

P069 Table

Treatment:	1	2	3	4	5	6	7	8	
Diet*:	C	C	C	H	H	H	H	H	
Portion Ground:		Corn	Corn		Corn	Corn	Diet	Diet	
Item Diet form:	Meal	Meal	Pellet	Meal	Meal	Pellet	Meal	Pellet	SEM
ADG, g	648	621	618	585	564	599	548	573	24.8
ADFI, g	1001	963	948	935	917	909	861	890	41.1
G:F	0.648	0.647	0.652	0.626	0.615	0.659	0.637	0.644	0.01
Caloric efficiency, mcal/kg									
ME	5.12	5.14	5.09	5.20	5.31	4.95	5.11	5.07	0.08
NE	3.66	3.67	3.63	3.65	3.73	3.48	3.59	3.56	0.05
Final wt, kg	24.8	24.2	24.7	23.4	23.3	23.8	22.4	23.1	0.58

G:F. Pelleting improved performance; however, fine grinding corn or other components of the high-by-product diet did not further improve nursery pig performance. (See table above.)

Key Words: DDGS, feed processing, wheat middlings

P070 The effects of feeder design (conventional dry vs. wet-dry) on growth performance of 20- to 12-kg pigs. S. Nitikanchana¹, S. Dritz, M. Tokach, R. Goodband, J. DeRouche, J. Nelssen, *Kansas State University, Manhattan.*

A total of 1,253 pigs (PIC 1050 × 337; initially 20.4 kg) were used in a 104-d study to evaluate the effects of using a wet-dry (WD) or conventional dry (CD) feeder on growth performance of growing-finishing pigs. There were 25 to 27 pigs per pen and 24 pens per feeder type. At the start of the trial, pens of pigs were weighed and randomly allotted to 1 of the 2 feeder types. The CD feeder was a single-sided, 1.42 m wide, stainless steel feeder (Thorp Equipment, Inc., Thorp, WI) with 4 feeding spaces that were 35.6 cm wide and a 10.8 cm deep trough. A cup waterer in the pen using CD feeders ensured ad libitum access to water. The WD feeder was double-sided (38.1 cm wide feeder opening on each side) with a single nipple waterer (Crystal Springs, GroMaster, Inc., Omaha, NE) where water in the feeder was the only source of water. All pigs were fed the same corn-soybean meal diets containing 30% bakery meal and 10 to 45% dried distillers grains with solubles during 5 dietary phases. For the overall period, pigs fed with WD feeders had greater ADG ($P < 0.01$) and ADFI ($P = 0.01$) with no differences in G:F ($P = 0.51$) compared with pigs fed using the CD feeder. This study confirms previous results where pigs fed using a WD feeder have greater ADG and ADFI than those fed with a CD feeder.

Effects of feeder design (conventional dry vs. wet-dry) in 20- to 112-kg pigs

Feeder type	Conventional dry	Wet-dry	SEM	Probability, $P <$
d 0 to 104				
ADG, g	863	891	4.58	0.01
ADFI, g	2153	2235	21.9	0.01
G:F	0.402	0.399	0.003	0.51

Key Words: feeder design, growth, pigs

P071 The effects of increasing levels of pellet fines on growth performance of 14 to 34 kg nursery pigs. E. D. Frugé^{1,*}, E. L. Hansen¹, S. A. Hansen¹, K. A. Frerichs¹, C. W. Hastad², *¹Hubbard Feeds, Mankato, ²New Fashion Pork, Jackson.*

An experiment was conducted to determine the effects of increasing levels of pellet fines (0 to 100% fines) on growth performance compared to pigs fed meal diets. Pigs (N=1000, 14.5 kg) were allotted to 6 dietary treatments (TRT) with 6 replicates and 27

or 28 pigs per pen in a randomized complete block design. The experimental TRT were; 1) Meal diet; 2) pellet (screened); 3) Pellet with 25% fines; 4) Pellet with 50% fines; 5) Pellet with 75% fines; 6) Pellet with 100% fines. Percentage fines were achieved by roller grinding pellets and blending back to screened pellets. All diets were identical in ingredient and nutrient composition. Pig weights and feed disappearance were measured on d 0, 7, 14, 21, and 28. A summary of the overall (d 0 to 28) results is presented in Table 1. Pigs fed TRT 2 had improved ADG compared with pigs fed TRT 1, 5 and 6 with pigs fed TRT 3 and 4 intermediary. Pigs fed TRT 2 had improved G:F compared with all other TRT. Pigs fed TRT 3 and 4 had improved G:F compared to pigs fed TRT 1, whereas pigs fed TRT 5 and 6 had similar G:F with pigs fed TRT 1. There were no TRT differences for ADFI. Final BW of pigs fed TRT 2 was heavier than pigs fed TRT 1, 5 and 6 with those fed TRT 3 and 4 intermediary. Pigs fed TRT 6 had lighter final BW compared to those fed TRT 1. Regression curves were fitted for TRT 2 - 6 for ADG ($y = -0.6677x + 749.81$, $R^2 = 0.91$), ADFI ($y = -0.0088x^2 + 0.05019x + 1121.4$, $R^2 = 0.89$) and G:F ($y = -0.0004x + 0.6587$, $R^2 = 0.95$). These data allow for performance and financial analysis on the effects of diet form and pellet fines of 14 to 34 kg pigs.

