

Tackling wheat sensitivity

Citation for published version (APA):

van Buul, V. J., & Brouns, F. J. P. H. (2013). Tackling wheat sensitivity. *The World of Food Ingredients: the journal for practicing food technologists*, 4(5), 49-50.
https://www.researchgate.net/publication/253234142_Tackling_Wheat_Sensitivity

Document status and date:

Published: 01/01/2013

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license

Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.

Tackling Wheat Sensitivity

Mainstream multinationals have started to acknowledge that the market for gluten-free products is not as small as previously thought, mainly because of new findings concerning wheat sensitivity.

by Vincent van Buul and Fred Brouns

Wheat is one of the most widely cultivated cereal grains worldwide, grown in temperate climates from Scandinavia in the north, to Argentina in the south. It is third among the cereals, behind maize and rice, in total global production, which was 704 million tons in 2011. The demand for wheat for human consumption is increasing globally, due to the adoption of Western-style diets. Already, it supplies up to 20% of the energy intake of the world-wide population. For most people, wheat is a healthy staple food, rich in micronutrients, including minerals and B vitamins, and is a good source of energy.

Several reports in the international medical and nutritional literature pointed to beneficial effects of whole wheat in most individuals on reducing risks for heart disease, type 2 diabetes and bowel disease, while positive effects have also been reported in long-term weight control. With this, whole-wheat products are generally recommended as healthy.

However, about up to about 1% of the worldwide population has a genetic condition which causes wheat gliadin, a specific gluten protein, to induce damage and inflammation in the gut. Subsequently, small intestinal lining is damaged, leading to a deterioration

of the absorption of nutrients. This disorder is known as celiac disease. The only known effective treatment is a life-long gluten free diet, avoiding grains like wheat, rye, barley and spelt.

Next to celiac disease, an even smaller part of the population (~0.2%) is allergic to certain proteins in wheat. Wheat allergy involves an allergic response different from the inflammatory responses seen in celiac patients. Often it is as if the market for gluten-free products is only as big as these (relatively) small consumer segments. Therefore, specific companies focused on this niche market by advertising their products in patient-magazines,

avoiding the general public. As a consequence even until a few years ago, the gluten-free market was not considered “big and commercially interesting enough” by major corporations. During the last year, however, mainstream multinational companies have started to acknowledge that the market for gluten-free products is not as small as previously thought, mainly because of new findings concerning wheat sensitivity.

Sensitivity to Wheat

Very recently, wheat sensitivity has been defined as a broad affliction in which, apart from food, other environmental factors may also play a role. It is suggested that individuals with celiac disease and wheat allergy only form a part of the total wheat sensitive population. Interestingly, recent data showed that the presence of (non-celiac) wheat sensitivity is highly correlated with the diagnosis of Irritable Bowel Syndrome (IBS). In most countries, the prevalence of IBS is 10-15%, and in some countries (e.g. Mexico and Brazil) incidences of >30% have been reported. These numbers are expected to be underestimations, in light of the fact that many individuals are unaware of having IBS. Although these data stem from preliminary studies, it can be hypothesized that wheat sensitivity accordingly, is present in far more people than previously expected. In addition, several studies have indicated that exclusion diets, which include gluten exclusion, may benefit children suffering

Table 1: Gluten Containing and Gluten Free Grains

Gluten free grains	“Gluten grains” ¹	Potentially containing gluten ²	
Amaranth	Barley	Bagels	Lunch meat
Buckwheat	Bran	Beer	Muffins
Corn	Bulgur	Bouillon cubes	Oven- or deep-fried meats
Millet	Farina	Bread	Pastries
Montina	Kamut	Breaded meat or chicken	Pie crust
Oat	Orzo	Breakfast cereals	Pizza crust
Quinoa	Rye	Cake	Potato chips
Rice	Semolina	Candy	Processed meats
Sorghum	Spelt	Canned soup and broth	Sandwich buns
Teff	Wheat	Couscous	Sauces
Wild Rice		Cupcakes	Tabbouli
		Dressings	Tortilla chips
		Gravies	Tortillas
		Hot dogs	Vegetables in sauce
		Hotdog buns	

1. Grains containing the specific gluten protein “gliadin”; 2. Products that have mostly been processed using wheat derived ingredients. The product categories are also the most important ones for gluten free alternative NPD.

from ADHD. Although also from this regard, more precise and well controlled studies are needed, the first rough estimates indicate that probably up to 10% or more of the general public may be sensitive to wheat in some manner.

