

Pulses in the Health Food Market: The Gluten-Free Diet

in brief
The gluten-free market is a significant opportunity for value-added pulses.

Celiac disease (CD) is an inherited disorder in which the absorptive surface of the small intestine is damaged by a substance called gluten. Gluten is the general name for the storage proteins called "prolamins" found in wheat, rye and barley. The only treatment for CD is a strict gluten-free diet for life.

Undiagnosed and untreated, CD can result in malnutrition, increased risk of osteoporosis, cancer, development of other autoimmune conditions such as thyroid disease, miscarriage, infertility in both women and men, neurological conditions and other health problems. Because the symptoms of CD vary so widely in the nature and severity, especially among adults, misdiagnosis such as irritable bowel syndrome, fibromyalgia, chronic fatigue syndrome and allergies are common. CD can occur at any age and is sometimes triggered after a viral infection, surgery, pregnancy or severe stress.

Recent research¹ has revealed that CD is the most under-diagnosed disease in North America, affecting 1 in every 130 to 170 people, or 1.5 - 2 million Americans and 200,000 - 250,000 Canadians who have the disease. Unfortunately, only a fraction of these have been diagnosed, as most health professionals were taught that it was a rare disease and are not aware of the many new presentations of CD. It is estimated that for every 1 person diagnosed, there are 90 who remain undiagnosed. CD has been found in many



different ethnic groups and the worldwide incidence is 1 in 266 people.

There are specific blood-screening tests for CD, but the only definitive test is a small intestinal biopsy. A gluten-free diet should never be initiated before having a blood test and biopsy, as this can interfere with making the correct diagnosis.

More Info

Canadian Celiac Association
Phone: 1-800-363-7296
www.celiac.ca

Gluten-Free Diet: A Comprehensive Resource Guide by Shelley Case
www.glutenfreediet.ca

Discover the Pulse Potential cookbook by Saskatchewan Pulse Crop Development Board
Contains many gluten-free recipes. Contact foodfocus@quadrant.net

Pulses and the gluten-free diet

Pulses are a healthy option for people with celiac disease. Compared to many of the other gluten-free grain alternatives, pulses are an excellent source of dietary fibre, protein, iron, and other minerals and vitamins (see Table 1). For example, pulses have two major advantages in the gluten-free market. One is that pulses are high in iron, as iron deficiency anemia is a common nutritional concern for celiacs, along with vitamin B deficiencies. Secondly, pulses help with another problem that arises as a result of a diet low in whole wheat fibre, wheat bran and other dietary fibres: constipation. Pulses are a good source of fibre.

In the gluten-free diet, all forms of wheat, rye and barley must be strictly avoided (see Table 2). This can be a major challenge, as gluten is found in so many different foods, such as: breads, baked products, cereals, pastas, soups, sauces, seasonings, salad dressings, snack foods, prepared meats (hot dogs, deli meats, hamburger patties), flavored coffees and teas, candy and some medications. Fortunately, many foods are gluten-free by nature, including pulses, plain meat, fish, poultry, nuts, seeds, milk, yogurt, cheese, fruits, vegetables and wheat alternatives (amaranth, buckwheat, flax, millet, quinoa, sorghum, and rice).

The gluten-free market is growing rapidly in North America and Europe. A wide variety of specialty products, from ready-to-eat baked goods and mixes for breads, buns, bagels, muffins, cakes, cookies, pastries and pizza crusts; pastas; cereals; soups; sauces; entrees; and other foods are available in health food stores, grocery stores and pharmacies, as well as directly from gluten-free vendors. There are also gluten-free cookbooks with specific instructions and recipes for using gluten-free alternative flours and grains.

Most gluten-free baked products, cereals, pastas, grains and flours tend to be lower in vitamins, minerals and dietary fibre than their gluten-containing counterparts, as they are often made from refined flours and starches, and are not fortified with iron and B vitamins. Traditionally, a combination of white rice flour, tapioca starch, corn starch and potato

Table 1: Nutrient Composition of Gluten-free grains and pulses

250 mL (1 cup)	Protein (grams)
Lentils	17.9
Chickpeas	14.5
Faba Beans	12.9
Split Peas	16.3
White rice (enrich)	4.0
White rice flour	9.4
Potato starch	1.1
Corn starch	0.3
Tapioca starch	0.7
Garfava Flour	34.9
Chickpea Flour	23.2

