

Development of Novel High Fibre and Easily Digestible Frozen Bean Products

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The market for nutritive whole foods which offer health benefits and convenience is on the rise. A parallel development in food processing in recent years has been the increased formulation of foods containing probiotics. Consumer interest in the use of probiotics has soared in the last several years as research has unveiled their potential nutritional benefits. Probiotics are bacteria that positively influence GI health and many of them use fibre as their source of nutrition in the gastrointestinal tract.

One of the Pulse Cluster projects recently funded by the Growing Forward initiative of Agriculture Canada with matching funds from the Pulse Industry is looking at the development of novel high fibre and easily digestible canned and frozen bean products. Various reports have suggested that a major deterrent to pulse consumption in North America is the gastrointestinal discomfort experienced by consumers after pulse consumption. This is especially true in the case of the elderly. As a result, in spite of their positive health benefits, pulse consumption in North America remains lower than recommended intake levels.

Pulses, including peas, chickpeas, lentils and beans, are very healthy and contain high amounts of fibre, protein, vitamins and minerals. In addition to the desired positive benefits of a high fibre diet, some consumers experience discomfort after consuming pulses due to the absence of fibre digesting enzymes in the human gastrointestinal tract. Beneficial bacteria in the lower intestines feed on the undigested fibre in the colon resulting in fermentation and the associated abdominal discomfort. The current project therefore aims to explore the use of processing enzymes and probiotics to improve the digestibility of pulses while maintaining their nutritional value.

The specific objectives of the project include: (a) preparation of an extensive literature review which will assess social perspectives and acceptance of the use of probiotics in foods, specifically, frozen and canned bean products; (b) optimization of techniques to improve the quality of partially cooked frozen bean products; (c) development of novel frozen and canned bean products that are easily digested through the application of selected enzymes/probiotics at specific stages during processing and food preparation; and (d) sensory evaluation and human clinical trials to assess improvement in product digestibility following treatments.

The project is an initiative of Bonduelle, a major player in the market of fresh and frozen ready-to-eat and ready-to-use fruit and vegetable products in North America and Europe. Other funding partners include Manitoba Pulse Growers Association and Pulse Canada.

The research, which started at the end of 2010, is being conducted at Agriculture and Agri-Food Canada's Food Research and Development Centre located at St Hyacinthe in Quebec. The research team is made up of three AAFC research scientists, namely, Dr Joyce Boye, Dr Claude Champagne and Dr Byong Lee, who jointly bring many years of expertise in food biochemistry, food processing, microbiology and food enzymology. In addition, two recent graduates from the Department of Food Science at McGill University, Dr. Elham Azarpazhooh and Dr. Sung Hoon Park, have been hired to work on the project. Dr Azarpazhooh conducted her doctorate research on the impact of novel food processing technologies on food texture and quality. Dr Park's doctoral research focused on microbiology and enzymology. Together the team will bring to the project many years of research experience in the processing of a variety of food products, including soybean and pulses, and in studying the behaviour and nutritional properties of foods in different systems. The research team will be working in close collaboration with Mr Michel Casgrain of Bonduelle and other personnel from the company to ensure that results obtained are quickly translated in order to speed up the availability and use of any new knowledge generated.

The proposed project has very good prospects for the development of novel high fibre and easily digestible canned and frozen bean products which can be prepared quickly for consumption. Growing consumer interest in these products could ensure a market in North America and potentially abroad which should translate to increased economic output and enhanced markets for farmers.