

**Title:** Interventions to control PEDv (porcine epidemic diarrhea virus) in feed and feed ingredients – NPB #14-157

**Investigator:** Sagar M. Goyal

**Institution:** University of Minnesota

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**Scientific Abstract:** This study was undertaken to determine the effect of certain interventional strategies on the inactivation of PEDV in feed and feed ingredients. The strategies tested were: low heat, high heat, irradiation, and the addition of drying agents/acidifiers. At low temperatures, the survival of PEDV depended on all three factors studied (type of feed ingredient, temperature, and RH). For example, a temperature of 60°C at any of the 3 RH levels (30%, 50%, and 70%) was not sufficient to inactivate 4 log<sub>10</sub> of PEDV. However, 4 log<sub>10</sub> of PEDV was killed at 90°C within 15 to 30 min in some of the feed ingredients. A combination of 90°C and 70% RH killed 99.99% of PEDV within 10 to 30 min except in spray-dried plasma. Virus inactivation by irradiation was dose-dependent; greater than 99.97% virus was inactivated at 50 kGy while only 90% was killed at 10 kGy. We studied the effect of 4 different temperatures (120°C, 130°C, 140°C, and 145°C) on PEDV-spiked feed at 5 minute intervals and found that increasing amounts of virus were inactivated with increased temperature; 99.99% virus was inactivated within 10 to 25 min depending on the temperature used; 99.99% of the virus was killed within 10 min at 145°C. The effect of six different additives on PEDV was evaluated. Surprisingly, we found that the addition of sugar and salt was as good in killing virus as Kemin; they all killed more than 2 log<sub>10</sub> of virus (≥99% inactivation) but it took them 21 days to do so. Ultrap, ADA, and AB were not able to achieve this level of virus kill even after 21 days. Another objective was to evaluate the currently used methods of virus elution from feed and from stainless steel surfaces. Both methods were found to be adequate in recovering PEDV. The last objective was to determine the MID<sub>50</sub> of a standardized PEDV inoculum. We found that as low as 7 TCID<sub>50</sub> (50% tissue culture infective dose) of cell culture grown virus was able to induce disease in 11-day-old piglets.

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For more information contact:

National Pork Board • PO Box 9114 • Des Moines, IA 50306 USA • 800-456-7675 • Fax: 515-223-2646 • [pork.org](http://pork.org)

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