EFFECT OF ADDED FAT ON PERFORMANCE OF GROWING-FINISHING PIGS IN COMMERCIAL CONDITIONS

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Summary

A total of 1,040 pigs (half barrows and half gilts) was used in a 42-day experiment conducted in a commercial research facility to determine the influence of graded levels of added fat on growth performance, feed cost per pound of gain and margin over feed of growing-finishing pigs. The four dietary treatments were based on level of added dietary fat (0, 2, 4, or 6%), with the diets fed for a six-week period from 158 to 232 lb. Adding fat to the diet for pigs weighing 158 to 232 lb decreased ADFI, improved feed efficiency, increased cost per pound of gain and had no effect on income over feed cost. The economics of whether fat should be added to the growing finishing pig diet will depend on the cost of corn, soybean meal and fat. The results of this experiment demonstrate that, with current prices, the lowest cost per pound of gain was obtained when no fat was added to the diet for pigs from 158 to 232 lb. But because of the numerically greater ADG income over feed cost (IOFC) was numerically similar when fat was added to the diet.

(Key Words: Added Fat, Growing-Finishing Pigs)

Introduction

Several experiments have been conducted to determine the influence of fat additions to growing-finishing diets on pig performance and carcass composition. In general average daily gain and feed efficiency are expected to increase 1% and 2%, respectively, for every percent of added fat. However, several questions arise regarding this rule of thumb. First, is the response to added fat the same at all levels of fat addition (i.e., is the response from increasing dietary fat from 0 to 2% the same as increasing fat level from 4 to 6%)? Second, is the response the same for all phases during growing-finishing? Because pigs are more energy deficient in the early finisher period, we would expect a greater response during this period; however, this actual level of response is not well characterized. Third, recent trials in university research settings demonstrate a much smaller response to fat additions to grain-soybean meal diets than those in the rule of thumb presented above. The reason for this is that feed intake is normally 25 to 40% higher in university research settings than under field conditions. In a previous experiment with pigs conducted in commercial conditions, where pigs were fed diets with 0, 2, 4, or 6% fat from 80 to 265 lb, a linear improvement in daily gain was observed up to 130 lb, while feed efficiency improved linearly due to fat addition in all weight intervals over the total experiment. Therefore, the objective of this experiment was to determine the influence of graded levels of added fat (0 to 6%) on growth performance, feed cost per pound of gain and margin over feed of growing-finishing pigs reared in a commercial research facility.

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Procedures

The experiment was conducted in a commercial research facility. Pigs were allotted randomly to pens on entry to the barn. Forty pens (20 of barrows and 20 of gilts) with approximately 26 pigs per pen were used in the experiment. The finishing facility was a double curtain-sided deep pit barn that operated on natural ventilation during the summer and mechanical ventilation during the winter. The barn had a totally slatted floor with 7.2 ft^2 provided per pig. Each pen was equipped with a four-hole dry self-feeder and one cup waterer. The experiment was conducted from mid-April to the end of May.

The four dietary treatments were based on level of added dietary fat (0, 2, 4, or 6%). The diets were fed for a 6-week period from 158 to 232 lb. All diets were corn-soybean meal based and formulated to a constant lysine to calorie ratio with similar levels of vitamins and minerals (Table 1). Pigs were weighed and feed disappearance was determined every 14 days. Data were analyzed using the MIXED procedure of SAS for linear and quadratic effects with pen serving as the experimental unit of analysis.

Results and Discussion

During the first two weeks of the experiment (158 to 184 lb), ADG and F/G to improved linearly ($P<0.01$) as dietary fat level increased from 0 to 6% (Table 2). Average daily feed intake was not influenced by fat addition to the diet. For the second two-week period (184 to 208 lb), there was no response in ADG to added dietary fat, but ADFI decreased and F/G improved linearly ($P<0.01$) as added dietary fat increased from 0 to 6%. Similarly, during the final two weeks of the trial (208 to 232 lb), no response in ADG to added fat was observed, while ADFI decreased and F/G improved linearly ($P<0.01$).

For the overall period there was no response in ADG to added fat, while ADFI decreased and F/G improved linearly ($P<0.01$) as the level of fat in the diet increased. Feed cost per pound of gain was lower ($P<0.05$) for the 0% added fat diet compared to the added fat diets. Also, feed cost per pound of gain was lower ($P<0.05$) for pigs fed the diet containing 4% fat compared with those fed the 6% added fat diet. Income over feed cost averaged $20.8/pig but did not differ regardless of the level of fat added to the diet. Average pig weight on day 14 of the trial tended ($P<0.07$) to increase as the level of fat in the diet increased, but initial, day 28 and final pig weights were not different.

There was no treatment by sex interactions ($P>0.10$). During the first two weeks of the experiment, ADFI was lower ($P<0.01$) and F/G was improved ($P<0.02$) for gilts compared with barrows (Table 3). For the second two-week period, ADG was greater ($P<0.02$) for barrows and ADFI was lower ($P<0.01$) for gilts. During the final two-week period, there was a tendency ($P<0.07$) for ADG to be greater for gilts, while F/G and feed cost per pound of gain was lower ($P<0.01$) for gilts compared with barrows. Barrow weight at the end of the first two weeks of the trial tended ($P<0.07$) to be greater, while at the end of the second two-week period were greater ($P<0.02$) than gilts.

