



Pulse grains and organic acids to control growth performance and health of young pigs

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Why is this project important?

Because pulse grains, such as field pea and faba bean, contain protein and starch, they provide unique opportunities to reduce feed cost and maintain gut health in diets for weaned pigs. With the increasing cost of soybean meal, pulse grains have become an attractive, locally-grown alternative protein source. Yet despite the increased information on feeding pulse grains such as field pea, faba bean and lentil to weaned pigs, the idea to completely replace soybean meal requires further investigation.

Pulse grains also provide nutritional advantages. Since pulse starch has a lower glycemic index than cereal starch, it may support a greater level of protein deposition and reduced fat deposition.



Furthermore, pulse grains provide a dietary means to control gut health, thereby reducing future dependence on dietary antibiotics for that purpose.

In addition to feedstuffs or macro ingredients, feed additives may also provide benefits to gut health. Among the antibiotic replacement strategies, organic acids are seen as one of the effective feed additives needed to control gut health soon after weaning. Organic acids stimulate protein digestion in the immature digestive tract of weaned pigs, reducing the chance of post-weaning diarrhea. An increased understanding of whether dietary organic acids can increase protein digestibility of pulse grains (field pea and faba bean) will be important to reduce post-weaning feed cost through the use of local feedstuffs.

*Right: Pigs in the nursery at University of Alberta.
Photo: Lifang Wang*

What will researchers do?

In a series of experiments, the aim of this work is to characterize the impact of pulse starch, pulse oligosaccharides (a type of carbohydrate), and organic acids on growth and gut health of weaned pigs. The focus will be on a few key areas:

- Management of starch nutrition of field pea and faba bean to maximize lean deposition of weaned pigs and reduce feed costs.
- Use of pulse oligosaccharides to control gut health in weaned pigs.
- Use of organic acids to reduce the negative impact of undigested protein on gut health.
- Validation of effects of pulse grains and organic acids in nursery pig diets.

What will be the benefit of this research?

This project fulfills multiple SIP priorities, including reducing the use of antibiotics, improving pig health, lowering feed costs, boosting feed efficiency, and enhancing the sustainability and competitiveness of the Canadian pork industry.

The development of effective feeding programs that support optimal growth and gastrointestinal development of the newly-weaned pig will reduce the use of antibiotics in pork production, allowing product differentiation and market access. Reduced antibiotic use is a significant attribute in the eyes of the consumer. A survey in the U.S. indicated that 61% of consumers would pay an additional \$0.10 per kg for meat raised without antibiotics, and 37% indicated they would pay \$2.00 or more per kg for that meat.

What has been done so far?

As of 2021: Despite two research stoppages due to COVID-19, researchers completed another trial during the current year. Within each pulse grain, unique cultivars exist. The specific focus was to study an array of cultivars of faba bean that range in chemical composition. Differences included anti-nutritional factors that impact frost tolerance and, thereby, protein yield per acre.

Collaborators

Dr. Eduardo Beltranena University of Alberta

Project status

Currently in progress.
Results expected in 2023.

Additional resources and information about this project

R&D Featured Articles by Swine Innovation Porc

- [Science Taking Bite out of Feed Costs](#)
August 8, 2020

Related subprojects

The work presented in this fact sheet is one of three subprojects that make up a larger, nation-wide and multi-institutional Swine Cluster 3 project titled: *Development of innovative strategies to reduce feed costs in the post-weaning period while maintaining optimal performance and health*. The three subprojects are as follows:

- [Examination of the effectiveness of provision of functional amino acids to enhance pig robustness](#)
- [Strategies for detoxifying vomitoxin \(DON\) using innovative chemical and biological approaches in post-weaning piglets](#)
- [Pulse grains and organic acids to control growth performance and health of young pigs](#) (*this fact sheet*)

Financial support for this project

This project is part of the Swine Cluster 3 (2018-2023) research program, made possible through financial support from Agriculture and Agri-Food Canada's Canadian Agricultural Partnership, eight provincial pork producer organizations and over 30 industry partners. [Click here to learn more about the financial partners for Swine Cluster 3.](#)