

Utilization of yellow pea, lentil and faba bean fibre and starch for meat product applications

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SPG Contributions	Project Status	Duration/Timeline of Project (Year to Year)	Co-funders	Total Project Cost
\$35,026.00	Completed	April 2014 – March 2018	Agriculture and Agri-Food Canada	\$253,615.00

Project Description

The overall objective of the project was to enhance fibre levels of meat products through incorporation of suitable pulse fibre materials. AGT Foods provided commercially processed red lentil and yellow pea seed coat fibre samples which were then heat treated at pilot scale. Outcomes of this project will benefit both the pulse industry (enhance utilization of low value processing co-products) and meat industry (improve healthy attributes of the composition). Detailed physicochemical analyses and compositional analysis of fibre fractions from pea and lentil and their performance in low-fat bologna was conducted. The heat treatment applied generally had minor effects on fibre functionality. Addition of these fibres in meat bologna indicated that there are potential benefits for consumers (due to fiber enhancement) and meat producers (due to purge reduction) but further refinement of these fibers may be necessary to increase the fiber content, improve sensory properties and enhance their functionality in meat products. Air-classified starch fractions from pea, lentil and faba bean (also referred to as high viscosity or HV flours), with protein content of 12-16% showed potential as bulk fillers as well as texturizing solutions. After heat treatment, HV pea flour had higher rapid visco analyzer (RVA) scores, while those of HV faba bean flour had lower RVA scores than control samples. In addition, heat treatment reduced enzymatic activity (lipoxygenase) and beany after-taste in HV pulse flours.

Outcome

Detailed chemical and physicochemical analysis of five North American faba bean varieties differing in seed size and seed coat tannin level was completed. In addition, the levels of vicine/convicine, oligosaccharides and total phenolics were evaluated in starting materials and after two processing scenarios: soaking and autoclaving to simulate the thermal process used in the commercial canning industry, and after soaking and germination, to investigate potential of a value-added faba bean option for various applications. Raffinose, stachyose and verbascose in the seeds were significantly reduced (>50%) following 24 hours of germination. Content of vicine/convicine and phenolics were unaffected by either thermal processing or germination. The addition of faba bean ingredients (cotyledon flours, protein fraction, starch fraction) at 3% did not negatively affect the color, textural, and sensory properties of low-fat bologna products, and functioned similarly to other binders in current use (wheat flour, pea starch).

In summary, seed coat fibre of pea and lentil, pea starch and faba flour and fractions have significant commercial potential in the food industry. Several of these ingredients are now under evaluation as ingredients in processed meat applications. In addition, commercial applications of lentil and pea seed coat fibers in the pet food industry have been initiated.

Research Objective

OBJECTIVE 1

To study functionalities and suitability of fibre and starch fractions from dry fractionated faba bean, lentil and yellow pea for meat product applications; to develop meat products with pulse starches and fibres for consumer evaluation studies.