

Examining techniques for humane culling: chickens' aversion to various gases

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Disease control measures can require poultry to be killed on-farm to minimise risks of disease transmission beyond the infected premises. One technique used during recent avian influenza outbreaks was to kill birds in-situ by injecting lethal concentrations of gas into the poultry house. This experiment was designed to identify how aversive poultry found candidate gases and therefore which were most preferred on welfare grounds. Thirty-six chickens (26-32 days old) were tested for aversion to various levels of carbon dioxide (CO₂) in air (low=50%, medium=55%, high=60%), argon in CO₂ and nitrogen in CO₂ (both low=70%, medium=80%, high=90%). Individual birds were allowed to choose to feed and drink for one hour from three feeding/drinking stations (FDS), which they were trained to use, after overnight food deprivation. Each of the FDS was infiltrated with a different gas (with all low, medium and high levels of gases tested together, to limit permutations of gas x level x FDS position). Birds were video recorded during the test, and time spent with 'head-in' each FDS was noted. Least aversive combinations (though not significant) tended to be 90% nitrogen, 80% argon, and 50% CO₂ based on time spent with 'head-in' (126 ± 41 , 98 ± 35 , and 58 ± 21 sec, $\pm$ SE, respectively) ($P = 0.084$ by ANOVA). These three treatments were tested together on a further 12 chickens. Birds found 80% argon least aversive, followed by 90% nitrogen and 50% CO₂, based on time spent with head in (201 ± 65 , 179 ± 42 , 46 ± 11 sec respectively) ($P < 0.001$ by ANOVA). All gases were aversive to some degree, which is to be expected since, at the levels used here, they impair biological functions, however there is scope for using gases, preferably inert gas mixtures (such as argon + CO₂), for humane culling.

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