

# Feeding field peas to weaned pigs

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## Take Home Message

**Pork producers are always looking for ways to reduce feed costs without compromising growth performance of pigs. Alternative feedstuffs are especially essential in times when low or even negative margins are ahead or happening due to a combination of high prices for traditional feedstuffs and low pork prices. Feeding nursery pigs with up to 40 per cent field peas can replace up to 30 per cent soybean meal (SBM) and 10 per cent wheat in diets formulated to equal net energy (NE) value and standardized ileal digestible (SID) amino acid content without reducing overall growth performance after a seven-day adaptation. Field peas can have an important impact on reducing feed cost per tonne and per pig.**

## Past research on feeding field peas

Canada is the largest producer and exporter of field peas in the world. Yellow and green field peas from white-flowered cultivars are the most widely seeded and produced for both human consumption and animal feeding. Field peas have been fed to young pigs in the past to partially replace expensive SBM. Due to concerns about anti-nutritional factors (ANF) in peas that depress feed intake and growth, recommendations from over 20 years ago suggested to include maximally 10 to 15 per cent field peas in diets for nursery pigs weighing less than 20 kg. Some recent trials tested greater dietary inclusion of field peas, but that reduced growth performance. For yellow and

green field peas, ANF are relatively low indicating that reduced growth performance in earlier studies was likely related to nutrient imbalances, because diets were not formulated to equal NE and SID amino acid content. In addition, genetic improvements have reduced ANF in field pea, thus, we need to examine the feasibility of including field pea in diets for nursery pigs.

## Nutrient profile of field peas

The field pea sample was a yellow cultivar grown in Alberta and sourced from a commercial feed supplier. The sample contained 22.6 per cent crude protein, 1.62 per cent lysine, 6.8 per cent crude fiber and 9.2 per cent acid detergent fibre, so it provided 51 per cent less protein and 45 per cent less lysine, but 33 per cent more fibre than SBM. Content of ANF was lower in field peas, providing 36 per cent less tannins, 50 per cent less trypsin inhibitory activity and 27 per cent less phytate than SBM, indicating that ANF in this yellow field pea sample was less a concern for animal feeding. However, peas other than green and yellow that are darker in color such as Maple, Austrian and Marrowfat must be avoided for swine feeding because they contain more tannins that reduce nutrient digestibility and utilization and thus growth performance of pigs.

## Weaned pig trial set up

The trial was conducted at the Swine Research and Technology Centre of the University of Alberta (Edmonton, AB). Starting one week after weaning at 19

days of age, 260 pigs (initial body weight  $8.5 \pm 0.9$  kg) were fed Phase 1 diets for two weeks (day 1–14) and sequentially Phase 2 diets for 3 weeks (day 15–35). The experimental diets consisted of a wheat-based control diet and four diets containing 10, 20, 30 or 40 per cent field pea that were formulated by replacing up to 30 per cent SBM and 10 per cent wheat with field pea. Diets were pelleted and formulated without antimicrobials or growth promoters to provide 2.45 Mcal NE/kg and 1.23 per cent SID lysine in Phase 1 and 2.35 Mcal NE/kg and 0.99 per cent SID lysine in Phase 2. Other amino acids were formulated as an ideal ratio to lysine. Pigs had free access to feed and water throughout the entire 35-day experiment. Individual pig body weight and pen feed disappearance were measured weekly. An indigestible marker was included in the feed, and feces were collected to calculate total tract digestibility of protein and energy in the feed.

## What we found

Increasing the dietary field pea from 0 to 40 per cent linearly decreased the total tract digestibility of crude protein from 82.7 to 77.1 per cent for Phase 1 diets, but only slightly decreased from 84.3 to 83.4 per cent for Phase 2 diets, indicating that young pigs had less ability to digest field pea storage protein, e.g., albumin. Increasing the dietary field pea reduced total tract digestibility of energy from 86.5 to 84.5 per cent for Phase 1 diets, but was not affected for Phase 2 diets, indicating young pigs have difficulty to digest field pea fiber.

