

information were collected at the start and end of the phase to allow for calculation of average daily gain (ADG), average daily feed intake (ADFI), and feed efficiency (G:F). All pigs were vaccinated against porcine circovirus, *Mycoplasma hyopneumoniae*, Salmonella, and Lawsonia. The pigs were porcine reproductive respiratory syndrome and porcine epidemic diarrhea virus negative. Data were analyzed as a randomized complete block design using the PROC MIXED procedure of SAS with pen as the experimental unit, treatment as a fixed effect, and block as the random effect. Results were considered significant at $P \leq 0.05$ and considered a trend at $P > 0.05$ and $P \leq 0.10$. Overall, there were no significant differences in average daily gain (0.96, 0.98, 0.98, and 0.97 kg/d; $P > 0.10$) or feed to gain (0.38, 0.39, 0.39, 0.39; $P > 0.10$) between dietary treatments. In conclusion, the feeding of high levels of feed grade lysine when crude protein remains above 13% crude protein does not impact performance. Furthermore, the addition of potassium chloride and choline chloride did not influence performance.

Key Words: lysine, grow-finish, pig

345 Effects of Lysine (and ideal protein) Levels on Performance of Pigs with and without the Addition of a Blend of Phytonutrients (Lean Fuel) in the Late Finishing Phase. F.

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The objective of this experiment was to determine whether the response in performance to different levels of lysine (ideal protein) is affected by a blend of phytonutrients (Lean Fuel, LF), and whether altered Lysine:ME ratios are required when formulating with LF. A total of 1,847 DNA 600 finishing pigs (BW=85.7kg, 2.5) were allocated randomly among 8 treatments using a randomized complete block design. Diets were formulated to SID Lys levels of 0.45%, 0.55%, 0.65%, and 0.75%, with or without (0.125%) Lean Fuel in a 4×2 factorial arrangement. All diets contained 3,318 kcal ME/kg. Diets were formulated with corn and soybean meal with no DDGS. SID Lys:ME ranged from 1.35 to 2.26 g/Mcal, respectively and diets were formulated according to ideal protein level where protein level followed SID Lysine level. There were 24-27 pigs/pen with 7-9 replications per treatment. Pens of pigs were weighed and feed disappearance recorded on d 0, 7, 21, and 50 to calculate ADG, ADFI, and G:F. Analysis used the MIXED procedure of SAS with a randomized complete block design. In addition,

orthogonal polynomial contrast was used to determine the effect of levels of SID Lys with or without LF. The NLIN procedure of SAS was used for the Broken-line analysis with overall ADG, ADFI, and G:F. During d 7-21, lysine level improved ADG linearly ($P < 0.05$) without LF and quadratically with LF ($P < 0.05$). Diets of 0.55% and 0.65% SID Lysine with LF led to higher G:F than diets of 0.55% and 0.65% without LF (0.285, 0.299 vs 0.276, 0.276; $P < 0.05$ SEM 0.005). Overall, as dietary Lys increased, ADG increased linearly ($P < 0.01$; 858 g, 893 g, 988 g, and 989 g, respectively) without LF and quadratically ($P = 0.007$ SEM 26; 888 g, 975 g, 971 g, and 987 g, respectively) with LF. LF improved G:F ($P < 0.05$) at 0.45% SID Lysine (0.270 vs 0.283) and at 0.55% SID Lysine (0.282 vs 0.294) with no effect on ADG or G:F at 0.65 and 0.75% SID Lysine. Using broken-line analysis, Lys breakpoint for maximum ADG was lower when LF was added (0.67%) in the diet than without (0.69%). However, the breakpoint where lysine achieved the best G:F was much lower at 0.59% as compared to 0.69% when LF was fed. The results of this experiment suggest that the Lysine:ME ratio may need to be adjusted when feeding LF, and this depends on whether ADG or G:F is the key performance criteria.

Key Words: lysine, finishing pig, growth performance

346 Effects of Feeding a Finisher Feed Containing Ractopamine HCl to Pigs Sorted By Body Weight at Placement on Growing-Finishing Pig Growth Performance. C. M. Vier*, M. B.

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Our objective was to determine the effects of feeding left over finisher diet containing ractopamine HCl (RAC) and 0.82% standardized ileal digestible (SID) Lys to grower pigs of different BW at placement in the finisher. A total of 1,188 pigs (PIC 359 \times 1050; initially 16.6 ± 0.16 kg) were used in a 72-d study. Pens of pigs were blocked by location and randomly allotted to 1 of 6 treatments. Treatments included three BW categories: light (12.0 ± 0.27 kg), medium (15.9 ± 0.38 kg), and heavy (21.9 ± 0.55 kg); and two dietary strategies: standard grow-finisher diets throughout (Control) or 4.5 kg/pig of a late finishing feed containing 5 mg/kg RAC and 0.82% SID Lys fed at placement and then standard diets thereafter. There were 7 pens per treatment and 27 pigs per pen. Dietary strategy, BW category, and their interaction were included as fixed effects in the statistical model and location block as a

