161 Effect of High- and low-Fiber Diets on Growth Performance in Growing-Finishing Pigs Selected for low or High Feed Efficiency.

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Abstract: Understanding the effects of high- and low-fiber diets on the growth performance of pigs with different feed efficiencies will help the livestock industry develop new strategies to reduce the costs of pig production. In this study, 18 Landrace × Large White sows with high and low estimated breeding value on feed conversion ratio (EBV-FCR) were inseminated with semen from Large White with known EBV-FCR to produce 9 litters of low feed efficiency pigs and 9 litters of high feed efficiency pigs. A total of 94 growing pigs with low or high feed efficiency were fed a low-fiber (3% crude fiber) or high-fiber (6% crude fiber) content diet in a 2 × 2 factorial arrangement for 70 days. Pigs fed a high-fiber diet presented higher body weight (BW) on day 70 (P < 0.05). High feed efficiency pigs presented lower average daily feed intake (ADFI) and feed conversion ratio (FCR) than low feed efficiency pigs from day 0 to 70 (P< 0.05). There was an interaction between fiber and feed efficiency group on average daily gain (ADG;P < 0.05) and FCR (P < 0.05) from day 0 to 35. High feed efficiency pigs fed a high-fiber diet presented lower FCR than low feed efficiency pigs fed a low-fiber diet (P< 0.05). Low feed efficiency pigs fed a low-fiber diet showed the lowest ADG (P< 0.05). Regardless of efficiency groups, pigs fed a high-fiber diet presented higher ADG and lower FCR than pigs fed a low-fiber diet from day 42 to 70 (P< 0.05). These results suggest that high feed efficiency pigs can present lower FCR and ADFI without reducing final BW and ADG. Feeding a high-fiber diet can increase ADG and reduce FCR in the later stages of the experiment.

Keywords: feed efficiency, fiber, growing-finishing pigs

168 Evaluation and Improvement of the Nutritional Value of Cereal and Pulse Grains for Swine. Ruurd T. Zijlstra¹, Felina Tan¹, Eduardo Beltranena¹, Martin Nyachoti²,
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Abstract: Feed represents the greatest variable cost of swine production, with feed energy as its largest component. In most swine production systems, cereal grains such as corn, wheat, or barley provide historically the most energy in feed. Cereal grains contain >50% starch and < 20% crude protein. Pulse grains such as field pea, faba bean, and chick pea are now widely grown on the Great Plains for human consumption and crop diversification. Pulse grains contain 30 to 40% starch and 20 to 30% crude protein. Apparent total tract digestibility (ATTD) of starch does not differ between cereal and pulse grain. However, apparent ileal digestibility (AID) of starch is lower for pulse grains; thus, apparent hindgut fermentation of starch is greater. Both AID and ATTD of total dietary fiber are greater for pulse than cereal grains. Calculated net energy (NE) value is greater for cereal than pulse grains. Standardized ileal digestibility (SID) of lysine is greater for pulse than cereal grains. Cereal and pulse grains are milled prior to diet mixing, and particle size reduction can increase ATTD of energy. Whereas steam pelleting may not increase nutrient digestibility of pulse grains, extrusion may increase digestibility of both energy and amino acids. Fiber-degrading enzymes can increase nutrient digestibility of grains by depolymerizing the fiber matrix. In phase-3 nursery diets that are formulated to equal NE value and SID lysine, barley grain can replace wheat grain without reducing growth. Similarly, pulse grains can replace part of cereal grain and soybean meal in phase-3 nursery diets without reducing growth. In conclusion, pulse grains are alternative energy sources to cereal grains but can also replace protein feedstuffs such as soybean meal in sustainable swine feeding programs and provide agronomic benefits like rhizobia N fixation and reduced carbon footprint.

Keywords: cereal grain, pig, pulse grain