

EVALUATION OF THE SURVIVAL OF VIRAL PATHOGENS IN CONTAMINATED FEED INGREDIENTS USING TRANSBOUNDARY SHIPMENT MODELS

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Introduction

This study evaluated survival of important viral pathogens of swine or their surrogates in contaminated feed ingredients during simulated transboundary transportation. Based on global significance, 11 viruses were selected, including Foot and Mouth Disease Virus (FMDV), Classical Swine Fever Virus (CSFV), African Swine Fever Virus (ASFV), Influenza A Virus of Swine (IAV-S), Pseudorabies virus (PRV), Nipah Virus (NiV), Porcine Reproductive and Respiratory Syndrome Virus (PRRSV), Swine Vesicular Disease Virus (SVDV), Vesicular Stomatitis Virus (VSV), Porcine Circovirus type 2 (PCV2) and Vesicular Exanthema of Swine Virus (VESV).

Materials and Methods

To model the survival of FMDV, CSFV, PRV, NiV, SVDV and VESV, surrogate viruses with similar physical properties and stability were used, and those consisted of Seneca Virus A (SVA) for FMDV, Bovine Viral Diarrhea Virus (BVDV) for CSFV, Bovine Herpesvirus Type 1 (BHV-1) for PRV, Canine Distemper Virus (CDV) for NiV, Porcine Sapelovirus (PSV) for SVDV and Feline Calicivirus (FCV) for VESV. Remaining assessments involved the actual pathogen. Controls included complete feed (positive and negative controls) and stock virus positive controls (virus only, no feed matrix). Virus survival was evaluated using either a Trans-Pacific or Trans-Atlantic transboundary model, involving representative feed ingredients, transport times and environmental conditions, with

samples tested by PCR, VI and/or swine bioassay.

Results

Select viruses (SVA, FCV, BHV-1, PRRSV, PSV, ASFV and PCV2) maintained infectivity during transport, while others (BVDV, VSV, CDV and IAV-S) did not. Survival was maximized in ingredients including conventional soybean meal, lysine hydrochloride, choline chloride, and vitamin D.

Discussion and Conclusions

These results demonstrate survival of certain viruses in specific feed ingredients (“high-risk combinations”) under conditions simulating transport between countries. This work supports previously published data on the survival of PEDV in feed and provides further evidence indicating that contaminated feed ingredients may serve as risk factors for foreign animal diseases.