

# Feeding canola press-cake to starter pigs

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## Take home message

Canola press-cake (CPC) is a co-product of biodiesel production from processing plants that mechanically press canola seed without conditioning, flaking, cooking and solvent extraction. The CPC contains 37 per cent crude protein and 20 per cent remaining oil; thus, CPC could be a source of protein and energy in pig diets. Effects of replacing soybean meal (SBM) and canola oil with increasing inclusion of CPC on diet nutrient digestibility and growth performance of weaned pigs were evaluated. In total, 240 pigs (initial weight = 7.5 kg) starting 1 week after weaning (19 d of age) were fed 5 wheat-based diets containing 0, 5, 10, 15, or 20 per cent CPC replacing SBM and canola oil in 2 phases (Phase 1 and 2). Diets were balanced for net energy (NE) value using canola oil and standardized ileal digestible (SID) amino acid (AA) content using crystalline AA. Increasing dietary inclusion of CPC did not affect average daily feed intake and average daily weight gain but improved feed conversion (feed:gain). In conclusion, 20 per cent CPC can replace 20 per cent SBM and 3.3 per cent canola oil in diets formulated to equal dietary NE value and SID AA content and fed to nursery pigs 1 week after weaning without detrimental effects on growth performance.

## Canola press-cake

Solvent-extracted canola meal (CM) is the most common canola co-product and is fed to pigs mainly as cost-effective alternative to SBM. The CM is produced by extracting canola oil using solvent extraction in crushing plants. Canola oil can also be extracted by simply pressing seed mechanically without conditioning, flaking, cooking and solvent-extraction, leading to lower infrastructure cost and

equipment requirements. The co-product after pressing is named canola press-cake (CPC).

Apart from human food consumption, canola oil is also used to produce biodiesel. Demand for biodiesel is increasing worldwide due to policies supporting renewable diesel content in fuels as alternative to petroleum diesel to reduce greenhouse gas emissions. Consequently, canola seed crushing and oil production will increase further, and may lead to greater availability of CPC.

Feeding CPC to pigs may have advantages over feeding CM: 1) The CPC contains about 20 per cent remaining oil that is much more than CM (3 per cent), indicating greater energy value for pigs; 2) The availability of AA in CPC may also be greater than that in CM due to exclusion of cooking and desolventizing that may cause heat damage to AA. Feeding CPC to pigs may also have a concern: the lower processing temperature

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may be insufficiently high to inactivate the enzyme myrosinase that hydrolyses glucosinolates to produce harmful breakdown compounds. With increasing availability of CPC in North America, its feeding value as AA and energy source for pigs should be validated. However, the growth response of weaned pigs to increasing dietary inclusion of CPC has not been researched extensively.

### Nutrient profile of canola press-cake

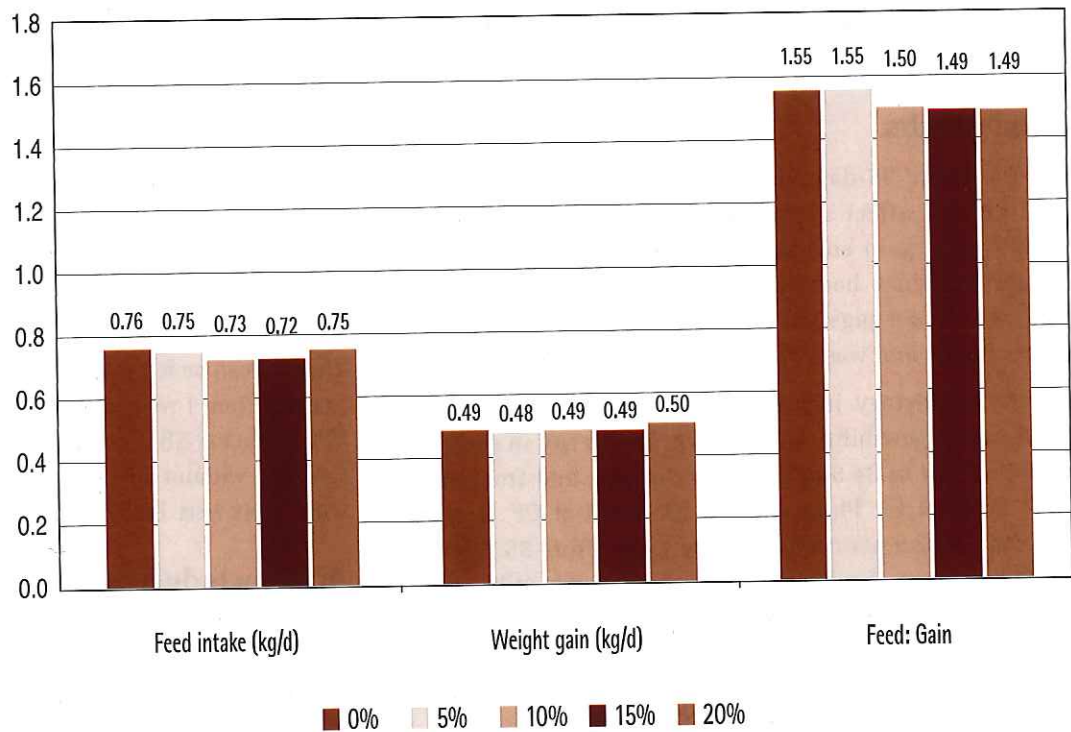
Canola seed was sourced from Apex Nutri-Solutions Inc. (Edberg, AB, Canada). The CPC was produced at the Agri-Food Discovery Place (Edmonton, AB, Canada). The sample contained 37 per cent CP, 20 per cent crude fat, 20 per cent ADF, 23 per cent NDF, 2.3 per cent lysine and 2.2 per cent available lysine, 0.73 per cent methionine, 1.6 per cent threonine, and 1.1 per cent phosphorus on as fed basis.

