Improving the poultry shackle line

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Abstract

The most significant welfare problems associated with the current design of the shackle lines and water-bath stunners are the pain caused by compression of the birds’ legs in the shackles, the stress caused by being inverted and suspended by the legs, poor or inadequate stunning caused by the commercial need to minimise carcass damage, and poor water-bath entry. Research is described in which some practical solutions to these problems were investigated. The aim is to identify solutions that individually, or jointly, could be retro-fitted to existing plants, or incorporated into the design of new, small processing plants to improve poultry welfare. The development and commercial availability of such systems would enable small, local and niche market poultry processing lines to continue operating following the implementation of EC Council Regulation No 1099/2009.

Keywords: animal welfare, broilers, poultry, shackle line, slaughter, water-bath

Introduction

The most widespread technique for slaughtering poultry in Europe is electric water-bath stunning followed by exsanguination. This approach, however, is associated with welfare problems. The most significant of these are: leg compression in the shackles; being inverted and suspended from the shackles; inadequate electrical stunning due to the need to protect carcass quality; and pre-stun shocks due to poor water-bath entry (EFSA 2004; FAWC 2009).

One solution to these problems seems to be the use of controlled atmosphere stunning, however this is suitable only for high throughput plants and requires a major equipment refit. The high capital and operating costs of these systems make them currently unsuitable for medium and small processing lines. Equipment manufacturers are also developing new electrical stunning solutions, however, the mechanical complexity of these systems is likely to limit their uptake. If small-scale, local, and niche market processing lines are to remain viable then relatively simple, cheap and robust systems offering an acceptable level of welfare need to become available. Rapid uptake of such systems would be enhanced if they could be retro-fitted to existing equipment rather than requiring a complete refit.

This paper describes three relatively simple techniques that have been investigated to improve poultry welfare at slaughter. Taken together, they are expected to address the main welfare problems associated with the traditional water-bath and shackle line. In many cases they could be retro-fitted to existing plants at relatively low cost, thus enabling small plants to achieve a higher standard of welfare and at an earlier stage than would be otherwise possible. The techniques have been tested and developed separately and to various stages. Each approach is described, its apparent benefits and problems described and the future development needs identified.

Compliant shackles

Compliant shackles are a simple and low cost concept aimed at avoiding the compression of the birds’ legs while still maintaining good electrical contact. Sparrey (1995) reports that forces of five or ten times the birds’ weight are frequently used to pull the birds into the tapering gap of the shackles resulting in severe compression of the bird legs by forces of around 180 Newtons (N). Gentle and Tilston (2000), have shown that the legs of poultry are well supplied with nociceptors and so conclude this leg compression is likely to be painful.

A trial set of compliant shackles was developed and tested in a small commercial poultry processing line dealing with free-range broiler chickens. Examination of a sample of legs from birds slaughtered in the plant showed that the mean leg width at the shackling point was 12.7 mm with a standard deviation of 0.55 mm. The shackles used in the plant had two available pairs of slots, one 11.3-mm wide designed for broilers and one 13.3-mm wide for turkeys. Assuming that the legs’ sizes were normally distributed, this suggested that...