BORREGAARD

AMERI-BOND 2X IN SWINE GESTATION PELLETS

PURPOSE

To document improvement in durability of a Swine Gestation pellet achieved by the addition of 0.75% Ameri-Bond 2X to the formulation.

RESULT

- Durability of pellets collected off the cooler increased from 54.7 to 80.7.
- Durability of pellets collected after the fat-coater increased from 51.1 to 82.2.
- Predicted fines delivered to the feeder decreased from 45.9% to 24.4% (Table 2).

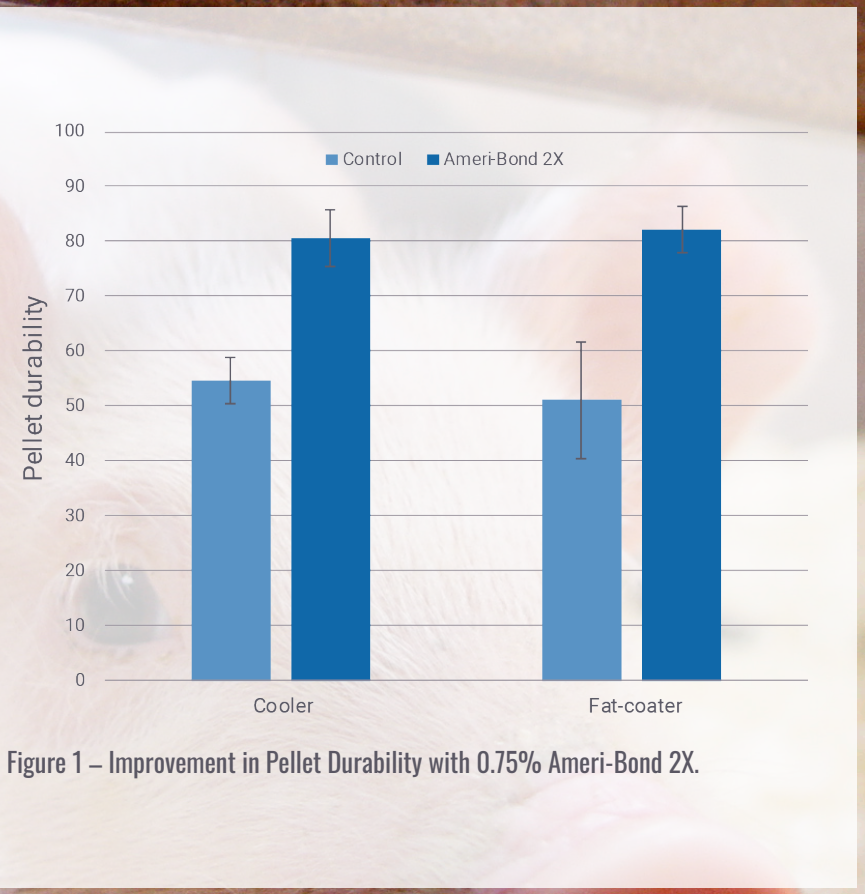


Figure 1 – Improvement in Pellet Durability with 0.75% Ameri-Bond 2X.

