136 The effect of spray-dried blood meal in the phase III (d 21 to 42 postweaning) diet.

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A total of 216 weanling pigs (initially 5.3 kg and 21 d of age) was used in a 42 d growth assay to determine the optimum level of spray-dried blood meal in the phase III diet (d 21 to 42 postweaning). All pigs were fed the same phase I (d 0 to 7 postweaning) diet that contained 20% dried whey, 7.5% spray-dried porcine plasma, 1.75% spray-dried blood meal, and formulated to contain 1.5% lysine and .44% methionine. On d 7 postweaning, pigs were switched to the same phase II (d 7 to 21 postweaning) diet that contained 10% dried whey, 2.5% spray-dried blood meal and formulated to contain 1.25% lysine and .35% methionine. On d 21 postweaning (10.9 kg BW), pens were randomly assigned to one of six experimental diets. Experimental diets were corn-soybean meal based and contained 0, .5, 1.0, 1.5, 2.0, or 2.5% spray-dried blood meal and formulated to contain 1.15% lysine and .35% methionine. During phase I, ADG, ADFI, and G/F were 245 g, 277 g, and .86, respectively. During phase II, ADG, ADFI, and G/F were 281 g, 540 g, and .52, respectively. During phase III, there was a linear (P < .05) decrease in ADG and G/F as spray-dried blood meal increased. However, the reduction in ADG and G/F was only evident at 2 and 2.5% spray-dried blood meal. Lower inclusions of blood meal (< 2%) had no influence on pig performance. In conclusion, if the early-weaned pig is fed complex phase I and II diets containing high quality protein sources from weaning to 11 kg, a simple corn-soybean meal diet can be fed from 11 to 23.5 kg without sacrificing growth performance.

		Spray-dried blood meal, %						
Item		0	.5	1.0	1.5	2.0	2.5	CV
d 21 to 42								
	ADG, g[a]	603	626	608	599	586	576	6.3
	ADFI, g	1,021	1,062	1,035	1,021	1,008	1,040	6.6
	G/F[a]	.59	.58	.58	.59	.58	.55	4.6

[a] Linear effect of spray-dried blood meal (P < .05).

Key Words: Blood Meal, Pigs, Growth Performance.

137 The effects of dietary soy protein source fed to the early weaned pig on subsequent growth performance.

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Two hundred ninety-five pigs (initially 5.6 kg and 21 ± 2 d of age) were used to determine the effect of different soy protein sources fed during phase I (d 0 to 14 postweaning) on subsequent growth performance. One of five experimental treatments was fed to pigs from d 0 to 14 postweaning. A control diet including 9.0% casein, 20% dried whey (DW), 7.5% spray dried porcine plasma, and 1.75% spray dried blood meal (SDBM) was formulated to contain 1.6% lysine, .44% methionine, and 14.4% lactose. A soy protein source replaced casein on an equal lysine basis to form the other four dietary treatments. The commercially available soy protein sources that were evaluated included: 1) moist extruded soy protein concentrate (MESPC); 2) soybean meal (SBM); 3) soy protein concentrate (SPC) or 4) moist extruded soy flour (MESF). From d 14 to 28 postweaning (phase II), all pigs were fed a common (1.25% lysine) corn-SBM diet containing 2.5% SDBM and 10% DW. During phase I, there were no differences (P > .14) in ADG or feed efficiency (G/F) between pigs fed any experimental treatments. However, pigs fed the MESPC based diet had higher ADFI (P < .10) when compared to pigs fed either SBM or MESF. From d 14 to 28, pigs fed MESPC during phase I, had higher ADG (P < .09) when compared to the performance of pigs fed SPC and MESF and higher ADFI (P < .09) when compared with pigs receiving the other experimental treatments. Pigs fed SBM during phase I had improved (P < .08) G/F compared to SPC and MESPC. Cumulative data (d 0 to 28 postweaning) indicated that pigs fed the diet containing MESPC during phase I had higher ADG and ADFI when compared to pigs fed the MESF (P < .05) or SPC (P < .10) treatments; however, pigs fed MESPC were less efficient. Feed cost per pound of gain was the lowest for pigs fed SBM during phase I for overall performance. Pigs fed MESPC in phase I had numerically higher ADG (P > .15) and were .60 kg heavier at the end of the trial when compared to pigs fed SBM; however, this advantage will have an additional expense associated with feed cost. In summary, economics and performance must be considered before deciding to use SBM or MESPC in the phase I diet. The results of this experiment indicate no advantage in using SPC or MESF in the phase I diet.

Item		Casein	MESPC	SBM	SPC	MESF	CV
d 0-14	ADG, g	295	295	259	267	263	16.1
	G/F	.97	.96	.95	.96	.98	6.1
d 14-28	ADG, g	476^{abc}	499^{a}	490^{ab}	463^{bc}	454^{c}	7.4
	G/F	.63^{abc}	.61^{a}	.65^{c}	.62^{ab}	.63^{abc}	5.0
d 0-28	ADG, g	386^{ab}	399^{a}	377.0^{ab}	367^{b}	358^{b}	9.4
	G/F	.73^{ac}	.70^{b}	.73^{ac}	.71^{abc}	.73^{abc}	3.5

^{abc}Means in the same row without a common superscript differ (P < .10).

Key Words: Early weaned pig, Growth.

