

SWINE HEALTH

Title: Evaluation of an accelerated hydrogen peroxide disinfectant to inactivate porcine epidemic diarrhea virus in swine feces on metal surfaces under freezing conditions – **NPB #14-272**

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SCIENTIFIC ABSTRACT

In May of 2013 porcine epidemic diarrhea virus (PEDV) was detected in swine for the first time in the United States and spread quickly across much of the country, partly due to the movement of contaminated livestock trailers. The objective of this study was to evaluate two concentrations of an accelerated hydrogen peroxide (AHP) disinfectant in a 10% propylene glycol (PG) solution to determine if the mixture was sufficient to inactivate PEDV in the presence of swine feces on metal surfaces at -10°C. Conditions were chosen to mimic those found in commercial livestock trailers in winter months after most of the fecal and organic matter has been removed by scraping and a traditional wash is unavailable. Eight treatment groups representing two AHP disinfectant concentrations (1:16 and 1:32) in a 10% PG solution, two contact times in a -10°C freezer (40 minutes and 60 minutes), and two concentrations of feces (5mL and 10mL) in addition to a negative control group and a positive control group were evaluated. PG was combined with the AHP disinfectant to prevent it from freezing at -10°C. PEDV positive (Positive control group and all treatment groups) or negative (negative control group) feces were applied to an aluminum coupon and subjected to one of the ten groups described above. Post-treatment, contents from the aluminum coupons were administered to 3-week old commercial pigs. These pigs served as a bioassay to determine the infectivity of virus following treatment. Infectivity was determined by detection of virus with reverse transcriptase polymerase chain reaction (RT-PCR) on fecal swabs collected from the inoculated pigs on days 3 and 7 post-inoculation. Each treatment was performed in 4 replicates (4 coupons and 4 pigs per treatment). Pigs in each treatment group were housed separately in raised tubs within the same room. Bioassay results were PEDV negative in 100% of the pigs in the negative control group as well as all AHP disinfectant treatment groups. Bioassays were PEDV positive in 100% of the pigs in the positive control group. Bioassay outcomes for all of the AHP disinfectant treatment groups were significantly different (p-value < 0.05) than the bioassay outcomes for the positive control group (Pos) via Fishers Exact Test. These results suggest that that it may be possible to inactivate PEDV in the presence of feces on metal surfaces under freezing conditions (-10°C) by applying a 1:16 or 1:32 concentration of an AHP disinfectant prepared in a 10% PG solution to a scraped commercial trailer for 40 minutes of contact time. All fecal loads (5 mL and 10 mL), AHP disinfectant dilutions (1:16 and 1:32), and contact times (40 minutes and 60 minutes) evaluated were sufficient to inactivate PEDV.

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