Using canola meal as a major protein source for lactating sows

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Canola meal, the main co-product of the canola seed crushing industry, is a commonly used protein source for swine. Compared to soybean meal, canola meal has a lower protein and amino acid content, with around three times the fiber. In recent years, the development of canola meal with low glucosinolate content has increased its usage in swine diets even though the higher fiber content can reduce energy and nutrient digestibility in swine.

Earlier studies at the University of Manitoba have shown that when feeding canola meal at higher inclusion rates (e.g. up to 25 per cent) to weaner pigs, formulating diets based on net energy and standardized ileal digestible amino acid content can overcome the potential negative impact on growth performance. However, not much research has been conducted to evaluate the effects of feeding higher levels of canola meal on lactating sow and piglet performance. If sow nutrient requirements are not met, mobilization of body reserves could occur, having detrimental consequences on both reproduction and piglet survivability.

For our study we hypothesized that optimal performance in lactating sows can be maintained by feeding diets containing higher levels of canola meal if they are formulated on the basis of net energy and standardized ileal digestible amino acid systems.

The study

Objective: to determine the effects of higher dietary canola meal inclusion in lactation diets on reproductive performance of sows with diets formulated on the basis of net energy and standardized ileal digestible amino acid.

The study was conducted at the Glenlea Swine Research Unit, University of Manitoba with 45 (Yorkshire × Landrace) sows and their litters. A week before the expected day of farrowing, sows were moved from gestation pens to individual farrowing crates and were fed one of three experimental diets until weaning. The three experimental diets consisted of a corn-soybean meal basal diet containing 0, 15 or 30 per cent canola meal. Sows were fed 3.0 kg of their respective experimental diets once daily until parturition. After farrowing, feed was gradually increased over a one-week period, after which the respective diets were offered *ad libitum* until weaning. The quantity of feed provided and the feed refusals per sow were recorded daily to determine the average daily feed intake (ADFI) by sows. Sow body weight and backfat depth were measured and recorded on day 111 of pregnancy, immediately after farrowing (day 0), day seven post-farrowing and at weaning (day 21). Milk samples were collected from sows on day 0, seven

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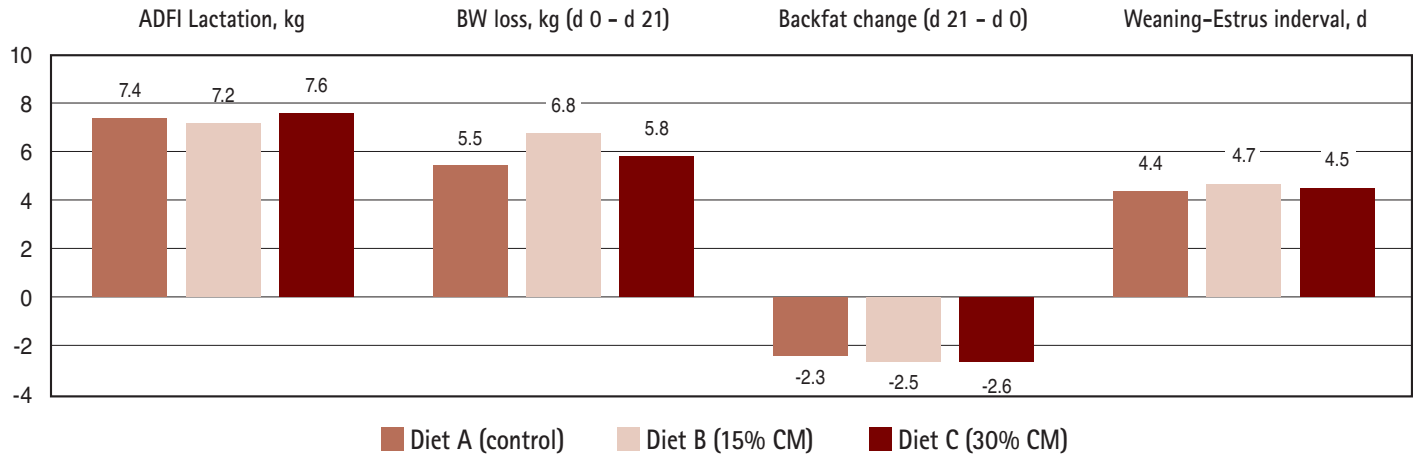
Key points

