Inside Our Daily Bread: Facts and Misconceptions

A large number of suppositions have been made on the adverse effects of cereals on public health. But what are the facts?

by Fred Brouns

The history of bread stretches far back into the past, helping to nourish masses of people. More recently, however, a sudden notion has cropped up, particularly among those susceptible to the fear-mongering news on social media, that eating wheat and bread causes physical and mental symptoms.

A large number of suppositions have been made about the adverse effects of cereals on public health. This is the case both on the internet as well as by authors of popular diets and books such as the "Paleolithic diet," "Wheat Belly" which were translated into many languages, and "The Grain Brain" (see box on page 58). The arguments put forward are mostly based on a one-sided selection of corresponding literature. This is often related to animal experiments or the results of test-tube research conducted in a lab. It is therefore difficult for this to be directly translated to the situation that man finds himself in.

Proponents claim that humans have only been eating cereals for the past 10,000 years, ostensibly too short a time for "our genes to adapt," resulting in a plethora of diseases. Another claim is that modern bread wheat has been genetically modified, resulting in its containing far more "pathogenic components" than the older "non-modified" cereals. This supposedly results in leaky gut, causing a multitude of ailments and symptoms. But what are the facts?

Wholegrain Bread Facts

History of Cereal Consumption: Archaeological findings in Africa prove that our very early predecessors ate a diet that was primarily based on plants, tubers, grasses and seeds. Cereals belong to the grass family with seeds that grew there at that time that would, most likely, have been eaten by them. After all, cereals contain protein, starch and other nutrients. The lack of evidence thereof (for the simple reason that no archaeological finds have been made to that effect) does not prove that this was not the case. By contrast, there is evidence to suggest that we consumed a diet to which cereals made a daily contribution, far further back than the assumed 10,000-year mark. Wheat, rye, and barley, for example, formed a significant part of the Neanderthal diet that dates as far back as 45,000 years ago. There is robust evidence from findings in Italy and a famous archaeological site at the sea of Galilee, Israel, that people had already been hand milling rye, barley and wheat and were baking the first types of pita bread on a regional level in the late Paleolithic age.

Historical Gluten Content: Modern bread wheat (hexaploid) only appeared in nature approximately 11,000 years ago, coming from a spontaneous cross-pollination (hybrid) between a diploid and tetraploid cereal variety. It is often put that older cereal types contain little or no gluten, when compared to modern bread wheat. This, however, appears to be incorrect, as both the old diploid wheat (Einkorn) and the tetraploid wheat varieties (Emmer, Durum) contain gluten. Moreover, it appears that the oldest ancestor of modern bread wheat (150,000-500,000 years), *Aeglilops Taunshii*, contains the D genome. This is also present in Einkorn and in modern bread wheat, known to be responsible for the production of a gluten protein fragment (toxic epitope). It causes the most reactivity to people that may develop celiac disease. In addition, it was recently shown that the total gluten content of modern wheat types is in fact slightly lower than that of the old wheat varieties. This is in contrast to the starch content, which has slightly increased over time.

Conquering Grains: The reasons why only several dozen cereal

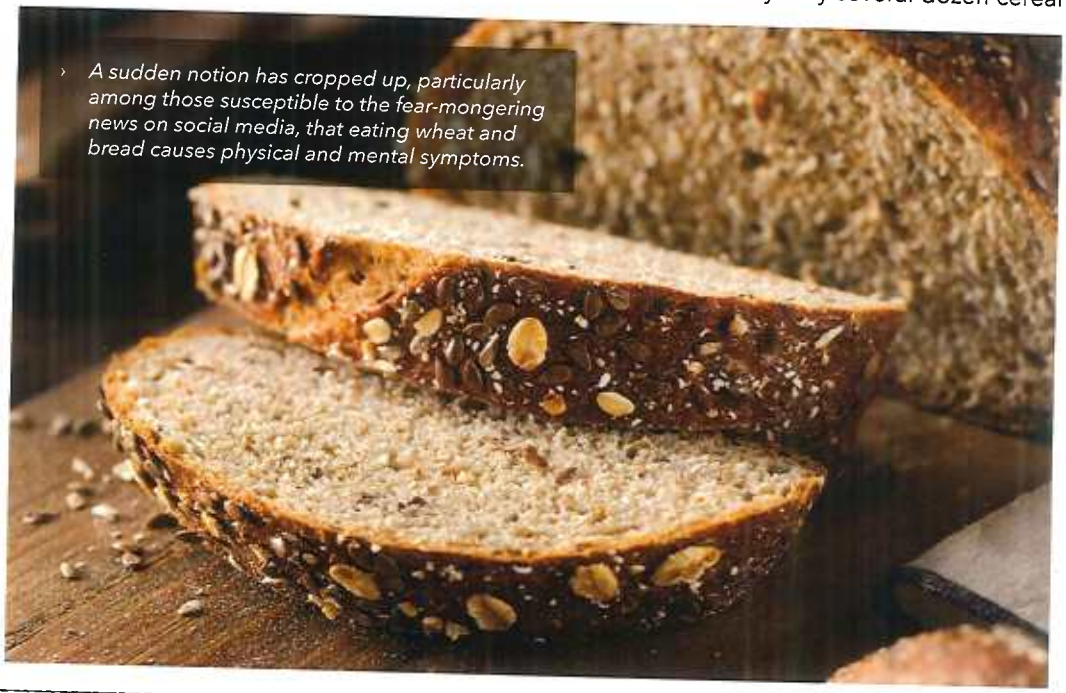

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Table 1: The GI Values of Selected Starch Products

