
270 Effects of Different Watering Options on Standardized Ileal Digestibility of Amino Acids and net Energy in Diets fed to Growing Pigs.

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Abstract: Two experiments were conducted to test the hypothesis that different watering options affect the standardized ileal digestibility (SID) of amino acids (AA), apparent total tract digestibility (ATTD) of dry matter (DM) and gross energy (GE), and concentration of net energy (NE) by growing pigs. A corn-soybean meal-based diet was used in both experiments. There were 3 treatments: 1) dry feeder plus a water nipple located outside the feeder, 2) wet-dry feeder with the water nipple inside the feeder, and 3) combined system with a water nipple both inside the feeder and also an outside nipple. In Exp. 1, pigs (n = 6; initial weight = 27.53 kg) that were equipped with a T-cannula in the distal ileum were allotted to the 3 treatments using a replicated 3 × 3 Latin square design with 6 pigs and three 7-d periods. All pigs were fed an N-free diet for an additional period to determine basal endogenous losses of AA. Chromic oxide was added to all diets and ileal digesta were collected according to standard procedures. In Exp. 2, 24 pigs (initial weight = 50.23 kg) were allotted to the 3 treatments using a replicated 3 × 3 Latin square design with 6 chambers (i.e., 4 pigs per chamber) and three 15-d periods. Oxygen consumption and CO₂ and CH₄ productions were measured during fed and fasting states and fecal and urine samples were collected. In both experiments, pigs were allowed ad libitum access to feed and water. Results indicated that there were no differences among watering options for SID of AA, feed intake, total and fasting heat production, ATTD of DM and GE, or NE in diet. In conclusion, different watering options did not affect the digestibility of AA, DM, and GE and concentration of NE in a corn-soybean meal diet fed to growing pigs.

Keywords: net energy, standardized ileal digestibility, watering option

272 Effects of a Probiotic Bacillus Strain on Ileal Digestibility of Crude Protein, Starch, Energy and fat and Total Tract Digestibility of Energy and Dietary Fiber in Diets fed to Weanling Pigs. Maryane Sespere Faria de Oliveira¹, Guillermo Jimenez², Hans H. Stein¹, ¹University of Illinois at Urbana-Champaign, ²Rubinum, S.A.

Abstract: An experiment was conducted to test the hypothesis that probiotic *Bacillus toyonensis* M15750 improve the apparent ileal digestibility (AID) and apparent total tract digestibility (ATTD) of energy and nutrients when included in diets fed by weanling pigs. A control diet was formulated based on corn, soybean-meal, and distillers dried grains with solubles and a second diet was formulated by supplementing the probiotic *Bacillus toyonensis* M15750 (1×10^9 cfu/kg feed) to the control diet. Titanium dioxide (0.50 %) was added to the diets as an indigestible marker. Sixteen weanling barrows (10.7 ± 0.7 kg) that had a T-cannula in the distal ileum were allotted to the two diets with 8 replicate pigs per diet in a randomized complete block design with body weight being the blocking factor. Pigs were adapted to the diets and to the metabolism crates for 7 days, urine and fecal materials were collected during the following 4 days according to standard procedures using the marker-to-marker approach, whereas ileal digesta were collected for 8 h during the following 2 days. The AID and ATTD of energy and nutrients were calculated for each diet. The AID of dry matter and gross energy was greater ($P < 0.05$) and the AID of starch tended to be greater ($P = 0.05$) in the diet supplemented with the probiotic *Bacillus toyonensis* M15750 compared with the control diet (Table 1). However, no differences were observed for the ATTD of energy or nutrients between the 2 diets, which indicates that the increased digestibility in the small intestine of pigs fed the diet supplemented with *Bacillus toyonensis* M15750 was offset by a reduction in hindgut fermentation. These results indicate that inclusion of probiotic *Bacillus toyonensis* M15750 in diets for weanling pigs have the potential to improve the AID of dry matter, gross energy and starch.

Table 1. Apparent ileal digestibility (AID) and apparent total tract digestibility (ATTD) of dry matter, energy, and nutrients and digestible energy and metabolizable energy of experimental diets fed to pigs¹

Item	Control diet	Control diet + <i>Bacillus toyonensis</i> M15750	SEM	P-value
AID, %				
Dry matter	66.92	70.67	0.76	0.026
Gross energy	68.89	72.18	0.72	0.041
Crude protein	71.56	72.79	1.06	0.458
Acid hydrolyzed ether extract	73.90	75.30	2.14	0.535
Starch	90.19	92.28	0.65	0.051
ATTD, %				
Dry matter	88.13	87.56	0.57	0.523
Gross energy	87.94	87.06	0.63	0.383
Acid hydrolyzed ether extract	78.23	78.04	1.26	0.807
Insoluble dietary fiber	67.09	66.67	1.52	0.854
Soluble dietary fiber	74.41	70.38	2.94	0.388
Total dietary fiber	67.78	67.05	1.41	0.740
Digestible energy, kcal/kg	3,498	3,458	25.48	0.322
Metabolizable energy, kcal/kg	3,339	3,302	35.09	0.495

¹Data are means of 6 observations for basal diet and 7 observations for the diet with the *Bacillus toyonensis*.

Keywords: Bacillus, digestibility, probiotics

274 Effects of Feeding Levels in Early Gestation on PIC Camborough Sows and Litter Performance.

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Abstract: Our objective was to determine the effects of increasing feeding levels for PIC Camborough sows during early gestation on sow and litter performance. A total of 636 sows (PIC Camborough) were randomly assigned at weaning to 1 of 4 treatments that were balanced for weight and caliper scores within parity categories. Treatments consisted of feeding sows with daily feed allowances to meet 85, 115, 145, or 175% of the NRC (2012) maintenance metabolizable energy (MEM) requirement calculated as MEM, kcal/d = 100 × (body weight, kg)^{0.75}. A common corn-soybean meal-distillers dried grains with solubles-based diet with 3,092 kcal of ME/kg and 0.64% standardized ileal digestible lysine was used. Treatments were applied from d 6 to 35 of gestation, after which sows were moved to gestation pens and fed according to body condition through an electronic sow feeder until moved to the farrowing room. Sow was the experimental unit and data were analyzed using generalized linear mixed models with the lmer and glmer functions of R. On average, females were ideal condition at weaning across treatment as determined by the caliper scores. Average feed allowances were 1.6, 2.1, 2.6, and 3.2 kg/day for the 85, 115, 145, and 175% treatments, respectively. Increasing feed allowances reduced (linear, P < 0.05) body weight loss (-13.8, -10.3, -4.7 and -0.5 kg, respectively) and increased caliper score gain (-0.43, -0.03, 0.64, 0.76 units, respectively) from weaning to d 35 of gestation. There was no evidence for treatment effects on farrowing rate, total born, stillborn rate, average litter weight, piglet throughput, or subsequent reproductive performance. In summary, increasing feed allowances to meet 85 to 175% of the MEM requirements during early gestation on Camborough sows resulted in a reduction in body weight loss and an improvement in caliper gain until d 35 of gestation without evidence of impact in reproductive performance.

Keywords: Camborough, early gestation, feeding levels, reproduction