

## ANIMAL SCIENCE

**Title:** Evaluating Moderate to Severe Feed Processes in Light of Increasing Use of Wheat in Swine Diets. **NPB #13-069**

**Investigator:** Mike Tokach, Ph.D., Jon De Jong, Chad Paulk, Ph.D., Joel DeRouchey, Ph.D., Cassandra Jones, Ph.D., Robert Goodband, Ph.D., Charles Stark, Ph.D., Jason Woodworth, Ph.D., and Steve Dritz, Ph.D.

**Institution:** Kansas State University

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### Scientific Abstract:

A total of 864 pigs (PIC 327 × 1050; initially 96 lb) were used in two studies to determine the effects of hard red and soft white winter wheat particle size on finishing pig growth performance, diet digestibility and caloric efficiency. Pens of pigs were balanced by initial BW and randomly allotted to treatments with 8 pigs per pen and 12 pens per treatment in each experiment. In each study, the same basal wheat-soybean meal-based diets were used for all treatments with diets fed in three phases.

In Exp. 1, the 6 experimental diets were based on hard red winter wheat ground to 200, 400, or 600  $\mu$  or soft white winter wheat ground to 200, 400, or 600  $\mu$ . All diets were fed in pelleted form. Overall, feeding hard red winter wheat improved ( $P < 0.05$ ) ADG, ADFI, and caloric efficiency on both an ME and NE basis when compared to soft white winter wheat. There was a tendency ( $P < 0.07$ ) for a quadratic particle size × wheat source interaction for ADG, ADFI, and both DM and GE digestibility. This was due to ADG, ADFI, and both DM and GE digestibility having the lowest values at 400  $\mu$  for hard red winter wheat while they were all the highest at 400  $\mu$  for soft white winter wheat. There were no significant ( $P > 0.10$ ) main effects of particle size, or particle size within wheat source. Finally, dietary treatments did not impact carcass characteristics. In conclusion, decreasing wheat particle size from 600 to 200  $\mu$  in pelleted diets had no effect on growth performance. Feeding hard red winter wheat improved ADG, ADFI, and caloric efficiency when compared to feeding soft white winter wheat.

In Exp. 2, the 3 dietary treatments were hard red winter wheat ground with a hammer mill to 730, 580, or 330  $\mu$ . From d 0 to 40, decreasing wheat particle size decreased (linear;  $P < 0.05$ ), ADFI, but improved (quadratic;  $P < 0.05$ ) F/G and caloric efficiency (CE), with no change in ADG. From d 40 to 83, decreasing wheat particle size increased (quadratic;  $P < 0.05$ ) ADG, and improved (linear;  $P < 0.05$ ) F/G and CE, with no change in ADFI. Overall from d 0 to 83, decreasing wheat particle size improved (linear;  $P < 0.05$ ) F/G, and CE on both an ME and NE basis, with no difference in ADG or ADFI. Finally, reducing wheat particle size improved (linear;  $P < 0.05$ ) DM and GE digestibility. In summary, fine grinding hard red winter wheat was detrimental to feed intake in early finishing, but improved ADG in late finishing and improved F/G in both periods and overall. Dry matter and GE digestibility as well as CE were all improved for the overall period with fine grinding wheat. Grinding wheat from 730 to 330 improved the caloric content on a NE basis by 100 kcal/lb.

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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

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