Table 2: Gluten-containing ingredients to avoid

Barley	Malt Flavoring
Bulgur	Malt Syrup**
Cereal Binding	Oat Bran***
Couscous	Oats***
Durum	Rye
Einkorn	Semolina
Emmer*	Spelt (Dinkel)*
Farro*	Triticale
Graham Flour	Wheat
Kamut*	Wheat Bran
Malt**	Wheat Germ
Malt Extract**	Wheat Starch

* Types of wheat

** Derived from barley

*** The issue of cross contamination of oats with wheat and/or barley remains a concern in North America, therefore, oats are NOT recommended by celiac organizations in Canada or the U.S. at this time

Source: *Gluten-Free Diet: A Comprehensive Resource Guide* by Shelley Case

starch were used in gluten-free baked products and pastas were made with white rice, potato or corn. However, there is a trend to incorporate healthier ingredients into gluten-free products, not only for improved nutrition, but also for taste and texture qualities.

Legume flours (such as romano bean, faba bean – also known as “fava bean,” chickpea, lentil), ground flax, amaranth, quinoa and brown rice flours are now being used. Authentic Foods in Gardena, California has developed “Garfava” flour, which is a mixture

Dietary Fibre (grams)	Iron (mg)	Preparation
15.6	6.6	cooked
12.5	4.7	cooked
9.2	2.6	cooked
16.3	2.5	cooked
0.7	2.0	cooked
3.8	0.6	
0.0	3.5	
1.2	0.6	
0.0	1.3	
12.0	7.9	
20.9	7.5	

Source: *Gluten-Free Diet: A Comprehensive Resource Guide* by Shelley Case

Table 3: Pulse products in gluten-free mixes

Bette's Gourmet Four Flour Blend Garfava flour, sorghum flour, cornstarch, tapioca flour
Bob's Red Mill Gluten-Free All Purpose Baking Flour Chickpea (garbanzo) flour, faba flour, potato starch, tapioca flour, sorghum flour
Kinnikinnick All Purpose Gluten-Free Mix White rice flour, tapioca starch, sugar, fructo-oligosaccharide, gluco delta lactone, dextrose, whole egg powder, sodium bicarbonate, egg white powder, pea fibre, soy lecithin, sodium carboxymethylcellulose, pea protein, fructose
Sylvan Border Farm General Purpose GF Flour Mix Potato flour, white rice flour, brown rice flour, amaranth, quinoa, white cornmeal, chickpea flour, soy flour

Source: Case Nutrition Consulting, 2003

of chickpeas (known in the US as garbanzo beans) and faba beans that have been specially processed. Other companies are processing romano (cranberry) beans or chickpeas into flour. These pulse flours are sold separately and are also combined with other gluten-free flours in baking mixes (See Table 3).

In addition to flours and baking mixes, pulses are being used in several pasta products. Adrienne's Gourmet Foods in Santa Barbara, California, produces a line of four different shapes of lentil pastas under the brand name

Papadini. In Canada, Natural Noodles from Penticton, BC, produce a variety of pastas, including lentil/brown rice, lentil, mung bean, pea and wild rice.

Most commercial canned soups and dried soup mixes are not gluten-free, as they contain barley, wheat noodles or hydrolyzed wheat protein. However, there are some gluten-free soups and many of these contain pulses. Dixie USA manufactures a line of dried soup mixes called "Legumes Plus" made from peas or lentils. The "Health Valley" canned organic soups are made from beans, lentils or split peas. Dried soups from "Taste Adventure" also contain beans, lentils or split peas.

In the June 2003 edition of *PulsePoint*, Dr. Robert Tyler discussed the new processing possibilities for the pulse constituents starch, protein, and fibre. One of the largest gluten-free specialty companies in North America, Kinnikinnick Foods in Edmonton, incorporates pea fibre and pea starch into baked products, not only for the nutritional properties but for functionality as well. The majority of their gluten-free products are also milk free, and as a result, other proteins have been used to replace the milk protein. Ted Wolff, President and Researcher stated they have recently replaced the soy protein with pea protein in some of their products, and they are currently investigating the use of fractionated beans and chickpeas in their cereal and snack food product lines. As Kinnikinnick Foods is one of the leaders in the gluten-free market, it will be interesting to see if other gluten-free companies incorporate pulse constituents into their products.

As these and other companies are realizing, the gluten-free market offers significant opportunities for value-added pulses in Canada. Growers, researchers, food processors, marketers and others will need to learn more and do more to access this increasingly valuable market. Now is the time. 

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Notes

- 1 "Prevalence of Celiac Disease in At-Risk and Not-At-Risk Groups in the US: A Large Multi-Center Study," *Archives of Internal Medicine*, February 10, 2003, Fasano, A., Berti, I., et al.