



Advances in the Breeding and Processing of Grains and Pulses

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Global demand for healthier and high-protein, plant-based foods continues to inspire cereal scientists to innovate with grains and pulses. Many consumers are seeking gluten-free, whole grain, and low-glycemic foods, as well as vegetarian and vegan-based diet options, but they don't want to give up taste or variety in their food experiences. Cereal scientists are accepting this challenge by exploring novel solutions from the seed to the finished product. In this issue of *Cereal Foods World* (CFW), we explore what's new in the breeding and processing of grains and pulses and how these innovations are delivering new consumer benefits.

In the area of breeding, scientists are using novel tools, as well as conventional methods, to produce new varieties of grains and pulses that deliver improved nutritional benefits, such as higher levels of dietary fiber and lower levels of gluten. In addition, these innovations allow the formulation of foods without the need to add other ingredients during processing, which supports the clean label trend.

With greater detection of celiac disease and greater awareness and incidence of non-celiac gluten sensitivity, there continues to be a demand for gluten-free products. Development of a celiac-safe wheat is a long way off. However, Crispin Howitt at CSIRO and his coauthors have worked on developing a barley variety (Kebari®) with a low gluten content (below the 20 ppm limit) that can be used in a range of gluten-free products. One of these products is a gluten-free barley-based beer (Pionier, Radeberger). The feature article, "Gluten Reduction Strategies for Wheat and Barley," shares their work.

By increasing the amylose content in the wheat endosperm through breeding, Marcus Newberry and colleagues from CSIRO and Limagrain Céréales Ingrédients have enhanced the resistant starch (dietary fiber) level in wheat grain with minimal impact on product taste and acceptability. The feature article, "High-Amylose Wheat Foods: A New Opportunity to Meet Dietary Fiber Targets for Health," illustrates another example of how breeding can be used to tailor a wheat to improve a nutritional component (fiber) of a common food source (wheat).

The feature article, "Glabrous Canary Seed: A Novel Food Ingredient," reports on the development of an annual glabrous (hairless) canary seed that has been approved for food use in Canada and the United States. Carol Anne Patterson from Pathfinders and her coauthors highlight the nutritional properties of this new canary seed, which can be used in a variety of foods with minimal impact on flavor and texture.

Martin Scanlon from the University of Manitoba and his coauthors share their review on pulse flour milling, "The Critical Role of Milling in Pulse Ingredient Functionality." They discuss how different wheat milling techniques can be applied to pulse milling to create value-added pulse ingredients. They also explore factors that affect the milling quality of pulses.

Further innovation in foods and assurance that a new product makes it to the marketplace can come from communicating protein levels to consumers. Unfortunately, current regulatory frameworks in Canada and the United States may limit protein content claims for plant-based protein foods. In the final feature article, "Navigating Protein Claim Regulations in North America for Foods Containing Plant-Based Proteins," Chris Marinangeli from Pulse Canada and his coauthors outline the challenges encountered in navigating the current regulatory frameworks for protein content claims in North America.

Exploring another health trend in their article, "Purple and Blue Wheat—Health-Promoting Grains with Increased Antioxidant Activity," Heinrich Grausgruber and colleagues at the University of Natural Resources and Life Sciences, Vienna, discuss the development of purple and blue pigmented wheat varieties that contain high levels of anthocyanins with beneficial antioxidant properties. These novel wheats are being incorporated into an array of innovative products to boost their health attributes.

Advancements in faba bean breeding have led to the development of new varieties with lower levels of vicine and convicine, which can be potentially toxic for humans who have a specific enzyme deficiency (variants of glucose-6-phosphate dehydrogenase [G6PD]). Constance Chiremba with the Saskatchewan Pulse Growers and her coauthors address how these new faba bean varieties are expected to increase faba bean production and their use in foods in their hot topic article, "New Opportunities for Faba Bean."

In the Spotlight section of this issue, we are excited to profile the International Maize and Wheat Improvement Center (CIMMYT) and long-time AACCI member Julie M. Jones. CFW readers may recall the popular series of nutrition articles contributed by CIMMYT staff and Julie over the last few years. Headquartered near Mexico City, CIMMYT is a global leader in publicly funded maize and wheat research. Julie is a distinguished scholar and professor emerita at St. Catherine University in St. Paul, MN; former president of AACCI; and regular contributor to CFW.