THE WAR ON WHEAT How unsubstantiated wheat and gluten related health concerns are damaging the cereal foods sector and compromising public health.

Article · September 2015

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OPINION: THE WHEAT DEBATE

The War on Wheat

How unsubstantiated wheat and gluten related health concerns are damaging the cereal foods sector and compromising public health.

by Fred Brouns, Luud Gilissen, Peter Shewry and Flip van Straaten

Recent proposals to initiate an evidence-based evaluation of the effects of wheat types and food processing in the context of wheat and gluten avoidance was presented as an important activity within the European Health Grain Forum.

Worldwide an anti-gluten and anti-wheat hype has developed over the last 4 years, with significant impact on all parts of cereal supply chains. This has resulted in significantly reduced sales of bread, breakfast cereals and pasta products in various markets impacting also on the supply chain.

The Most Cultivated

Of all grains, wheat is most widely cultivated worldwide. Wheat is third among all cereals, behind maize and rice, in total global production, which is over 700 million tons annually. The demand for wheat for human consumption is also increasing globally, including in countries, which are climatically unsuited for wheat production, due to the adoption of western-style diets. Wheat is relatively rich in micronutrients, including minerals and B vitamins, and supplies up to 20% of the energy intake of the global population. Nevertheless, an ever-increasing demand for gluten-free and wheat-free products has developed in recent years.

Apparently, social media statements that gluten and wheat cause overweight and health problems, as well the new consumer "free from" trend have played a major role in this development. About 95% of the wheat that is grown and consumed globally is modern bread wheat (*Triticum aestivum*), a relatively new species, having arisen in southeast Turkey about 10,000 years ago. Cereal (including wheat) proteins that may cause allergies and intolerances (including coeliac disease) have been reviewed in the context of reducing the incidence of such diseases. Recently it has been suggested, that some allergen genes (e.g. ATIs-alpha amylase trypsin inhibitors) are low or even absent in ancient wheat (Einkorn), as compared with modern bread wheat. Such observations have triggered suspicion that ancient wheat is healthier than modern bread wheat.

Celiac disease affects only 1% (range 0.5-3%) of the population, whereas true wheat allergy is very rare, affecting only <0.2% of the population. Accordingly, the question arises why so many individuals (in some countries > 30%) say to feel more comfortable on a gluten-free or wheat free diet or when consuming ancient wheat.

Several popular nutritional plans, such as the Paleolithic diet and diets more recently proposed by Davis, in "Wheat Belly" and Perlmutter in "Grain Brain," have suggested that wheat consumption has many adverse health effects ,leading to numerous chronic diseases, ranging from obesity, diabetes and cardiovascular disease to epilepsia, Alzheimer's and hyperactivity syndrome. Such suggestions are based on different hypotheses relating adverse health effects to wheat gluten, wheat lectins and wheat protein digestion-derived opioid like peptides, including impacts on eating behavior. With this, the authors of these books follow a recent trend to relate the cause of certain diseases, such as for example obesity, to one specific type of food or food component, rather than to multifactorial causes including food overconsumption and inactive lifestyle in general (see box).

Wheat Grain Functions

The wheat grain contains many hundreds of individual proteins, which may have structural, metabolic, protective or storage functions (as reviewed by Shewry et al.). They include the gluten proteins, which are the major storage components and may account for up to 80% of the total grain protein. Higher intakes of whole grain products, which in the US and Europe are mainly based on wheat, are associated with reduced risks of type 2 diabetes, cardiovascular disease, some types of cancer, as well as a more favorable weight management. Worldwide international food authorities such as FAO, WHO, EFSA, FDA, as well as national food recommendations state that wholegrain consumption is supporting health, helping to reduce chronic disease risk significantly.

Hard data about adverse human health effects of wheat components such as gluten and lectins (beyond celiac disease and wheat allergy), including aspects of weight management and insulin resistance are not available. Accordingly, there are currently no grounds to advise the general public to not consume this common dietary staple food. This conclusion is further supported by the outcome of a recent cohort study, where it was observed that individuals who consumed recommended amounts of (whole)-wheat had the least amount of abdominal fat accumulation.

