EVALUATION OF BARLEY FOR FINISHING SWINE

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Summary

Three-hundred and ten crossbred finishing pigs averaging 110 lbs. were utilized in two growth trials to evaluate the effects of feeding barley to finishing hogs. In both experiments, there were no differences in average daily gain or average daily feed intake between hogs fed the milo-soybean meal control diet, a pelleted barley diet, or a 5% added fat barley diet. However, there was a significant decrease in average daily gain with the basal barley diet and a barley diet balanced on a lysine basis. Pelleting or adding fat significantly improved feed effeciency.

In Experiment 2, hogs fed a 5% molasses diet and a rolled barley diet had the lowest average daily gains and poorest feed efficiency.

These results indicate that pelleting and adding fat to barley-based diets improve average daily gain and feed efficiency. It would also appear that diets with barley substituted lb. for lb. for milo or balanced on a lysine basis have approximately 90-95% the value of a milo-soybean meal diet for finishing swine.

Introduction

With feed comprising 60 to 75% of the costs of a swine operation, it is essential for the producer to do everything possible to minimize feed costs, yet maintain high production and efficiency. When prices are favorable, barley becomes an attractive alternative grain source because of its high protein content. Several agronomic factors including low rainfall requirement, high yields, and early harvestability contribute to barley's profitability as a feed source. However, the high fiber and low energy content of barley generally limit its feeding value to 80 to 90% that of corn or milo. The following experiments were conducted to evaluate the use of Kansas-grown barley (Kanby) in swine finishing diets.

Experimental Procedures

In Experiment 1, 150 finishing pigs averaging 117 lbs. were allotted randomly to one of five dietary treatments with three replications per treatment and 10 pigs per pen. The trial was conducted from November 11, 1984 through January 22, 1985. Treatments included:

A: Milo-soybean meal control diet.
B: Milo replaced lb. for lb. by barley.
C: As B, pelleted.
D: Barley with 5% added fat, isocaloric to A.
E: Barley balanced on an equal lysine basis with A.

In Experiment 2, three additional treatments were evaluated with the five existing diets from Experiment 1.

F: Barley with 5% added molasses.
G: As B, rolled.
H: Barley substituted for 50% of the milo.

Composition of the diets is shown in Table 1. Pigs averaged 103 lbs. and were allotted randomly with two replications per treatment and 10 pigs per pen. The trial was conducted from January 17 through April 4, 1985.

In both experiments, feed and water were provided ad libitum. Pigs were weighed and average daily gain, feed intake, and feed efficiency were measured monthly. On the last day of the trial, each pig was scanned for last rib fat depth with a Scanoray Probe.

Results and Discussion

From the results of Experiment 1 (Table 2), it would appear that energy intake is a limiting factor in barley-based diets. Increasing the energy density of the diet by adding fat or pelleting significantly improved gain and feed efficiency, making them equal to the control group. Both processes would mask any detrimental effects of the fiber content of the diet, as well as improve palatability. In the basal and lysine- balanced barley diets, it would appear pigs could not consume enough feed to optimize their growth potential because of the high fiber levels. This might also be related to palatability of barley. Both of these diets were considerably dustier than the other diets, which possibly influenced intake. There were no differences between the basal and lysine-balanced barley diets, indicating that the lysine availability of barley may be adequate for this level of performance, thereby reducing the amount of soybean meal needed in the diet.

In Experiment 2, adding fat or pelleting again improved performance with barley-based finishing diets (Table 3). Although numerically lower, the basal, lysine- balanced, and 50% barley diets were not stastically different from the pelleted diet in average daily gain. Feed efficiency was best for the added-fat barley diet, followed by the lysine-balanced and pelleted diets. The addition of 5% molasses did not improve perfomance above the basal barley diet. Because of the cold weather during the trial, the molasses did not blend well into the diet and formed marble sized aggregates. Therefore, the increased feed intake and feed effeciency might be a reflection of feed wastage from the pigs sorting through the feed. Performance of the pigs fed rolled barley was also inferior, because of the decreased digestibility of whole kernels present, as well as the possible settling out of other ingredients in the diet. Last rib fat depth was also significantly lower, because of the slower rate of gain.

