

PEDV Research Updates 2013

Porcine Epidemic Diarrhea virus (PEDV) has caused significant challenges to the swine industry. The virus had not been previously identified in the United States prior to April of 2013. To assist producers and their veterinarians in the management, control and potential elimination of the virus, the National Pork Board funded key research projects to better understand PEDV. In order to provide timely information to producers from those projects, the objectives and initial updates will be periodically reported.

NOTE: The updates from the proposal represent interim information only and are not intended to be a final report. The final and formal reports will be provided at the end of the terms of the projects and then posted online at pork.org. The update information is intended to inform stakeholders of progress but are not intended to be the final outcome. For further information, please contact Dr. Lisa Becton at lbecton@pork.org.

#13-248: Iowa State University

Evaluation of Stalosan F disinfectant to inactivate Porcine Epidemic Diarrhea Virus and Porcine Reproductive and Respiratory Virus when applied to commercial hog trailers

Objective. The objective of this study was to investigate the efficacy of using Stalosan F disinfectant to inactivate PEDv and PRRSV in swine feces on metal surfaces similar to what is found in livestock trailers after fecal and other organic matter has been removed by scraping and sweeping, but not washed.

Methods. A Stalosan F treatment group and positive and negative control groups were evaluated. Five ml of undiluted PEDV-positive feces plus 2mL of a PRRSV isolate (or negative feces and 2 mL of saline for the Negative Control group) was spread evenly on the bottom surface of a 6 inch by 6 inch aluminum tray with 1 inch sides, made to replicate a trailer floor. Aluminum plates were then distributed evenly across various locations of the floor and walls within a commercial hog trailer to simulate areas of fecal contamination in the trailer. Stalosan F disinfectant powder was blown throughout the trailer with an electric leaf blower at a rate of 1lb/60ft² and allowed to contact the plates in such a way as determined by the natural movement of the powder through the trailer. During the hour of contact time, the plates were removed from the trailer and placed inside at room temperature to avoid freezing of the feces. Following treatment as outlined in Table 1, the feces was diluted with saline, re-collected from the tray, and 4 mL was centrifuged to obtain 2 mL of supernatant. The supernatant was injected IM and the remaining fecal mixture (~6-8 mL) was passed via gastric tube into PEDv and PRRSV-naïve, 4-week old pigs. Each pig served as a bioassay for both PEDV and PRRSV, a single pig corresponded to a single plate. Pigs were monitored for clinical signs consistent with PED or PRRS and fecal swabs and blood were collected on days 3 and 7 post-challenge. Swabs and serum were tested via PEDV and PRRSV RT-PCR.

Each treatment group contained 8 replicates of the treatment with passage into separate pigs for the bioassay. Individual pig was the experimental unit. The treatment groups are described in Table 1.

Table 1. Summary of treatment groups.

Group	Description of Treatment	Treatment Simulates:
Negative Control	PEDV-negative feces and 2 mL of saline were used. Plates were sealed during Stalosan F treatment to prevent contact with disinfectant.	No exposure to PEDV
Positive Control	PEDV-positive feces and 2 mL of PRRSV isolate were used. Plates were sealed during Stalosan F treatment to prevent contact with disinfectant.	Exposure to a PEDV-contaminated hog trailer with no decontamination attempted.
Stalosan F Treatment	PEDV-positive feces and 2 mL of PRRSV isolate were used. Plates were left uncovered during Stalosan F treatment to allow contact with disinfectant for one hour.	Exposure to a PEDV-contaminated hog trailer that was manually scraped clean but not washed, with application of Stalosan F disinfectant.

Results. Preliminary results are summarized in Table 2. Please note that the results are preliminary and subject to possible changes based on retesting underway at the ISU VDL.

Table 2. Summary of pig bioassay PEDV results by treatment groups.

Group	Percentage of PEDV positives (out of 8)	Percentage of PRRSV positives (out of 8)
Negative Control	0% (0/8)	Testing is ongoing
Positive Control	100% (8/8)	Testing is ongoing
Stalosan F Treatment	100% (8/8)	Testing is ongoing

The PEDV bioassay results were analyzed via Fisher's Exact Test. Treatment with Stalosan F disinfectant powder was found to be no different than positive controls ($p=1.000$) and significantly different than negative controls ($p=0.0001554$).

Conclusions and Implications. These results suggest that the use of Stalosan F disinfectant powder is not an efficacious means of inactivating PEDv in unwashed livestock trailers.

PRRSV bioassay results are still undergoing testing and analysis. No conclusions can be drawn regarding Stalosan F anti-PRRSV activity in unwashed hog trailers at this point.

Producer / Stakeholder Take-home Points:

1. This information is not meant to suggest alternatives to thorough washing, disinfecting, and drying of hog trailers between loads of pigs – these are the gold standard for trailer biosecurity and should be accomplished whenever possible.
2. Producers should not expect to kill the PED virus with the use of Stalosan F disinfectant powder in a hog trailer that has not been properly washed. The effectiveness of Stalosan F disinfectant in trailers that have been properly washed is unknown.

Current Knowledge Gaps:

1. The use of Stalosan F disinfecting powder as part of a broader trailer biosecurity protocol that involves trailer washing needs to be evaluated.
2. The regular use of Stalosan F disinfectant powder in pig facilities to decrease environmental contamination with PEDV needs to be evaluated.