

## ANIMAL SCIENCE

**Title:** Using high-fiber diets to limit energy intake in developing gilts: effects on puberty, reproduction, culling rates, lifetime productivity, and progeny health and growth – **NPB #10-164**

**Investigators:** Phillip Miller and Rodger Johnson

**Institution:** University of Nebraska – Lincoln

**Co-investigators:** Justin Bundy and Daniel Ciobanu

**Date Submitted:** June 18, 2013

### Scientific Abstract

A total of 182 gilts were used to evaluate the effects of limiting energy intake during development compared to traditional corn-soybean meal based diets using the addition of soybean hulls to reduce caloric intake with ad libitum access to feed. The gilt developmental period consisted of 110 days, from 120 to 230 days of age. Data collected during development included body weight, backfat, longissimus muscle area, and feed intake, every 2 weeks. Estrus detection was conducted on a daily basis until breeding. Females were maintained in the breeding groups for 4 parities (785 days of age), at which time data collection ceased. Animals were only removed from the experiment for reproductive failure, ruptures, or severe lameness. Reproductive measurements included pre- and post-farrowing body weight and backfat, lactation length, lactation feed intake, number born alive, stillborns, mummified fetuses, weaned, litter birth and weaning body weights. Gilts fed the diets with 40% soybean hull inclusion consumed less feed compared to gilts fed the corn-soybean meal (control) diet ( $P < 0.05$ ; 2.79 vs. 3.11 kg/d, respectively). There was no difference in daily feed intake during the overall developmental period when expressed on a % of body weight basis. Gilts consuming the soybean hulls consumed 33% less metabolizable energy during development. Reduced energy intake resulted in gilts that were 18.6 kg lighter, had 9 mm less backfat, and 5.5 cm<sup>2</sup> less longissimus muscle area at breeding ( $P < 0.01$ ). Gilts with lower energy intake had 30% less backfat, but only 12% less body weight and longissimus muscle area at breeding. Reduced energy intake delayed age at 1st detectable estrus by 11 days. The delay in puberty occurred earlier than the common age at which gilts are bred in commercial conditions. Feed costs during development were reduced by 17.26 U.S. dollars (USD)/hd and were 14.3% less for gilts fed the soybean hull diets compared to control diets. Gilts developed on the lower energy regimen tended to have larger parity 1 litter birth weights ( $P < 0.10$ ). However, there was no difference observed in litter weaning weight during parity 1. Females that were developed on the lower energy regimen had decreased body weight and backfat at farrowing and weaning during parity 1 and 2 ( $P < 0.05$ ). There were no differences in weight or backfat loss during lactation. By parity 3, the previously detected differences in weight and fat thickness were not observed. There were no differences due to energy intake for litter or sow data for parity 3 and 4. No

---

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](http://pork.org)

---

differences were observed between the 2 treatment groups in the total number of litters produced, total number of pigs produced, and total litter weights. No differences were observed in progeny growth rates between the dietary treatments. In conclusion, developing gilts with reduced energy intake by utilizing soybean hulls in the diet reduced feed cost and had no detrimental effects on sow productivity.