Increased blood collection from lamb carcases

July 2003

Results for today; Ideas for tomorrow

Thoracic stick

Following electrical stunning of sheep, the major blood vessels of the neck region are severed by a transverse incision (a 'Halal' type cut) and blood released. The major volume of blood is collected in a defined 'bleeding' area and subsequently processed for sale as blood meal. One kilogram of blood will yield approximately 190 grams of blood meal which presently sells for $600 to $800 per tonne. For a plant processing 5000 sheep per day, the collection of an extra 100 grams of blood per head would be worth about $70 per day.

Rodder with blade used for the thoracic stick

Small volumes of blood continue to be released from many carcases as they move along the slaughter line. This blood loss creates an effluent problem as the blood is hosed away as part of the overall slaughter floor cleaning program. This increases the BOD of the effluent (raw blood has a BOD of approximately 200,000 mg/L), so it is desirable that as much blood as possible be collected in the bleeding area.

When beef carcases are processed to meet the Halal religious requirements, the initial bleeding incision is similar to that used with sheep i.e. a transverse incision of the neck which cuts the major blood vessels and also the trachea and oesophagus. Subsequently there is a lengthwise incision which severs the major blood vessels in the vicinity of the heart (a 'thoracic stick'). This thoracic stick is rarely used in sheep processing plants in Australia. It could be expected that this extra stick could lead to increased blood removal from the carcase.

Many New Zealand plants do a thoracic stick when the body is suspended by all 4 legs and in fact there is a combined elastrator rodding/thoracic stick knife available for this purpose. One of these devices was purchased for testing in a project funded by Meat and Livestock Australia.

A group of lambs was used in a trial of this knife on a small slaughter line. The lambs were individually loaded into a V restrainer/conveyor and received 4 seconds of electrical stun using a twin probe 'head only' handpiece. The stunned lambs were then ejected from the conveyor onto a small bleeding area where a Halal-type cut was done. This cut was made across the neck and severed the major blood vessels on both sides of the neck, together with the oesophagus and trachea. This was immediately followed by tying off the oesophagus with string and removal of the head. A shackle was applied to the right hind leg and the carcase hoisted.

In this trial, which simulated horizontal bleeding employed in some New Zealand operations, the forelegs were placed in a spreader suspended from a rail at a height that had the carcase sloping forward at an angle of 45°. The carcases were held in this position for 2 minutes after the original Halal-type cut had been made by which time there was generally very little blood dripping from the neck.

After the initial 2 minutes bleeding, the rodder/knife was inserted into the exposed end of the neck and pushed forwards and upwards with the blade in the upper position. At the same time a large deep plastic tray containing an opened carton liner was placed under the carcase to collect the released blood. This tray remained in position for 2 minutes after which it was removed and the carton liner and its blood

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contents weighed. With the control (no thoracic stick) group of carcases blood was collected for the same 2 minute period.

The results (below) show that there was considerable variation in the quantity of blood collected in the interval 2 – 4 minutes after the initial stick within both groups, however the difference between mean values was quite significant. On average, about 75 grams of extra blood was obtained through the use of the thoracic stick knife.

Weight of blood (grams) released per body in the period 2 to 4 minutes after the initial throat cut

	Range	Average
Halal-type incision only	16 – 98	48
Halal-type + thoracic	11 – 239	125
Increase		77

It was found that in practice the knife could be used either before or after head removal. Care needs to be taken to avoid contact between the knife and the fleece to avoid contamination. This may require a Y cut to be made to the forelegs before the thoracic stick. An examination of the hearts revealed that they were not damaged in any way. There is some evidence that the extra blood release may contribute to an improvement in carcase appearance due to an increased whiteness of the superficial fat.

It is not essential to use this type of rodder/knife (shown in the photograph). The same effect could presumably be obtained if the thoracic stick was performed with a standard curved sheep skinning knife.

Some employees modify their knives by welding a pig tail rodder to its tip. However, the knife pictured has the advantage that it can be used for the following three tasks:

- Rodding to separate the oesophagus;
- Sealing of the oesophagus with a rubber ring, and
- Thoracic stick.

The knife may be obtained from:

Heiniger Australia
Airport West VIC. 3042
Phone (03) 9338 9400.

Electric current application

The application of an electric current to the carcase after the thoracic stick was found to lead to a further small (average approximately 15 grams) increase in released blood. It is unlikely that this amount would justify the installation of an electrode system for current application. However, if electrical current was being applied for immobilisation purposes, then the extra blood release would be a bonus.

Additionally, these currents may exert a conventional electrical stimulation effect with an increase in meat tenderness and an improvement in meat appearance - a lighter, brighter muscle colour. Results from an Australian Sheep Industry Cooperative Research Centre project indicated that this was the case. Thus it is possible that the application of an electric current after the thoracic stick may have 3 separate effects:

- Immobilisation;
- Improvement in meat quality, and
- Increased blood collection.

The combined thoracic stick and electric current application released an additional 90 grams of blood per sheep when compared with the Halal-type stick.

Further information

For further information on this topic contact:

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