

Aerosol transport of PEDV: Determination of particle size associated with PEDV transport in the natural swine environment

Courtesy of Pipestone Applied Research and 3M

Background:

Detection of PEDV in aerosols has been reported by multiple parties. No description of the particle size that actually carries PEDV in the natural environment is available. Therefore, the purpose of this study was to determine the size of airborne particles that actually carry PEDV within an airspace housing a naturally infected population of finishing swine.

Design:

An aerosol survey of a barn was completed using a MOUDI (micro orifice uniform deposition impactor) size fractioning particle collector (range 0.056 um to 18.0 um). The MOUDI was placed within the airspace containing a population of finishing swine (n = 500) approximately 150-200 lbs in weight previously determined to be acutely infected with PEDV. Clinical signs of PEDV (diarrhea) were noted in > 50% of pens within the room. The MOUDI was placed on a tripod in the center alley, approximately 5 feet off the ground, preventing direct pig contact. Size fractioned particles from the airspace were collected for 24 hours on aluminum foil substrates. These were tested for the presence of PEDV RNA by PCR at the SDSU VDL. MOUDI substrates not exposed to the airspace were submitted as negative controls.

Findings:

The attached chart demonstrates that a wide range of particle sizes were positive for PEDV RNA. Lower Ct values appear to be associated with larger particles. A Ct value of ≥ 40 is considered a negative value and represents a PEDV negative sample.

Conclusion: Within the natural swine environment, PEDV can be found on a wide range of airborne particles during the period of acute infection.

Detection of PEDV RNA according to particle size

