

A COMPARISON OF THE EFFECTIVENESS OF EARTHING METHOD IN A LOW VOLTAGE ELECTRICAL STIMULATION UNIT FOR BEEF CARCASSES

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Low voltage electrical stimulation (LV-ES) of beef carcasses is recommended to prevent the occurrence of cold-toughening of muscles, thus improving the production of tender meat (Powell et al. 1985). In a comparison of LV-ES systems, CSIRO have previously recommended that an anal probe be used as an earth for effective stimulation to occur. However, incorrect insertion of the anal probe has potential to pierce the rectal wall of the animal, which may result in increased microbial contamination. In 1 Victorian abattoir the incidence of rectal piercing is reported to be as high as 80%. This study aimed to investigate the effectiveness of alternative methods of earthing during low voltage electrical stimulation.

Three methods of earthing were used to compare a Koch-Britton Low Voltage Electric Stimulator to an unstimulated control group using 30 carcasses per treatment (total = 120). Stimulation occurred within 5 minutes of slaughter with carcasses subjected to a peak voltage of 45 volts for 40 seconds at a pulse rate of three seconds on/one second off. The pH was measured in duplicate in the muscle *longissimus dorsi*, at 3 hours post-slaughter using a Sentron pH meter. Carcasses were of mixed sex and breeds and ranged from 140-250 kg hot carcase weight. The mean pH for each treatment group is shown below in table 1.

Table 1. The mean pH \pm SE for each treatment group

Treatment Group	Mean pH \pm SE
Control	6.70 \pm 0.05 ^{aA}
Nose stimulation/anal probe earth	6.06 \pm 0.05 ^b
Nose stimulation/shackle bar earth	6.14 \pm 0.05 ^b
Nose stimulation/tongue earth	6.24 \pm 0.04 ^c

^A Means with similar superscripts are not significantly different (P > 0.05).

These results indicate that the shackle bar earthing system is as effective in reducing the meat pH immediately post-slaughter as the anal probe earthing system. Adoption of the shackle bar earthing system would eliminate the risk of increased microbial contamination from the anal probe piercing the rectum. A fixed rubbing bar earth would be recommended with this system to overcome any resistance in the lower leg. The tongue earthing system is not as effective in reducing pH post-slaughter and is therefore not recommended as a suitable substitute. Abattoirs which use the anal probe earthing system need to ensure careful placement of the anal probe to reduce the occurrence of rectum piercing and microbial contamination of the carcase.

POWELL, V.H., HARRIS, P.V. and SHORTHORSE, W.R. (1986). *Food Tech. in Aust.* 38: 230-3.