Using the economic data presented in Table 2, adding fat to the diet for pigs weighing 158 to 230 lb increased cost per pound of gain and had no effect on income over feed cost. For the first two weeks of the experiment there was a tendency for ADG to be greater when fat was added to the diet, with pigs fed the 4 or 6% added fat diet being 1 lb heavier compared to those fed the 0% added fat diet. This would indicate that pigs were in an energy deficit for a short period at the start of the experiment. The economics of whether fat

should be added to the growing finishing pig diet will depend on the cost of corn, soybean meal and fat and the value of additional gain. The results of this experiment demonstrate that, with current prices, the lowest cost per pound of gain was obtained when no fat was added to the diet for pigs from 158 to 232 lb.

Table 1. Composition of Experimental Diets (As-fed Basis)

	Added fat, %			
Item	0	2	4	6
Corn	77.40	74.10	71.15	67.85
Soybean meal (46.5%)	20.55	21.85	22.75	24.05
Choice white grease	-	2.00	4.00	6.00
Monocalcium phosphate (21% P)	0.50	0.54	0.57	0.60
Limestone	0.85	0.85	0.84	0.84
Salt	0.35	0.35	0.35	0.35
Vitamin premix[a]	0.08	0.08	0.08	0.08
Trace mineral premix	0.10	0.10	0.10	0.10
L-Lysine HCl	0.15	0.15	0.15	0.15
Total	100.00	100.00	100.00	100.00
Calculated Analysis				
Lysine, %	0.94	0.97	0.99	1.02
ME, kcal/lb	1,519	1,560	1,600	1,641
Protein, %	16.1	16.5	16.6	16.9
Calcium, %	0.51	0.52	0.52	0.53
Total phosphorous, %	0.46	0.46	0.47	0.48
Available phosphorous, %	0.25	0.25	0.26	0.27
Lysine:calorie ration, g/mcal	2.81	2.82	2.81	2.82

[a]Includes 136,050 FTU phytase units.

Table 2. Effect of Added Fat on Performance of Grow-Finish Pigs in Commercial Facilities

	Added fat, %					P<	
	0	2	4	6	SED	Linear	Quadratic
Day 0-14							
ADG, lb	1.85	1.83	1.90	1.92	0.05	0.07	0.68
ADFI, lb	5.25	5.16	5.15	5.09	0.10	0.15	0.90
Feed/gain	2.84[a]	2.82[a]	2.71[b]	2.65[b]	0.05	0.01	0.65
Day 15-28							
ADG, lb	1.74	1.71	1.75	1.71	0.05	0.81	0.81
ADFI, lb	5.60[a]	5.41[b]	5.24[c]	5.11[c]	0.08	0.01	0.56
F/G	3.23[a]	3.17[ab]	2.99[c]	3.01[bc]	0.08	0.01	0.56
Day 29-42							
ADG, lb	1.70	1.60	1.66	1.71	0.06	0.13	0.64
ADFI, lb	5.56[a]	5.26[b]	5.13[b]	5.12[b]	0.17	0.01	0.10
F/G	3.30[ab]	3.31[a]	3.12[bc]	3.00[c]	0.09	0.01	0.30
Day 0-42							
ADG, lb	1.76	1.72	1.77	1.78	0.03	0.27	0.27
ADFI, lb	5.47[a]	5.28[b]	5.17[b]	5.10[c]	0.08	0.01	0.32
F/G	3.11[a]	3.08[a]	2.92[b]	2.87[c]	0.03	0.01	0.65
Feed cost/lb gain[d]	0.164[a]	0.170[bc]	0.168[b]	0.172[c]	0.002	0.01	0.50
IOFC, $/pig[ef]	21.10	20.24	21.02	20.80	0.45	0.80	0.29
Weight, lb[g]							
Day 14	183.6	183.9	184.7	184.6	0.67	0.07	0.64
Day 28	207.9	208.3	209.2	209.0	0.97	0.18	0.62
Day 42	231.9	230.9	232.5	233.2	1.47	0.24	0.44

[abc]Means with different superscript letter differ (P<0.05).
[d]Corn = $ 0.04/lb, soybean meal = $ 0.091/lb, choice white grease = $ 0.13/lb.
[e]Income Over Feed Cost.
[f]Pig price = $45/cwt.
[g]Average initial weight 157.8 lb.

Table 3. Performance of Barrows and Gilts in Grow-Finish in Commercial Facilities

	Gender			
	Barrows	Gilts	SED	P<
Day 0-14				
ADG, lb	1.91	1.85	0.04	0.20
ADFI, lb	5.37	4.96	0.10	0.01
F/G	2.82	2.69	0.04	0.02
Day 15-28				
ADG, lb	1.81	1.65	0.05	0.02
ADFI, lb	5.69	4.99	0.12	0.01
F/G	3.15	3.04	0.11	0.37
Day 29-42				
ADG, lb	1.61	1.72	0.05	0.06
ADFI, lb	5.44	5.09	0.22	0.16
F/G	3.40	2.96	0.09	0.01
Day 0-42				
ADG, lb	1.78	1.74	0.04	0.36
ADFI, lb	5.50	5.01	0.14	0.01
F/G	3.10	2.89	0.07	0.02
Feed cost/lb gain[a]	0.174	0.162	0.004	0.02
IOFC, $/pig[bc]	20.59	21.03	0.61	0.50
Ending weight, lb[d]				
Day 14	184.9	183.6	0.60	0.07
Day 28	210.3	206.9	1.12	0.02
Day 42	233.1	231.2	1.64	0.27

[a]Corn = $ 0.04/lb, soybean meal = $ 0.091/lb, choice white grease = $ 0.13/lb.
[b]Income Over Feed Cost.
[c]Pig price = $45/cwt.
[d]Average initial weight 160 lb for barrows and 155.6 lb for gilts.