132 Comparison of carbohydrate sources for the early weaned pig.

S. S. Dritz*, R. D. Goodband, J. L. Nelssen, M. D. Tokach, and C. A. Kerr. Kansas State University, Manhattan.

A total of 180 weanling pigs (initially 5.3 kg and 21 d of age) was used in a 35 d growth assay to compare various carbohydrate sources. Pigs were allotted by weight and ancestry with six pigs per pen and six replications per treatment. The carbohydrate sources compared were corn, edible-grade oat flour, two modified potato starches, and lactose. Potato starch 1 was a spray-dried glucose syrup with a dextrose equivalent of 20g/100g. Potato starch 2 consisted of primarily spray-dried malto-dextrin and has a dextrose equivalent of 6g/100g. The various carbohydrate sources were substituted on an equal lysine basis using a combination of casein and L-lysine HCl. Soybean meal level was held constant in all diets. The five carbohydrate inclusion levels were as follows: 1) 36.5% ground corn (Corn), 2) 36.5% edible grade oat flour (Oat), 3) 12% modified potato starch 1 and 23.9% ground corn (PS 1), 4) 12% modified potato starch 2 and 23.9% ground corn (PS 2), and 5) 12% lactose and 23.9% ground corn (Lactose). All phase I (d 0 to 14 postweaning) diets were formulated to contain 1.6% lysine. The phase I diets contained, 7.5% spray dried porcine plasma, 1.75% spray-dried blood meal, and 25% dried whey. All pigs were fed the same phase II diet (d 14 to 35 postweaning) formulated to contain 1.25% lysine. For d 0 to 14 postweaning, pigs consuming Pot 1 diet had higher (P<.05) ADG and ADFI than pigs consuming the corn or oat flour diets and numerically higher ADG and ADFI than pigs fed the other two diets. Currently, the hygroscopic nature of modified potato starches prohibits regular application in starter pig diets. However, the performance of pigs consuming Pot 1 warrants further investigation. Pigs consuming the lactose diet had higher ADG (P<.05) than pigs consuming the corn diet; however, during the cumulative period (d 0 to 35 postweaning) there was no differences in growth performance. Thus, economics indicate no additional need of lactose above 18% (25% dried edible grade whey) in the phase I diet . There were no differences in performance for any phase of the experiment between the pigs consuming the corn or oat flour diets. In conclusion, oat flour does not appear to be a superior carbohydrate source than corn in the phase I nursery diet.

Item		Corn	Oat	PS 1	PS 2	Lactose	CV
d 0 to 14	ADG, g[a]	313[x]	326[xy]	372[z]	340[yz]	350[yz]	8.3
	ADFI, g[a]	404[z]	400[z]	454[y]	413[xy]	440[xy]	8.7
d 0 to 35	ADG, g	418	431	459	436	427	6.8
	ADFI, g	785	790	799	763	763	4.7

[a]Means lacking a common superscript differ (P < .05).

Key Words: Starter pig, carbohydrate, growth performance.

