Triticale Performs in Pig Feeds

Introduction

Many crop growing areas of Alberta are suitable for triticale production. Grain yields of various triticale varieties have exceeded that of wheat. Although triticale is somewhat more susceptible to ergot than wheat grain, the cost of cleaning ergot out using optical sorters is outweighed by the higher grain yield of triticale compared with wheat. Triticale is expected to thrive in the drier areas of south-eastern Alberta where winter seeding is practiced.

Alberta-grown triticale grain can be effectively included in swine feeds. Feeding success is because of good palatability and nutritional value of modern varieties of triticale grain. Modern varieties are of a new hybrid generation of improved triticale (X Triticosecale Wittmack L.) and have more characteristics of the wheat parent than the rye parent. This mix results in good palatability and reduced antinutritional factors for livestock. These triticale grain varieties have also been selected for higher energy value. Consequently, feed intake on triticale diets is comparable to that of wheat grain or hulless barley diets. Pigs do just as well when fed triticale compared with wheat grain regarding growth rate and feed efficiency traits.

Laboratory Analysis

Based on laboratory analyses, the nutritional value of triticale compares well with wheat and barley grain. The important nutrients for monogastric animals like pigs and poultry are digestible energy and amino acids content. In 1998, about 400 samples of triticale were grown in research plots around Alberta and had laboratory analyses conducted for protein and amino acids. The results were compared with similar analyses of locally-grown wheat and barley grain harvested the previous year. The results are shown in Table 1.

Table 1. Comparison of triticale with wheat and barley grain for some essential amino acids (dry matter basis).

	Triticale	Wheat	Hulless Barley	Hulled Barley
Protein %	14.00	14.40	15.91	13.87
Lysine %	0.41	0.39	0.51	0.47
Threonine %	0.41	0.43	0.49	0.45
Methionine %	0.19	0.22	0.26	0.21
Tryptophan %	0.21	0.24	0.24	0.23

Triticale protein and amino acid content compare well with wheat grain. However, barley protein had higher lysine and threonine content than either wheat or triticale grain, which is an important consideration for inclusion in pig feeds.

Experimental Results

Two experiments were performed at the University of Alberta Swine Research Farm feeding different varieties of triticale to weaned pigs. In the first trial, two varieties of spring triticale (Ultima and Pronghorn) and two varieties of winter triticale (Bobcat and Pika) were compared with two types of wheat (CWRS and CPSR) in a 4-week trial starting one week after weaning at 20d of age. Triticale grain completely substituted

wheat in test diets (66.5% inclusion). Replacing wheat with either spring or winter triticale grain did not affect daily feed intake or weight gain of weaned pigs, but increased feed efficiency by 0.02 for spring triticale and 0.03 for winter triticale grain ($P<0.001$). Growth performance variables did not differ between winter and spring triticale varieties. Apparent total tract digestibility of dry matter, crude protein, gross energy, calcium and phosphorus was greater for triticale diets than wheat diets, whereas there was no difference between spring and winter triticale diets. Higher CP and lower NDF content for triticale than wheat grain were likely the reasons for the differences in improved digestibility and feed efficiency.

In the second trial, four spring triticale varieties (Alta, Bunker, Pronghorn and Tyndal) were compared with CPS wheat in a 4-week trial starting one week after weaning at 20d of age. Triticale completely substituted wheat grain in test diets (62.6% inclusion). Overall, daily feed intake and feed efficiency were similar among triticale varieties and compared with wheat. Average daily gain was similar among pigs fed Alta, Bunker, Pronghorn or wheat diets, but was lower for pigs fed Tyndal, resulting in lower body weight at d 28 of the trial for Tyndal fed pigs. The digestibility of crude protein, crude fat, calcium and phosphorus were not different between wheat and triticale diets. The digestibility of DM and gross energy was greater for wheat than triticale diets, likely because the triticale varieties had greater levels of NDF than the wheat variety (CPS 5700) fed in this experiment.

The two experiments above confirmed that weaned pigs fed triticale as the sole dietary cereal grain can achieve growth similar to that of weaned pigs fed wheat, except for a small growth lag feeding Tyndal triticale variety. Therefore, these recommendations for feeding triticale to weaned pigs supersede previous research by from Alberta Agriculture. Sam Jaikaran's research from1997 showed that pigs fed an all-triticale grain diet ate slightly less and grew slightly slower. Therefore, for weaner diets, the previous recommendation was to feed no more than half triticale and half wheat to make up the cereal portion of the diet. However, **our two more recent experiments show that it is safe to feed triticale as the sole dietary cereal grain to weaner pigs.**

In 1997, an experiment was conducted at the University of Alberta Swine Research Farm in which Pronghorn triticale was fed to market hogs. The experiment was designed to determine how well market hogs performed on triticale diets as compared to other hogs fed wheat or corn-based diets. Carcass quality and meat characteristics of the market hogs were evaluated by Wayne Robertson, a meat quality researcher at the Lacombe Research Station. The results of these studies were very positive for triticale.

Triticale grain was used to replace corn or hulless barley in a three-stage feeding program (20-50 kg, 50-80 kg and 80 kg – slaughter) for pigs from 20 kg to a market weight of 110 kg. Another group of pigs was fed a triticale/hulless barley mixture.

The results are shown in Table 2. Pigs on the corn, hulless barley and triticale diets ate about the same, grew equally fast and had similar feed conversion efficiency. These results proved that growing pigs were able to utilize nutrients in triticale grain with similar efficiency as hulless barley or corn grain. It also suggested that the energy value and protein quality in triticale were at least as high as hulless barley or corn grain. With respect to carcass quality, it was found that the corn and the triticale/hulless barley diets produced pigs with greater backfat than the barley or triticale diets and about one per cent less estimated lean yield. Consequently, average grade index on the corn fed pigs was 106.5 whereas barley and triticale-fed pigs averaged 109.5. The conclusion from this study was that triticale grain can completely replace barley or wheat grain in the diets for market hogs.

Table 2. Growth performance of pigs (27-110 kg) fed diets with various cereals

Treatment	Average Daily Feed Intake (kg)	Average Daily Gain (grams)	Feed Conversion (F/G)	Grade Index
Corn	2.50	885	2.85	106.5
Hulless Barley	2.53	915	2.87	109.2
Triticale	2.50	899	2.81	109.6
Hulless barley and triticale 1:1	2.66	935	2.86	106.4

Conclusion

Our newer research in weaner pigs showed that triticale can be fed as the sole cereal grain (up to 66% inclusion) without affecting growth performance. Feeding Tyndal triticale resulted in slightly lower performance highlighting the importance of testing different varieties for feeding pigs.

Grower-finisher pigs fed Pronghorn triticale showed excellent performance. Therefore, triticale grain can completely replace barley or wheat grain in the diets of market hogs.

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