

A total of 311 weanling pigs (initially 4.9 kg and 17 d of age) was used in a 25-d growth trial to compare the use of spray-dried blood meal (SDBM) and fish by-products in the phase II (d 7 to 25 postweaning) diet. Pigs were allotted by weight to one of five dietary treatments with 7 replications and 8 to 11 pigs/pen. Pigs were fed a common phase I (d 0 to 7) 1.5% lysine diet that contained 20% dried whey, 7.5% spray-dried porcine plasma and 1.75% SDBM. Protein sources used in the phase II diets were SDBM, select menhaden fish meal (SMFM) and spray-dried fish hydrolysate (SDFH) or a blend of either fish by-products and SDBM. Protein sources were added on an equal lysine basis with inclusion rates of 2.5% SDBM, 5.0% SMFM, 4.18% SDFH, 2.5% SMFM + 1.25% SDBM and 2.0% SDFH + 1.25% SDBM. Phase II (d 7 to 25) diets contained 10% dried whey and were formulated to contain 1.25% lysine and .36% methionine. During phase I (d 0 to 7 postweaning), ADG, ADFI, and gain/feed (G/F) were 184 g, 222 g, and .84, respectively. During the first week (d 7 to 14 postweaning) of phase II, pigs fed the diet containing SDBM had improved ($P < .06$) ADG compared to pigs fed diets containing SMFM, SDFH, and SMFM + SDBM. Pigs receiving SDBM also had improved ($P < .01$) ADFI compared to those receiving SDFH. Pigs receiving SDBM had an increased ($P < .02$) G/F compared to pigs receiving SMFM. For the overall phase II period (d 7 to 25), there were no differences in ADG. Average daily feed intake was improved for pigs receiving SDBM compared to those receiving SDFH ($P < .01$) and SMFM + SDBM ($P < .03$). However, when comparing feed efficiency, pigs receiving SDBM had lower G/F than those receiving SMFM ($P < .05$), SDFH ($P < .01$), and SMFM + SDBM ($P < .02$) for the phase II period. In conclusion, fish by-products provided comparable performance to SDBM for the overall trial; however, the transition from phase I to II was improved by SDBM.

Item	SDBM	SMFM	SDFH	SMFM+ SDBM	SDFH+ SDBM	CV
d 7 to 14 ADG, g ^{abc}	267	231	235	240	249	10.80
d 7 to 14 G/F ^c	.65	.56	.62	.60	.59	10.46
d 7 to 25 ADG, g	409	413	399	404	413	5.53
d 7 to 25 G/F ^{abc}	.68	.71	.72	.72	.69	4.42

^a SDBM vs SDFH ($P < .03$). ^b SDBM vs SMFM + SDBM ($P < .06$).

^c SDBM vs SMFM ($P < .05$).

Key Words: Spray-dried Blood Meal, Fish By-Products, Pigs.

A total of 197 weanling pigs (initially 5.3 kg and 18 d of age) was used in 28 d growth assay to determine the influence of spray-dried egg protein (SDEP) as a protein substitute for either soybean meal (SBM) or spray-dried porcine plasma (SDPP) on starter pig performance. Pigs were blocked by weight into six replications of 7 to 8 pigs/pen. During Phase I (d 0 to 14 postweaning), pigs were fed one of five experimental diets: control, 3 or 6% SDEP substituted for SBM, 3 or 6% SDEP substituted for SDPP. All Phase I diets were formulated to contain 1.5% lysine, .90% Ca and .80% P. The control diet was a high nutrient density diet containing 7.5% SDPP, 1.75% spray-dried blood meal (SDBM) and 20% dried whey. The SDEP product that was used as a substitute for either SBM or SDPP contained 3.3% lysine, 47.5% CP and 34.5% fat. Total added fat was maintained at 5% with soybean oil or the egg protein product as the fat source. From d 14 to 28 (Phase II), all pigs were fed a corn-SBM based diet containing 2.5% SDBM and 10% dried whey. Phase II diets were formulated to contain 1.25% lysine, .90% Ca and .80% P. In Phase I, pigs consuming the diet substituting 6% SDEP for SDPP had the poorest ADG ($P < .06$) and gain/feed (G/F) ($P < .07$). This difference was also seen for ADG during Phase II ($P < .01$) and during the entire trial ($P < .01$). The impaired G/F of pigs fed SDEP indicates that fat availability from SDEP warrants further investigation. These data suggest that SDEP can replace up to 6% SBM and up to 3% SDPP in a Phase I starter diet. These effects are represented in the table below.

Item	Control	SBM Substitution		SDPP Substitution		CV
		3%SDEP	6%SDEP	3%SDEP	6%SDEP	
d 0-14 ADG, g	237 ^a	240 ^a	230 ^a	228 ^a	193 ^b	13.7
G/F	.839 ^a	.843 ^a	.771 ^b	.779 ^b	.728 ^b	7.8
d 14-28 ADG, g	468 ^a	450 ^a	452 ^a	469 ^a	404 ^b	8.7
G/F	.638	.629	.661	.648	.643	5.1
d 0-28 ADG, g	352 ^a	345 ^a	342 ^a	348 ^a	298 ^b	8.4
G/F	.695 ^{a,b}	.690 ^{a,b}	.697 ^a	.686 ^{a,b}	.670 ^b	3.8

^{ab}Means in row not bearing a common superscript differ ($P < .05$).

Key Words: Egg Protein, Early weaned pig.

