

on earlier demonstrations of VIR improvement of P digestibility. Four replications of crossbred pigs (24 gilts and 8 barrows; two pigs/pen) with average initial and final weight of 29.1 and 113.2 kg, respectively, were used. Feed and water were supplied at libitum. A basal (B) corn-soybean meal diet was formulated for each stage of growth (29 to 50, 50 to 80, and 80 to 113 kg). Dietary treatments were: 1) B, 2) B + VIR, 3) B - DICAL, and 4) B + VIR - DICAL. Diets 1 and 2 met all NRC (1998) requirements with Ca/aP of 0.60/0.23, 0.50/0.19, and 0.45/0.15 for the three growth stages, respectively. Diets 3 and 4 were slightly P deficient. The removal of DICAL reduced bone ash contents (P = 0.01) and mean bone strength (P = 0.05) as anticipated. Although the amount of phytate-utilizing organisms tended (P = 0.13) to increase with VIR, the diminished bone strength associated with the DICAL removal was not recovered with VIR supplementation.

Effect of virginiamycin and phosphorus removal in grow-finish pig diets

Treatment:	1	2	3	4	P-value		VIR x
					VIR	DICAL	DICAL
ADG, kg	0.751	0.786	0.797	0.738	0.75	0.97	0.20
MC-MT strength, kg	138.2	145.1	128.9	131.2	0.39	0.05	0.67
MC ash, %	59.5	59.7	59.2	59.1	0.54	0.01	0.17
MT ash, %	57.5	57.2	56.5	56.4	0.54	0.01	0.84
LEA, cm ²	44.1	46.4	44.7	43.5	0.68	0.46	0.25
Backfat, cm	2.21	2.08	2.16	2.11	0.68	0.97	0.85
Ileal bacteria (Log ₁₀ CFU/g), individual means							
Phytate-utilizing	7.35	8.26	7.97	8.24	0.13	0.46	0.44
Lactobacilli	9.58	7.84	8.25	8.69	0.10	0.36	<0.01

Key Words: Virginiamycin, Phosphorus, Bacteria

137 Effect of sex and slaughter weight on pig performance and carcass quality. J. Mullane^{1,2}, P. G. Lawlor^{*1}, P. B. Lynch¹, J. P. Kerry², and P. Allen³, ¹Teagasc, Moorepark Research Centre, Fermoy, Co. Cork, Ireland, ²University College, Cork, Ireland, ³National Food Centre, Ashtown, Dublin, Ireland.

The aim here was to examine the effect of sex and slaughter weight on performance and carcass quality in pigs of a lean genotype. Forty five single sex pairs of pigs (meatline Landrace sire on Landrace x Large White sows) were used in a 3 (sex) x 3 (slaughter weight) factorial design with 5 pairs per treatment. The experimental period was from weaning (mean = 26 days and 8.6 kg) to slaughter. Sexes were boar (B), castrate (C) and gilt (G) and the slaughter weights were 80, 100 and 120 kg liveweight. All pigs were fed the same diets based on wheat, barley and soybeanmeal ad libitum as dry pellets. Nutrient content of the diets were 14.5 MJ/kg digestible energy (DE) and 13.0 g/kg total lysine (LYS) from weaning to 15 kg;14.1 MJ/kg DE and 13.0 g/kg LYS from 15 to 30 kg and 13.7 MJ/kg DE and 11.1 g/kg LYS from 30 kg to slaughter. Sex x slaughter weight interaction effects were not significant (P>0.05). Daily weight gain and feed conversion ratio (FCR) were 737, 753 and 710g (s.e. 9.6; P<0.01) and 2.30, 2.45 and 2.47 (s.e. 0.04; P<0.05) for B, C and G respectively. Backfat depth, muscle depth and carcass lean meat content (by Hennessy Grading Probe) were 11.0, 13.3 and 11.2 mm (s.e. 0.4; P<0.01); 51.2, 52.3 and 53.6 mm (s.e. 1.1; P>0.05) and 563, 544 and 567 g/kg (s.e. 4, P<0.01) for B, C and G respectively. Daily weight gain and feed conversion ratio (FCR) were 717, 735 and 748 g (s.e. 10, P=0.11) and 2.15, 2.43 and 2.64 (s.e. 0.04; P<0.01) for slaughter weights of 80,100 and 120 kg respectively. Backfat depth, muscle depth and carcass lean meat content were 10.2, 12.2 and 13.1 mm (s.e. 0.4; P<0.01); 46.2, 53.2 and 57.7 mm (s.e. 1.1; P<0.01) and 568, 557 and 549 g/kg (s.e. 4; P<0.01) respectively. Boars grew faster than gilts, more efficiently than gilts and castrates and had a greater lean content than castrates. Growth rate increased, FCR deteriorated and lean meat content reduced as slaughter weight increased.