Borregaard

BORREGAARD

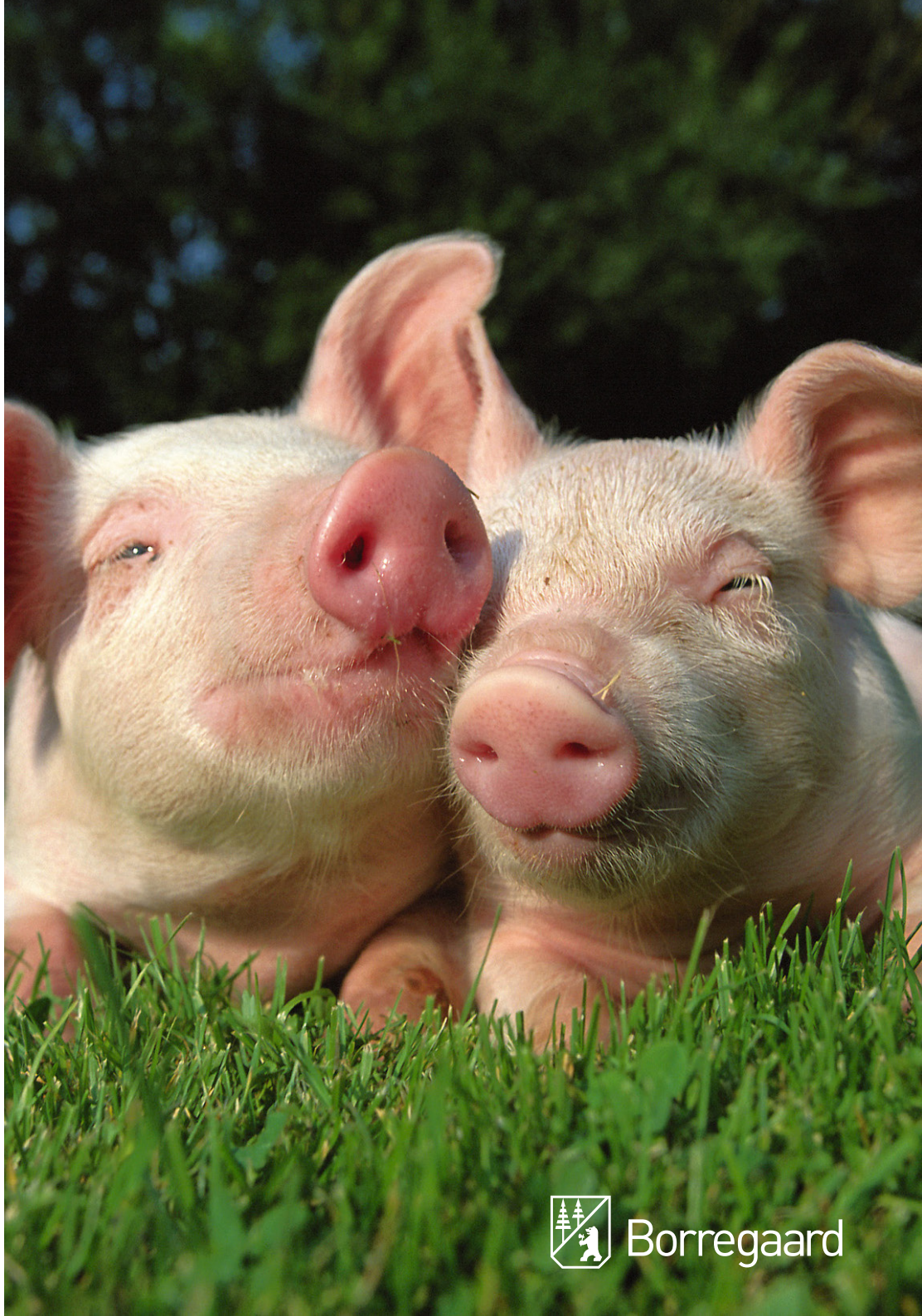
PROCEDURE

This test was conducted on a corn/soya-based Swine Gestation feed. Fifty tons each of Control feed with no additive and feed mixed to include 0.75% Ameri-Bond 2X were pelleted on a 500 HP CPM Press. Die Specs were 4.5 mm (11/64") x 1-1/2" effective thickness (L:D = 9.2). Control set-points were: 90% motor load; 85°C spout temperature; and 60 TPH. Boiler pressure was 96 to 98 psi and regulated down to 29-30 psi at the pellet mill. HOBO U12 Data Loggers were used to continuously record Amperage and Spout Temperature (Figure 2). In addition, Amperage, Spout Temperature and other process parameters were recorded manually in 5-minute intervals off the Beta Raven batching system (Table 1).

