Use of high Concentrations of Carbon Dioxide for Stunning Rabbits Reared for Meat Production

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Abstract

An investigation was performed to determine whether high concentrations of carbon dioxide (CO_2) at 70-98% in atmospheric air are a suitable alternative for stunning rabbits compared to conventional approaches such as electronarcosis. Aversion to the gas and efficacy in causing prolonged unconsciousness and death were studied in a total of 480 rabbits by means of behavioural parameters, physiological indicators (presence of rhythmic breathing and corneal reflex) and electroencephalography (EEG, brain function). The use of any of the 4 studied concentrations of the gas caused more nasal discomfort and vocalisations than the use of atmospheric air ($P<0.001$). EEG activity confirmed that loss of posture is a good indicator of the onset of unconsciousness in rabbits exposed to CO_2, occurring earlier ($P<0.05$) at 90 and 98% than at 70 and 80%. Rabbits showed signs of aversion for 15 s before the onset of unconsciousness, which occurred around 30 s after the beginning of the exposure to the gas, similar to species such as swine in which high concentrations of CO_2 are also used for stunning. CO_2 at 80 to 98% is suggested as a reasonable concentration range to induce a long state of unconsciousness and death in rabbits, while 70% CO_2 is not recommended because it requires too long duration of exposure (more than 360 s) to ensure effectiveness. Despite the advantages in terms of pre-stun handling and irreversibility, CO_2 is not free of animal welfare concerns. In consequence, a debate is necessary to ascertain if CO_2 can be considered a suitable alternative to stun rabbits, considering the advantages and drawbacks cited, quantified in the present study as 15 s of aversion (nasal discomfort and vocalisations) before losing posture.