However, a few recent scientific publications in animals and humans do raise certain potential concerns about wheat consumption for reasons of weight gain, inflammation and intolerance. For example, in one study in rats, excluding gluten from the diet showed a favorably impact on reducing fat tissue increase (Soares FLP, de Oliveira Matoso R, Teixeira LG, et al., 2013). The authors concluded that gluten exclusion may help to reduce body weight and can be a new dietary approach

› The War on "Modern" Wheat

- Genetically modified.
- More toxic gluten, ATI's and lectins.
- High content of glutenmorphins.
- Causes a leaky gut.
- Causes small intestine bacterial overgrowth/dysbiosis.
- Fructans (FODMAPs) cause intolerance.
- Vital wheat gluten (VWG) is separated in a crude way. causing changes in the composition that cause intolerance.
- Industrial processing using yeast causes intolerance.

(in humans) to prevent the development of obesity and related sickness. The latter is a conclusion, which, lacking any supporting human data, seems rather premature.

Another trial aimed to study the effect in humans of Khorasan wheat (Kamut, a putative ancient grain related to "ancient" tetraploid durum wheat), replacing "modern wheat in the diet", on cardiovascular risk parameters (Sofi et al., 2013).

Based on the obtained data, it was concluded that a replacement diet with ancient wheat products could be effective in reducing disease risks. The publication gave no information on the recipe of the products and the way they were processed before consumption, giving rise to many questions. In a more recent study, the same research group, (Sofi et al., 2014) studied the effects of consuming organic, semi-whole-grain products derived from *Triticum turgidum*- subsp. *turanicum* (ancient wheat), replacing a modern wheat based diet, on irritable bowel syndrome (IBS) associated symptoms and inflammatory/biochemical responses. The authors reported a significant improvement of gastrointestinal symptoms after the ancient wheat intervention period. In addition, a significant reduction was observed in inflammation markers. Also in this study ,no data were presented about the product recipes and the processing and final composition of the products. Although the authors stated that ancient wheat resulted in improvements, it cannot be excluded that compositional changes as a result of food processing may have played a role.

More or less simultaneously, it was suggested that a high content of so-called FODMaPs (fermentable oligo-, di-, monosaccharides and polyols) plays a role in intestinal intolerance. However, these carbohydrate compounds are not at all specific to bread wheat, and also occur in many other foods. Based on the outcome of recent studies in individuals with hypersensitive bowels (irritable bowel syndrome), it has been suggested that about 6% of the general population seems to benefit from a gluten-free or wheat-free (read also: low FODMaP) diet. However, the degree of the benefit (as well as the severity of the original symptoms) is less well defined.

Flawed Interpretations

The cereal supply chain is being blamed as feeding the world with sick making cereal products, much based on flawed interpretations of research data and/or statements of blogging activists. On the other hand, no solid comparative data are available on ancient vs. modern grains and the effects of their specific processing e.g. in bread making, let alone on the influence of consumption on gastrointestinal and general well-being. In contrast, several recent meta-analysis indicate significantly reduced risks for developing heart disease, diabetes and some forms of cancer in individuals that regularly consume wholegrains (most of which is wheat-based), compared to low consumers. Based on the findings listed above and the current social media hype to reduce the consumption of gluten-containing grains, major food companies have observed a decline in cereal foods sales. In this respect, Health Grain Forum considers that there is a need to evaluate:

1. Compositional changes that take place during the processing steps from grain kernels : flour dough/die : product ready for consumption, as well as during the processing of vital wheat gluten.
2. Impact of consumer beliefs/perceptions on wheat gluten avoidance and well-being.
3. Impact of consumption on metabolism, gut integrity and well-being in individuals with hypersensitive bowels.

These questions are now being addressed in a global research initiative for which international industrial partnership is being sought. ▼

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› Food Prices Hit Lowest Levels in Six Years

Prices for major food commodities in July hit their lowest average monthly level since September 2009 as sharp drops in the prices of dairy products and vegetable oils more than offset some increases for those of sugar and cereals.

Meat prices, meanwhile, remained stable. The UN's FAO Food Price Index averaged 164.6 points in July, down 1.0 percent from June, and 19.4 percent from a year earlier.

In July, the dairy price index dropped 7.2 percent from the previous month, mainly due to lower import demand from China, the Middle East and North Africa amid abundant EU milk production, which has resulted in good availability of dairy products for export. The July vegetable oil price index was some 5.5 percent below its June level, reaching its lowest value since July 2009.

The recent slide was primarily caused by a fall in international palm oil prices, due to increased production in Southeast Asia combined with slower exports especially from Malaysia, and a further weakening of soy oil prices on ample supplies for export in South America and a favorable outlook for global supply in 2015/16.

The cereal price index rose by 2.0 percent from June, but was still 10.1 percent below July last year's level. For the second consecutive month, higher wheat and maize prices, in part due to unfavorable weather in North America and Europe, kept the cereal index rising, but rice prices continued to fall. ▼