RESEARCH ABSTRACT

SWINE HEALTH

Title: Inactivation of African Swine Fever Virus on Stainless Steel and Concrete with Commercial Disinfectants and Organic Acids – **NPB #19-221**

Investigator: Lindsay Gabbert, MPS

Study Director: John Neilan, Ph.D.

Support scientists: Mariceny Zurita; Lauren Martignette, M.S.; Jose Barrera, DVM, Ph.D.

Institution: Department of Homeland Security Science and Technology Directorate, Office of National Labs, Targeted Advanced Development Group, Plum Island Animal Disease Center

Date Summary Submitted: February 14, 2022

Scientific Abstract:

An outbreak of ASFV in the U.S. would greatly affect the continuity of domestic pork production and restrict export of U.S. pork and pork-derived products. Strict biosecurity practices currently serve as the most effective measure for ASFV control. Identification of additional chemical disinfectants that effectively inactivate ASFV will provide actionable data for the development of robust cleaning and disinfection (C&D) procedures on non-porous and porous surfaces in the response and recovery phases of an ASFV outbreak. Presently, there are seven disinfectants registered by the U.S. EPA under The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Section 3 for use against ASFV (APHIS, 2021). Three additional chemicals are approved under FIFRA Section 18 for emergency use when no registered products are available. Importantly, many of these registered disinfectants are not routinely used by pork producers and may not be readily available in large quantities during an ASFV outbreak if disruptions in product supply chains occur. The purpose of this study was to determine whether products commonly in use at swine production facilities were capable of inactivating ASFV on porous and non-porous surfaces.

All tests were conducted according to protocols published in the *OECD Quantitative Method for Evaluating Virucidal Activity of Microbicides used on Hard Non-Porous Surfaces* (OECD, 2013). High-titer stocks of the Vero cell-adapted ASFV strain BA71V were combined with a standard soil load comprised of bovine mucin, yeast extract, and bovine serum albumin (BSA). Viral inocula were dried on either stainless steel or concrete coupons (n=7/test) and exposed to each disinfectant for10-minutes. Test chemicals were neutralized, and the sample eluates were titrated on Vero cells to determine the 50% tissue culture infectious dose ($TCID_{50}$) based on viral cytopathic effects (CPE) after 8 days. Results are reported as the log_{10} reduction in infectious ASFV when compared with untreated control samples (n=3/test). Each test was conducted on two days to increase statistical confidence.

Test results for stainless steel and (concrete) demonstrated reductions in viable ASFV (log_{10} $TCID_{50}$/mL) of 5.5 (0.4) for acetic acid (3%); 4.8 (4.1) for Virocid® (1:256); 4.7 (3.2) for Virkon™ S (1%); 4.4 (2.1) for citric acid (3%); 2.9 (2.1) for Synergize® (1:256); 2.7 (1.8) for Tek-Trol®; and 2.0 (1.3) for Intervention®.

The data obtained in this study provide valuable information for pork producers concerned with choosing effective liquid disinfectants for non-porous and porous surface cleaning and virus elimination on ASFV-infected premises. Additionally, two chemical disinfectants that were not previously registered under FIFRA demonstrated the ability to inactivate > 4 log_{10} of infectious ASFV on non-porous (Virocid ® and acetic acid) and porous (Virocid ®) surfaces.