



Sustainable Livestock Production LINK Programme

Project LK0684F: Avoiding the welfare/quality compromise: head only stunning electrical stunning of poultry

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Introduction

Both the European Food Safety Agency (EFSA) and the Farm Animal Welfare Council (FAWC) have concluded that the electrical currents used to stun broilers on the traditional shackle line may not result in immediate and long lasting unconsciousness for some of the birds. This would compromise bird welfare. However, commercial use of larger stun currents is difficult because they cause high levels of carcass damage. Research indicates that the stunning currents required by EC directive 1099/2009 will result in a three-fold increase in damage prevalence resulting in both significant industry costs and also in the need for more broilers to be grown to make up the shortfall in high quality carcasses.

Approach

The stunning method chosen for investigation was head-only stunning. Because of the problems of accurately positioning stunning electrodes on birds' heads this option has not been feasible for commercial processing lines. However developments in the aquaculture industry have identified an alternative approach using an electric field in a water bath. This electric field causes current to flow through the water and also to flow in the broilers' heads when they are immersed anywhere in the water bath. Accurate location of the head is not required.

When birds are stunned their wings flap violently due to the loss of brain control. This must be avoided since it causes broken and dislocated wing bones. It is prevented by passing a small, secondary current through the body of the bird from the shackle to the waterbath.

The use of an immobilising current without simultaneous stunning would be inhumane and illegal. However by ensuring that this current cannot flow without the birds' heads being immersed in the water bath, simultaneous stunning and immobilisation is assured. This situation is not dissimilar to traditional water bath stunning. In both systems an electric current is used to stun the birds and to immobilize them. However in the head-only approach each electric current is specified to achieve its specific function, whereas in the traditional approach the same current is used for both, resulting in either poor stunning or high levels of carcass damage.

Experimental objectives

The overall aim of this project was to investigate whether the linkage between welfare and carcass quality could be avoided.

Specific objectives were, to:-

1. determine the magnitude of the electric field in the water bath required to cause immediate and long lasting unconsciousness.
2. investigate the use of a low amplitude, high frequency current passing through the birds bodies to suppress this involuntary wing flapping.
3. investigate the consequences for carcass quality, in a controlled trial using 600 treatment birds and 600 control birds. The trial was done in a commercial poultry processing plant and the control birds were stunned using a 600Hz pDC current of 63 mA/bird.

Key results

Results of these trials showed that it is possible to apply a head only electric stun to poultry in a manner suitable for use on a commercial high speed shackle line. Exposure for 1s to a 50Hz AC electric field of 10V/cm resulted in immediate but short duration unconsciousness for all birds tested, and exposure to a 20V/cm resulted in immediate and long lasting unconsciousness. Involuntary wing flapping was prevented by passing a 2000Hz AC electric current of 25-30 mA through the birds' bodies during stunning. The carcass quality of birds stunned for 8 s using the 20V/cm electric field as described differs little from that of birds conventionally stunned using high frequency pDC current: damage. The prevalence of broken bones may be slightly lower.

Expected benefits

The results of the project, when implemented will improve bird welfare at slaughter by more closely aligning the welfare interests of the birds and the commercial interests of the processors. This was a feasibility project so the results are not ready for use by the industry: further development and optimisation are required.

This approach to stunning can be integrated with the breast support conveyor development and with the use of compliant shackles, to ameliorate all the significant welfare problems of the traditional shackle line as identified by FAWC and EFSA. If this integration and development is successful, it will be the only currently known electric stunning system for broilers which meets the high welfare aspirations of EFSA and FAWC and the only currently known poultry slaughter system suitable for small and medium sized processing lines.

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