PRODUCT BENEFITS:

- Effective stimulation with minimal variability between carcasses
- Can be programmed to provide different levels of stimulation using different frequencies
- Operator safe – Class B under Australian and New Zealand safety Standards
- Logs each stimulation for round-the-clock monitoring
- Remote access and support available

SUITABLE FOR:

- Sheep
- Beef
- Deer
- Goats
- Pigs

Carne Technologies

WHO ARE WE?

Carne Technologies is committed to providing systems and expertise to improve product quality and processing efficiencies in the primary, secondary and retail meat sectors.

We develop, manufacture and supply state-of-the art technologies for use in carcass processing, and real-time quality measurement systems. The technologies are integrated with in-depth consultancy to design, tailor or optimise processes and procedures in the abattoir, boning room or retail meat preparation facility. Our highly experienced technical team provide remote support for all our equipment and can problem solve processing and quality problems.

The pioneering technologies we have developed in New Zealand are being used by meat processors around the globe.

Carne Technologies

SureStim

CARNE TECHNOLOGIES

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INTRODUCTION

Electrical stimulation (ES) post-slaughter is the industry-recommended method to accelerate the tenderisation of meat.

Electrical stimulation reduces the time meat takes to mature by as much as 10 hours, meaning a faster turnaround time from slaughter to retail. It is a critical component in the processing chain to ensure a high quality end product.

Effective electrical stimulation impacts on a range of quality attributes, including tenderness, meat colour, retail colour stability and drip loss during storage.

PRINCIPLES OF ELECTRICAL STIMULATION

After death, muscles acidify through the accumulation of lactic acid. Meat pH starts around neutral pH 7 at slaughter and falls to around pH 5.5 when lactic acid production stops and rigor mortis sets in.

This process of acidification can take 8-12 hours in beef and lamb carcasses, but this can be reduced to as little as 2 hours if muscles are made to use energy faster by producing muscle contractions in response to ES (Figure 1).

ES by itself does not directly tenderise meat. Instead, by making the meat pH fall faster, it changes the relationship of pH and temperature within the carcass.

All the effects of electrical stimulation, good and bad, arise from manipulating the relationship between pH and temperature.

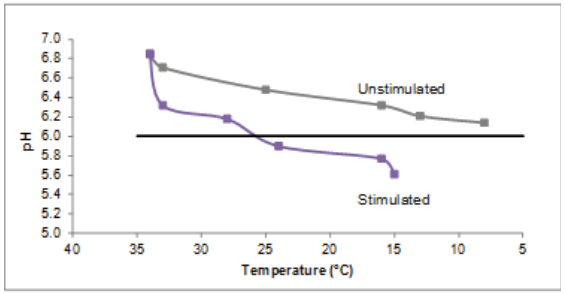

Figure 1: pH/temp decline with or without electrical stimulation

When the pH fall is slow - usually because ES is not used - the acid conditions in muscles develop only after the carcass has spent many hours in the chiller and the carcass temperature is low.

In contrast, when the pH fall is very fast, rigor mortis can develop within 1-2 hours, before the carcass has had a chance to cool and the carcass temperature is high.

Faster tenderisation is the result of producing rigor mortis while the carcass is still warm. The key points are:

- Tenderisation - the breakdown of meat by enzymes - starts at or near the onset of rigor mortis.
- The rate of tenderisation is faster at higher temperatures.
- Using ES to get meat into rigor mortis earlier means tenderisation starts when meat temperatures are higher; higher temperatures produce faster tenderisation.
- As the carcass chills, the tenderisation slows, but the stimulated carcasses will have a 'head start' compared with unstimulated carcasses.
- Eventually, after enough maturation or ageing time, the tenderness of unstimulated carcasses will catch up with stimulated carcasses.

Stimulation does not affect the final tenderness of meat, only the time needed to achieve the final tenderness.

Better tenderness following electrical stimulation is often attributed to avoiding cold shortening. But cold shortening rarely occurs in modern processing systems.

Using the right amount of electrical stimulation to get the optimum pH fall for the chilling rate accelerates the tenderization. Therefore the meat needs less time to reach an acceptable tenderness standard prior to retail. This is the commercial advantage of ES (Figure 2).

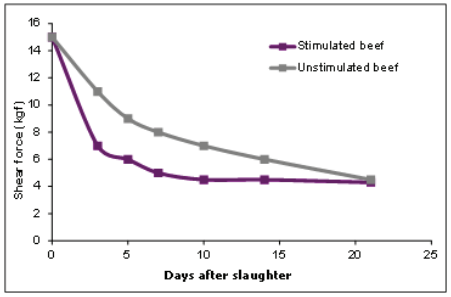

Figure 2: Tenderisation rate, with and without electrical stimulation

SURESTIM

Early stimulation systems used either 100V (low voltage stimulation) or more than 800V (high voltage stimulation).

SureStim normally operates at 300V (medium voltage stimulation) but a range of outputs between 100 and 300V are possible.

Effective pH control depends on more than just voltage: pulse width and pulse frequency are also important variables which can be used to optimise stimulation.

SureStim allows both pulse width and pulse frequency to be programmed to meet individual plant requirements. To ensure ES is effective, it is critical that the target pH fall is appropriate for the subsequent carcass or primal chilling. So during commissioning, we also monitor chilling and adjust the stimulation parameters to ensure that the carcass pH/temperature condition is optimized.

SureStim can be applied at any stage during carcass processing up to 40 minutes after slaughter, but stimulation of the dressed carcass just before chilling is the preferred option. Stimulation is generally applied via a rubbing bar electrode (continuous chain) or pneumatic arm electrode (stop/start chain).

SureStim is normally configured to a 'touch safe' specification – not dangerous, but does not allow working on electrified carcasses.