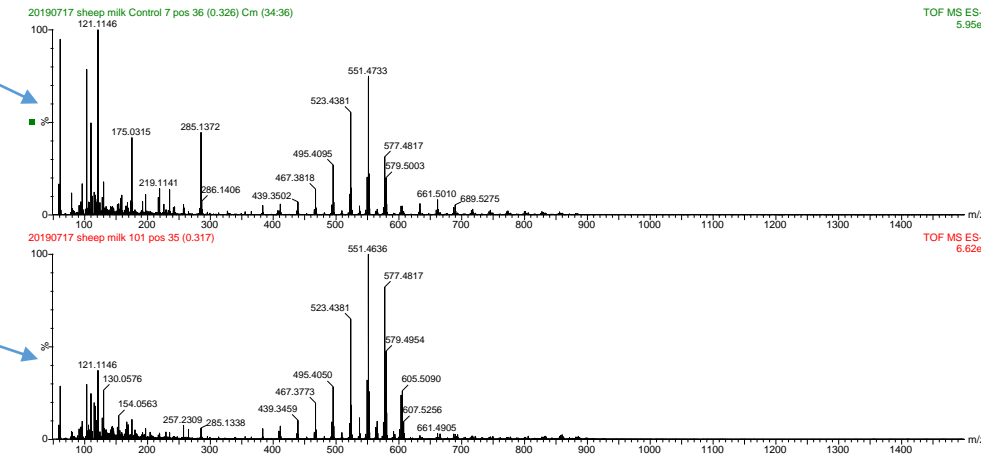


REIMS fingerprinting of milk:

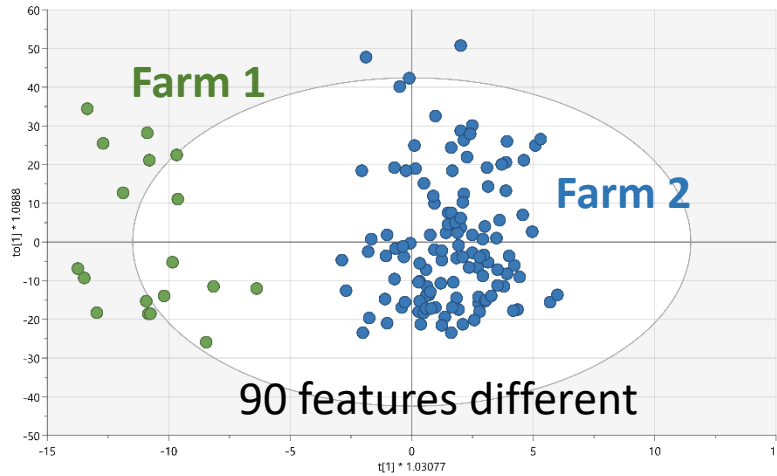
Moo vs baa: bovine and ovine milk very different



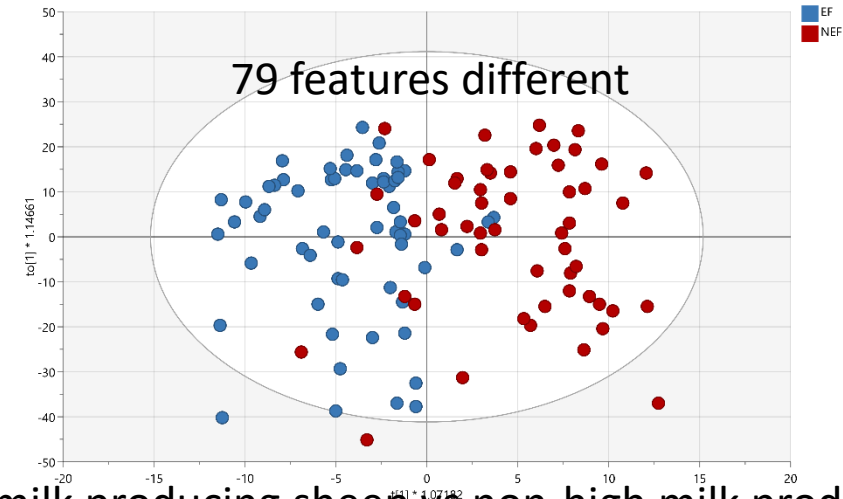
Clear difference, around 600 features different between bovine and ovine milk



