164 Evaluating the effect of manufacturing porcine epidemic diarrhea virus (PEDV)-contaminated feed on subsequent feed mill environmental surface contamination. L. L. Schumacher*[1], R. A. Cochrane[1], C. E. Evans[1], J. R. Kalivoda[1], J. C. Woodworth[1], A. R. Huss[1], C. R. Stark[1], C. K. Jones[1], Q. Chen[2], R. Main[2], J. Zhang[2], P. C. Gauger[2], S. S. Dritz[1], M. D. Tokach[1], *[1]Kansas State University, Manhattan, [2]Iowa State University, Ames.*

With the introduction of porcine epidemic diarrhea virus (PEDV) to the United States in 2013 and the subsequent identification of feed as a route of transmission, identifying sources of feedstuff contamination and methods to reduce the risk of transmission at feed mills has become paramount. As with other biological hazards, contaminated ingredients can easily lead to cross-contamination of finished feeds and contamination throughout the facility. Therefore, the objective of this study was to monitor equipment and environmental contamination after manufacturing PEDV-positive feed and after the production of subsequent PEDV-negative feed. PEDV-positive feed (50 kg with 4.5×10^4 $TCID_{50}$/g, Ct 11) was mixed in a $0.11m^3$ paddle mixer, discharged into a bucket elevator, and collected. Following processing of the contaminated feed, 4 subsequent batches of PEDV-free feed (sequence 1–4) were processed through the mixer and bucket elevator with no decontamination between batches to mimic commercial feed production. Porcine epidemic diarrhea virus contamination of equipment and surrounding areas were monitored via the collection of swabs that were analyzed via quantitative PCR (qPCR) for PEDV RNA. Swabs were collected from equipment and facility surfaces prior and after processing contaminated feed and after processing subsequent sequenced batch diets. Monitored areas for equipment included the interior of the mixer and bucket elevator. Facility areas included high and low foot traffic areas (concrete), floor drain (concrete), worker boot bottoms (rubber), table (metal), and door (metal). Three replications of contaminated feed and subsequent sequence batch diet processing was completed, with equipment and facility decontamination between replicates. Following qPCR analysis, Ct values ≤ 40 were considered PEDV-positive and all numerical data was converted to ± for statistical analysis via PROC MIXED procedure of SAS. The interactions feed contact surface by sequence were found to be significant ($P < 0.01$). All swabs collected from equipment surfaces after processing of PEDV-positive feed were positive for PEDV, while 16 of 18 of the collected facility swabs were positive for PEDV RNA. Following processing of the first sequence batch diet, 100% of equipment surfaces and 88.9% of facility surfaces were positive for PEDV. Surprisingly, a large percentage of equipment and facility surfaces remained PEDV-positive through the processing of the subsequent sequence batch diets. Furthermore, all swabs collected from concrete and rubber surfaces remained PEDV-positive through all processing of all diets. This study demonstrates the extent of equipment and facility contamination that could occur in a feed manufacturing facility after processing of PEDV-contaminated feed.

Key Words: PEDV, feed mill, contamination

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165 To determine if hand held near infrared spectroscopy can be used to measure corn particle size, corn particle distribution and corn moisture. A. Criado*[1], C. Piotrowski[1], P. Wilcock[2], C. L. Bradley[2], B. Haberl[3], B. C. Smith[3], *[1]Aunir, Towcester, United Kingdom, [2]AB Vista Feed Ingredients, Marlborough, United Kingdom, [3]Iowa Select Farms, Iowa Falls.*

In swine production the effect of corn particle size on performance in pigs fed pelleted diets has shown that in general the finer the grind size the better the feed efficiency. Currently, to determine particle size, the most widely used methods are the onsite 3 pan sieve analysis because of its simplicity, cheapness and ease of interpretation or the 13 pan sieve analyses which is often tested off site at a laboratory. Near-infrared (NIR) spectroscopy is an analytical technique used for grain quality assessments due to its versatility and speed. Although the ability of NIR to estimate particle size is well documented, obtaining the full particle size distribution profile has not been studied in depth. The objective of this trial was to determine if a hand held near-Infra-red (HHNIR) spectroscopy could be used to measure corn average particle size, moisture and particle distribution. To develop this calibration, 95 corn samples resulting in 141 scans across 2 instruments (from roller and hammer mills) were collected, split and either tested using the corresponding particle size references by a 13 stage sieve analysis derived from the US standard Sieve Series (SV) using a sieve agent or scanned in triplicate on a hand held NIR (950–1,650 nm) spectrometer (NIRS). For average particle size and moisture there was a strong correlation between SV and NIRS ($r^2 = 0.79$; RPD = 2.2 and $r^2 = 0.91$; RPD = 3.3 re-

Table 165. Calibrations for individual sieve pans.

Sieve Pan	Mean	SD	RSQ	SECV	RPD
d6	0.13	0.07	0.67	0.07	1.7
d8	0.89	0.60	0.80	0.39	2.2
d12	3.99	2.71	0.80	1.69	2.2
d16	18.43	11.66	0.62	8.24	1.6
d20	40.06	13.72	0.80	8.57	2.2
d30	57.46	9.96	0.81	6.15	2.3
d40	68.28	6.94	0.81	4.59	2.3
d50	74.97	5.30	0.80	3.29	2.3
d70	78.98	4.65	0.80	2.82	2.2
d100	82.92	3.80	0.80	2.41	2.3
d140	86.12	3.18	0.82	1.95	2.3
d200	88.18	2.67	0.82	1.69	2.3
d270	89.54	2.43	0.83	1.45	2.4