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Licensing poultry CO₂ gas-stunning systems with regard to animal welfare: investigations under practical conditions

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Abstract

Carbon dioxide stunning of broilers is not permitted in Germany. However, the competent authority can license a system for testing, during which scientific evaluation with regard to animal welfare is required. Between 2004 and 2011 several aspects of three systems have been evaluated in Germany and Italy under practical conditions including: (i) supply to the stunning system; (ii) induction conditions; (iii) stunning effectiveness; and (iv) process control. The systems were: (i) LINCO progressive gas-stunning system in which broilers in their transport crates are lowered stepwise into a pit filled with CO₂ and exposed to slowly increasing concentrations of CO₂ in air up to between 50 and 65% with total dwell times between 275 and 440 s depending on birds' weight; (ii) Stork PMT two-phase gas-stunning system (40% CO₂/30% O₂/30% N₂ for 1 min/ 80% CO₂ for 2 min) in which broilers are tipped onto a belt, on which they pass through the gas atmospheres; and (iii) Anglia Autoflow two-phase CO₂-stunning system, in which the birds are exposed to the atmosphere in their crates. Results on the third system are pending as the investigation is still ongoing. In systems (i) and (ii) analysis of behaviour showed that birds were only exposed to high CO₂ concentration (> 40%) after becoming unconscious. Stunning effectiveness was very high but, nevertheless, occasionally birds (0.027% LINCO system and 0.003% Stork PMT system) were able to regain consciousness. Examples of evaluation of behaviour during induction are presented in this paper and animal welfare aspects are compared. Controlled-atmosphere stunning systems for broilers using less than 40% CO₂ until animals are unconscious, show obvious advantages compared to electrical water-bath stunning, for example, the avoidance of shackling and achieving high stunning effectiveness.

Keywords: animal welfare, broiler, CO₂ stunning, CAS, key parameters, monitoring points