Key Words: Sex, Slaughter weight, Castration

138 Apparent and true ileal amino acid digestibility and DE and ME of specialty protein sources intended for nursery pig diets. R. O. Gottlob^{*1}, J. M. DeRouchey¹, M. D. Tokach¹, R. D. Goodband¹, J. L. Nelssen¹, S. S. Dritz¹, C. W. Hastad¹, K. L. Lawrence¹, and D. A. Knabe², ¹Kansas State University, ²Texas A & M University.

Two experiments were conducted to determine the apparent (AID) and true (TID) ileal digestibility of amino acids, and DE and ME of rice protein concentrate (RPC), salmon protein hydrolysate (SPH), whey protein concentrate (WPC), and spray-dried animal plasma (SDAP). In Exp. 1, six barrows (initially 29.5 kg) were surgically fitted with simple T-cannulas and fed each of 4 corn starch-based diets containing 12.5% CP in a balanced crossover design. During the last period, pigs were fed a protein free diet to calculate TID. Ileal digesta was collected, analyzed, and AID and TID values were calculated (Table 1). In Exp. 2, six barrows (initially 37.6 kg) were fed each of 4 corn-based diets containing 20.0% CP in a balanced crossover design. A corn control diet containing 8.2% CP was also included to calculate energy values by difference. Feces were collected and DE and ME were calculated. In Exp. 2, DE and ME values were 4724 and 4226, 4173 and 3523, 4949 and 4352, and 4546 and 3979 kcal/kg for RPC, SPH, WPC, and SDAP, respectively. Although RPC and SPH have lower amino acid digestibility than WPC or SDAP, the values are similar to published values for soybean meal. The high amino acid digestibility, coupled with relatively high DE and ME values, indicates these protein sources may warrant further investigation as potential ingredients for nursery pig diets.

Table 1. Apparent and true ileal digestibility of ingredients, %

Amino Acids	RPC		SPH		WPC		SDAP	
	AID	TID	AID	TID	AID	TID	AID	TID
Isoleucine	75.6	80.7	72.2	81.2	90.8	94.3	87.1	92.8
Lysine	80.0	86.6	85.6	89.7	93.3	95.7	92.8	95.4
methionine	65.6	69.0	85.5	88.7	89.9	93.9	85.7	93.5
Threonine	68.4	78.9	69.8	80.2	83.6	88.4	86.5	92.2
Tryptophan	84.7	103.9	65.4	104.8	92.3	102.2	91.2	101.0
Valine	76.0	81.3	73.7	83.4	87.4	92.5	89.2	93.8

Key Words: Digestibility, Protein source, Amino acid

139 The effects of Natuphos[®] phytase, Ronozyme[®] phytase, and a combination of the two products on nutrient digestibility in growing pigs. K. Saddoris^{*}, L. Peddireddi, B. Richert, and J. Radcliffe, Purdue University.

Sixteen crossbred barrows (56 kg) were used over 2 experimental periods to evaluate the relative efficacy of the addition of Natuphos[®] phytase (NP), Ronozyme[®] phytase (RP) or a combination of the two products (N+R) to corn-SBM based diets on growth performance, feed efficiency, and nutrient digestibility. Dietary treatments consisted of a negative control diet (NC) with 0.10% aP and 0.43% Ca, and the NC diet supplemented with 500 U/kg of NP, RP, or N+R (250 U/kg of each product). Pigs were individually housed in metabolism pens (1.2 m²) for 10 d per period with a total collection occurring in the final 3 d of each period. Pigs fed diets supplemented with phytase had increased (P<0.005) ADG (0.747 to 0.990 kg/d) and increased (P< 0.05) G:F (0.292 to 0.355) compared to pigs fed the NC diet. However, no additional improvements were observed in growth or feed efficiency in pigs fed the N+R diet compared to pigs fed the NP or RP diets. There were no differences detected in ADFI among treatment groups. Phytase supplementation increased (P<0.005) P digestibility (24.3 to 38%), increased (P<0.0001) Ca digestibility (41.2 to 52.9%), and tended to decrease DM digestibility (86.4 to 85.2%) compared to pigs fed the NC diet. Pigs fed the N+R diet tended to have increased (P<0.10) P digestibility (36.1 to 41.3%), increased (P=0.05) Ca digestibility (60.4 to 67.9%), and tended (P<0.10) to decrease DM digestibility (85.7 to 84.1%) compared to the NP and RP fed groups. However, no differences were detected in P, Ca, or DM digestibility between pigs fed the NP or RP diets. In conclusion phytase supplementation improved P and Ca utilization by increasing P and Ca digestibility by 36 and 28% respectively. The NP and RP enzymes were equally effective in enhancing nutrient digestibility. However, supplementing with a combination of the two products resulted in a further improvement in P (13.3%) and Ca (11.0%) digestibility compared to feeding each source separately.

Key Words: Phytase, Pigs, Phosphorus