133 Optimum level of spray-dried porcine plasma for early-weaned (10.5 d of age) starter pigs.

S. S. Dritz*, M. D. Tokach, R. D. Goodband, J. L. Nelssen, and K. Q. Owen. Kansas State University, Manhattan.

A total of 290 early-weaned pigs (initially 3.4 kg and 10.5 d of age) was used to evaluate various dietary levels of spray-dried porcine plasma. Pigs were allotted to six replicates with 9 or 10 pigs per pen. Pigs were assigned to one of five experimental diets with spray-dried porcine plasma (5, 7.5, 10, 12.5, or 15%) and lactose replacing dried skim milk on a lysine and lactose basis. Diets were formulated to contain 1.8% lysine, .53% methionine, 4% select menhaden fishmeal, and 25% dried whey. Soybean meal was held constant at 11% of the diets. Pigs were fed these diets from d 0 to 14 postweaning. Common diets were fed from d 14 to 42 postweaning in order to monitor subsequent performance. The common diet fed from d 14 to 25 postweaning contained 1.4% lysine, 2.5% spray-dried porcine plasma, 2.5% spray-dried blood meal, and 20% dried whey. From d 25 to 32 postweaning, the common diet contained 1.25% lysine, 2.5% spray-dried porcine plasma, and 10% dried whey. All pigs were then switched to a common corn-soybean meal diet formulated to contain .95% lysine. During the first phase (d 0 to 14 postweaning), linear improvements in ADG (P<.06) and ADFI (P<.01) were observed as the level of spray-dried porcine plasma increased. This resulted in a linear (P<.06) increase in pig weight on d 14 postweaning. For the first phase, there were no differences in feed efficiency (G/F). From d 14 to 25 postweaning, there were numeric decreases in ADG and ADFI as the level of spray-dried porcine plasma increased. However, this reversal of performance resulted in no difference of pig weights at d 25. From d 25 to 42 postweaning, there was a quadratic effect (P<.04) in ADG. In summary, increasing the level of spray-dried porcine plasma resulted in increased ADG and ADFI from d 0 to 14 postweaning; however, the impact on subsequent performance needs to be investigated further.

		Spray Dried Porcine Plasma, %					
Item		5	7.5	10	12.5	15	CV
d 0 to 14	ADG, g[a]	203	210	215	217	227	10.0
	ADFI, g[b]	219	220	231	233	249	7.8
	G/F	.93	.95	.93	.93	.91	6.3
d 14 to 25	ADG, g	356	342	331	312	338	9.9
	ADFI, g	434	424	412	389	412	9.6
	G/F	.82	.81	.80	.80	.82	6.1
d 25	Wt, kg	10.2	10.2	10.2	10.0	10.4	5.1
d 25 to 42	ADG, g[c]	432	420	408	406	430	5.4

[a,b]Linear effect (P<.06, .01, respectively). [c]Quadratic effect (P<.04).

Key Words: Starter pig, spray-dried porcine plasma, skim milk

134 Spray-dried porcine plasma in diets for early-weaned pigs housed either in an experimental or conventional nursery setting.

R.D. Coffey* and G.L. Cromwell, University of Kentucky, Lexington.

Three 28-d experiments were conducted to evaluate the effects of substituting porcine plasma (PP; American Protein Corp., Ames, IA) for dried skim milk (DSM) in diets for early-weaned pigs housed either in an environmental chamber in newly purchased pens (clean environment; CLN ENV) or a commercial-type nursery (dirty environment; DRT ENV). In all experiments, a corn-soy-20% DSM-20% dried whey (DW) control diet (.80% met+cys) was fed from 0-14 d; from 15-28 d, all pigs received a corn-soy diet with 10% DW. PP substitutions for DSM in the control diet were on a lysine basis, and lactose was added to these diets. In Exp. 1, 80 pigs (17±1 d age; 5.5 kg BW) housed in the CLN ENV were allotted to the following treatments: (1) control diet (1.50% lys, .87% Na), or (2) 3%, (3) 6%, (4) 9%, or (5) 12% PP. Daily gain (ADG), daily feed (ADFI), and feed/gain (F/G) were, respectively: 310, 313, 287, 289, 268 g; 497, 488, 512, 532, 500 g; 1.60, 1.56, 1.79, 1.85, 1.87 for 0-14 d, and 405, 420, 407, 403, 397 g; 740, 702, 723, 719, 698 g; 1.83, 1.67, 1.78, 1.78, 1.76 for the entire trial (0-28 d). ADG and ADFI were not different for pigs fed DSM or PP from 0-14 d or 0-28 d. However, F/G from 0-14 d was poorer (P<.02) for pigs receiving PP than those fed DSM, and F/G increased linearly (P<.001) as the level of PP increased. In Exp. 2 and 3, 160 pigs (18±2 d age; 5.2 kg BW) were fed (1) control diet (1.40% lys, .68% Na) or (2) a diet containing 8.3% PP in the CLN ENV, or these two diets (3, 4) in the DRT ENV. Pooled ADG, ADFI, and F/G were, respectively: 283, 300, 203, 269 g; 411, 483, 260, 376 g; 1.46, 1.62, 1.31, 1.41 for 0-14 d, and 428, 423, 264, 334 g; 675, 701, 461, 549 g; 1.58, 1.66, 1.83, 1.67 for 0-28 d. From 0-14 d and 0-28 d, pigs in the CLN ENV had higher (P<.001) ADG and ADFI than those in the DRT ENV, but F/G from 0-14 d was poorer (P<.001) for pigs in the CLN ENV. In the DRT ENV, pigs consuming PP had greater (P<.03) ADG and ADFI than pigs fed DSM from 0-14 d and 0-28 d. Pigs fed PP in the CLN ENV ate more feed (P<.001) and were less efficient (P<.05) from 0-14 d than those fed DSM. From these results, early-weaned pigs housed in a conventional nursery respond more to dietary PP than those reared in a cleaner nursery.