Item	Light		Medium		Heavy		SEM
	Control	RAC	Control	RAC	Control	RAC	
d 0 to 15							
ADG, g ¹	572 ^d	499 ^e	640 ^e	544 ^d	744 ^a	689 ^b	6.8
ADFI, g ²	807	740	916	866	1,202	1,175	10.9
G:F, g/kg ³	709 ^c	674 ^c	699 ^c	628 ^b	619 ^b	586 ^a	7.3

¹ Diet x BW: $P=0.018$; ² Diet: $P<0.001$, BW: $P<0.001$; ³ Diet x BW: $P=0.026$.

random effect. An interaction ($P<0.03$) between BW and diet occurred for ADG and G:F from d 0-15. Pigs fed the finisher diet with RAC had reduced ADG and G:F within all three BW categories. However, the decrease was greater in the medium BW than the other two BW categories. Pigs fed the finisher diet with RAC had reduced ADFI compared to pigs fed the control ($P<0.001$) from d 0-15. Overall, ADG, ADFI, and G:F differed between the BW categories ($P<0.001$), with heavy pigs having greater ADG and ADFI, and poorer G:F. Pigs fed the 4.5 kg/pig of finisher diet with RAC had reduced growth rate (761 vs 784 g/d; $P<0.001$) and feed intake (1.61 vs 1.65 kg/d; $P<0.005$), but no evidence for differences were observed for G:F. In conclusion, feeding a finishing diet containing ractopamine during the early stages of the grower period reduced growth performance regardless of BW category due to a decrease in feed intake compared to pigs fed standard grow-finisher diets. This demonstrates that bins holding a finisher diet containing RAC and 0.82% SID Lys should be emptied prior to placement of the next group of pigs.

Key Words: ractopamine, growth, leftover

347 The evaluation of feed acidification with feed grade sodium formate on wean to finish pig performance.

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In study one, 1,200 pigs (PIC 337 × Camborough; PIC, Hendersonville, TN) started at 5.91 kg were allocated to one of 4 dietary feed grade sodium formate regimens (Amasil NA, BASF, Florham Park, NJ) to evaluate the inclusion of sodium formate on wean-finish pig performance. Dietary treatments consisted of: 1. Basal diet, 2. 3 g Amasil/kg from wean to finish, 3. 6 g Amasil/kg from wean to the end of the grower period (d 84) and again at 106.6 kg BW, and 4. 9 g Amasil/kg from wean to the end of the nursery period (d 42) and again at 106.6 kg BW. A second study, evaluated 0, 3, 6, and 9 g Amasil NA/kg during the grow-finish (30-74 kg BW) period using an additional 48 single gender pens. Pigs

were blocked by sex and equalized weight. The diets fed in both studies were all in meal form and were formulated to meet or exceed current NRC (2012) recommendations. Mortalities and pen removals were weighed and recorded. Pigs were PRRS and PEDV negative and were vaccinated for PCV2, *Mycoplasma hyopneumoniae*, Salmonella and Lawsonia. Data were analyzed as a randomized complete block design using Proc mixed with pen as the experimental unit, treatment as the fixed effect, and block as the random effect. In study 1, there were significant reductions in ADG and improvements in G:F with the inclusion of sodium formate in weeks 2-3 (0.88, 0.83, 0.83, 0.84 ± 0.01 kg/d; $P=0.02$; and 0.68, 0.75, 0.74, 0.78 ± 0.04; $P=0.01$, respectively). Furthermore, there was a significant improvement (0.41, 0.42, 0.42, 0.42 ± 0.02, respectively; $P=0.03$) in G:F from d0 through the first market with the use of the sodium formate with no differences in ADG. In study 2, there was a tendency for improvement in ADG (0.94, 0.97, 0.95, 0.96 ± 0.02 kg/d, respectively; $P=0.09$) when pigs were fed 3g of Amasil/ kg of feed from the start of the study for the 42 days. In conclusion, the use of feed grade sodium formate improves feed efficiency in the nursery and that may be carried over into the grow-finish period.

Key Words: performance, pig, sodium formate

348 The Effect of a Bacillus Subtilis-Based Direct-Fed Microbial Feed Additive on the Lactation Performance of Sows and Their Offspring.

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Two experiments were completed to quantify the effect of a *Bacillus subtilis*-based direct-fed microbial feed additive (DFM) on lactation performance of sows and their piglets. In both experiments, multiparous sows (PIC C29 & 1050 genetic lines) were randomly allotted to one of two dietary treatments within breeding/farrowing group, genetic line, and parity (replicate). Treatments included a control diet devoid of DFM and the control diet supplemented with DFM (Visano™ Sow, United Animal Health, Inc.)