- Canola breeding has resulted in cultivars with low concentrations of anti-nutritional factors (mainly glucosinolates), making it a suitable feedstuff for swine
- Sow and litter performance data from the current study indicate that when diets are formulated on the basis of net energy and standardized ileal digestible amino acid systems, canola meal could be incorporated as a major protein source in lactating sow diets

Figure 1. Effect of high dietary canola meal inclusion on growth and reproductive performance in lactating sows



and 21 post-farrowing to determine the milk composition. Total number of piglets born alive and number of piglets weaned per sow was recorded and litters were weighed on day 0, 7 and 21 to calculate average daily body weight gain (ADG). Since excessive mobilization of body reserves can result in lack or absence of the expression of estrus in sows, detection of estrus was conducted post-farrowing to determine weaning to estrus interval.

Results and discussion

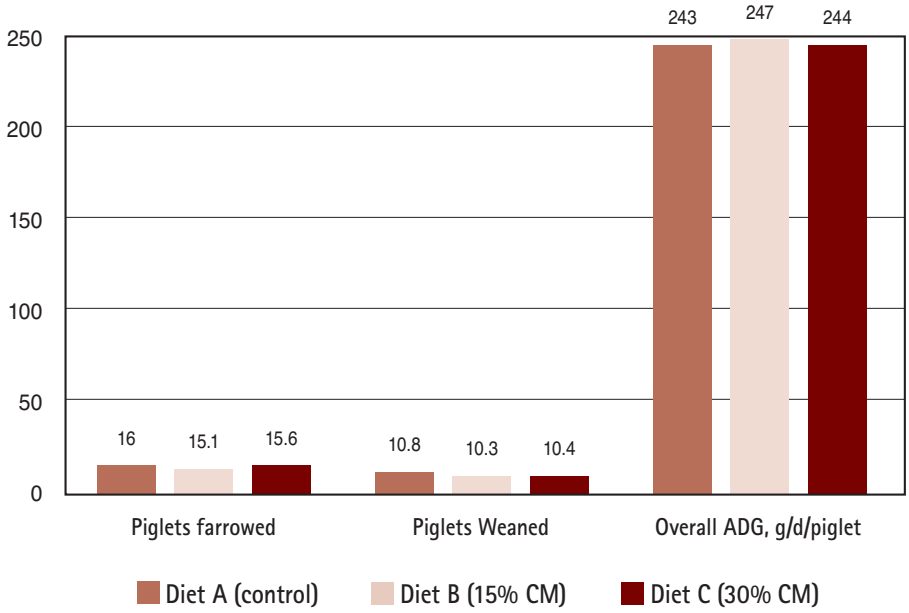
The results from the study showed no negative effects of higher dietary canola meal on lactation feed intake, sow body weight and backfat change and weaning to estrous interval (Figure 1). Sow milk composition (fat, protein, lactose and urea) was also unaffected by higher rates of canola meal inclusion (data not shown). There was no negative effect of dietary canola meal inclusion on litter ADG (Figure 2).

Sows can tolerate a maximum level of 4 µmol/g total glucosinolates in diets, above which their reproductive performance has shown to be negatively affected. Standard canola breeding techniques have led to a considerable reduction in glucosinolates levels in canola meal. The canola meals used in this study contained moderately low levels (7.9 µmol/g) of glucosinolates, equivalent to 1.32 µmol/g and 2.82 µmol/g for diets with 15 and 30 per cent canola meal, respectively. Thus, the lack of a difference in ADFI between sows fed the control diet and canola meal-containing diets in the current study could also be due to the fact that the concentration of glucosinolates in diets was within the tolerance level for sows. In the present study, the milk composition was also un-affected with higher canola meal inclusion; perhaps because the diets were formulated to contain similar standardized ileal digestible amino acid contents.

Conclusion

Net energy system enables more effective utilization of high fiber ingredients like canola meal without affecting the animal performance. Based on the absence of negative effects of higher dietary canola meal inclusion on sow ADFI, sow milk composition and piglet ADG, we conclude that inclusion of up to 30 per cent canola meal in lactation diet can support satisfactory sow and suckling piglet performance when such diets are formulated on the basis of net energy and standardized ileal digestible amino acid systems. Currently, a study is underway at the University of Manitoba looking into the effect of high dietary canola meal inclusion from early gestation on lactating sow and litter performance.

Figure 2. Effect of high dietary canola meal inclusion on litter performance



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