138 Optimum level of soybean meal for early-weaned (12 d of age) starter pigs.

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A total of 192 pigs (initially 3.6 kg and 12 d of age) was used in a 28 d growth trial to determine the optimal soybean meal level in starter diets for the 12-d old weaned pig. Pigs were allotted by weight to six replicates with 6 or 10 pigs per pen. From d 0 to 14 postweaning, pigs were fed experimental diets containing 0, 5, 10, and 15% soybean meal and formulated to contain 1.7% lysine and .49% methionine. Soybean meal and lactose were substituted for dried skim milk on a lysine and lactose basis. The diets contained 7.5% spray-dried porcine plasma, 1.75% spray-dried blood meal, 4.5% select menhaden fishmeal and 25% dried whey. All pigs were fed the same diet from d 14 to 21 postweaning containing 1.4% lysine, 20.9% soybean meal, 2.5% spray-dried porcine plasma, 2.5% spray-dried blood meal, and 20% dried whey. From d 21 to 28 postweaning, pigs were fed a diet containing 1.25% lysine, 2.5% spray-dried blood meal, and 10% dried whey. A linear (P<.01) improvement in ADG and ADFI was observed in the d 0 to 14 postweaning period as soybean meal increased. There were no differences in feed efficiency (G/F) for any phase of the experiment. No differences in growth performance were observed when pigs were fed the common diets from d 14 to 28 postweaning. For the cumulative period (d 0 to 28) there was a linear (P<.02) improvement in ADG and a linear (P<.07) and quadratic (P<.08) improvement in ADFI as soybean meal level increased in the diet during d 0 to 14 postweaning. In conclusion, up to 15% soybean meal can replace dried skim milk as a protein source in the diet for pigs weaned at 12 d of age.

		Soybean meal, %				
Item		0	5	10	15	CV
d 0 to 14	ADG, g[a]	117	136	164	159	14.4
	ADFI, g[a]	168	184	201	202	9.4
	G/F	.70	.74	.82	.79	14.7
d 14 to 28	ADG, g	307	325	314	322	9.6
	ADFI, g	518	559	552	543	7.3
	G/F	.59	.58	.57	.59	6.9
d 0 to 28	ADG, g[c]	211	232	239	239	8.3
	ADFI, g[b,d]	340	372	377	372	6.5
	G/F	.62	.62	.63	.64	5.7

[a,b,c] Linear effect (P < .01, .02, and .07 respectively). [d] Quadratic effect (P < .08)

Key Words: Starter pig, soybean meal, skim milk

139 The effect of dietary L-carnitine on growth performance and tissue accretion rates in the early weaned pig.

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A total of 216 pigs (initially 4.9 kg and 21 d of age) was used in a 35 d growth trial to determine the effect of dietary L-carnitine on growth performance and tissue accretion rates for the early weaned pig when fed a porcine plasma-based diet. Pigs were blocked by weight, ancestry, and sex in a randomized complete block design resulting in six pigs per pen and six pens per treatment. Four males and four females were slaughtered at the start of the study and carcasses were ground to determine initial carcass composition. Experimental diets were fed in two phases from d 0 to 35 postweaning. During phase I (d 0 to 14 postweaning), the control diet was corn-soybean meal based, and included 7.5% spray-dried porcine plasma, 25% dried whey (DW), 1.75% spray-dried blood meal (SDBM) and formulated to contain 1.6% lysine, and .44% methionine. On d 14, all pigs were switched to a phase II (d 14 to 35 postweaning) diet that contained 10% DW and 2.5% SDBM and formulated to contain 1.25% lysine and .36% methionine. L-carnitine replaced sucrose in the phase I and II control diets to provide dietary L-carnitine levels of 0, 250, 500, 750, 1000, and 1250 ppm. On d 35, three barrows and three gilts per treatment (1 pig/block) were ground for carcass composition. From d 0 to 14 postweaning, increasing L-carnitine had no effect on growth performance. From d 14 to 35 and d 0 to 35, there were no differences in ADG and ADFI; however, pigs fed the 1000 ppm L-carnitine were more efficient (P<.07) over the entire trial and were .88 kg heavier on d 35 than pigs on the positive control treatment. Percentage carcass CP, lipid and daily protein accretion (DPA) were not influenced (P>.20) by dietary L-carnitine on d 35. However, daily fat accretion (DFA) was effected quadratically (P=.09) with increasing dietary L-carnitine with pigs on the 750 ppm L-carnitine having the lowest DFA. Based on the results of this experiment, L-carnitine addition reduces daily fat accretion and improves G/F when fed during the nursery phase.

		Dietary L-Carnitine, ppm						
Item		0	250	500	750	1000	1250	CV
d 0 - 14	ADG, g	344	342	346	348	367	362	10.8
	G/F	.87	.86	.85	.87	.90	.88	6.1
d 14 - 35	ADG, g	531	540	554	544	558	553	7.2
	G/F	.55	.57	.55	.56	.58	.55	5.8
d 0 - 35	ADG, g	454	458	472	467	481	476	7.4
	G/F[a]	.62	.62	.62	.63	.65	.62	4.5
d 35	DPA, g/d	58.0	56.3	55.8	53.1	54.6	56.3	11.8
d 35	DFA, g/d[b]	42.9	41.9	41.8	37.0	42.3	45.1	15.2

[a] Control vs 1000 ppm L-carnitine (P<.07). [b] Quadratic effect of dietary L-carnitine (P=.09)

Key Words: L-Carnitine, Pigs, Growth performance.