RESEARCH ABSTRACT
SWINE HEALTH

Title: Small-scale, in-barn carcass management exploration – NPB#19-223 IPPA

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Introduction

Proper management of swine mortalities in response to a Foreign Animal Disease (FAD) outbreak is imperative to mitigate disease spread to other pig populations. If infected carcasses are improperly managed, the pathogen can remain in the environment and severely inhibit recovery efforts from FAD outbreaks. Existing mortality management options for swine include composting, shallow burial, landfill disposal, rendering, and incineration. However, all existing carcass management approaches challenge biosecurity and threaten pathogen spread via air, water, soil, vegetation, or fomites (USDA, 2020). Therefore, if pathogen inactivation can be achieved before carcass removal from the barn, a reduction in the exposure of mortalities or leachate to transmissive agents is possible.

Composting has been the preferred method for catastrophic mortality events because of the potential for the pile to reach elevated temperatures to inactivate pathogens, the wide availability of carbon sources near animal production facilities, and the creation of a usable end product (Glanville et al., 2005; Wilkinson, 2006; Kalbasi, Mukhtar, Hawkings, & Auvermann, 2005). However, composting systems managed improperly can quickly become a biosecurity hazard if a pile is turned before completion of the primary inactivation stage, windrows are sized improperly, or an inappropriate site is selected where soil and water contamination is a risk (Wilkinson, 2006; Kalbasi, Mukhtar, Hawkings, & Auvermann, 2005; USDA, 2012). Modified Ag-Bag composting systems mitigate many of the biosecurity risks associated with traditional composting, but are not ideal for large carcasses such as swine, and specialized carcass-handling equipment is required for the system (Ag-Bag Forage Solutions, 2020; Kalbasi, Mukhtar, Hawkings, & Auvermann, 2005).

Alternatively, carcass burial is a simple approach but presents many challenges: it can be cost-prohibitive due to land prices and equipment rental, suitable land is difficult to secure in many regions of the US, and the potential for long-term impacts on ground water exists (DeOtte Jr. & DeOtte III, 2010; Harper, DeRouchey, Glanville, Meeker, & Straw; Glanville, et al., 2005). Additionally, burial is not a biosecure option and in one case, poultry carcasses still infected with avian influenza were unearthed after 15 years (Malone, 2005). Rendering is only a viable carcass management option for non-diseased mortalities and is hindered by lack of capacity (DeOtte Jr. & DeOtte III, 2010; USDA, 2012). Landfill disposal of carcasses can incur costs of up to three times that of other options, and the ability of the landfill to contain and process leachate from carcasses is often challenged (Bendfeldt, Peer, & Flory, 2006). Finally, incineration commonly has inadequate capacity and odor problems can become a serious issue (Glanville, 2009).

Due to the biosecurity issues associated with existing management strategies for mass swine mortalities, efforts should be made to inactivate pathogens prior to removal from the facility. In-barn mortality management strategies have been tested and deployed for catastrophic poultry mortality events with success. As little as 50% of the labor is required for in-barn methods of disposal compared to traditional carcass disposal methods, limiting risk of disease transfer by workers (Tablante & Malone, 2006). Additionally, it is a relatively cost-effective option, high temperatures can easily be generated and maintained for pathogen inactivation, and exposure of pathogens to the environment is avoided (Tablante & Malone, 2006). For these reasons, in-barn mortality management strategies for swine should be explored and quantification of carcass responses are needed to determine feasibility of managing swine moralities in-barn.

The objectives of this research project were: (1) Create a mobile, two-room, small-scale typical swine facility equipped with the instrumentation for evaluating different in-barn mortality management options and (2) evaluate an in-barn mortality management option, that is, desiccation/decomposition with pig carcasses: after subjection to heat inactivation.