The Old School, Brewhouse Hill, Wheathampstead,
Hertfordshire AL4 8AN, UK
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The effect of age and method of gas delivery on carbon dioxide euthanasia of pigs

MA Sutherland*†, PJ Bryer‡§ and BL Backus§

† AgResearch Ltd, Ruakura Research Centre, Hamilton 3214, New Zealand
‡ Midcoast STEAM Microschool, Rockland, ME 04841, USA
§ Department of Animal and Food Sciences, Texas Tech University, Lubbock, TX 79409, USA
* Contact for correspondence and requests for reprints: mhairi.sutherland@agresearch.co.nz

Abstract

*The objectives of this research were to evaluate the effect of age and delivering method during carbon dioxide (CO_2) euthanasia on the welfare of pigs (*Sus scrofa*). In Experiment 1, pigs aged 1, 2, 3, 4, 5 and 6 weeks (GRAD; n = 5 pigs per age) were placed in a chamber gradually filled with CO_2 released at a flow rate of 20% chamber volume per min. In Experiment 2, three week old pigs were placed in a chamber pre-filled with 100% CO_2 (PRE; n = 5). In both experiments, plasma cortisol concentrations were measured before and after exposure to CO_2. Behaviours indicative of stress and insensibility were recorded continuously during gas exposure; panting, open-mouth breathing, righting response, escape attempts, loss of posture, muscular excitation and respiratory arrest. Cortisol concentrations were elevated in pigs after CO_2 euthanasia, regardless of age or gas delivery method. The behavioural response to CO_2 was not affected by pig age. Latency to display panting, righting response, escape attempts, loss of posture, muscular excitation and respiratory arrest were shorter for PRE than GRAD pigs, but, duration of escape attempts and the cortisol response to euthanasia were similar between PRE and GRAD pigs. However, pigs placed in a chamber pre-filled with CO_2 spent a greater proportion of time prior to loss of posture displaying escape attempts. Regardless of age or induction method, exposure to CO_2 causes behavioural changes indicative of stress prior to loss of consciousness, therefore there is a need to continue to evaluate alternative methods of euthanasia.*

Keywords: *age, animal welfare, behaviour, carbon dioxide, euthanasia, pigs*