

Characterization of phytochemicals and dietary fibres in pulse processing by-products for value-added functional food products

Dr. Rong Cao

Agriculture and Agri-Food Canada – Guelph Food Research Centre

SPG Contributions	Project Status	Duration/Timeline of Project (Year to Year)	Total Project Cost
\$218,500.00	Completed	July 2015 – December 2017	\$218,500.00

Project Description

Increasing evidence suggests that consumption of pulses lead to improved health and reduced risks of chronic diseases, especially those caused by oxidative stress. The rich dietary fibre content of pulses also points to the benefits of pulse consumption to gut health. However, recent studies showed that some compounds in the hulls of pulses may be released in human digestive tract, especially during colonic fermentation, and they may play a significant role in enhancing the immune responses thus contributes gut health. This project aimed at utilizing the by-product of pulse processing for value-added health foods. The project specifically focused on developing solid-state fermentation technologies using food grade microbes, and targets on enhanced release and potential health benefits of the bioactives in hulls of lentils and peas.

Outcome

Results of the study showed that food grade yeast, fungi, and probiotic bacteria all enhanced the release of polyphenols which led to increased antioxidant activities. A gluten-free bread formulation based on lentil and pea hulls was developed and the bread quality was considered acceptable. These results suggest that the processing by products of lentils and peas are great candidate of health promoting foods, and solid state-fermentation can lead to even greater potential. Fermented hulls can be value-added functional food ingredients, especially when further studies are conducted to confirm the bioavailability and in vivo health benefits, and the feasibility and palatability of different functional foods.

Research Objective

OBJECTIVE 1

To develop methods for solid-state fermentation of the lentil and/or pea processing by-products (hulls).

OBJECTIVE 4

To develop and formulate proto-type functional foods using fermented hulls.

OBJECTIVE 2

To characterize and compare the phytochemical and dietary fibre compositions in raw and fermented processing by-products.

OBJECTIVE 3

To determine the effects of solid-state fermentation on the antioxidant, anti-inflammatory and enzyme-inhibitory activities.