

## Cluster 2 – Progress Report for the Cluster 2 Science Advisory Body

### 1. CLUSTER PROJECT DETAILS

**Project number:** H32

**Name of Project:** The Effect of Variety and Processing on the Protein Quality of Canadian Pulses for the Human Diet

**Project research period:** April 1, 2014 – March 31, 2018

**Period covered by this report:** April 1, 2015 – December 31, 2015

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### NON-CONFIDENTIAL ABSTRACT/SUMMARY

Pulses, including peas, beans, and lentils, represent important dietary sources of protein for the global diet. However, domestic consumption in Canada has been limited, despite growing demands for alternative protein sources. The pulse sector has the potential to position whole pulse flours and pulse fractions (concentrates; isolates) as ingredients within the food industry. However, the lack of data with respect to the impact of processing or variability associated with market class and growing conditions, on the quality of the protein represents a significant hurdle. In order to position foods or food ingredients as dietary sources of protein, the quality of the dietary protein must be assessed and made available to regulatory agencies (Health Canada; USDA). Existing and proposed methods for measuring protein quality rely on the use of data collected from animal-based studies. There is the need to not only measure the quality of pulse proteins using existing approved methods, but also for the development of alternative approaches to accurately assess protein quality. As such, the current research program was designed to address the following objectives:

- To determine the amino acid composition of Canadian pulses and pulse fractions
- To determine the impact of processing methods, as well as, varietal differences on measures of protein digestibility, a measure of the quality of dietary proteins

- To develop new models to predict the quality of pulse proteins without relying on the use of animal-based assays

We will address these objectives by securing composite samples from 10 market classes of pulses (beans, peas, and lentils), as well as small lots secured from breeding programs in Manitoba and Saskatchewan. The composite samples will be milled and processed via a standardized heat treatment (baking) or extrusion or the use of consumer preparation methods. The samples will be measured for protein digestibility-corrected amino acid score (PDCAAS, the approved U.S. methodology), or the Canadian Protein Rating system (based on the Protein Efficiency Ratio). Additionally, we will measure all samples via the proposed system called the Digestible Indispensable Amino Acid Score (DIAAS), which represents a proposed refinement of the PDCAAS system. For the samples secured from breeding programs, we will measure the full amino acid profile, determine the major nutritional components, and assess the in vitro digestibility of all the samples. Additionally, we will determine the impact of selecting for novel storage proteins on the quality of pulses. This research program will lead to new information to guide the pulse sector towards positioning pulse-derived protein sources for the food industry and guide the development of new approaches to systematically and efficiently determine the quality of dietary proteins via methods that do not rely on the use of animal-based assays, thus enhancing the pathway to innovation for the plant protein sector.