Triticale-based Diets for Market Pigs in Deep-bedded Hoop Barns: A Progress Report

A.S. Leaflet R1964

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Summary and Implications

Triticale-based diets were fed to pigs in deep-bedded hoop barns for a swine feeding study. Finishing pigs (240 head) were used to evaluate the dietary effects of triticale-based diets. The experiment was a randomized complete block design. There were four blocks (two summer, two winter); each block had three dietary treatments, with two replications per treatment. Each replication consisted of a pen of ten pigs (five barrows and five gilts).

Addition of triticale up to 80% of the diets of finishing pigs greater than 160 pounds to market weight in deep-bedded hoop barns, compared with a corn-soybean meal diet, resulted in pigs that weighed less, grew slower, needed more feed per unit of liveweight gain, had less backfat, and smaller loin eye areas. There was no difference in feed intake.

There may be several factors that led to these results. The variety of triticale used in the study is predominantly used for forage, not cereal grain. The authors believe the amino acid content of the triticale may have been over-estimated. If this were true, the pigs would not have been provided adequate protein, resulting in slower growth and more feed required per unit of liveweight gain. The study will be repeated, using a different variety of triticale and a more complete amino acid analysis of the triticale.

Introduction

Triticale (trit-ah-kay-lee) is a relatively new, synthetic small-grain crop produced by crossing Durum wheat with rye. Triticale was developed to combine the high crude protein and digestible energy of wheat with the high yields and protein quality of rye. Triticale has the ability to grow in acidic soils and extreme climates, coupled with larger yields than rye, making it a practical and economical feedstuff. Triticale is not a major crop in the United States; therefore, it has not been widely fed to livestock.

Small grains such as triticale may provide an excellent addition to Iowa's swine industry. There may be advantages of adding these cereal grains to swine production. Generally, pigs fed small cereal grain-based diets perform as well as those fed corn-based diets. Other attributes create utilization of these grains attractive as well. Producers are able to add a third crop to a typical corn-soybean rotation. This may prove beneficial, as producers are able to reduce costs, improve distribution of labor and equipment, improve yields of corn and soybeans, provide better cash flows, alleviate crop pest problems, and reduce weather risks. Small cereal grains may provide environmental benefits such as erosion control and improved nutrient recycling.

Different cultivars of triticale may have differences in nutrient composition. When using triticale in swine diets, it is important to know the variety and its nutrient composition. Overall, compared with corn, triticale has a higher crude protein content, lower ether extract content (fat), and higher crude fiber, therefore, it provides a lower level of energy than corn. In addition to having greater lysine content than corn, triticale also has a more balanced amino acid profile. Only 14% of the phosphorus in corn is available to pigs, but 46% of the phosphorus in triticale is available. In triticale-based diets, less inorganic phosphorus needs to be added and less phosphorus will be excreted. Also, the additional cost of inorganic phosphorus may be reduced.

Materials and Methods

A total of 24 pens of ten pigs (five barrows and five gilts) were fed three diets. The three diets were control (corn and soybean meal), 40% triticale, and 80% triticale (by weight). The diets were isolysinic, based on calculated analysis. Table 1 shows the composition of the diets used for the study. Prior to allotment, pigs were fed together in a separate, large deep-bedded hoop structure and transferred to the test pens in bedded hoops for the trial. Each test pen had one water space and two feeder spaces. Pigs were given a two-week adjustment period to adapt to the new diets and smaller pens. The pigs were started on experiment at approximately 160 lbs. The pigs were weighed at the beginning and end of the trial and marketed at Farmland, Denison, IA. Pigs were scanned using ultrasound at the end of the trial to measure backfat and loin eye area.

Results and Discussion

Performance of the pigs fed experimental diets is shown in Table 2. The pigs were started on test at approximately 160 lbs and fed for 49 days. Average daily gain was 2.1 lb/d for pigs fed corn-soybean meal diet, 1.9 lb/d for pigs fed 40% triticale, and 1.5 lb/d for pigs fed 80% triticale. However, there was no difference in average daily feed intake for the three diets. As a result, feed efficiency was much poorer for pigs fed triticale-based diets. Pigs fed control corn-soybean diet required 4.1 lb feed/lb gain, pigs fed 40% triticale diet required 4.5 lb feed/lb gain, and pigs fed 80% triticale diet required 5.4 lb feed/lb gain. Pigs fed the 40% triticale diet had the same backfat thickness as the control diet, while pigs fed 80% triticale diet had slightly less backfat thickness. Pigs fed triticale diets had smaller

loins than pigs fed the corn-soybean meal diet (7.53 in^2, 7.15 in^2, and 6.12 in^2, for the control, 40% triticale, and 80% triticale diets, respectively).

Acknowledgments

The authors gratefully acknowledge and appreciate the assistance of Lance Gibson, assistant professor, agronomy and the Western Experimental Farm Association. We also gratefully thank the Baker Endowment Advisory Council for Excellence in Agronomy for its funding of this project.

Table 1. Composition of diets fed to pigs in deep-bedded hoop barns, %.

Ingredient	Corn-SBM	40% Triticale	80% Triticale
Corn	85.00	46.50	8.50
Triticale	0.00	40.00	80.00
SBM	12.91	11.53	9.64
Dicalcium phosphate	0.60	0.33	0.07
Limestone	0.90	1.05	1.20
Salt	0.34	0.34	0.34
Vit Premix	0.20	0.20	0.20
Min Premix	0.05	0.05	0.05
Total	100.00	100.00	100.00

Calculated Analysis

	Corn-SBM	40% Triticale	80% Triticale
Crude Protein, %	12.90	13.60	14.10
Lysine, %	0.61	0.62	0.61
Ca, %	0.53	0.54	0.55
Available P, %	0.17	0.17	0.18
ME, kcal/kg	3320.00	3240.00	3160.00

Table 2. Performance of pigs housed in deep-bedded hoops fed 0, 40, and 80% triticale diets.

Diet	Corn/soy	40% triticale	80% triticale
Pigs, no.	80	80	80
Start wt, lbs	160.4	159.5	156.1
End wt, lbs	260.6	251.6	230.6
Gain, lbs	100.2	92.1	74.5
Days on test, d	49	49	49
Avg. Daily Gain, lb/d	2.1	1.9	1.5
Avg. Daily Feed, lb/d	8.4	8.4	8.2
Feed/Gain, lb feed/ lb gain	4.1	4.5	5.4
Backfat, in.	0.82	0.81	0.76
Loin eye area, in^2.	7.53	7.15	6.12