121 Effects of Total Dietary Fiber Content During Gestation on Sow Reproductive Performance.

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Abstract: The objective of this study was to investigate the effects of total dietary fiber (TDF) levels during gestation on sow and litter performance. A total of 397 (Camborough, PIC) individual-housed sows were used. Sows were balanced by parity (P4-P10) and body condition score (BCS, 1-5) at breeding and allocated to 2 treatments: Low Fiber (TDF = 9%, LF) or High Fiber (TDF = 18%, HF) with similar insoluble to soluble fiber ratios 7.4 and 7.5 respectively. During gestation, all sows were fed according to their BCS (BCS 1 and 2 = 2.7 kg/d, BCS 3 = 2kg/d and BCS 4 and 5 = 1.6 kg/d). From d 90 of gestation thin sows (BCS 1 or 2) received an additional 0.9 kg/d. During lactation sows received a common diet, 1.81 kg/d pre-farrow, and then ad libitum. Diets were milo based with wheat midds and soy hulls as fiber sources. Dietary treatments were isonutrient and isocaloric and formulated to meet or exceed NRC (2012) nutrients. Data were analyzed for main effects of treatment and within body condition category. Overall, sows that received the LF diet were heavier at placement in lactation (306.6 and 280.6 kg; P = 0.012, for LF and HF, respectively). Similarly, the estimated post-partum BW was heavier for those fed the LF diet (283.1 and 256.1 kg; P = 0.008) and at wean BW (271.3 and 257.1 kg; P = 0.003). However, sows fed a HF gestation diet tended to lose less weight during lactation (17.0 and 4.0 kg; P = 0.080). There were no differences for total born (P = 0.767), born alive (P = 0.821), stillborn (P = 0.850) or weaned pigs (P = 0.620). In conclusion, elevating TDF during gestation did not improve litter performance, but did reduce weight and body condition loss during lactation.

Keywords: gestation, fiber, reproduction, sow

119 A Meta-Regression Analysis to Evaluate the Influence of Branched-Chain Amino Acids in Lactation Diets on Sow and Litter Growth Performance.

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Abstract: The branched-chain amino acids (BCAA) Ile, Leu, and Val are 3 dietary essential amino acids for lactating sows; however, effects of dietary BCAA on sow and litter growth performance in the literature are equivocal. Thus, a meta-regression analysis was conducted to evaluate effects of BCAA and their interactions in lactating sow diets to predict litter growth performance, sow bodyweight (BW) change, and sow feed intake. Thirty-four publications representing 43 trials from 1997 to 2020 were used to develop a database that contained 167 observations. Diets for each trial were reformulated using NRC (2012) nutrient loading values in an Excel-based spreadsheet. Amino acids were expressed on a standardized ileal digestible (SID) basis. Regression model equations were developed with the MIXED procedure of SAS (Version 9.4, SAS Institute, Cary, NC), and studies were weighted by the inverse of the squared SEM. Statistically significant ($P < 0.05$) predictor variables were assessed with a step-wise manual forward selection and required to provide an improvement of at least 2 BIC for model inclusion. Significant predictor variables within 3 equations developed for litter ADG included the count of weaned pigs per litter, dietary concentrations of NE, SID Lys, and CP, sow ADFI, Val:Lys, Ile:Lys, and Leu:Val. For sow BW change, significant predictor variables within 2 developed models included litter size at 24 h, sow ADFI, Leu:Lys, and Ile+Val:Leu. The optimum equation for sow ADFI included Leu:Trp, SID Lys, NE, CP, and Leu:Lys as significant predictor variables. Overall, the prediction equations suggest that BCAA have an important role in litter growth, sow BW change, and feed intake during lactation; however, the influence of BCAA on these criteria is much smaller than that of other dietary components such as NE, SID Lys, sow ADFI, and CP.

Table 1. Regression analysis prediction equations to evaluate the influence of branched-chain amino acids in lactating sow diets on litter growth performance[1]

Variable	Equation[2]	BIC[3]
Litter ADG, kg		
Model 1	= -4.8199 + (0.1967 × pigs weaned per litter) + (0.000568 × net energy, kcal/kg) + (1.0735 × SID Lys, %) + (0.8119 × ADFI, kg) - (0.06202 × ADFI × ADFI) + (0.0012 × Val:Lys) + (0.000963 × Ile:Lys)	-230.1
Model 2	= -5.1198 + (0.2002 × pigs weaned per litter) + (0.000679 × net energy, kcal/kg) + (0.805 × SID Lys, %) + (0.8065 × ADFI, kg) - (0.06097 × ADFI × ADFI) + (0.000902 × Val:Lys) + (0.01763 × crude protein, %)	-231.6
Model 3	= -4.8731 + (0.1988 × pigs weaned per litter) + (0.000676 × net energy, kcal/kg) + (0.7224 × SID Lys, %) + (0.7882 × ADFI, kg) - (0.05954 × ADFI × ADFI) + (0.0214 × crude protein, %) - (0.00048 × Leu:Val)	-231.4

[1]Model adjusted for heterogeneous errors using the inverse of squared SEM.
[2]Amino acid ratios expressed on standardized ileal digestible (SID) basis.
[3]Bayesian information criterion.

Keywords: branched-chain amino acids, lactation, litter performance, sows