

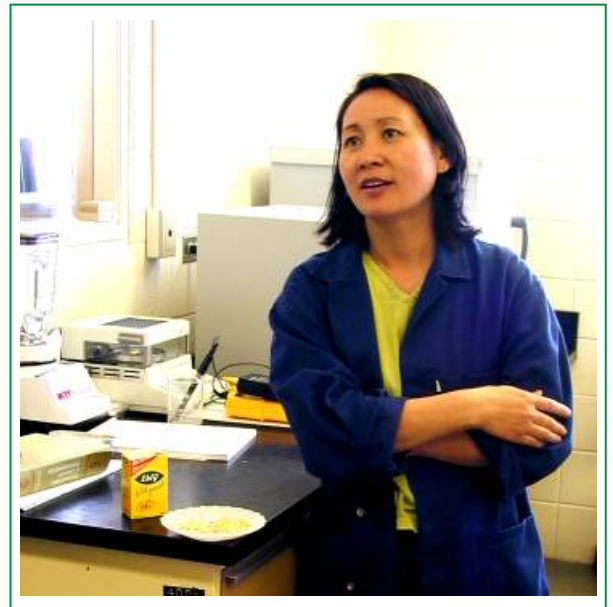
Value-Added Processes for Barley

The article below, submitted by food engineer Hong Qi, is an excellent example of both innovative value added development, and partnership.

As the funding partner, ACIDF was impressed by the clarity and focus of the project, well complemented by attainable goals and solid industry support. The industry support came from private companies and from the Alberta Barley Commission. Both recognize the great potential for expanding the use of our grains as specialty products here and abroad.

Ms. Qi, pictured at right, works in Edmonton at the Centre for Agri-Industrial Technology. The talented folk at CAIT are doing innovative work with the mechanical side of food processing. The team is well known for problem solving skills in forming products and extrusion. CAIT's expertise includes handling, storage and drying of agricultural crops; food process engineering; essential oil extraction; sensors and instrumentation; physical properties of agricultural and food materials; and even design and layout of processing plants and equipment. More information on CAIT is available at the AAFRD website. (www.agric.gov.ab.ca)

CAIT and Ms. Qi now have the particular honor of being the first guest authors for the ACIDF newsletter. Enjoy the article!



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Valued Added Barley *(continued)*

Value-Added Process Development of Pretreated Barley for Food Uses

Barley is often considered a livestock feed crop, and certainly is grown by many for that very purpose. But barley can be much more than that.

Barley is a healthful grain providing a low fat, excellent source of dietary fibre in the form of beta glucan, B vitamins as well as tocotrienols and tocopherols. This unique combination of nutrients has many health benefits. The soluble fibre component in barley, beta glucan has been proven to reduce cholesterol and regulate blood glucose levels. The tocotrienols and tocopherols are natural antioxidants, which protect cells from free radical changes and degradation. Barley has a low glycemic index that makes it useful in maintaining blood sugar levels for diabetics.

Huge Market Potential

The two primary markets for Alberta barley are Japan and the United States. Japan's consumption of imported barley in 1998 was estimated at 247,000 tonnes. Barley usage in Japan includes miso paste, rice extenders, shochu, tea and other uses. A significant portion of the demand for barley in Japan, approximately 55%, is currently being met by Australian barley. The largest short-term opportunity for Canadian barley is expected to be in gaining some market share from Australian suppliers. However, a long-term advantage is attainable through the development of the value-added products currently used in Japan with Alberta barley. Because of the Japanese population's consciousness about maintaining and promoting their health, the health-oriented food market is expected to maintain a rapid growth..

In the United States, the size of the market for prepared foods is \$6.15 billion(1998 figure), and the “shelf stable” category is 42% or \$2.57 billion. The food industry literature provides numerous statistics and projections reflecting the growing sales of convenience products for specific markets, as well as a greater focus amongst consumers on healthy eating. In particular, the “greying” population will have a greater and greater influence on food consumption patterns and will, as in the Japanese market, focus on health.



Dried Durum Wheat and Pretreated Barley Product (right) in CAIT Laboratory

At present, the use of barley in human foods is very limited. Commercially available barley products for the foods market include pot and pearled barley, grits, flakes and malt flour. Barley flour and cracked barley can be successfully incorporated into bread formulations. There are also numerous possibilities for the use of high fibre barley in the production of breakfast cereals through extrusion, flaking, puffing and blending with other grains.

The Challenge: Processing Time

Consumers, particularly in Canada, want to know there is a health benefit in their food. Consumers also want foods that are similar to their current diet and easy to prepare. One of the obstacles to incorporate barley into daily diet is the lengthy

cooking time required (approx. 45 minutes). A quick-cooking barley product will provide benefits for convenience. There is an opportunity to develop a pretreated barley ingredient. This will provide a quick cooking alternative, which will help in developing barley-based functional foods that provide a healthful benefit to the consumer. The market for such products includes institutions (e.g., hospitals), restaurants, homes and export.

Value-added Opportunity

The project will benefit both the producer and the food processing industry by creating value-added opportunities for barley utilization and processing of the abundant raw material Alberta produces. It will provide an opportunity to develop and market a wide range of convenient, nutritious, flavorful food products. This will provide the consumer a variety of healthy barley-based products to choose from which is currently lacking in the marketplace. Additional markets would result in an increase in value-added cereal based processing in the Province, jobs and growth.

The objectives of this project are to develop processes for quick-cooking barley and related barley products including:

- Pretreatment development such as hydrothermal treatments, steam with/without pressure, sonication treatment
- Processing methods such as microwave, infrared, thermal, or drying
- Optimization of processing parameters
- Quality measurements, physical properties, nutritional analysis and sensory evaluation
- Scaleup assessment

The project team is diverse with experts such as Dr. Feral Temelli, professor from the University of Alberta, who has done an extensive research on beta glucan extraction from barley. The team members include the researchers from CAIT, Hong Qi, Connie Phillips and Marshall Eliason, Karen Erin (Food Processing Development Centre). The Alberta Barley Commission supports the project, and Dr. Jim Helm (AAFRD) and Dr. Brian Rossnagel (University of Saskatchewan) have been assisting with selecting varieties.

After developing a pretreatment process using barley, we expect to see a number of variety of value-added food products and ingredients come from this work. New products will be developed for specific markets, such a puffed barley for breakfast cereal and extruded barley products. Potential products can substitute for rice- and oat-based products. The pretreatments/processes themselves may be able to be adapted to other crops such as pulses, legumes, or oats.

The current project is phase I of process development. In phase II we will develop products based on the pretreated barley such as breakfast cereals, rice extender, barley flour, and barley flakes. Phase III will test potential markets such as hotels, restaurants and institutions. The commercialization plan will be consolidated with the Alberta Barley Commission and local processing companies.

This applied research project, supported by ACIDF, is the first step in developing a line of value added products for Alberta. Cooperation between the partners is key to its success.

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