Possible Mechanisms

A recent study lead by Dr. Anne Sapone, from the Second University of Naples, in Italy, evaluated possible mechanisms underlying sensitivity for gluten from wheat. Patients who were not suffering from celiac disease, but who were sensitive to gluten, were exposed to a supervised 4-month gluten containing or gluten free diet. The main gastrointestinal symptoms of the patients in the gluten-condition were: gas, diarrhea, weight loss, abdominal pain and fatigue.

When compared to celiac patients, the gluten-sensitive individuals, however, did not show unfavorable changes in intestinal cell walls. This study shows that the two gluten-associated disorders, celiac disease and gluten sensitivity, are different clinical entities. A double-blind, randomized, placebo-controlled study addressing wheat gluten sensitivity was conducted at the Monash University, in Victoria, Australia. This trial was undertaken in patients with irritable bowel syndrome in whom celiac disease was excluded, and who were (symptomatically controlled) on a gluten-free diet. Participants received either gluten or placebo in the form of two

bread slices plus one muffin per day with a gluten-free diet for up to 6 weeks. Symptoms were evaluated using a visual analog scale and markers of intestinal inflammation, injury, and immune-activation were monitored. Although more intestinal distress symptoms were reported on a wheat gluten trial, there were no unfavorable changes in gut health related parameters. This highly controlled study disproved that gluten protein in wheat causes gut damage in non-celiac disease individuals.

However, since some gluten containing products also contain relatively rapidly fermentable carbohydrates, such as oligofructose and arabinoxylan, exclusion from the diet of these and other fermentable carbohydrates (also referred to as "FODMAPs") has been reported to reduce intestinal distress to similar extents as gluten free diets. Accordingly, at present, it remains unclear whether gluten proteins as such or other factors are involved in the etiology of gluten sensitivity. Since the possible mechanisms behind wheat sensitivity are diverse, and might even involve other environmental factors, besides food, a diagnosis for wheat sensitivity is not easy. From this respect, some medical doctors advise persons suffering from vague physical complaints (for which no physical cause can be found) to refrain from gluten containing foods for several weeks, in order to see whether the complaints

lessen. Such complaints may be a sensitive intestinal system, gastrointestinal distress, bloating, rumbling, chronic fatigue, poor concentration, ADHD, frequent headache, migraine, repeating episodes of loose stools of diarrhea, and arthritis.

Public Awareness

Recently, the news that leading tennis player Novak Djokovic partially attributed his success to his gluten-free diet had a huge public impact. The sales of gluten-free products soared in the US, in response to this. In 2011, US consumers spent \$6.1 billion on gluten-free products, and during the last years (2006-2010), the annual growth in the gluten-free foods segment was 30%. Also in research, there is an increase in awareness. A search shows that over 3,500 articles were published about gluten, in the first half of 2012. Meanwhile, a number of multinationals began promoting a wider use of gluten-free products with grains like oats, quinoa, teff, amaranth, and millet. Consumers who had never thought about these alternatives, might be surprised by the good taste and quality of these products. More research is needed on the actual nutritional contents of these wheat alternatives, as it is unclear if they could replace the current fiber-rich whole-wheat products. Additionally, the consumer perception of the taste and mouthfeel is not properly documented. Additionally, there are still numerous technological challenges with respect to food processing since gluten absence in dough has a very profound effect on dough quality, baking volume and consumers mouthfeel.

Market Impact

Thus, since we recognize that a substantial number of individuals may benefit from avoiding gluten containing grains, such as wheat, rye, spelt and barley, it is important that the food industry starts developing a much wider spectrum

of foods that are based on non-gluten cereals such as teff, amaranth, oat, quinoa, and millet. Also, research on the development of commercially attractive gluten-free grains is warranted. A research group, led by Dr. Luud Gilissen, Wageningen University, the Netherlands, proposed various strategies in this respect to help reduce exposure to gluten-gliadin. Next to the reduction of the elements in gluten protein in existing foods/grains that cause celiac disease, they propose the production of guaranteed safe, gluten free foods for those individuals that need security on this.

In addition, they propose an increased production of foods based on the use of cereals that are gluten free from nature and developed a guaranteed gluten free type of oats that is commercially viable and has been used for baking a surprising good type of oats bread. Given the fact that much more than the initial estimated 1% of the population may today benefit from gluten free products, these strategies will have both a global economic and public health impact. ♦

Vincent van Buul and Fred Brouns work at Maastricht University's department of Human Biology, focusing on Health Food Innovation Management. Email: fred.brouns@maastrichtuniversity.nl; www.healthfoodinnovationmanagement.nl



Natures Earthly Choice Easy Quinoa with Garden Vegetable (US) features a "gluten free" claim.

Source: Innova Market Insights

