144 **Evaluation of potato protein in starter pig diets.** J.W. Smith, II*, B.T. Richert, R.D. Goodband, J.L. Nelssen, M.D. Tokach, L.J. Kats, K.Q. Owen, and S.S. Dritz, Kansas State University, Manhattan

In two separate trials, the use of potato protein (75% CP, 5.9% lysine), as a replacement for spray-dried porcine plasma (SDPP) in Phase I and for spray-dried blood meal (SDBM) and select menhaden fish meal (SMFM) in Phase II diets (d 0 to 14 and d 7 to 28 postweaning, respectively), was evaluated. In Exp. 1, 185 weanling pigs (initially 4.4 kg and 15.5 d of age) were blocked by weight and gender and allotted in a randomized complete block design to one of five dietary treatments. The control diet was formulated to 1.5% lysine and .42% methionine and contained 3% SDPP and 25% dried whey. The experimental diets were formulated by substituting, on an equal lysine basis, additional SDPP (2.5 or 5% added; 5.5 or 8% total) or potato protein (2.6% or 5.1%) for soybean meal (SBM) in the control diet. These diets were fed from d 0 to 14 postweaning. From d 14 to 28, all pigs were fed a common Phase II diet. During d 0 to 14 postweaning, pigs fed diets containing 5.5 or 8% SDPP had improved ADG ($P<.05$) compared with those fed the control diet or the diet with 5.1% potato protein. No differences were observed in ADG and ADFI of pigs fed the diet with 2.6% potato protein compared with pigs fed the control diet or diets with additional SDPP. Feed intake was increased for pigs fed 8% SDPP ($P < .05$) and decreased for pigs fed the 5.1% potato protein ($P < .05$), when compared to the control group. Feed efficiency (G/F) was not affected by dietary treatment. Overall (d 0 to 28), no differences occurred in ADG, ADFI, and G/F among treatments. In Exp. 2, 270 weanling pigs (initially 6.2 kg and 20 d of age) were used. Pigs were blocked by weight and gender and assigned to each of three dietary treatments at weaning. There were 15 pigs per pen with six replicate pens per treatment. From d 0 to 7 postweaning, all pigs were fed the same diet that was formulated to 1.5% lysine and contained 10% SDPP and 25% dried whey. The Phase II experimental diets contained 10% dried whey and were formulated to 1.25% lysine and .34% methionine. The protein sources, 2.50% SDBM, 4.8% SMFM, or 3.92% potato protein, were substituted on an equal lysine basis, with all diets containing 22.63% SBM. From d 7 to 28 postweaning, pigs fed potato protein had decreased ADG and G/F ($P < .05$). No differences occurred between pigs fed either SDBM or SMFM. These results suggest that potato protein can not replace the entire portion of SDPP, SDBM, or SMFM in starter pig diets.

Exp. 1		Porcine Plasma, % : Potato Protein, %					
Item		3:0	5.5:0	8:0	3:2.6	3:5.1	CV
d 0 to 14	ADG, g	154[b]	190[a]	197[a]	174[ab]	151[b]	16.4
	ADFI, g	472[ab]	522[ab]	560[a]	479[bc]	423[c]	12.4
	G/F	.72	.79	.77	.80	.78	10.4

Exp. 2				Potato	
Item		SDBM	SMFM	Protein	CV
d 7 to 28	ADG, g	350[a]	359[a]	291[b]	6.3
	G/F	.645[a]	.670[a]	.582[b]	3.8

[abc]Means in row with different superscripts differ ($P < .05$).

Key Words: Starter Pigs, Potato Protein, Growth.

145 **A spray dried poultry byproduct meal is a high quality protein source for weanling pigs.** T. L. Veum* and D. W. Bollinger, University of Missouri, Columbia and A. K. M. Haque and R. L. Bell, American Dehydrated Foods, Inc., Springfield, MO.