Sixteen weanling pigs (7.2 kg and 26 d of age) were individually penned and fed either a diet containing spray-dried porcine plasma (SDPP; 8.5% SDPP, 20% dried whey, 10% lactose, and .13% DL-methionine) or one containing dried skim milk (DSM; 20% each of DSM and dried whey). Diets were equal in lactose content and contained similar amounts of all nutrients. Pigs were allotted according to ancestry with littermates in pens directly opposite each other (two rows of pens) allotted to different diets. Pigs had ad libitum access to diets and water throughout the 21-d experiment. Feed intake was recorded daily and body weight was recorded weekly. Lights were on for 24 h/d. On d 3, 7, and 14, feeding behavior was observed continuously for 18 h (0600 to 2400). Time spent consuming feed and time between periods of feeding were recorded. After 10 min of no feeding, feeders were weighed. The distribution of the cumulative number of intervals between periods of feeding versus the interval length was used to classify periods of feeding into meals. The maximum length of the within-meal interval ranged from 1.5 to 31 min.

Item	Treatment	Day			CV, %
		3	7	14	
SIZE, g	SDPP	33.63	32.45	39.63	73.8
	DSM	25.75	27.02	40.55	
MEALS, No.	SDPP	15.6	17.0	16.6	38.9
	DSM	15.1	14.0	16.0	
RATE, g/min	SDPP	.46	.50	.56	32.9
	DSM	.34	.35	.56	
TIME, %	SDPP	14.3	11.2	10.5	37.8
	DSM	12.0	8.9	12.8	

Pigs fed the SDPP diet consumed 30 and 18% ($P = .16$) more feed than those fed DSM during the first 7 d and during 21 d, respectively. This was reflected by increases ($P < .05$) in both meal size (SIZE) and rate of consumption (RATE). From d 3 to 14, both SIZE and RATE increased ($P < .01$) linearly. Treatment had no effect ($P = .39$) on the number of meals (MEALS) or the percentage of time spent consuming feed (TIME). There was no difference ($P > .05$) in ADG (404 g for SDPP and 378 g for DSM). Gain/feed was higher ($P < .05$) for pigs fed the DSM diet (.64 vs .59 for SDPP). Increased food intake was caused primarily by increases in SIZE and RATE. These results indicate that increased intake in response to SDPP is due to increased palatability of SDPP.

Key Words: Meal Patterns, Weanling Pigs, Palatability

One hundred eighty weanling pigs (23 d of age and 5.7 kg average BW) were used in a 37-d growth assay to determine the effects of replacing the protein from dried skim milk (DSM) or soybean meal (SBM) in Phase I (d 0 to 14), and replacing the protein from dried whey in Phase 2 (d 14 to 37) with spray-dried wheat gluten (WG). Phase 1 treatments were: 1) DSM-SBM-dried whey-based control (DSM-SBM), 2) DSM of Diet 1 replaced with WG and lactose (WG-SBM), and 3) SBM of Diet 1 replaced with WG and cornstarch (DSM-WG). Phase 2 treatments were: 1) dried whey-SBM-based control (WHEY) and 2) dried whey of Diet 1 replaced with WG and lactose (WG). For d 0 to 14, pigs fed WG-SBM and DSM-WG had ADG, ADFI, and G/F similar ($P > .25$) to those fed DSM-SBM. Pigs fed WG-SBM had greater ADFI ($P < .01$), but lower G/F ($P < .001$) than those fed DSM-WG. Pigs fed WG-SBM and DSM-WG had greater ($P < .001$) apparent digestibilities of DM and N than those fed DSM-SBM. In

Phase 1	DSM-SBM	WG-SBM	DSM-WG	CV	Phase 2 (d 14 to 21), pigs previously		
					WHEY	WG	DSM-WG
ADG, g	.65	.64	.66	7.4	.68	.68	11.7
G/F	1.023	.982	1.116	5.6	.693	.646	7.6
N dig, %	87.1	87.5	90.7	1.5	80.4	81.4	2.6

greater ($P < .01$) G/F and digestibilities of DM and N compared to those fed DSM-SBM. Pigs fed WG-SBM had greater ADG ($P < .001$), ADFI ($P < .001$), and G/F ($P < .02$) than those fed DSM-WG. Overall (d 0 to 37), pigs fed WG-SBM and DSM-WG had greater ADG ($P < .06$) and G/F ($P < .01$) than those fed DSM-SBM. Pigs fed WG-SBM had greater ($P < .001$) ADG and ADFI compared to those fed DSM-WG. For Phase 2 treatments, pigs fed WHEY had greater ADG ($P < .01$), ADFI ($P < .02$), and G/F ($P < .01$) for d 14 to 21, but pigs fed WG as Phase 2 treatment had greater ($P < .05$) G/F overall (d 0 to 37). In conclusion, pigs fed WG-SBM had overall improvements of 13, 9, and 3% in ADG, ADFI, and G/F compared to those fed DSM-SBM.

Phase 2	DSM-SBM		WG-SBM		DSM-WG		CV
	WHEY	WG	WHEY	WG	WHEY	WG	
d 14 to 21							
ADG, g	.80	.70	1.00	.84	.76	.68	11.7
G/F	.663	.609	.753	.702	.693	.646	7.6
N dig, %	79.2	79.0	81.6	82.6	80.4	81.4	2.6
d 0 to 37							
ADG, g	.89	.86	1.00	.98	.85	.89	7.4
G/F	.709	.719	.730	.745	.726	.747	2.7

Key Words: Piglets, Dried Skim Milk, Wheat Gluten