2005

Triticale-Based Diets for Market Pigs in Deep-Bedded Hoop Barns: A Progress Report

Zebblin M. Sullivan
Iowa State University

Mark S. Honeyman
Iowa State University, honeyman@iastate.edu

Wayne B. Roush
Iowa State University, wroush@iastate.edu

Triticale-Based Diets for Market Pigs in Deep-Bedded Hoop Barns: A Progress Report

Abstract
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, and has 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.

Keywords
Animal Science

Disciplines
Agricultural Science | Agriculture | Animal Sciences

Triticale-Based Diets for Market Pigs in Deep-Bedded Hoop Barns: A Progress Report

Zebblin M. Sullivan, research assistant
Mark S. Honeyman, professor
Department of Animal Science
Wayne B. Roush, farm superintendent

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, and has 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 to adding these cereal grains to swine production. Generally, pigs fed small grain-based diets perform as well as those fed corn-based diets. Other attributes make utilization of these grains attractive as well. Producers are able to add a third crop to a typical corn-soybean field rotation. This may prove beneficial because 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 also 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 a higher crude fiber content; 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. While only 14% of the phosphorus in corn is available to pigs, 46% of the phosphorus in triticale is available. This is important because less supplemental phosphorus needs to be fed in triticale-based diets and subsequently 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. The adjustment period given for adaptation to the new diets and smaller pens was two weeks. The pigs were started on the experiment at approximately 160 lb. The pigs were weighed at the beginning, day 28, and at the end of the trial and then marketed at Farmland, Denison, Iowa. Pigs were scanned using ultrasound to measure backfat and loin eye area at the end of the trial. Barrows from one summer and one winter block were used to evaluate pork quality measures and sensory characteristics.

Results and Discussion

Performance of the pigs fed experimental diets is shown in Table 2. The pigs were started on the test at approximately 160 lb and fed for 49 days. Average daily gain was 2.0 lb/d for pigs

fed the corn-soybean meal diet, 1.9 lb/d for pigs fed the 40% triticale and 80% triticale. Average daily feed intake was 8.3, 8.5, and 8.9 lb/day for pigs fed corn-soybean meal diets, 40% triticale- and 80% triticale-based diets, respectively. As a result, feed efficiency was poorer for pigs fed triticale-based diets. Pigs fed the control corn-soybean diet required 4.1 lb feed/lb gain, pigs fed the 40% triticale diet required 4.4 lb feed/lb gain, and pigs fed the 80% triticale diet required 4.6 lb feed/lb gain. Pigs fed the 40% triticale diet had the same backfat thickness as the 80% triticale diet, whereas pigs fed the control diet had slightly less backfat thickness. Pigs fed triticale diets had slightly smaller loins than pigs fed the corn-soybean meal diet (7.24 in^2, 6.85 in^2, and 6.89 in^2, for the control, 40% triticale, and 80% triticale diets, respectively). Preliminary review of pork quality characteristics indicates no dietary effects.

Acknowledgments

The authors gratefully acknowledge and appreciate the assistance of Lance Gibson, agronomy professor, Wayne Roush and the Western Iowa Experimental Association, Ken Prusa and the Sensory Evaluation Laboratory, Don Beitz's Lab, Swift and Co. of Marshalltown, Iowa, and the Baker Council 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	3240	3160

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, lb	157.8	157.8	155.4
End wt, lb	256.7	254.0	250.4
Avg. daily gain, lb/d	2.0	1.9	1.9
Avg. daily feed, lb/d	8.3	8.5	8.9
Feed/gain, lb feed/ lb gain	4.1	4.4	4.6
Backfat, in.	0.70	0.77	0.75
Loin eye area, $in.^2$	7.24	6.85	6.89
Yield, %	76.2	77.0	76.4
Lean, %	54.8	52.6	53.4
pH	5.74	5.69	5.69
Japanese color score	3.80	3.44	3.39
Marbling	3.10	3.22	3.00
% Loin purge	1.68	1.69	1.77