of glucagon-like peptide-2 (GLP-2) and insulin. No effects of diet were observed for milk N, CP, or insulin; however, N, CP, and insulin were increased ($P < 0.05$) on d 1 compared to d 14. When evaluating DM and GE, no diet or time effects were observed. For piglet GLP-2, a treatment by time interaction was observed ($P < 0.009$); specifically, GLP concentrations were greater ($P < 0.001$) in CTL+ compared to RES (6.73 vs. 1.21 ng/mL). For serum insulin, a treatment by time interaction was observed ($P < 0.01$); specifically, insulin in RES was greater ($P < 0.03$) than CTL on d 1. In conclusion, nutritional management of the developing gilt may impact piglet serum biomarkers during lactation.

Key Words: energy restriction, milk, sows
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167 The impact of dietary SID Trp:Lys on growth performance of nursery pigs. D. D. Koehler[1,*], J. F. Patience[2], K. J. Touchette[3], S. A. Gould[2], T. A. Kellner[2], L. M. Gesing[1], L. S. Courtney[1], *[1]Vita Plus Corporation, Madison, WI, [2]Iowa State University, Ames, [3]Ajinomoto Heartland, Inc., Chicago, IL.*

The current NRC recommended SID tryptophan-to-lysine ratio (Trp:Lys) for nursery pigs is 0.17 (NRC, 2012). However, studies in both high-health and health-challenged pigs have reported performance advantages with Trp:Lys from 0.20 to 0.26. Therefore, the objective of this experiment was to evaluate the impact of varying SID Trp:Lys on growth performance of nursery pigs. There were 5 dietary treatments with 9 pens (90 pigs) per treatment. Pigs were fed a common diet from d 0 to 7. The five dietary treatments with titrated SID Trp:Lys (0.150, 0.175, 0.200, 0.225, and 0.250) were fed from d 7 to 35 in two 2-wk dietary phases. Pigs were individually weighed, and feed remaining in feeders was weighed on d 0, 7, 14, 21, 28, and 35. Data were analyzed using PROC MIXED of SAS with block as a random effect. Pen was the experimental unit. Incremental body weight and the corresponding rate of gain and feed efficiency were analyzed as repeated measures. For each variable, normal distribution of residuals was tested using PROC UNIVARIATE. Determination of the optimal SID Trp:Lys of the 5 dietary treatment least squares means were analyzed using PROC REG for linear, quadratic, and broken line models. PROC NILN was utilized for exponential regression analysis. Over the entire experiment increasing Trp:Lys resulted in increased ADG ($P = 0.002$), decreased ADFI ($P = 0.023$), improved gain to feed ratio ($P = 0.008$), and increased BW exiting the nursery (d 35; $P = 0.007$). The relationship between Trp:Lys and overall G:F tended to be significant when fitted to an exponential curve (Fig. 3; $P = 0.061$), but not a linear, quadratic, or broken line curve ($P \geq 0.244$). These data indicate that there is no advantage in growth performance and feed efficiency to having a diet containing a SID Trp:Lys greater than 0.175 for nursery pigs. These data are supportive of the 0.17 Trp:Lys ratio specified by the NRC.

Key Words: lysine, nursery pigs, tryptophan
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168 Effects of a gluco-oligosaccharide on growth performance of nursery pigs. F. Wu*, J. M. DeRouchey, M. D. Tokach, S. S. Dritz, J. C. Woodworth, R. D. Goodband, *Kansas State University, Manhattan.*

A total of 3456 pigs (initially 5.63 ± 0.41 kg) were used in a 42-d study to determine the effects of gluco-oligosaccharide (Midori USA, Inc., Cambridge, MA) on growth performance. In each of 3 rooms, pens of pigs (27 pigs/pen) were blocked (6, 5, and 5 blocks in room 1, 2, and 3, respectively) by initial pen weight and allotted randomly to 1 of 8 dietary treatments in a 2-phase feeding program (d 0 to 14 and 14 to 42). Dietary treatments were arranged in a 2 × 4 factorial: with or without antibiotic (0 or 55 ppm, Carbadox, Phibro Animal Health Corp., Teaneck, NJ) and 4 gluco-oligosaccharide concentrations (0, 200, 400, and 600 mg/kg). Gluco-oligosaccharide product used in rooms 1 and 2 originated from a different batch than that used in room 3. No 3-way or antibiotic × gluco-oligosaccharide interactions were observed for any overall growth responses, but tendencies were observed ($P < 0.10$) for room × gluco-oligosaccharide interaction for final BW and ADG. In rooms 1 and 2, antibiotic treatment increased ($P < 0.05$) ADG and ADFI in both phases and overall and G:F from d 14 to 42. Increasing gluco-oligosaccharide increased (linear, $P < 0.05$) ADG from d 0 to 14, d 14 to 28, and overall, and increased (linear, $P < 0.01$) G:F from d 0 to 14 and overall. In room 3, a smaller response was observed for antibiotic inclusion with only increased ($P < 0.05$) G:F from d 14 to 28 and ADG and ADFI from d 28 to 42. Pigs fed increasing gluco-oligosaccharide tended (linear, $P < 0.10$) to have decreased ADG and ADFI from d 14 to 28; however, overall growth performance was not affected by antibiotic or gluco-oligosaccharide treatments. In conclusion, feeding gluco-oligosaccharide may improve growth performance in nursery pigs, and this effect is independent of antibiotic treatment and more prominent during the early nursery phase. However, further research is required to confirm the consistency of the responses to the gluco-oligosaccharide used in this study.

Key Words: antibiotic, gluco-oligosaccharide, nursery pig
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Table 167. Least squares means for SID Trp:Lys in nursery pigs

	SID Trp:Lys					Pooled	
Item	0.150	0.175	0.200	0.225	0.250	SEM	*P* value
ADG, kg	0.338	0.372	0.356	0.332	0.364	0.013	0.002
ADFI, kg	0.510	0.539	0.531	0.491	0.529	0.021	0.023
Gain/Feed	0.661	0.691	0.680	0.676	0.688	0.006	0.008