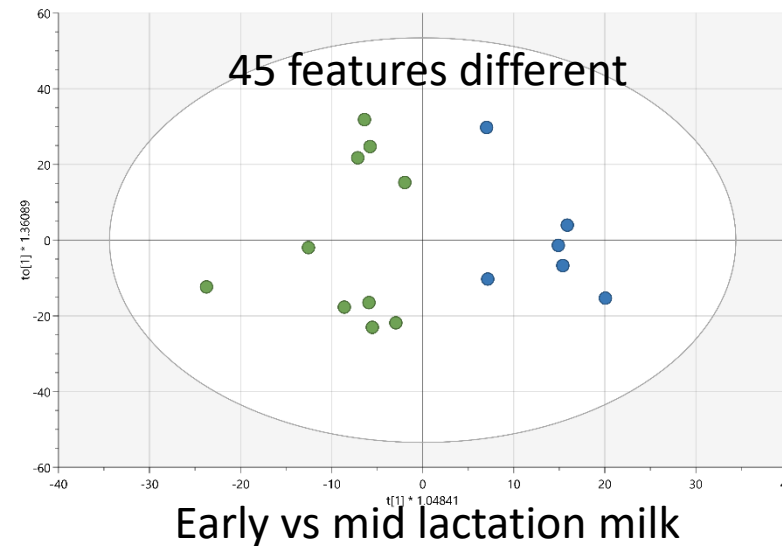
REIMS analysis of different sheep milk conditions



Different farms (same broad geographic region)



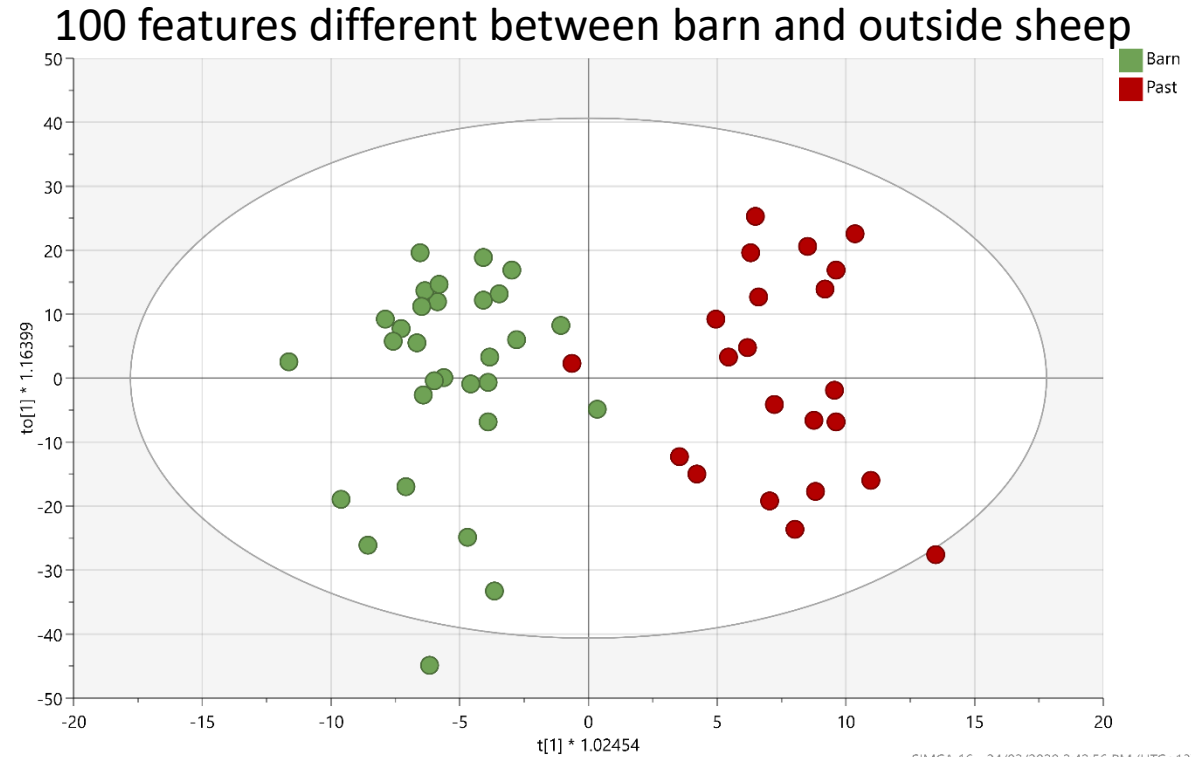
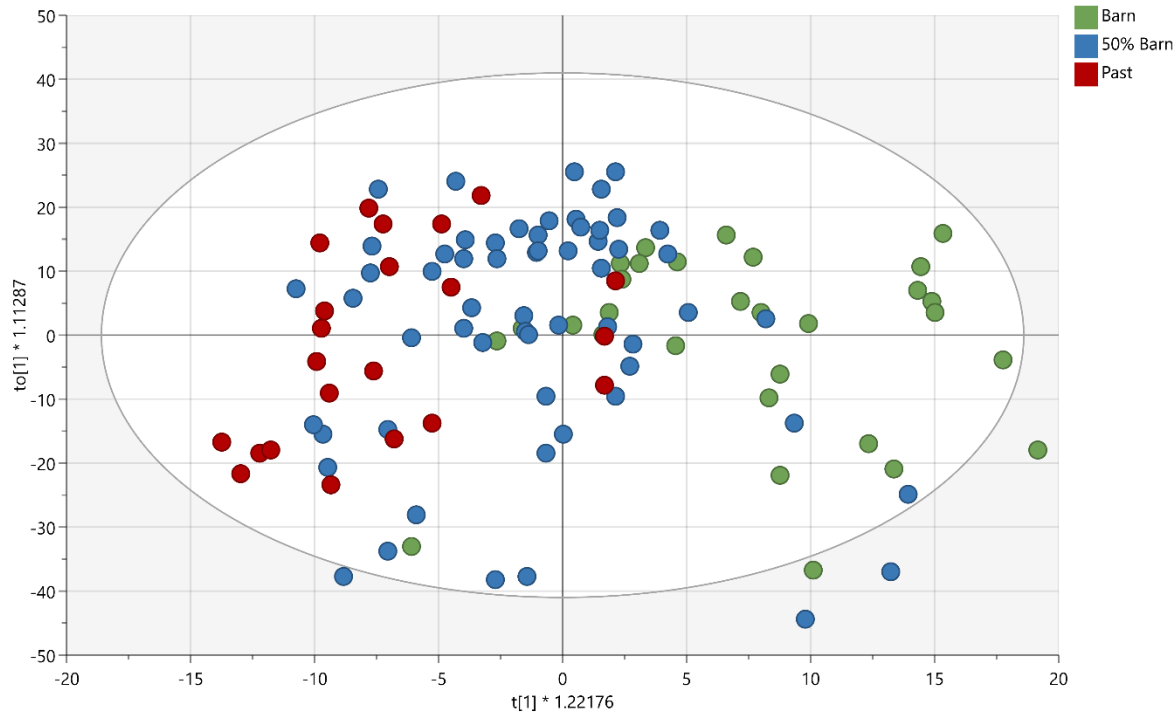
High milk producing sheep vs non-high milk producing sheep



