Condensed Porcine Solubles in Diets Fed to Growing-Finishing Pigs

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Summary and Implications

Condensed porcine solubles (CPS) was a suitable source of energy and protein when fed at 5% of the diet as a partial replacement of corn and soybean meal. Therefore, its use in growing-finishing diets should be based on relative ingredient costs and convenience of incorporation of a liquid material at the mixer.

Introduction

Condensed porcine solubles (CPS) is a byproduct of the separation of heparin from hydrolyzed small intestines of pigs. The product contains 45% dry matter, 21% crude protein, and 5% crude fat. The protein is largely in the form of individual amino acids, and these amino acids are well balanced in relation to the pig's amino acid needs. Our interest was to determine its feeding value as a source of protein and energy for growing-finishing pigs.

Materials and Methods

The treatments compared were: (1) corn-soybean meal control diets and (2) diets in which 5% CPS partially replaced corn and soybean meal. The diets containing CPS were formulated with lower as-fed densities for the nutrients (energy, lysine, calcium, and phosphorus). On a dry matter basis, however, nutrient densities of diets were similar. The pigs were phase-fed diets in periods representing approximate body weight ranges from 50 to 80, 80 to 120, 120 to 180, and 180 to 240 lb. Diet formulas and calculated analyses are presented in Table 1.

The experiment was designed as a randomized complete block with two treatment regimes and seven blocks. Each block contained two contiguous pens; each pen contained six pigs. Body weight and feed intake data were recorded every other week in the growing-finishing period lasting 16 weeks. Pigs' initial and final average body weights were 51 and 242 lb, respectively.

Results and Discussion

Treatment averages for daily gain (ADG), daily feed intake (ADFI), and gain/feed ratio (G/F) are presented for each two-week period and for the total grower-finisher period.

The ADG and ADFI did not differ between treatment groups in any period. In some two-week periods and for the total experiment, however, pigs feed the control diets had greater G/F ratios than did the pigs fed diets containing CPS. These treatment differences were caused by the dilution effect of the moisture content of the CPS. When feed efficiencies for the entire 16-week period were expressed as megacalories of energy consumed per pound of body weight gain, treatment averages were almost identical (4.41 Mcal/lb for control pigs and 4.37 Mcal/lb for pigs fed CPS.

During periods 5 and 6, all pigs experienced respiratory distress with considerable coughing. This disease caused depression in average growth performance over a period of approximately four weeks.

When CPS was incorporated into the diet at 5% of the mixture, we experienced no feed spoilage. The experiment was conducted from March through June of 1997. Diets containing 5% CPS had favorable handling characteristics. They did not "bridge" in self-feeders, and there was less dust produced by these diets than by the control diets.

Table 2. Summary of effect of condensed porcine solubles on pig performance.

		Treatments			
Item	Period[a]	Control	5% CPS	CV, %	P<
ADG, lb	1	1.11	1.06	15.1	.58
	2	1.80	1.79	7.7	.90
	3	2.00	1.96	3.8	.39
	4	1.94	1.78	11.3	.21
	5	1.57	1.70	10.8	.22
	6	1.34	1.25	13.8	.39
	7	2.03	2.00	9.2	.76
	8	1.99	1.98	8.0	.89
	Total	1.72	1.69	4.7	.48
ADFI, lb	1	2.63	2.65	9.8	.88
	2	4.04	3.97	7.4	.69
	3	4.85	4.99	4.2	.26
	4	5.41	5.28	8.0	.59
	5	5.35	5.53	7.4	.43
	6	4.78	4.56	7.6	.29
	7	6.20	6.35	4.5	.36
	8	6.63	6.70	7.6	.82
	Total	4.97	5.00	4.9	.86
G/F	1	.420	.398	5.9	.14
	2	.447	.453	5.6	.70
	3	.413	.394	4.7	.10
	4	.358	.338	4.5	.05
	5	.292	.306	5.2	.14
	6	.281	.274	8.3	.61
	7	.326	.315	8.4	.47
	8	.300	.295	5.4	.59
	Total	.347	.339	1.5	.03

[a]The duration of periods was 2 weeks, and the total period was 16 weeks.

Table 1. Diet composition.

	Control				5% CPS			
Item	50–80	80–120	120–180	180–240	50–80	80–120	120–180	180–240
Ingredients, %								
Corn	74.54	78.46	83.65	87.44	72.30	76.30	81.39	85.17
Soybean meal	21.60	18.10	12.90	9.40	18.90	15.30	10.20	6.70
Animal fat	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CPS					5.00	5.00	5.00	5.00
Dicalcium PO_4	1.35	.90	.98	.78	1.29	.85	.95	.77
$CaCO_3$	.83	.86	.84	.85	.83	.85	.83	.83
NaCl	.25	.25	.25	.25	.25	.25	.25	.25
Vitamin premix	.20	.20	.20	.10	.20	.20	.20	.10
Lysine·HCl	.13	.13	.13	.13	.13	.13	.13	.13
Trace mineral premix	.05	.05	.025	.025	.05	.05	.025	.025
Tylan-40	.05	.05			.05	.05		
BMD-60			.025	.025			.025	.025
Calculated analysis:								
ME, kcal/lb	1523	1530	1531	1536	1476	1482	1483	1488
Lysine, %	.95	.85	.70	.60	.93	.82	.68	.58
Calcium, %	.70	.60	.60	.55	.68	.58	.58	.53
Phosphorus, %	.60	.50	.50	.45	.58	.48	.48	.44
Dry matter, %	88.83	88.77	88.67	88.57	86.68	86.54	86.46	86.36