

SPECTROSCOPY OF NEW ZEALAND LAMB MEAT: A PRELIMINARY ANALYSIS

Ruth Eloisa Sales^{1*}, Sara J. Fraser-Miller¹, Frederique Vanholsbeeck², and Keith C. Gordon¹

Dodd-Walls Centre for Photonic and Quantum Technologies

¹Department of Chemistry, University of Otago, New Zealand

²Department of Physics, University of Auckland, New Zealand

The red meat industry has been a principal driver of New Zealand's economy and identity. To stand ahead of its competitors, it is driven to consistently improve its reputation for quality and innovation in the global market. The continuous development of spectroscopic methods allows the testing of meat quality to move from laboratories to the production line. Spectroscopy is suitable for on-line measurement of meat quality parameters as it is a fast, non-destructive technique with little or no sample pre-treatment, and has multivariate output [1]. This study aims to develop non-invasive rapid quantification methods for industry-specified parameters in red meat by selecting the optimal combination of spectroscopic techniques and determining in which technique is best for which task. This approach will pave the way for developing devices that would benefit NZ red meat producers, by allowing them to grade red meat according to quality and identify and select product for quality and apply premium pricing and marketing. This is a preliminary study aiming to optimize method parameters and sample acquisition for future work towards a larger dataset, which will then correlate quality attributes to spectroscopic information. Preliminary analysis of New Zealand lamb samples, Figure 1(a), were done using multiple spectroscopic techniques: Fourier transform infrared (FT-IR), FT-Raman, dispersive Raman, Raman microscopy and near infrared (NIR). Specific peaks in the spectra were identified corresponding to the associated components of the meat. Raman microscopy can detect the relationship between chemical and spatial composition, Figure 1(b). The different methods were able to detect different attributes within the sample based on their bio-chemical components and associated spectroscopic selectivity.

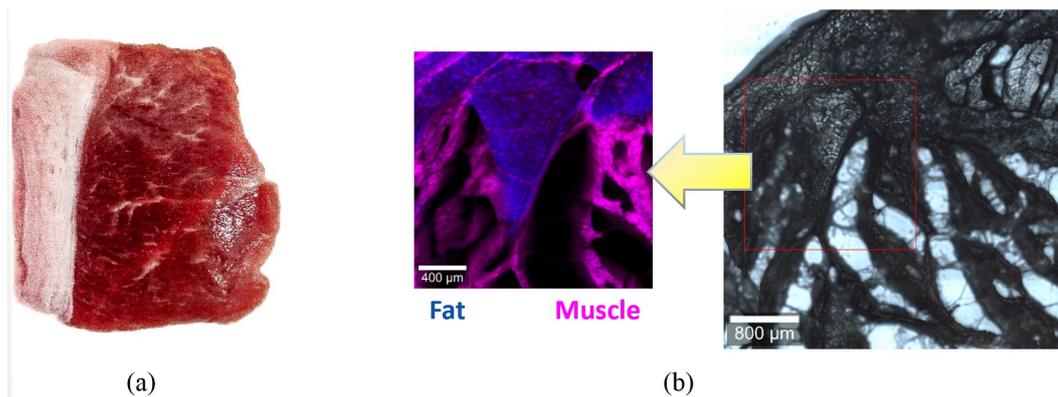


Figure 1: (a) Lamb meat sample tested. (b) Confocal Raman spectral image of lamb meat.

References

- [1] J.-L. Damez, and S. Clerjon, *Meat quality assessment using biophysical methods related to meat structure*, *Meat Science* **80**, DOI:10.1016/j.meatsci.2008.05.039.

*Contact email: ruth.sales@postgrad.otago.ac.nz