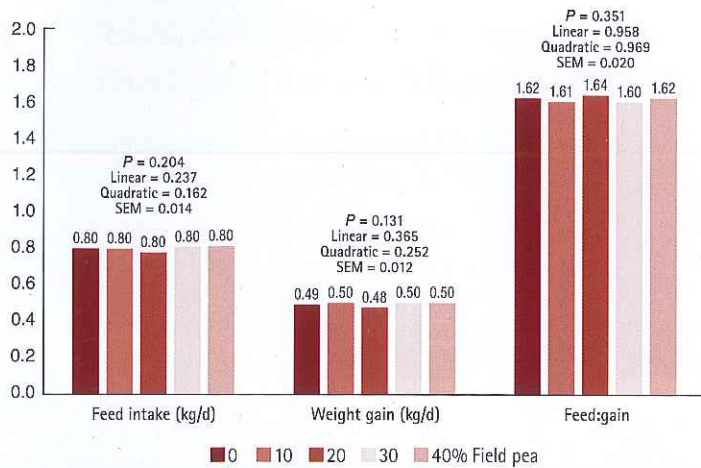
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Figure 1. Growth performance of weaned pigs fed diets with increasing dietary inclusion of up to 40% field pea in substitution for up to 30% soybean meal and 10% wheat



Overall, feeding up to 40 per cent field pea to nursery pigs did not affect feed intake, weight gain, and feed conversion (Figure 1). However, feeding up to 40 per cent field pea to nursery pigs linearly reduced growth rate in the first week despite maintained feed intake, resulting in poor feed conversion. In the last week of the trial, increasing field pea inclusion did linearly increase growth rate for pigs. Final pig weight was 25.8, 26.0, 25.2, 26.1 and 26.2 kg for pigs fed 0, 10, 20, 30 and 40 per cent field pea, respectively, and was not affected by field pea inclusion.

### Cost vs. benefit

Using current market prices (\$/tonne) for main ingredients in September 2018, wheat 255, field peas 242, soybean meal 528, canola oil 1,100 and L-lysine-HCl 2,025, increasing dietary inclusion of up to 40 per cent field peas in substitution of SBM reduced feed cost per tonne by up to \$64 for Phase 1 and \$73 for Phase 2. This reduction in feed cost per tonne combined with no differences in overall growth performance and final pig weight, reduced feed cost per pig by \$0.68, 0.99, 1.56 and 2.08 when field peas were included at 10, 20, 30, and 40 per cent, respectively.

### Recommendations

Yellow field pea is a locally produced crop that is a source of energy and protein in pig diets to replace SBM and reduce feed costs. Results from this trial showed that increasing dietary inclusion of field peas reduced growth rate and feed efficiency in the first week of the trial, but not during the rest of weeks. We suggest to phase-feed nursery pigs starting with 10 per cent field pea, and subsequently increase field pea inclusion up to 40 per cent in diets if the field pea price is attractive. Finally, diets should be formulated based on NE value and SID amino acid content to maintain growth performance.

### Acknowledgements

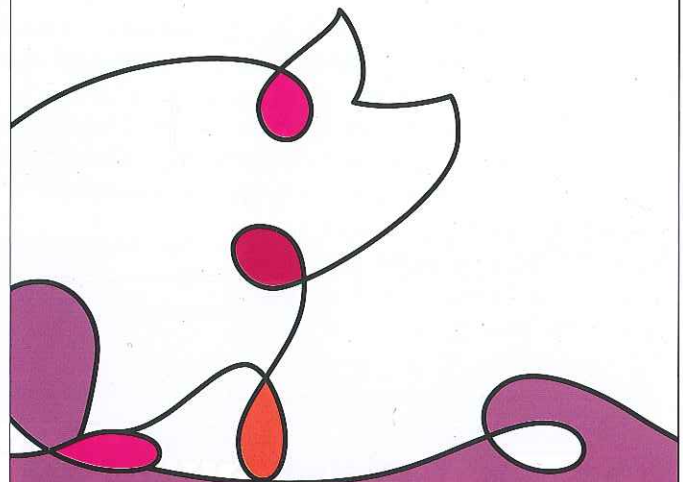
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