RESEARCH ABSTRACT

SWINE HEALTH

Title: Virus Survival in Preprocessed Compost Under Cold Conditions - NPB #20-016

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Scientific Abstract:
The elimination of a foreign animal disease like the African Swine Fever virus (ASFV) requires an efficient means of disposal for infected or exposed animal carcasses. The disposal method must prevent the further spread of disease and reliably kill or inactivate infectious viruses. Limited studies have been performed on the monitoring of swine viruses over time in compost piles and studies on the preprocessing of carcasses before composting is based primarily on cattle carcasses. With the majority of the pig population in the United States residing in the Midwest, cold winter conditions are a concern for the proper execution of the composting process. Most compost studies in the literature are performed under very controlled environments, and not the adverse weather conditions where most composting occurs. Therefore, this study aimed to evaluate the ability to preprocess of swine carcasses for compost to eliminate viral pathogens in the face of adverse weather conditions (winter the Midwestern United States). This study further evaluated the preprocessing method for the potential risk of environmental contamination via aerosolization as it has not been previously addressed. The risk of leaching of pathogens into groundwater was also analyzed to ensure further viral spread is limited from the composting process. Carcasses of pigs exposed to Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) and Porcine Epidemic Diarrhea Virus (PEDV) were used as virus surrogates for testing and monitoring over time. Aerosol sampling during the carcass preprocessing was performed. Water wells at various depths were placed for weekly monitoring of groundwater. Three compost biomass materials (woodchips, cornstalks, and 1:1 ratio of both) were used to form separate compost windrows of each type for comparison of ability to eliminate virus over time and for the ability to reach appropriate composting temperatures. Reverse transcription real-time polymerase chain reaction (PCR) testing of air samples, groundwater, and compost composite samples for PRRSV, and PEDV were performed. An on-site weather station monitored weather conditions (daily high and low temperatures and wind speed). The results of the study revealed that the composting of preprocessed carcasses was able to reach adequate temperatures for the elimination of ASFV and common swine virial pathogens, even in cold weather conditions. Aerosol and groundwater contamination from carcass preprocessing and composting appears minimal under the conditions of the study. Although each biomass windrow type was effective at reaching adequate temperatures, there was a difference in time until negative in surrogate virus detection. In conclusion, the preprocessing and compost method for carcass disposal is a viable potential method for pathogen control and elimination for ASFV and common swine pathogens.

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

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