Table 1 The effects of increasing levels of fines.¹

TRT ²	1	2	3	4	5	6	SEM	$P <$
Initial BW, kg	14.6	14.5	14.7	14.4	14.5	14.5	0.10	0.50
ADG, g	705 ^b	742 ^a	721 ^{ab}	723 ^{ab}	699 ^{bc}	677 ^c	9.50	0.05
ADFI, g	1130	1126	1130	1131	1105	1089	15.71	0.33
G:F	0.62 ^c	0.66 ^a	0.64 ^b	0.64 ^b	0.63 ^{bc}	0.62 ^c	0.004	0.05
Final BW, kg	34.4 ^b	35.3 ^a	34.9 ^{ab}	34.7 ^{ab}	34.1 ^{bc}	33.4 ^c	0.31	0.05

¹abc Within a row, means without common superscript differ ($P < 0.05$).

²Actual fines: meal, 5, 43, 59, 73, & 100%

Key Words: fines, nursery pigs, pellet

P072 Effects of increasing dietary bakery meal on growing-finishing pig growth performance and carcass quality. C. Paulk^{1,*}, S. Nitikanchana², S. Dritz², M. Tokach¹, J. Nelssen¹, J. DeRouche¹, R. Goodband¹, K. Prusa³, *¹Animal Science and Industry, ²Diagnostic Medicine Pathobiology, Kansas State University, Manhattan, ³Animal Science, Iowa State University, Ames.*

A total of 1,263 pigs (PIC 337 × 1050; initially 35.3 kg BW) were used in a 102-d study to determine the effects of dietary bakery meal on growth performance and carcass quality. Pens were randomly allotted to 1 of 3 dietary treatments while balancing for initial BW and gender. There were 16 pens per treatment with 25 to 28 pigs per pen. Dietary treatments included 0, 7.5, and 15% bakery meal. Analyzed bakery meal contained 14.0% CP, 8.1% ADF, 19.0% NDF, 6.4% fat, and 5.3% ash (as-fed basis). On d 84, the 5 heaviest

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Item	Bakery meal,%				SEM	Item	Bakery meal,%			
	0	7.5	15	SEM			0	7.5	15	SEM
ADG, g	933	916	928	7	HCW, kg	97.0	96.3	96.8	0.7	
G:F	0.381	0.374	0.371	0.003	Yield, %	75.6	75.8	75.4	0.2	
Caloric efficiency, mcal/kg					Backfat thickness, mm ¹	15.8	15.9	15.6	0.2	
ME	8.93	9.17	9.30	0.08	Loin depth, mm ¹	70.6	70.6	70.8	0.4	
NE	6.70	6.79	6.81	0.06	Lean, % ¹	51.4	51.3	51.5	0.1	
Final BW, kg	128.4	127.0	128.4	1.0	Belly IV					
					d 84	78.7	78.6	80.2	0.6	
					d 102	75.2	76.0	81.1	1.0	

¹Adjusted to a common HCW.

pigs from each pen (determined visually) were sold. On d 102, the remaining pigs were sent to harvest for carcass data collection. On d 84 and d 102, the median weight market pig from every pen was selected (determined visually) for collection of carcass quality measurements. Pigs fed diets containing 7.5% bakery meal tended to have the lowest (quadratic, $P<0.07$) ADG. Increasing bakery meal worsened (linear, $P<0.02$) G:F and caloric efficiency on a ME basis. This suggests that ME values overestimated the energy value of bakery meal (3,700 ME kcal/kg; 2,415 NE kcal/kg). There were no differences ($P>0.21$) in carcass weight, yield, backfat, or loin depth. For pigs subsampled on d 84, belly fat iodine value (IV) tended to increase (linear, $P<0.09$) as bakery meal increased. Pigs subsampled on d 102 had decreased (linear, $P<0.04$) middle and edge belly thickness, increased (linear, $P<0.001$) belly IV, and tended to lower (linear, $P<0.09$) belly weight with increased bakery meal. In conclusion, adding this bakery meal source negatively affected growth performance and carcass fat quality with most of the negative effects on fat IV when feeding 15% bakery meal. (See table above.)