The results of these experiments indicate that increasing the energy density of barley diets through pelleting or adding fat will improve average daily gain and feed efficiency to a level comparable to a milo-based finishing diet. Furthermore, diets based on barley substituted either lb. for lb. or balanced on a lysine basis have approximately 90-95% the feeding value of milo-based diets.

Table 1. Composition of Finishing Diets.

Ingredients	Treatments[a]							
	A	B	C[b]	D	E	F	G[b]	H
Milo	1637	---	---	---	---	---	---	821
Barley	---	1641	1641	1542	1726	1541	1641	821
Soybean meal	300	300	300	300	215	300	300	300
Soy oil	---	---	---	100	---	---	---	---
Molasses	---	---	---	---	---	100	---	---
Dical (21% P)	25	17	17	18	17	17	17	21
Limestone	19	23	23	21	23	23	23	21
Salt	10	10	10	10	10	10	10	10
T.M. premix	2	2	2	2	2	2	2	2
Vitamin premix	5	5	5	5	5	5	5	5
Antibiotic	2	2	2	2	2	2	2	2
Calculated Analysis:								
% Protein	14	15	15	14.5	13.7	14.5	15	14
% Lysine	.60	.74	.74	.73	.60	.73	.74	.68
% C. fiber	3.0	7.3	7.3	6.8	7.7	6.8	7.3	5.1
% Ca	.69	.70	.70	.69	.69	.69	.70	.70
% P	.56	.56	.56	.56	.55	.56	.56	.58
ME Kcal/lb	1412	1317	1317	1425	1321	1368	1317	1366

[a] Treatments F, G, and H were only included in the second experiment.
[b] All diets were fed in meal form except C, which was pelleted, and G, which was rolled.

Table 2. Effect of Barley in Finishing Diets. Experiment 1.

Item	Treatments				
	Milo Basal	Barley Basal	Barley Pellets	Barley +5%fat	Barley +Lysine
ADG,lbs.[a]	1.75[b]	1.60[c]	1.74[b]	1.71[b]	1.59[c]
ADFI, lbs.	6.49	6.25	6.44	6.04	6.59
Feed/gain	3.76[c]	4.00[b]	3.71[cd]	3.54[d]	4.15[b]
Backfat[e]	.81	.79	.76	.81	.76

[a] Total of 150 pigs (10 pigs/pen with 3 pens/treatment), average initial wt. 117 lbs. and average final wt 231 lbs. Trial duration 68 days.

[bcd] Means on the same line with different superscripts differ (P >.05).

[e] Last rib unadjusted fat depth.

Table 3. Effect of Barley in Finishing Diets. Experiment 2

Item	Treatments							
	Milo Basal	Barley Basal	Barley Pellets	Barley +5% Fat	Barley +Lysine	Barley +5% Mol.	Barley Rolled	Barley 50%
ADG, lbs.[a]	1.82[b]	1.65[cd]	1.76[bc]	1.81[b]	1.65[de]	1.54[ef]	1.51[f]	1.66[cd]
ADFI, lbs.	6.87[b]	6.53[cd]	6.73[bc]	6.33[de]	6.08[e]	6.88[b]	6.58[bcd]	6.65[bc]
Feed/gain	3.91[de]	3.96[cd]	3.82[de]	3.50[e]	3.69[de]	4.40[b]	4.36[bc]	4.00[bcd]
Backfat[g]	.75[b]	.69[bc]	.74[b]	.72[b]	.72[b]	.71[b]	.62[c]	.73[b]

[a] Total of 160 pigs (10 pigs/pen with 2 pens/treatment), average initial wt. 103 lbs, average final wt. 230 lbs. Trial duration 74 days.

[bcdef] Means on the same line with different superscripts differ (P<.05).

Goodband, R.D. 1955 KSU Swine Day Report