Early vs mid lactation milk

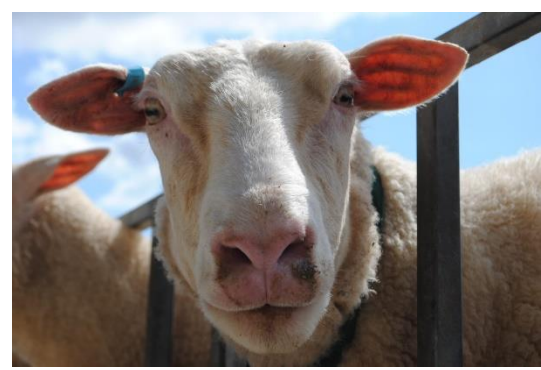
Comparisons complicated by differences in genetics, lactation stage and feed types

Effect of sheep housing on milk composition



Comparison of milk composition between sheep housed 100 % in a barn, 50 % in a barn and 100 % outside

Comparison complicated by differences in genetics, lactation stage and feed types



Summary and Future

- REIMS was able to detect differences between farms and farm systems based on sheep milk composition
 - What do these compositional differences mean in practice?
- Bovine and ovine milk are clearly different and this can be detected rapidly
- Sheep milk varies greatly, and there could be value in understanding the potential value from differences in milk composition
 - Seasonal variation
 - Genetic variation
 - Geographic variation
- Mass spectral fingerprinting methods detecting thousands of variables from direct sample measurements have great potential for quality and traceability tracking
- Method improvements (laser interface) should increase throughput and more comprehensive characterisation of sheep milk can be carried out

Acknowledgements

- Many thanks to Spring Sheep Milk Co., Maui Milk, Kingsmeade Cheese, Blue River Dairy, and Antara Ag Farms for supplying the samples



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