

# Fat Depth Measurement

Optimising Carcase Fat Depth Measurement

Project code  
2020-1098

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Date submitted  
28/06/2024

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## Project description

The project was established to compare the precision and accuracy of the HGP and MiS in predicting GR tissue depth in lamb and P8 fat depth in beef, providing a cost-effective, portable, objective measurement solution for a small, multi-species processing plant. If successful, the project would seek AUS-MEAT accreditation for these devices for use in both beef and lamb at DBC.

## Project context

In Australia, the trading of beef and sheep carcasses is primarily based on carcass weight and a single-site measurement of subcutaneous fat depth. Consumers prefer lean meat with minimal subcutaneous fat, as overfat carcasses reduce saleable lean meat yield and increase labour costs due to the need for trimming. Therefore, accurately determining carcass fatness is essential for enhancing the productivity and profitability of the red meat supply chain.

Currently, fat scoring in lamb is done at the GR site using subjective palpation or invasive techniques like the GR Knife and the AUS-MEAT sheep probe. However, these methods can be prone to operator error and are not always practical at high abattoir chain speeds. In beef, fat depth is measured at the P8 site using instruments like the cut and measure knife or the Hennessy Grading Probe (HGP), though commercial uptake of the HGP has been limited.

Small processors face challenges in implementing precise, accurate, and cost-effective measurement technologies that can be used across species. While a HGP for lamb exists, it is not currently accredited for GR tissue depth and has shown variability in accuracy. There is a push in the Australian and New Zealand red meat industries to develop new objective livestock measurement technologies that are non-invasive, robust, and capable of operating under commercial conditions.

Murdoch University has developed an ultra-wide band microwave system (MiS) for objectively measuring subcutaneous fat in beef and lamb. The MiS uses non-ionizing electromagnetic waves to distinguish tissue layers without causing tissue destruction. It is portable, handheld, low-cost, and captures measurements instantaneously, demonstrating good precision and accuracy in predicting subcutaneous fat depth.

Dardanup Butchering Company (DBC) has traditional methods for measuring fatness in beef and lamb, with cut and measure rib and P8 fat measurements in beef and manual palpation for GR tissue depth in lamb, which can be imprecise. This led DBC to explore objective measurement technologies for these fat depth measures. In collaboration with Murdoch University and the ALMTech team, DBC investigated the Microwave Scanner (MiS) and the Hennessy Grading Probe (HGP) as potential solutions. DBC aimed to find an objective measurement technology applicable to both beef and sheep.

From a broader industry perspective, this project offers a multi-species solution for small operators, distinct from other projects focused on single species in large-scale enterprises. It aligns with ALMTech's efforts to facilitate commercial testing of a handheld microwave scanner compared to existing industry measures or accredited measures like the Hennessy probe. These measurements aim to enhance confidence and trust in the feedback provided to farmers within the supply chain.

## Project outcome

The first data collection revealed that the HGP could not accurately predict fat depth, leading DBC to not continue its consideration for commercial installation and trials. On the other hand, the MiS showed positive results in accurately reading fat depths in both beef P8 and sheep GR. However, a complete dataset for beef P8 fat depth measurements could not be collected during the second trials due to inconsistencies and inaccuracies caused by hot carcass washing. As a result, DBC decided to proceed with accreditation of the MiS solely for lamb GR fat depth measurement.

Accreditation trials for the MiS measurement of GR fat depth were successfully completed, meeting all AUS-MEAT Accreditation Standards. The device has been fully integrated into the DBC plant, used daily with MiS measurements directly linked to DBC's production system. Although the MiS GR fat depth measurement is not yet printed on each carcass ticket, this feature is in progress. DBC may continue to pursue accreditation for beef pending further trial results.

### Benefit for industry

Although there has not yet been a reduction in labour and the MiS device is still slower than palpation for taking measurements, this may improve over time with full integration into the plant's processing software and optimization of the MiS installation height for rapid measurement.

The GR fat depth measurement accuracy has significantly increased, as demonstrated by the data analysis in this report. While it is currently difficult to quantify any monetary gains resulting from the improved measurement accuracy, this will be assessed over time.

The device can provide more accurate feedback to producers, enhancing compliance and quality

In conclusion, the MiS device stands out as an excellent option for processors looking to enhance fat depth measurement accuracy in sheep, offering ease of implementation, cost-effectiveness, and robust performance.

### Useful Resources

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