Key Words: Early-Weaned Pigs, Porcine Plasma, Environment

135 Effects of wheat gluten and plasma protein on growth performance and digestibility of nutrients in nursery pigs.

J.S. Pendergraft*, J.D. Hancock, R.H. Hines, C.G. Mills, and L.L. Burnham, Kansas State University, Manhattan.

An experiment was conducted to determine the nutritional value of spray-dried wheat gluten and porcine plasma in diets for weanling pigs. For the experiment, 120 pigs (6.4 kg avg initial BW) were used in a 35-d growth assay. Phase 1 treatments (fed from d 0 to 14 postweaning) were: 1) dried skim milk (DSM)-dried whey-soybean meal-based control; and 2, 3, and 4) spray-dried wheat gluten (WG), spray-dried porcine plasma (SDPP), and a blend of the wheat gluten and porcine plasma (WG-SDPP) used to replace DSM on a protein basis. All diets were formulated to 1.4% lysine, .9% Ca, and .8% P. For Phase 2 (d 14 to 35), all pigs were fed the same corn-soybean meal-dried whey-based diet (1.20% lysine, .8% Ca, and .7% P). Contrasts (based on Phase 1 treatments) were: 1) DSM vs the other treatments; 2) WG and SDPP vs the WG-SDPP blend; and 3) WG vs SDPP. For d 0 to 14, pigs fed SDPP had greater ADG (P < .03) and ADFI (P < .04) compared to pigs fed WG. However, for d 14 to 21 (i.e., during the transition period to the Phase 2 diet), pigs fed diets with WG during Phase 1 had greater ADG (P < .09) and ADFI (P < .02) compared to pigs fed SDPP. Overall (d 0 to 35), pigs fed diets with WG and(or) SDPP had greater ADG (P < .05) and G/F (P < .01) than pigs fed DSM. These results indicate that SDPP improves growth rate for the initial postweaning phase; however, feeding WG during Phase 1 results in improved growth performance during the transition to a Phase 2 diet.

	Protein Sources				Contrasts			
Item	DMS	WG	SDPP	WG-SDPP	1	2	3	SE
d 0 to 14								
ADG, g	359	349	395	373	-	-	.03	13
ADFI, g	373	339	390	357	-	-	.04	16
G/F	.962	1.029	1.013	1.045	-	-	-	.057
d 14 to 21								
ADG, g	288	429	307	325	-	-	.09	47
ADFI, g	501	592	492	469	-	.04	.02	25
G/F	.575	.725	.624	.693	-	-	-	.093
d 0 to 35								
ADG, g	386	419	413	446	.05	.15	-	16
ADFI, g	582	581	570	586	-	-	-	12
G/F	.663	.721	.725	.761	.01	-	-	.021
Apparent digestibility, %								
DM (d 10)	83.1	81.9	87.2	83.4	-	-	.001	.7
N (d 10)	81.0	77.7	84.3	79.8	-	-	.02	1.4
DM (d 20)	79.8	83.1	77.3	80.9	-	-	-	3.1
N (d 20)	74.6	76.6	73.4	74.1	-	-	-	4.8

Key Words: Wheat Gluten, Plasma Protein, Pig