Pellet samples were collected after the cooler at 5-minute intervals. Samples were collected by inserting a round PVC pipe into the stream of pellets flowing from the end of the counterflow cooler drag down a transition into the pellet elevator. A second group of samples was collected in like manner as they left the fat-coater. Samples were stored in plastic bags.

Samples were screened over a #6 sieve. One-hundred grams of clean pellets were placed the New Holmen Portable Tester (NHP-100) and run for 30-second at 72 mbar without a filter. The weight of the surviving pellets was reported as the Pellet Durability Index (PDI). These results are listed in Table 1.

Durability of pellets was also tested using the Tumbling Can method. Samples were weighed, screened, and weighed again to determine the percentage of fines. 500-g of clean pellets were then tumbled for 10-minutes, sieved, and the percentage of surviving pellets calculated. The percentage of fines generated by the tumbler was added to the percentage of fines that was initially screened off and these combined fines were used to estimate the amount of fines that would be delivered to the feeders.



BORREGAARD
DATA

Table 1 - Process parameters and pellet durability by the NHP-100 Tester.

Time	Spout temp., °C	Amps	Feeder	TPH	Power, kWh/T	Cooler	Fat-coater
			Control Pellets:				
09:25	78.9	471	52	39.9	8.8	55.6	40.0
09:30	83.9	475	57	43.7	8.1	57.6	46.7
09:35	84.4	497	61	46.8	7.9	49.0	51.1
09:40	85.0	502	62	47.6	7.9	56.0	55.3
09:45	85.0	503	63	48.3	7.8	55.4	62.5
09:50	85.0	508	64	49.1	7.7		
09:55	85.0	505	64	49.1	7.7		
Average:	83.9	495	60	46.4	8.0	54.7	51.1
			Pellets with 0.5% PellTech				
13:05	78.9	411	44	33.7	9.1	66.1	69.3
13:10	81.1	465	55	47.4	7.3	70.4	74.9
13:15	83.9	487	60	46.0	7.9	76.9	79.7
13:20	84.4	504	62	47.6	7.9	80.7	80.7
13:25	85.0	506	62	47.6	7.9	84.5	85.7
13:30	85.0	507	62	47.6	8.0	83.7	85.8
13:35	85.0	502	62	47.6	7.9	85.8	86.9
13:40	85.0	507	63	48.3	7.8	86.9	86.7
13:45	85.0	528	63	48.3	8.2	85.5	85.6
13:50	85.6	505	63	48.3	7.8	86.1	86.7
Average:	86.7	492	60	46.2	8.0	80.7	82.2

BORREGAARD

DISCUSSION

Process conditions were identical for these two runs (Table 1 and Figure 2). The only difference was the inclusion of 0.75% Ameri-Bond 2X pellet binder, which made a dramatic improvement in pellet durability and cut the amount of Feeder Fines in half. This was a very powerful and undeniable binder response.

Two methods of testing durability were used here. The Tumbling Can method was developed by Kansas State University. The Model Handling System was used as the absolute measure of how a pellet would stand up to mechanical stress. Fifty pounds of clean pellets were circulated through this system for 10-minutes and then screened to determine the percentage of pellets that survived. Results from this system were used to develop the Tumbling Can method. The prediction of fines delivered to the feeder is based on this extensive research, which was reported in KSU's Feed Production School Proceedings in 1962.

The method is old but solid. It was adopted by the American Society of Agricultural Engineers (269.1) as the official method for measuring pellet durability. There was a clear advantage of tumbling 500-g rather than fifty pounds!

The second method used in this investigation was the New Holmen Portable Tester, which was developed by Borregaard in 1997. Only in the feed industry can something be over 20 years old and still be 'new'. This test uses only 100 g of pellets and completes the test in 30-seconds. While it is not an official method, it does correlate well with results from the Tumbling Can, and it is much more convenient.

Both test methods are good, and both agreed that addition of Ameri-Bond 2X substantially improved pellet durability.

