RESEARCH ABSTRACT

ANIMAL WELFARE

Title: Determine and Validate the Optimal Requirements and Duration of Time to Achieve Unconsciousness and Euthanasia in Pigs from Birth to 15 Pounds with a Novel Electrocution Device - **NPB #**: 10-077

Investigator: Sarah Probst Miller, DVM, Swine Veterinarian

Institution: Carthage Veterinary Service, Ltd.

Date Submitted: September 3, 2010

Scientific Abstract

Electrocution induces a loss of consciousness in a rapid, timely manner, and requires little training[3].Electrocution, if effectively administered will render the brain insensible and initiate cardiac fibrillation and death[1]. Traditionally, electrocution has not been used on young pigs under 10 pounds because the resistance around the skin can be less than that across the body causing the electrical current to flow on the skin's surface rather than through the body. Preliminary trials of the electrode design of S & R Resources, LLC appear to overcome the previous disadvantage. In addition, this novel device is equipped with user safety features that limit the chance of electrical exposure to the user. The focus of this research was to validate that this novel electrocution device provides a safe, humane alternative to current euthanasia methods available for young pigs from birth to 15 pounds.

The first consideration with euthanasia via electrocution is validating that the method causes a rapid loss of consciousness (Phase I). Initially, a minimal time to loss of consciousness (Stage 3 Plane 2)[5] was determined for 2 different times of electrocution in 3 different age and weight groups. Loss of consciousness for this measurement was defined as movement from Stage 3 Plane 1 (light anesthesia) to Stage 3 Plane 2 (surgical anesthesia) [5]. Thirty commercial pigs ranging from birth to 15 pounds were identified as being ill, unthrifty, or fallouts. Parameters measured included tong placement relative to weight, voltage, and amperage. Cardiac and brain electrical activity were monitored using an electrocardiogram and an electroencephalogram, respectively. Pigs were evaluated for dilation of pupils, absence of corneal reflexes, and absence of nociceptive reflexes to determine Stage 3 Plane 2 unconsciousness. The electrocution device was successful in inducing a Stage 3 Plane 2 loss of consciousness in all pigs at 5 seconds and 3 second duration for the groups >3 days of age, <5 pounds and >3 days of age, > 5 pounds. However, the <3 days, < 5 pound cohort was eliminated from Phase II of the trial due to a poor stunning success rate (70% success) at the 5 second electrocution interval. Any pigs that did not lose consciousness by electrocution were immediately and humanely euthanized via Pentobarbitol injection.

In Phase II of the trial, 66 commercial sick pigs (>3 days of age, <5 pounds; and >3 days of age, > 5 pounds) were sedated and euthanized via electrocution at time intervals of 5, 10, and 15 seconds. The same monitoring equipment and data collection parameters were used as in Phase I. Successful death events were recorded in 98.5% of pigs.

This study indicates that electrocution using this novel device is a humane form of euthanasia when carried out in piglets greater than 3 days of age. Electrocution reliably induced unconsciousness at less than or equal to 3 seconds after the application of current. Additionally, electrocution repeatedly induced death in piglets greater than 3 days of age at time periods equal to or greater than 5 seconds of current application. Caregiver well being during implementation and emotional response to the perception of the quality of death is an important consideration of the euthanasia method and design of this novel device. To reduce the incidence of involuntary gasps and kicks post electrocution, it would be recommended to electrocute pigs greater than 3 days of age for duration of 10 seconds.