

Phase Feeding in the Grow-Finish Period

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Introduction

Several factors can affect the grow-finish pig's nutrient requirements and subsequent ration formulation, but those of greatest influence are genetics, sex, herd health, environmental temperature and stage of maturity. When expressed as a percent of the diet, nutrient requirements decrease with age or maturity. Theoretically, this occurs on a daily basis, but practically it is not feasible or necessary to reformulate that frequently. This experiment compared the feeding of either 1, 2, 3, 4 or 5 diets to pigs from 50 to 250 lb. The variable studied was crude protein or amino acid level.

Procedures

One hundred twenty terminal cross pigs were used in a 2 x 5 factorially arranged experiment. Two replications of barrows and gilts, penned separately, were assigned to one of the following five dietary treatments:

1. One diet for the entire feeding period; 15% crude protein equivalent (CP) for barrows and 17% CP for gilts.
2. Two diets, one for each 100 lb of gain; 17-13% CP sequence for barrows and 19-15% CP sequence for gilts.
3. Three diets, one for each 67 lb of gain; 19-15-11% CP sequence for barrows and 21-17-13% CP sequence for gilts.
4. Four diets, one for each 50 lb of gain; 19-16.33-13.67-11% CP sequence for barrows and 21-18.33-15.67-13% CP sequence for gilts
5. Five diets, one for each 40 lb of gain; 19-17-15-13-11% CP sequence for barrows and 21-19-17-15-13% CP sequence for gilts.

The fortified corn-soybean meal diets (Table 1) varied only in the ratio of corn and soybean meal. All other ingredients were held constant. The experiment was started when pigs averaged 50 lb and was terminated by pen when the pen averaged 250 lb. All diet changes were made when the pen average weight reached the target weight.

Individual pig weights and pen feed consumption data were obtained. All pigs were subjected to real-time ultrasound for the determination of backfat within two days of reaching the pen average final weight of 250 lb.

Results

The averages of the diet treatment data are presented in Table 2. Surprisingly, the only statistically significant difference in the table is for average daily gain. Pigs fed one diet from 50 to 250 lb gained faster than those in any other treatment. As the number of diets increased, gain decreased ($P < .01$). Gain reflected feed intake, but due to large variation, the feed intake means were not significantly different. Neither the feed efficiency nor the backfat means were different.

It has been theorized that phase feeding might affect variation or spread in weight gain or other parameters. The standard deviation data presented show that a great deal of variation exists, but the number of diets fed during the grow-finish period did not influence the variation. At an average final pen weight of 250 lb, individual pigs varied from 196 to 292 lb and from 0.43 to 1.73 inches of backfat. Purdue pigs are not clones!

As expected, barrows gained faster, were slightly less efficient, and were fatter than gilts (Table 3). Feed costs, which averaged \$16.44 per cwt of gain, did not differ among treatments, either number of diets or sex.

Conclusions

The data presented indicate very little advantage, biological or economical, to feeding several diets during the grow-finish period. Larger numbers of replications are needed to substantiate these observations. The only consistent difference noted was between barrows and gilts. The improved carcass (less fat) of the gilts would certainly be of economic benefit at marketing.

Table 1. Composition of diets, %.

Ingredient	Protein Equivalent, %									
	21	19	18.33	17	16.33	15.67	15	13.67	13	11
Corn, ground	69.02	74.02	75.72	79.12	80.82	82.52	84.22	87.52	89.22	94.32
Soybean meal, dehulled	27.30	22.3	20.60	17.2	15.50	13.80	12.10	8.80	7.10	2.00
L-lysine-HCl	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18
Soybean oil	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Dicalcium Phosphate	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Limestone	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Salt	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25
Vitamin-trace mineral premix ^a	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25
Antibiotic ^b	+	+	+	+	+	+	+	+	+	+

^a Added to meet or exceed all requirements as given by the NRC.

^b 100g chlortetracycline per ton of feed.

Table 2. Performance and associated variation of pigs fed one to five diets during grow-finish.

Item	Number of Diets Fed				
	1	2	3	4	5
Average initial weight, lb	50.2	50.0	49.9	49.4	50.0
Average final weight, lb	249.9	250.5	251.5	249.7	249.1
Average daily gain ^a	1.95	1.92	1.83	1.87	1.83
Average daily feed intake	5.48	5.25	5.15	5.37	5.08
Feed/Gain ratio	2.81	2.73	2.82	2.88	2.78
Backfat, in.	.94	.94	1.00	.91	.93
Average SD ^b of final weight within pens	11.72	14.85	22.96	16.73	18.72
Average SD ^b of backfat within pens	3.25	4.16	5.87	3.68	6.16
Average cost of 200 lb gain ^c	\$32.92	\$31.95	\$33.84	\$33.53	\$32.13

^a Linear statistical effect, $P < .01$.

^b Standard deviation.

^c Cost of feed calculated assuming the following: corn = \$2.32/bu; soybean meal = \$170/ton; and medicated premix = \$.367/lb.

Table 3. Sex comparison of grow-finish pigs fed one to five diets.

Item	Sex	
	Barrows	Gilts
Average daily gain, lb ^a	1.93	1.82
Average daily feed intake, lb ^a	5.52	5.01
Feed/Gain ratio	2.86	2.74
Backfat, in. ^a	1.03	.87
Average cost of 200 lb gain ^b	\$32.89	\$32.86

^a P<.01

^b See footnote c, Table 2.