

Feed preference of weaned pigs for soybean meal, *Brassica napus* canola meal, or *Brassica juncea* canola meal

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Take Home Message

When given a choice, weaned pigs prefer soybean meal (SBM) over canola meal (CM). But preference differs among canola meal types. *Brassica (B.) juncea* CM contains more glucosinolates especially bitter gluconapin, and therefore, weaned pigs prefer regular *B. napus* CM over *B. juncea* CM. However, feed preference may not hamper feed intake or growth. Weaned pigs offered free choice of two feeds (*B. juncea* CM or *B. napus* CM) in two separate feeders in the same pen did not reduce feed intake, weight gain, and feed conversion compared to pigs similarly offered free choice of two feeds that include SBM, specifically the pair (SBM or *B. napus* CM) or (SBM or *B. juncea* CM). Our study indicates that lower preference of weaned pigs for CM over SBM does not result in poor growth performance. Canola meal can be a valuable alternative to SBM for weaned pigs as feedstuff in western Canada.

Feed preference matters

Feed intake and thus energy intake is the key driving force for pigs to grow, but feed intake is affected by many factors including feed palatability. Canola meal can be included in pig feed to replace SBM thereby reducing feed cost. The CM may contain glucosinolates that may produce off-flavors that reduce palatability. In Canada, 95 per cent of CM originates from *B. napus* and the balance is from *B. juncea* and *B. rapa*. These CM types differ in nutrient profile and glucosinolates content and composition. Sensory systems (olfaction and taste) of young pigs are sensitive, as demonstrated previously by starter pigs persistently reducing selection of diets containing five to 20 per cent CM over SBM. Whether gluco-

sinolates in CM from western Canada affect feed palatability and further affect feed intake in weaned pigs needs to be answered. Previously, we showed that feeding 20 per cent modern *B. napus* CM containing 3.8 µmol glucosinolates/g did not reduce feed intake in weaned pigs but feeding 24 per cent *B. juncea* CM containing 10.8 µmol glucosinolates/g did reduce feed intake. To further quantify feed preference of weaned pigs for CM, we arranged double-choice preference tests by providing free choice of two feeds offered in the same pen. We then measured feed intake and growth of weaned pigs fed one of the three combinations of three diets containing 20 per cent SBM, *B. napus* CM, or *B. juncea* CM.

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Chemical profile of soybean meal, canola meal and the diets fed

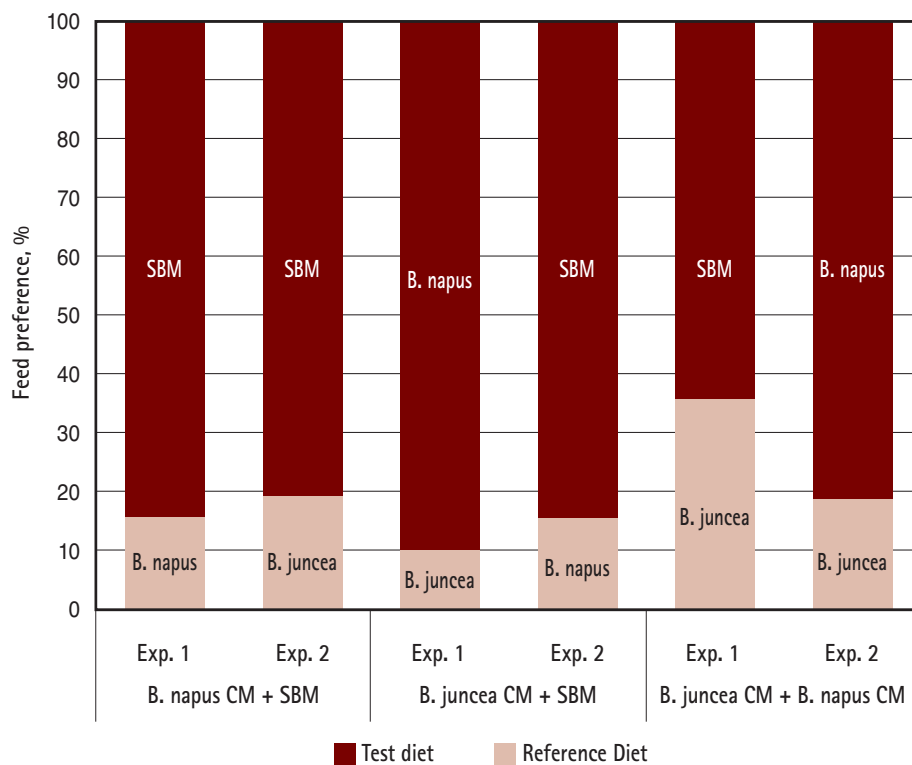
The *B. napus* and *B. juncea* CM contained less CP (~39 per cent), but more acid detergent fibre (14–18%) than the SBM. The *B. juncea* CM contained double glucosinolates than *B. napus* CM (10.8 vs. 4.91 $\mu\text{mol/g}$). The dominant glucosinolate in *B. juncea* CM was 3-butenyl (gluconapin), whereas the major glucosinolate in *B. napus* CM was 2-OH-3-butenyl (progoitrin) followed by gluconapin. Diets were wheat-based and formulated to contain 20 per cent of one of the three test feedstuffs. Diets were formulated to provide 2.36 Mcal net energy (NE)/kg and 4.49 g standardised ileal digestible lysine/Mcal NE (as-fed) with other AA as an ideal ratio to lysine. Premixes were added to meet or exceed trace mineral and vitamin requirements. Diets were fed as mash in Exp. 1 and were cold-pelleted in Exp. 2.

