

# A simple and portable electric device to measure cooked meat tenderness

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Figure 1. The electric tenderometer

## Introduction

The MIRINZ Tenderometer (MT) and Warner-Bratzler (WB) are widely used to measure cooked meat tenderness.

Both units have limitations; the WB is expensive and laboratory-bound, while the pneumatic drive of the MT requires a compressed air source and regular maintenance.

An updated version of the MT has been developed to overcome these problems (figure 1), featuring:

- An electric linear motor
- Blunt wedge-shaped tooth
- Multiple sample cartridge
- Data transmission to computer via cable or wireless
- Approx 4kg weight
- Battery or mains operation



Figure 2. Prepared tenderometer samples and modified knife for accurate cutting

## Objective

To develop and evaluate an electric tenderometer with improved features for low cost, portability and ease-of-use.

## Methods

Chilled beef and lamb samples were cooked in a 100°C waterbath to an internal endpoint of 75°C then immediately cooled on ice. Once samples were ≤4°C, ten samples of 10 mm x 10 mm cross-section portion with a length, parallel to the fibre axis, of at least 25mm were prepared and sheared at right angles to the fibre direction (see figure 2).

Tenderness measurements were made after a variety of treatments and included such processing variables as:

- electrical stimulation
- pre-rigor temperatures
- different ageing times

A total of 1528 samples were evaluated.

## Results

The relationship between the MT and ET shows a high correlation ( $r^2=0.83$ , figure 3).

The regression equation is:

$$ET_{(kgF)} = 0.391 MT_{(kgF)} + 2.08$$

This allows users to convert shearforce values from the MT to ET.

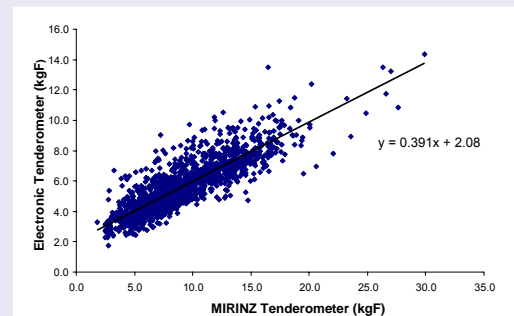


Figure 3. Relationship between MT and ET measured shearforce (kgF) based upon LD samples from both beef and lamb.

## Conclusion

The ET is a reliable shear device tool that can be used as an alternative to the WB and MT to provide objective meat tenderness assessments.

The ET is a portable and easy to use device that can be used in a research laboratory or for commercial QA procedures.

Given the high correlation between the ET and MT, and by inference, the WB, the ET may be used to predict consumer acceptability overcoming the problems of expensive and time consuming consumer studies.

### Acknowledgements

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