

Title: Optimal dietary protein for the development of gilts. **NPB #15-119 (14-235-Year2)**

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Scientific Abstract:

A previous trial funded by the National Pork Board indicated that within the practical range of commercially available ingredients for swine diets, metabolizable energy (ME) content in the diet could not be used to alter the growth rate of developing gilts, and had only minor effects on fat deposition. In addition, a 15% reduction of SID lysine levels commonly used in industry diets to develop gilts failed to reduce growth rates. In the current trial, diets were developed that had similar ME levels (3135-3278 Mcal/kg), and different SID lysine levels of 0.90, 0.79 and 0.68% (grower diets) and 0.68, 0.60 and 0.52% (finisher diets) for control, medium and low lysine levels. Grower diets were fed beginning at 100 days of age and continued for 6 weeks, followed by finisher diets until 220 days of age. At commencement of diets and at 28 day intervals until the end of the trial, gilts were weighed and measured for back fat and loin depth using ultrasound. Gilts were exposed to mature boars beginning at 160 days of age and observed for estrous behavior once a day. At 210 and 220 days of age, blood samples were collected from all gilts that failed to reach puberty, as indicated by standing estrus. At 220 days of age, gilts received an injection of PG600 to stimulate the onset of puberty, and gilts were observed for estrous behavior for an additional week. Results indicated that growth of body weight, loin depth and back fat were progressively reduced as SID lysine in the diets were reduced, indicating that diets reduced growth rate but did not alter body composition. Age at puberty was significantly greater in gilts on the low lysine diets compared to control and medium lysine diets (209±2 days versus 202±2 and 198±2 days, respectively). The percentage of gilts reaching puberty before 220 days of age was low but did not differ among treatments (38, 31 and 28% for control, medium and low lysine, respectively). A majority of gilts that had not reached puberty experienced puberty in response to PG600 injection, and this percentage did not differ between diets (85%, 76% and 79% for control, medium and low lysine diets, respectively). The gilts in this experiment experienced a porcine epidemic diarrhea virus outbreak in unison, but varied in age at the time of the outbreak (93 to 160 days of age) because they entered the trial on a weekly basis over a 9 week period. This may explain the low rate of puberty attainment. In conclusion, these results indicate that holding ME constant and decreasing SID lysine in diets was able to delay growth of gilts without altering body composition. The reduced growth rate increased age at puberty in the low lysine diet, but did not alter the percentage of gilts reaching puberty by 220 days of age. These diets will be useful in determining the effects of reduced growth rate in ad libitum fed gilts on sow productivity in the breeding herd.

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