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SDEC Partners Research Update

Project Update: Risk assessment of Porcine Epidemic Diarrhea Virus in feed ingredients of porcine origin

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Background

- Concerning reports from the USA and Canada have indicated that porcine based feed ingredients or feed cross contamination are potential routes for PEDv transmission. Consequently, many producers and veterinarians have made considerable changes to their feeding programs.
- Raw materials of porcine origin added to pig feed in the USA include rendered by-products, spray dried plasma, hydrolyzed proteins, and pet food byproducts. The thermal processes involved in manufacturing these ingredients play a role in pathogen inactivation, but limited research is available to assess their levels of effectiveness against PEDv transmission.
- A recent risk assessment was employed to model and quantify the risk associated with porcine based feed ingredients. Using a multidisciplinary approach, data from numerous sources, e.g. industry, scientific journals, recent experimental studies and industry reports, were evaluated to identify their limitations and used to propose areas in need of further research.

Objective

Assess the risk of feed ingredients of porcine origin as vehicles for transmission of PEDv

Results

- Based solely on experimental data on heat activation, the prolonged high temperatures involved in the rendering and hydrolyzed protein processes, the likelihood of PEDv survival was deemed negligible.
- The thermal processes used in spray-drying involve shorter exposure times and lower temperatures than those utilized in rendering and hydrolysis, and based solely on experimental data on heat inactivation, the likelihood of PEDv survival is low. However, it is known that other processes during spray-drying assist in PEDv inactivation.
- Experimental data on PEDv inactivation using laboratory scale spray-dryers indicated a significant reduction in PEDv with no infection observed in either laboratory cell cultures or live pigs in two experiments. However, laboratory scale processes may not be comparable to commercial scale spray-drying operations for porcine plasma.
- Incorporating the industry standard of two weeks post-processing storage of spray-dried plasma at room temperature (20-22°C), the risk of PEDv survival was estimated to be negligible to low based on heat inactivation alone, and negligible from laboratory spray drying.
- Based on site visits in processing plants of each finished feed ingredient, pathways identified for post-processing cross contamination were estimated to be negligible to low risk. Potential pathways assessed included personnel movement from raw material areas to finished ingredient areas via clothes, hands and shoes, and airflow patterns within plants where viral particles may be entrapped in aerosol particulates and moved to finished ingredient areas.
- The likelihood for post-processing contamination at 'open facility' rendering plants was low to moderate due to potential contamination from outside. Risk was identified where contaminated manure from raw material delivery trucks may be picked up by skid-steer loader equipment and transferred to finished ingredients.

Challenges

- Risk assessments were constrained by limited data availability on topics including viral inactivation by spray drying, the infectious dose of PEDv, and the relationship between measures of virus RNA and infective dose. Limitations in these areas warrants the need for further scientific insight in order to assist producers in making significant changes to how they feed their herds.
- Understanding PEDv infective dose and source (culture adapted vs. field isolate) is pertinent in further evaluating data and estimating risk. A low risk at the feed level can translate to a much higher risk at a population level for large herds.

A copy of the full report can be found at: http://research.pork.org/Results/ResearchDetail.aspx?id=1812