Product	Carbohydrate (g/100g)	GI (glycemic index)	Serving (g)	GL (glycemic load)
Deep-fried potato	20	85	200	34
Boiled potato	17	78	200	27
Table sugar (saccharose)	100	65	35*	23
White wheat bread	48	75	35	13
Banana	20	51	120	12
Whole wheat bread	39	74	35	10
Apple	13	36	120	6

› Four Social Media Myths About Bread

Myth 1: The increase in wheat consumption is causing an increase in our body weight, which leads to obesity and chronic diseases related thereto, such as diabetes and cardiovascular diseases.
The argument implies a causal link between an increase in wheat products and an increase in the numbers of obese patients. Such a correlation, however, may not be ascribed a causal relationship without justification. There is, for example, also a correlation between the national consumption of chocolate and the number of Nobel prize winners from a given country. In this example, no one would consider winning a Nobel prize to be related or a result of chocolate consumption. "Naturally, overeating of calories would result in obesity, however, this is not simply down to wheat or cereal products. Even Asia, where diets include high rice intakes and relatively low wheat consumption, is seeing a steady increase in patients suffering from obesity. Moreover, countries such as Italy and Turkey, where very large quantities of wheat (pasta, bulgur, bread) are part of the diet, have only begun to see a more rapid increase in obesity levels over the past two decades."

Myth 2: The starch in wheat differs from the starch in other products rich in fiber and consequently results in an unwanted rise in blood sugar levels.
The starch present in our plant foods generally consists of two different types of glucose chains, namely amylopectin and amylose. The ratio of amylopectin (70-75%) and amylose (20-25%) in the various starchy foods are practically the same and, as such, cannot be a deciding factor to cause an adverse increase of blood sugar levels after wheat consumption, as has been suggested. To put things into perspective, robust scientific research has shown that the consumption of bread always results in lower blood glucose levels, when compared to a similar intake of boiled or baked potatoes or most boiled white rice types.

Myth 3: Wholewheat bread has a glycemic index (GI) that is even higher than that of sugar.
The international GI value for sugar has been established at 67, which is close to the GI value of white bread (GI=70). Whole-wheat bread has a GI value of 65.9. The foregoing values differ only very slightly from one another, but are lower than the GI values of other starch products such as white rice (73) and mashed potatoes (85) (see table 1).

Myth 4: Wheat opioids are so addictive that people lose control of their eating habits, resulting in overeating and overweight.
The term "opioid" refers to certain gluten protein fragments (peptides) that cannot be digested and, as such, remain intact in the intestine. An opioid-like activity was previously observed after scientists injected the substance into the brains of rats, which is why the term gliadorphins (gliadin fragments with a morphine-like effect) was coined. A simple fact that is overlooked, in this instance, is that the human small intestine is unable to take up these long gliadorphin peptide chains. As such, it is impossible for gliadorphin to reach the brain intact – other than through a direct injection into the brain. In addition, there is no scientific evidence to support the claim that gliadin increases appetite, nor have any withdrawal symptoms been observed in the absence of this protein. In fact, based on recent meta-analysis, is can be concluded that regular consumption of wholegrains is positively associated with better weight management.

varieties, out of over 100,000 species, were eventually selected for large-scale use include grain size, resistance to pathogens and insects and the degree of threshibility, meaning whether the grain can easily be separated from the chaff. From this regard, modern (hexaploid) bread wheat seemed to give farmers far greater yields and by virtue of economic reasons became the preferred cereal variety, thus "conquering" the farming world.

Lectin Confusion: Claims have also been made connecting wheat germ lectins to physical symptoms, partly since they are able to agglutinate to cells, which may cause damage. Lectins are different proteins to gluten and should not be confused with one another. They primarily play a role in natural plant defense against insects. It has been shown that the supposed harmful effects of lectins, through binding (agglutination) to the cells of the intestinal wall, are completely eliminated through heat exposure, such as during cooking or baking.

The Need for Research: Although at present the reasons and underlying mechanisms are unclear, some people who suffer from irritable bowel syndrome, but are not celiac, nor have a wheat protein allergy, seem to benefit from avoiding cereals that contain gluten (wheat, rye, barley and spelt).

Recent studies have shown that this may be due to protein components other than gluten (amylase trypsin inhibitors (ATIs) a natural crop protective protein against invaders).

Further study is being conducted in this field and likewise the development of a greater variety of gluten-free foods for the benefit of people who really need them, is also recommended. In addition, more and better research is required to identify which protein components cause which symptoms in certain people and how this can best be diagnosed.

The Wholegrain Advantage: There is no evidence that the consumption of wholegrain products in the general sense should contribute to disease or illness. On the contrary, a daily intake of whole grain products reduces the risk of: Type-2 diabetes, cardiovascular diseases and colon cancer.

The preceding does not, however, apply to the consumption of ("refined") white flour products. By far the largest share of the micronutrients contained in the grain is "packed" in the fiber matrix and germ and these nutrients are removed, during the fractionation of white flour.

Scientific Consensus: Based on the available scientific data available, there is a general consensus that there is no data that justifies an overall negative recommendation against the consumption of wheat and other cereals that contain gluten for all of us.

As such, recent recommendations (2015-2016) from the relevant authorities (World Health Organization (WHO), the Dutch Health Council (Gezondheidsraad), Voedingscentrum (Nutrition Centre) Nederland, the Belgian Superior Health Council (Hoge Gezondheidsraad), European Society of Cardiology, Nordic Dietary Recommendations (Scandinavian countries), UK Standing Advisory Commission on Nutrition (SACN), the American FDA/USDA and many others), unanimously include a recommendation for the increased consumption of wholegrain products, along with more vegetables and fruits.

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