



## QUANTIFYING PROTEIN QUALITY

# A comparison of key methodologies used to quantify protein quality in mammals: ileal digestibility, indicator amino acid oxidation, and in vitro digestibility

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### Why is this project important?

With a growing world population over the next several decades and the rise of developed countries, food will become more expensive. At the same time, dietary protein sources will be constrained due to the increased demand for high quality protein. There are numerous emerging dietary protein sources that have little to no data on the digestibility and metabolic availability of these ingredients, yet they may be a good source of dietary protein for swine. Even though Canada is a net exporter of pulse crops for the international human food market, having a better understanding of the nutritive value of pulse crops is appealing.

Generating data on the protein quality and bioavailability of pulse crops, as well as the impact of processing methods on nutrient availability, would allow locally grown feedstuffs to be incorporated as a cost effective source of protein for the swine industry. Moreover, there is a need to further evaluate the different methodologies currently being used to estimate protein quality in order to properly assess the nutritive value of current and emerging dietary protein sources.

### What will researchers do?

Researchers will determine the effects of various processing methods (and processing settings within methods) on nutrient content and characteristics in feedstuffs. Feedstuffs – such as novel Canadian-grown pulses - will undergo a variety of processing techniques including the effect of grinding (particle size), pelleting temperature (heat treatment) and extrusion conditions. Nutrients will be characterized in feedstuffs before and after processing to determine the effect of processing conditions .

## What will be the benefit of this research?

A major outcome of this project will be the reduction of nutrient excretion in pigs through the increased use of nutrients in feedstuffs. The environmental footprint of pork production remains a concern in Canada, especially in areas with a greater pig density. Increased use of locally-available feedstuffs will enhance nutrient recycling within the region, as opposed to importing feedstuffs and their nutrients from outside the region. Use of locally available feedstuffs may also reduce transportation of feedstuffs, thereby lowering the carbon footprint.

Novel feed ingredients and processing of existing ingredients should help to further reduce feed cost, increase pork exports and enhance feed competitiveness by exploiting the biological capacity of pigs as an omnivorous species. Combined with integrated models and precision feeding systems, the impact of this research will reduce feed cost by 10% - 20% per kg of gain.

## What has been done so far?

As of 2021: Researchers are currently processing the samples for analysis. In total there are 234 feed samples to analyze, which include whole pulses, ground pulses, pelleted pulses and extruded pulses.

### Collaborators

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### Project status

Currently in progress.  
Results expected in 2023.

## Additional resources and information about this project

### Related subprojects

The work presented in this fact sheet is one of five subprojects that make up a larger, nation-wide and multi-institutional Swine Cluster 3 project titled: *Reducing feed cost and the environmental footprint and enhancing global competitiveness of Canadian pork production by increased nutrient utilization of feedstuffs fed to growing-finishing pigs*. The five subprojects are as follows:

- [Nutritive evaluation of Canadian feed crops and their co-products for swine diets](#)
- [A comparison of key methodologies used to quantify protein quality in mammals: Ileal digestibility, indicator amino acid oxidation, and in vitro digestibility](#) (*this fact sheet*)
- [Biological roles and efficacy of novel processive cellulase and exogenous alkaline phosphatase for improving feed utilization efficiency and reducing the environmental footprint in growing-finishing pigs](#)
- [Improving nutrient value of soybean meal using characterized novel microbial fermentation](#)
- [Improve the nutritive value of Canadian feed crops and co-products for swine diets](#)

### 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.](#)