Weaned pig trial set up

We conducted two studies at the Swine Research and Technology Centre, University of Alberta (Edmonton, AB) with a total of 360 pigs (Large White \times Duroc; Hypor, Regina, SK, Canada).

There were three double-choice dietary treatments: 1) *B. napus* CM with SBM as reference, 2) *B. juncea* CM with SBM as reference, and 3) *B. juncea* CM with *B. napus* CM as reference. Both Exp. 1

Figure 1. Preference of weaned pigs fed paired diets containing 20% soybean meal, *Brassica napus* canola meal, or *Brassica juncea* canola meal in Experiment 1 and 2



and 2 were replicated 3 \times 3 Latin squares for three periods starting two weeks after weaning at 19 \pm 2 days of age. The use of Latin squares may help to reduce the early exposure effect, so each paired treatment was assigned equally as first exposure and applied to a pen once in the entire trial. Periods included four days of double-choice feed preference test followed by three days with a common non-test diet. Pigs had free access to two diets in two adjacent feeders in

each pen and feeders were switched daily from their original pen to adjacent pens with the same diet pair. Each feeder provided four feeding spaces.

In Exp. 1, 216 weaned pigs (initial body weight, 9.4 kg) were housed in pens of eight pigs in three nursery rooms. Feeder position (right or left) was not switched daily. In Exp. 2, 144 weaned pigs (initial body weight, 8.9 kg) were housed in pens of four pigs in four nurs-

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ery rooms. Feeder position (right or left) in each pen was switched daily.

For both experiments, pigs had free access to feed and water throughout. Pigs were weighed on day 0, 4, and seven of each seven day period. Feed added and remaining was weighed daily to calculate feed disappearance per pen. Feed availability was monitored three times per day to ensure adequate feed flow in the trough of each feeder. Feed preference

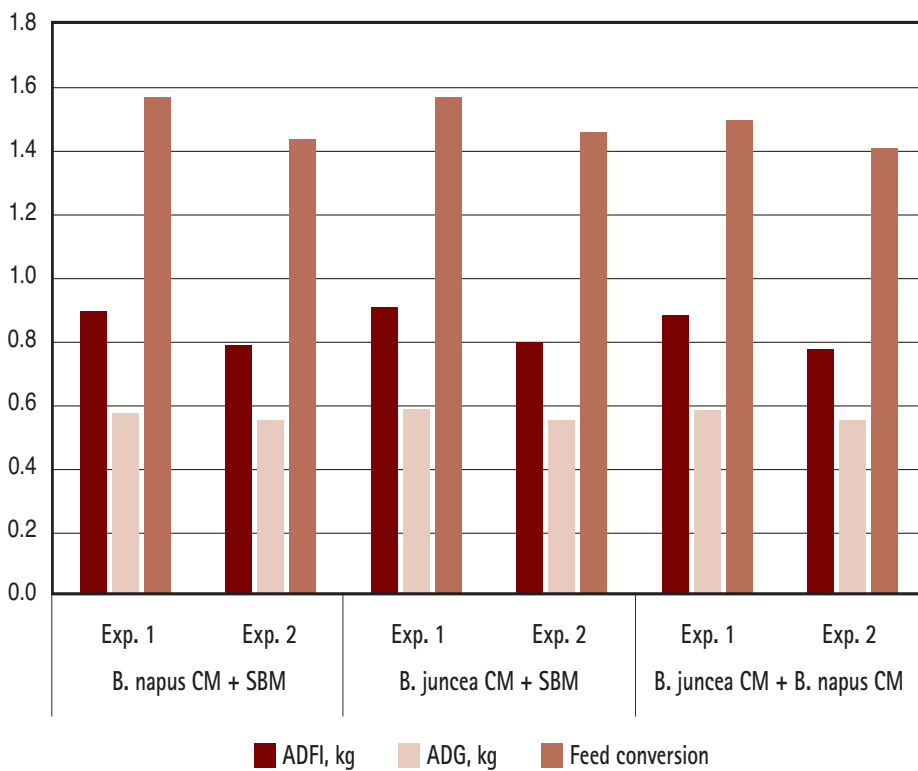
was calculated as a percentage of feed intake of a test diet out of total feed intake of a test diet and its paired reference diet.

What we found

For both studies, pigs preferred the SBM diet over the *B. napus* and *B. juncea* CM diets (Figure 1). Canola meal contains anti-nutritional factors, for example, glucosinolates and tannins that contribute to bitter flavor. Pigs may avoid

subsequent consumption of feed with an unpleasant flavor. Pigs preferred the *B. napus* CM diet over the *B. juncea* CM diet, likely because *B. juncea* contained 7 times more bitter gluconapin than *B. napus* CM. Strong avoidance of the *B. juncea* CM diet in weaned pigs indicated that canola breeding should reduce bitter gluconapin-type glucosinolates in *B. juncea* canola to prevent reduced feed intake in weaned pigs.

Figure 2. Growth performance of weaned pigs fed paired diets containing 20% soybean meal, *Brassica napus* canola meal, or *Brassica juncea* canola meal in Experiment 1 and 2



Interestingly for both Exp.1 and 2, overall ADG, ADFI and feed conversion did not differ among pigs fed the 3 paired diets (Figure 2). These data indicate that feed preference is not a good indicator of feed intake that the pigs actually achieve when there is not a choice.

Conclusions

Weaned pigs strongly preferred the SBM diet over *B. napus* CM or *B. juncea* CM diets. Weaned pigs preferred *B. napus* CM diet over *B. juncea* CM diet indicating that gluconapin in *B. juncea* CM was a major concern affecting CM preference. However, lower feed preference of a diet does not equate to poorer feed intake.

Acknowledgements

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