A spray dried poultry byproduct (PB) was supplemented with flavor enhancer products to evaluate their effects on ADFI, ADG and G:F ratio during Phase 1 (d 0 to 14). The pigs (n=126, 3 pigs/pen) were weaned at 3.5 wk of age and averaged 8.5 kg BW. The basal Phase 1 diet contained 10.0% PB, 1.40% Lys, .85% Met + Cys and 3.42 Mcal of ME/kg. The PB was supplemented with .2% Ultra Pig Crave™ (PC), 1.75% citric acid (CA), 1.0% of a protein digest (PD), or 1.5% Brewers' yeast (BY). Other ingredients were ground corn, 20% spray dried whey, soybean meal, lard, L-Lys, and mineral and vitamin supplements. During Phase 2 (d 14 to 28), all pigs fed diets containing PB in Phase 1 were fed the same basal diet that contained 2.83% PB, 10.0% dried whey, 2.5% spray dried blood meal, 1.30% Lys and .75% Met + Cys. A sixth diet contained 8.83% spray dried porcine plasma (PP) and .10% DL Met in Phase 1 and 2.5% PP and .09% DL Met in Phase 2 as a complete replacement for PB on a Lys basis. During wk 1 and Phase 1 there were no differences ($P>.50$) between treatments in ADFI, ADG or G:F ratio. During Phase 2, the higher ($P<.05$) ADFI for pigs fed PB compared to PP was attributed to feed wastage because ADG was not different ($P>.30$) among treatments for Phase 2 or overall. There were no differences ($P>.60$) in BW at d 7, 14, 21 or 28. In conclusion, diet enhancers did not improve pig performance, and a poultry byproduct produced weanling pig performance equal to that of porcine plasma.

Phase 1		PB	PB+PC	PB+CA	PB+PD	PB+BY	PP
Phase 2		PB	PB	PB	PB	PB	PP
ADFI	d 0-7 g	323	324	335	337	309	364
	d 0-14 g	412	426	427	436	415	450
	d 0-28 g	656	661	652	721	679	656
ADG	d 0-7 g	244	262	286	250	236	272
	d 0-14 g	283	307	292	291	284	324
	d 0-28 g	436	447	431	460	452	452

Key Words: Pigs, Weaning, Poultry Byproduct

146 **Microbial phytase replaces inorganic phosphorus in canola-grain sorghum diets for growing-finishing pigs.** T. L. Veum*, J. Liu, D. W. Bollinger, K. Zyla and D. R. Ledoux, University of Missouri, Columbia.

Crossbred pigs (n=126) were used to evaluate the total replacement of inorganic phosphorus (P) in canola grain sorghum diets with the addition of 0, 200, 400, 600 or 800 phytase units (FTU, Natuphos• BASF)/kg of diet from 21 to 105 kg BW. Dietary Ca and total P, respectively, were .55 and .45% in Phase 1 (21-55 kg), .50 and .42% in Phase 2 (55-82 kg), and .45 and .40% in Phase 3 (82-105 kg). All other nutrients were adequate. A positive control diet contained mono-dicalcium phosphate to provide Ca and P levels of .60 and .58% in Phase 1, .54 and .51% in Phase 2, and .50 and .46% in Phase 3. There were 3 pigs/pen (experimental unit). A metacarpal bone was removed at slaughter to measure bone breaking force. During Phase 1, ADG of pigs fed the basal diet with 400, 600 or 800 FTU/kg was similar ($P>.6$) to the Pos control, which were higher ($P<.03$) than that of pigs fed the basal with 0 or 200 FTU/kg. ADFI, ADG and G/F ratio were similar ($P>.15$) for all treatments during Phases 2 and 3 and overall. Metacarpal breaking force (kg/mm^2) was similar ($P>.6$) for pigs fed the basal diet with 600 or 800 FTU/kg and the Pos control, which were higher ($P<.05$) than that of pigs fed the basal with 0 or 200 FTU/kg. In conclusion, based on performance, 400 FTU/kg was adequate to completely replace the inorganic P in a canola-grain sorghum diet from 20 to 105 kg BW.

