Growing the market for pulse flours: Creating innovative bakery products and a pulse database for the food industry

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SPG Contributions	Project Status	Duration/Timeline of Project (Year to Year)	Co-funders	Total Project Cost
$1,684,382.00	Completed	March 2016 – March 2019	Western Grains Research Foundation; Manitoba Pulse and Soybean Growers	$1,867,824.00

Project Description

The overall goal of this research was to improve the knowledge about pulse flours used as food ingredients, specifically on functionality and flavour, and share this information with the food industry. Organizations that collaborated on this project included Cigi, Warburtons, University of Manitoba, University of Saskatchewan, Crop Development Centre, Agriculture and Agri-Food Canada (Morden), Camden BRI, Avena Foods, and InfraReady Products.

This project investigated the effects of genotype and environment, particle size, pre-milling (micronization, pre-germination, roasting, Revtech) and post-milling treatments (Revtech), pre-ferment technology, and storage of pulse flours on the functionality and flavour of various pulse flours when used in bread. The use of faba beans and the modification of a gluten-free baking formulation with pulse ingredients were also investigated. A database was also developed to provide those in the food industry with access to research findings related to the use of pulses in food products. Research conducted at the University of Saskatchewan, on the effect of short-term germination of pulse functionality, and University of Manitoba, identification of flavour and aroma compounds has also added to the knowledge of pulse ingredients and their use in food products.

Outcome

Micronization (105 – 110°C) of peas produced flours with good functionality and baking properties.

Pre-germination of peas negatively affected flour properties; flour had higher starch damage and water absorption capacity, lower pasting/poor dough quality.

Micronization and pre-germination were successful in reducing the strong aroma and flavour. Bread made with heat treated whole peas and split peas had lower intensities of aroma, pulse flavour and aftertaste and an increase in overall acceptability. Bread made with pre germinated peas had improved aroma and flavour but lower bread scores and loaf volume.

All of the breads made with roasted pea flours had better colour and crumb quality, had more acceptable flavour properties in both consumer and trained sensory panels than with untreated peas.

Pulse flours with a finer particle size produced bread with high quality scores, although firmer, there was no effect on sensory properties of the bread.

Bread made with fermented Kabuli chickpea flour at inclusion levels of 35% and 45% ferment had the most acceptable sensory properties."

Research Objective

OBJECTIVE 1
To develop a pulse database that can be used across all sectors of the food industry

OBJECTIVE 2
To explore uses of pre-ferment technology in baking on the functionality and end product quality of doughs containing pulse flours

OBJECTIVE 3
To develop pulse based bakery products that meet specific health & nutrition such as high protein, high fibre, lower gluten, gluten free, lower carbohydrate, resistant starch, lower calories, and reduced fermentable sugars