

ANIMAL SCIENCE

Title: Re-evaluating moderate to severe feed processes in light of high ingredient prices and the increasing use of fibrous feedstuffs. **NPB #11-169**

Investigator: Leland McKinney

Co-Investigators: Joel DeRouche, Mike Tokach, Steve Dritz, Bob Goodband - Kansas State
Chad Hastad – New Fashion Pork, Jackson, MN.

Institution: Kansas State University, Manhattan, KS.

Date Submitted: November 30, 2012

Scientific Abstract:

In Exp. 1, a total of 675 pigs (initially 24.5 lb BW and 37 d of age) were used in a 21-d study to determine the effects of feeding varying ingredient particle sizes and diet form for nursery pigs on performance, caloric efficiency, and economics. Pens of pigs were balanced by initial BW and randomly allotted to 1 of 8 dietary treatments with 17 replications per treatment and 5 pigs per pen. The 8 experimental diets included 3 corn-soybean meal-based diets consisting of: (1) corn 620 μ and fed in meal form, (2) corn 352 μ and fed in meal form, and (3) diet 2 but pelleted. The remaining 5 diets were high by-product diets containing 20% wheat middlings (mids) and 30% dried distillers grains with solubles (DDGS). Diets 4 to 8 consisted of: (4) corn 620 μ , mids and DDGS unground at 534 μ and 701 μ , respectively, and fed in meal form; (5) diet 4 but corn 352 μ and fed in meal form; (6) diet 5 but fed in pellet form; (7) corn, soybean meal, DDGS, and mids ground to 352 μ , 421 μ , 377 μ , and 357 μ , respectively, fed in meal form; and (8) diet 7 but fed in pellet form. The two formulated diets were not balanced for energy, so energy was lower for treatments 4 to 8 than for treatments 1 to 3. Overall (d 0 to 21), pigs fed pelleted diets had improved ($P < 0.03$) ADG, F/G, and caloric efficiency when measured on an ME or NE basis. Reducing the particle size of the corn did not influence F/G or caloric efficiency, but tended ($P < 0.08$) to reduce ADFI, which led to a reduction ($P < 0.02$) in ADG. Pigs fed the high-by-product diet had reduced ($P < 0.001$) ADG, ADFI, and final BW and poorer ($P < 0.01$) F/G. Grinding the by-products to a smaller particle size further reduced ($P < 0.05$) ADG, ADFI, and final BW but did not influence feed efficiency. For economics, feed cost per pig decreased ($P < 0.0001$) for pigs fed the high-by-product diet which resulted in a reduction ($P < 0.001$) in feed cost per pound of gain. Fine-grinding all feed ingredients decreased ($P < 0.0001$) revenue/pig and IOFC. Pelleting was the only processing technology that improved ($P < 0.01$) revenue/pig and IOFC. Grinding corn finer than 620 μ or grinding other components of the high-by-product diet did not improve pig performance or IOFC; however, pelleting resulted in the expected improvements in pig performance and economic return.

For Exp. 2, a total of 855 pigs (initially 56.54 lb BW) were used in a 111-d trial to evaluate the effects of corn particle size, complete diet grinding, and diet form (meal or pellet) on finishing pig growth performance, caloric efficiency, carcass characteristics, and economics. Pens of pigs were balanced by initial BW and randomly

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

For more information contact:

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

allotted to 1 of 5 dietary treatments with 9 replications per treatment. The same corn-soybean meal-based diets containing 30% DDGS and 20% midds were used for all treatments. Diets were fed in four phases. Different processing techniques were used to create the 5 dietary treatments: (1) roller grinding corn to 650 μ and fed in meal form; (2) hammer grinding corn to 320 μ and fed in meal form; (3) treatment 2 but pelleted; (4) corn initially roller ground 650 μ , then the complete mixed diet reground through a hammer mill to 360 μ and fed in meal form; and (5) treatment 4 but pelleted. Overall (d 0 to 111), reducing corn particle size from 650 to 320 μ improved ($P < 0.03$) F/G, caloric efficiency, feed cost per lb of gain, and income over feed cost (IOFC). Grinding the complete diet decreased ADG, ADFI, and final weight when the diet was fed in meal form, but increased performance when fed in pelleted form resulting in diet form \times portion ground interactions ($P < 0.02$). Pelleting the diet improved ($P < 0.001$) ADG, F/G, caloric efficiency on an ME and NE basis, final weight, carcass weight, and IOFC. For carcass characteristics, feeding a pelleted diet increased ($P < 0.001$) HCW, which led to a diet form \times portion ground interaction ($P < 0.02$), meaning HCW decreased when the complete diet was ground and fed in meal form but increased when the same diet was fed in pellet form. Grinding the complete diet decreased ($P < 0.03$) loin depth, and pelleting diets increased ($P < 0.02$) loin depth.