RESEARCH ABSTRACT

SWINE HEALTH

Title: Susceptibility of pigs to FMDV infection via natural ingestion: Establishing minimum oral infectious dose and evaluating potential benefits of chemical mitigants – **NPB #18-187 AND #18-194 SHIC**

Investigator: Jonathan Arzt

Institution: Foreign Animal Disease Research Unit, USDA-ARS, Plum Island Animal Disease Center

Date submitted: 03 September 2021

Scientific Abstract

(Published as Stenfeldt et al, 2021 https://doi.org/10.1111/tbed.14230)

Transboundary movement of animal feed and feed ingredients has been identified as a route for pathogen incursions. While imports of animals and animal-derived products are highly regulated for the purpose of infectious disease prevention, there has been less consideration of the viability of infectious agents in inanimate products, such as feed. This study investigated the ability of foot-and-mouth disease virus (FMDV) to remain infectious as a contaminant of commercial whole pig feed and select pig feed ingredients, and to establish the minimum infectious dose (MID_F) required to cause foot-and-mouth disease (FMD) in pigs that consumed contaminated feed. FMDV viability in vitro varied depending on virus strain, feed product, and storage temperature, with increased duration of infectivity in soybean meal compared to pelleted whole feed. Specifically, both strains of FMDV evaluated remained viable through to the end of the 37 day observation period in experimentally contaminated soybean meal stored at 4°C or 20°C. The MID_F for pigs consuming contaminated feed varied across virus strains and exposure duration in the range of $10^{6.2}$ TCID50 - 10^7 TCID50. The ability of FMDV to cause infection in exposed pigs was mitigated by pre-treatment of feed with two commercial feed additives, based on either formaldehyde (SalCURB®) or lactic acid (GuardianTM). Our findings demonstrate that FMDV may remain infectious in pig feed ingredients for durations compatible with transoceanic transport. Although the observed MIDF was relatively high, variations in feeding conditions and biophysical characteristics of different virus strains may alter the probability of infection. These findings may be used to parameterize modeling of the risk of FMDV incursions and to regulate feed importation to minimize the risk of inadvertent importation.