Item	Basal	Basal+ 200 FTU /kg	Basal+ 400 FTU /kg	Basal+ 600 FTU /kg	Basal+ 800 FTU /kg	Pos. Cont.
ADG Period 1, kg	.66[a]	.66[a]	.72[b]	.71[b]	.70[b]	.71[b]
Overall, kg	.77	.79	.81	.81	.81	.81
ADFI overall, kg	2.15	2.29	2.36	2.36	2.36	2.37
G/F overall	.36	.35	.35	.34	.34	.34
Metacarpal breaking, kg/mm^2	.39[a]	.52[b]	.55[bc]	.65[d]	.63[cd]	.65[d]

[abcd]($P<.05$)

Key Words: Pigs, Microbial Phytase, Canola-Grain Sorghum

147 **Evaluation of milk chocolate product as a substitute for whey in pig starter diets.** H. Yang*, J.A. Kerber, J.E. Pettigrew, L.J. Johnston and R.D. Walker, University of Minnesota, St. Paul.

Four experiments were conducted to evaluate the substitution of milk chocolate product (MCP) for dried whey (DW) in pig starter diets. Experiment (Exp) 1 involved four diets, six pens/diet, nine pigs (age: 25 d, BW: 7.4 kg)/pen and two dietary stages (S) (S1: 2 wks, S2: 2 wks). Diets were: (A) 0% DW + 0% MCP, (B) 20% DW + 0% MCP, (C) 10% DW + 10% MCP, (D) 0% DW + 20% MCP. Diets contained 1.25% lysine (lys) for S1, 1.10% lys for S2. Replacement of DW with 20% MCP reduced ADG and gain/feed (G/F; $P<.05$) and ADF ($P<.10$). Pig performance was not different among A, B and C diets. Exp 2 lasted five weeks (S1: 2 wks, S2: 3 wks) and involved the same four diets as Exp 1, eight pens/diet and seven pigs (age: 25 d, BW: 6.4 kg)/pen. Daily gain and ADF for pigs fed 20% DW were higher than those of pigs fed MCP diets ($P<.01$) or 0% DW diet ($P<.05$). Treatments did not affect G/F. Exp 3 involved four diets, six pens/diet and eight pigs (age: 20 d, BW: 6.1 kg)/pen and three dietary stages (S1: 1 wk, S2: 3 wks, S3: 1 wk). Treatments were: (A) 15% DW + 0% MCP, (B) 10% DW + 5% MCP, (C) 5% DW + 10% MCP, (D) 0% DW + 15% MCP. Diets contained 1.5% lys for S1 and 1.25% for S2 and S3. Daily gain and ADF decreased linearly ($P <.002$) as MCP increased, but MCP did not affect G/F. There were no differences in ADG, ADF and G/F between pigs fed 0 and 5% MCP diet. Exp 4 was a 2-week free choice preference trial and involved four diets and three comparisons with ten pens/comparison and eight or ten pigs (age: 24 d, BW: 6.9 kg)/pen. The diets were the same as the S2 diets of Exp 3. The comparisons were: diet A versus (vs) B, diet A vs C, and diet A vs D. The overall ADF (g) by diet was 91.0 vs 294.9; 86.1 vs 295.2; and 123.1 vs 231.1. Within each comparison, ADF for MCP diet was higher than ADF for whey diet ($P<.01$). In conclusion, the highest use level of MCP that supports maximal growth rate is in the range of 5 to 10% of the diet, and pigs strongly preferred MCP over whey.

	ADG (kg)					ADF (kg)				
Treatment	A	B	C	D	SE	A	B	C	D	SE
Exp 1	.22	.24	.23	.21	.02	.37	.38	.38	.36	.02
2	.37	.41	.36	.36	.02	.61	.65	.59	.57	.02
3	.29	.30	.27	.26	.01	.47	.46	.44	.42	.02

Key Words: pigs, whey, milk chocolate product