Key Words: bakery meal, carcass quality, growing-finishing pigs

P073 The effects of soybean hulls and their particle size on growth performance and carcass characteristics of finishing pigs. D. Goehring^{*}, J. M. DeRouchey, S. S. Dritz, M. D. Tokach, R. D. Goodband, J. L. Nelssen, *Kansas State University, Manhattan.*

A total of 1,215 pigs (initial BW 31.1 kg) were used in a 118-d study to determine the effects of 7.5 and 15% soybean hulls (unground or ground) on growth performance and carcass characteristics of finishing pigs raised in a commercial environment. Pens were balanced by initial BW and gender (28 pigs/pen) with 9 replications per treatment. Treatments were arranged in a 2 × 2 + 1 factorial with main effects of soybean hull particle size (unground or ground, 787 and 370 μ, respectively) and soybean hull level (7.5 or 15%) in corn-soybean meal-based diets. The fifth treatment was a positive control, corn-soybean meal-based diet. All diets were fed in meal form. No particle size × soybean hull interactions ($P>0.18$) were observed. Increasing soybean hulls, regardless of particle size, did not affect ADG but numerically increased ($P=0.11$) ADFI, resulting in poorer (linear, $P<0.02$) G:F. Increasing soybean hulls improved (linear, $P<0.002$) caloric efficiency on an ME and NE basis, indicating published energy values undervalue the energy content of soybean hulls. Grinding soybean hulls to a fine particle size worsened G:F ($P<0.05$) and caloric efficiencies ($P<0.03$). Carcass yield and HCW decreased (linear, $P<0.03$) with increasing soybean hulls. Increasing soybean hulls decreased (linear, $P<0.001$) backfat depth and increased ($P<0.01$) percentage lean. Grinding soybean hulls

to a fine particle size prior to diet manufacturing increased backfat depth ($P<0.002$) and decreased ($P<0.004$) percent lean and FFLI. In summary, increasing dietary soybean hulls to 7.5 or 15% did not affect ADG, ADFI, or final BW in growing and finishing pigs; however, G:F became poorer and carcass yield and HCW decreased.

Item	Soybean hulls, %:		7.5		15		SEM
	0	7.5	Ground	Unground	Ground	Unground	
ADG, g	835	841	837	820	843	9.8	
G:F	0.391	0.381	0.387	0.375	0.384	0.004	
Caloric efficiency, Mcal/kg							
ME	8.54	8.49	8.32	8.29	8.08	0.09	
NE	6.33	6.20	6.07	5.95	5.80	0.06	
Final BW, kg	128.3	128.8	127.7	126.5	128.9	1.39	
Carcass yield, %	76.6	75.2	75.4	75.2	75.0	0.36	
Lean, % ^a	57.4	57.5	58.1	57.8	58.4	0.19	
Loin depth, mm ^a	66.7	65.0	66.1	66.2	65.4	0.67	
Backfat depth, mm ^a	15.4	14.9	14.3	14.7	13.7	0.26	

^a HCW used as covariate

Key Words: finishing pig, particle size, soybean hulls

P074 Effect of replacing soybean meal with low oligosaccharide soybean meal in the diets of early weaned pigs. D. Pangeni^{1,*}, J. A. Jendza², L. Anil², S. K. Baidoo², ¹*Department of Animal Science, University of Minnesota, Saint Paul,* ²*Southern Research and Outreach Center, University of Minnesota, Waseca.*

An experiment was conducted to determine the effect of replacing conventional soybean meal (cSBM, 46.55 % CP) with low oligosaccharide soybean meal (LOSBM, 53.16 % CP) on growth performance, blood urea nitrogen (BUN), intestinal morphology and digesta viscosity of early-weaned pigs. Thirty-two 19-d old pigs (6.9 ± 0.4 kg BW) were assigned to individual pens based on a randomized complete block design, with 8 blocks (wt. group) of 4 dietary treatments. Four iso-nitrogenous nursery diets were formulated and used in 2 × 2 factorial arrangement with factors consisting of soybean meal type (cSBM vs. LOSBM) and FM/SDPP (with or without). Pigs were fed ad libitum through the entire experimental period of 14 d. Pigs were weighed; blood was collected via jugular vena puncture and were euthanized by overdose of sodium pentobarbital for organ (intestine, pancreas, liver, heart, kidney and spleen) harvest. No interaction of FM/SDPP and the source of soybean meal were observed for the response criteria studied. Average daily gain and average daily feed intake were not affected by dietary treatments. However, inclusion of FM/SDPP improved ($P = 0.03$) gain to feed ratio. Treatments had no effect on organ weights and intestinal length. No effect of dietary treatment was observed for