

Feed Processing and Nutritional Quality Among Wheat Classes Fed to Weaned Pigs

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Summary

Feed processing and nutritional quality for CPS and durum wheats have traditionally been expected to be lower than for Hard Red Spring (HRS). Performance of weaned pigs was compared among six wheat classes, whilst considering particle size and diet pellet quality. Results indicated that feed processing quality and growth performance did not differ among wheat classes. Weaned pigs fed various classes of wheat including CPS and durum may grow similarly.

Introduction

The processing and nutritional quality of wheat is expected to vary among classes; CPS and durum wheat are currently segregated. A range in wheat protein and fibre or non-starch polysaccharide (NSP) content may partly cause quality variation. The present study was designed to test whether wheat class by itself impacts feed processing or nutritional quality.

Experimental Procedures

Two cultivars from each of six classes (CPS White and Red, HRS, durum, Hard Red Winter (HRW) and Hard White (HW)) were collected (Table 1). Protein ranged from 12.2 to 17.4% and total NSP from 9.0 to 11.5% (Table 2). A 3-week growth and digestibility study was conducted with 12-kg weaned pigs (PIC; 39-day-old; 4 pigs/pen, 12 pens per cultivar), which were fed pelleted 65%-wheat diets (3.5 Mcal DE/kg; 3.4 g dig. lysine/Mcal).

Results and Discussion

Wheat particle size ranged from 536 to 734 mm (10/64"-screen) (Table 2). Pellet Durability Index was 96 for all diets. Feed processing quality was thus excellent for all wheat classes. In the growth study, average daily gain (ADG), average daily feed intake (ADFI), and feed efficiency did not differ among wheat classes for day 0 to 21 (Figure 1). However, some minor differences were observed in the first week. For example, ADG for durum was 9% lower than for HRW, and similar among other classes; ADFI for HW was 7% lower than for HRW, and similar among other classes. Finally, diet energy digestibility (and thus DE content) was lowest for CPS Red (86.5%), medium for CPS White, HRS and HW (87.2 to 87.5%) and highest for HRW and Durum (88.6 & 88.9%) (Figure 2).

Implications

Protein but not NSP content varied among 12 wheat cultivars harvested in western Canada in 2001. Wheat protein content was "corrected for" during diet formulation and did not affect pig performance. Wheat NSP content was low overall, indicating that all 12 wheat samples were of excellent nutritional quality. Still, DE content ranged 7% and was highest for durum. Reductions in ADG and ADFI for CPS and durum wheat were limited to the first two weeks, and did not exist after three weeks.

In conclusion, despite variations in wheat DE content, weaned pigs fed various classes of wheat including CPS and durum performed equally. Wheat class by itself was not a cause for a range in feed processing or nutritional quality.

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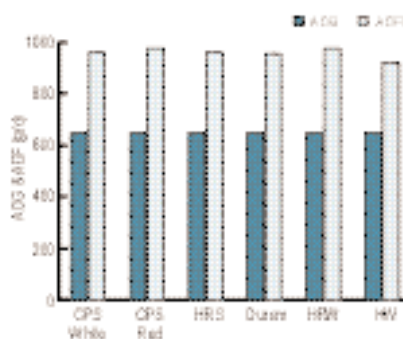


Figure 1: Effects of wheat class on average daily gain (ADG) and feed intake (ADFI) of weaned pigs in the 3-week growth study.

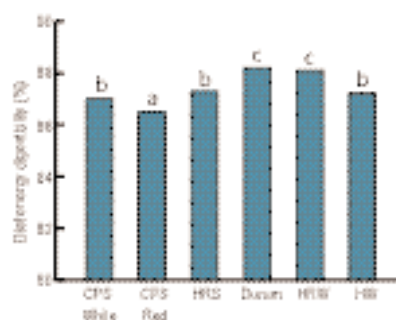


Figure 2: Effect of wheat class on diet energy digestibility measured in weaned pigs.

Table 1. The Canadian Wheat Board classes and popular names for the used wheats.

Canadian Wheat Board Class	Popular Name
Canadian Prairie Spring White	CPS White
Canadian Prairie Spring Red	CPS Red
Canadian Western Red Spring	Hard Red Spring (HRS)
Canadian Western Amber Durum	Durum
Canadian Western Red Winter	Hard Red Winter (HRW)
Canadian Western Hard White	Hard White (HW)

Table 2. Protein and NSP content and particle size of the ground wheat. Each value represents one of two cultivars per class.

Wheat class	Protein (% as is)	Total NSP (% as is)	Particle size (% as is)
CPS White	15.1,16.1	11.3,11.4	591,700
CPS Red	12.4,15.8	11.0,11.3	556,631
HRS	15.4,17.1	10.8,16.5	640,708
Durum	16.3,16.8	9.0,10.1	624,734
HRW	12.2,13.7	9.7,10.9	536,636
HW	16.5,17.4	10.9,11.3	629,724

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