A New Humane Slaughter Methods for Broilers - Low Atmospheric Pressure (LAPS)

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This research was aimed at developing an alternative humane and safe method of slaughtering broilers. The research included the design of the system so that it was humane, efficient, adapted to existing plant equipment, economic and addressed worker safety issues as well as producing a wholesome processed product. A series of experiments at the laboratory level and in a commercial broiler processing facility has demonstrated that the system meets all of the requirements. To determine insensibility via EEG and EKG as well as loss of posture (LOP) a series of single bird studies were performed. Electrodes were attached to the skin of broilers such that a Type II electrocardiogram (ECG) based on Einthoven's triangle was recorded. Electrodes were also attached to skin overlying the skull at the base of the comb to record electrical activity of the brain as an electroencephalogram (EEG). The electrodes attached to each chicken were connected to a telemeter which sent radio waves to a receiver that was hard wired to the PC-data acquisition system. Thus, ECG and EKG were simultaneously displayed as the test was conducted. On average a 90% reduction in EEG signal occurred within 32 seconds after the pressure of 21.4 kPa was reached and within 35 seconds the chickens' heart exhibited complete fibrillation of both the atria and ventricles. Finally, at 37 seconds after attaining the desired pressure, LOP was recorded. The next series of experiments utilized a large prototype with a 256 bird capacity cage. These experiments were to determine broiler behaviours via video during throughout the cycle. Before reaching the desired pressure no stress behaviours were observed. After LOP the behaviours were comparable to gas stunning. In addition, there were no vocalizations during the cycle. During the industrial application, corticosterone levels were determined. Twenty birds a day for 3 days were bled immediately after death to determine corticosterone levels of LAPS slaughtered birds. The mean level was 755+/-190pg/mL compared to 1642+/-306 for electrically stunned broilers on the same line. Blood loss volume was less for the LAPS broilers than for electrically stunned ones; however, there were no problems in processing. The birds were insensible when hung on the processing line and there were no negative issues with automated processing procedures. Further, DOAs were readily identifiable by methods similar to those employed with gas stunning as verified by United States Department of Agriculture Veterinary Inspectors in the processing plant.

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