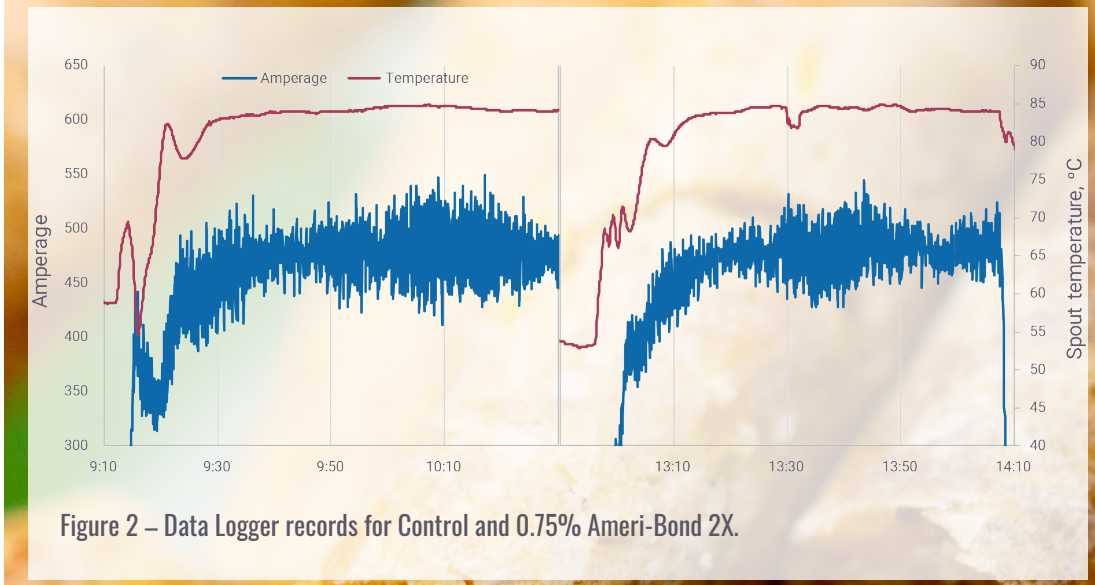


Figure 2 – Data Logger records for Control and 0.75% Ameri-Bond 2X.

Borregaard

BORREGAARD

CONCLUSIONS AND RECOMMENDATIONS

Pellet durability was greatly improved by the addition of Ameri-Bond 2X. The Tumbling Can method predicts that fines at the feeder will be cut in half. This project should be expanded to confirm that prediction. Several loads of pellets should be made with Ameri-Bond 2X and delivered to the farm silos. As the silos empty, multiple samples should be taken and screened to determine the level of actual delivered fines.

THIS WORK WAS PERFORMED AND REPORTED BY BORREGAARD

Email: animalfeed@borregaard.com

www.borregaardfeed.com

Table 2 - Tumbler prediction of fines (%) delivered to the feeder.

Time	Coler fines, %	Tumbler PDI	Fines, %	Feeder fines, %
Controll Pellets:				
9:25	8.5	56.2	43.8	52.3
9:30	14.0	59.9	40.1	54.1
9:35	11.8	62.9	37.1	48.9
9:40	11.2	67.0	33.0	44.2
9:45	6.1	69.3	30.7	36.9
9:50	8.4	69.1	30.9	39.4
Average:	10.0	64	36	45.9
Pellets with 0.75% Ameri-Bond 2X:				
13:05	6.0	73.1	26.9	32.9
13:10	7.3	77.2	22.8	30.1
13:15	3.5	78.7	21.3	24.9
13:20	3.9	78.6	21.4	25.3
13:25	4.1	78.1	21.9	25.9
13:30	5.4	84.9	15.1	20.6
13:35	5.2	85.0	15.0	20.2
13:40	5.1	84.8	15.2	20.3
13:45	6.2	81.6	18.4	24.6
13:50	5.3	86.1	13.9	19.2
Average:	5.2	80.8	19.2	24.4

Borregaard