### The weaned pig trial

The animal trial was conducted at the Swine Research and Technology Centre, University of Alberta (Edmonton, AB, Canada). Experimental diets were formulated to contain 0, 5, 10, 15 or 20 per cent CPC to replace up to 20 per cent SBM and 3.3 per cent canola oil. Diets were formulated to provide 2.46 and 2.39 Mcal NE/kg and 5.02 and 4.19 g SID lysine/Mcal NE and were fed for 14 (Phase 1) and 21 d (Phase 2), respectively. Canola protein concentrate and herring meal were each included at 5 per cent and 2.2 per cent in Phase 1 and 2, respectively, as specialty ingredients. Diets did not contain antimicrobials or growth promoters. Phase 1 and two diets were cold-pelleted and steam-pelleted, respectively.

In total, 240 pigs (Duroc x Large White/Landrace F1; Hypor, Regina, SK, Canada) were weaned at 19 days of age (initial weight = 7.5 kg) and housed in 60 pens with 4 pigs in each pen. After weaning, pigs were fed sequentially commercial Phase 1 and Phase 2 diets (Hi-Pro Feeds, Sherwood Park, AB, Canada) for five and two days, respectively. Pigs in each

Figure 1. Growth performance of piglets fed increasing inclusion of canola press-cake in diets.



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pen were then fed a randomly allocated test diet for five weeks. Pigs had free access to water and the assigned diets. Individual pig body weight and pen feed disappearance were measured weekly.

### Trial results

For the entire 35-day trial, increasing dietary inclusion of CPC did not affect average daily feed intake and average daily weight gain but improved feed conversion (feed:gain, Figure 1). Final body weight was 24.7, 24.2, 24.9, 24.4 and 24.9 kg for pigs fed 0, 5, 10, 15 and 20 per cent CPC, respectively, and was not affected by CPC inclusion.

Increasing dietary inclusion of CPC reduced the apparent total tract digestibility (ATTD) of gross energy in diets from 86.0 per cent to 84.8 per cent for Phase 1, and from 86.0 to 84.7 per cent for Phase 2; reduced ATTD of CP from 86.0 per cent to 83.5 per cent for Phase 1, and from 85.7 per cent to 84.0 per cent for Phase 2; reduced diet digestible energy values from 3.58 to 3.54 Mcal/kg for Phase 1, and from 3.46 to 3.42 Mcal/kg for Phase 2; reduced predicted NE values of diets from 2.51 to 2.46 Mcal/kg for Phase 1 but maintained diet NE value at about 2.41 Mcal/kg for Phase 2.

### Cost vs. benefit

Assuming prices per MT for wheat \$220, CPC \$350, SBM \$450, canola oil \$1,200, L-lysine-HCl \$2,550, L-threonine \$3,100, and DL-methionine \$5,000, increasing dietary inclusion of CPC from 0 to 5, 10, 15 and 20 per cent reduced feed cost by \$4.00, 7.99, 11.97 and 15.96 per MT for Phase 1, and \$4.34, 8.08, 11.98 and 15.65 per MT for Phase 2, respectively, and reduced feed cost per unit of body weight gain for the entire 35-d trial by 0.67, 4.08, 5.19 and 5.84 cents/kg, respectively.

### Recommendation

The CPC can be fed to pigs as dietary protein and energy source. Starting from 1 week after weaning, feeding up to 20 per cent of CPC replacing SBM and canola oil in nursery diets may reduce feed cost without affecting growth performance of weaned pigs when diets were balanced for NE value and SID Lys/NE ratio.

### Acknowledgements

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