

# Bread and Health

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**Abstract:** Introduction: Bread is a food full of flavors and nutrients and continues to be the basis of our daily diet. Aim: The aim of this review was the investigation of bread's usefulness in our daily dietary chain and health in general. Material-Method: Extensive review of the recent literature was conducted in electronic databases (Medline, Scopus, and Google Scholar) through the Association of Hellenic Academic Libraries (HEAL-Link) using the appropriate key words: bread, health, disease as well as a combination of them. Results: Bread is an excellent source of complex carbohydrates that provide the body with the energy needed. Although bread is a basic food of everyday human nutrition, it is implicated in a variety of situations that burden the human body, such as obesity. However, this happens only when it is consumed in very large quantities and when it is part of an unbalanced diet. Conclusions: Bread, when is consumed in balanced quantities can give the body plenty of nutrients essential for its good function.

**Key words:** Bread, health, disease.

## 1. Introduction

Bread or in Greek “artos” was considered in the past as the most important human good after health and water. The origin of the term “artos” is ancient Greek: it comes from the verb “ararisko” which means connect, match, put together or “artio” which means brew, and prepare. The modern term “bread” derived from the ancient verb “psoo” meaning rub and it is diminutive of the word “psomys” (→ bread = little bit, bite). Its history begins thousands years ago and unfolds in the depths of centuries [1, 2].

It belongs to the traditional diet, especially that of the poor. It believed to be the most complete and cheap food and basic auxiliary food in times of extreme food poverty. It is the main food in Europe but also in the cultures of America, Middle East and North Africa,

unlike East Asia, where the main food is rice [3, 4].

The bread, therefore, a food with awesome variety of flavors and nutrients remains the basis of our daily diet. However, it is accused of contributing to weight gain etc. [5, 6].

The *purpose* of this review is to highlight the importance of using bread in our daily food chain and its contribution to the promotion of our health in general.

## 2. Methods

The search for the sources of this review was made on the Internet from specific databases such as Medline, PubMed, Google Scholar, and the Hellenic Academic Libraries Association (HEAL-Link). The search included research articles of the last, mainly decades, about bread and nutrition, its characteristics, its nutritional value and its advantages. The criterion of exclusion of the articles was language other than Greek and English. The keywords that they used were: bread, health and disease.

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### 3. History of Bread

Known as “the essence of life”, bread is already made from 10.000 B.C. at the dawn of Neolithic period and the spread of agriculture, where the seeds were the main ingredient of bread. The first bread in a form similar to the current one is found in Egypt in some of the oldest surviving papyri in which instructions for bread-making process are included. It was also written there that the delay of the pyramids construction was due to insufficient supply of bread to the workers [7, 8].

Bread was also widely known in Ancient Greece, where, among other things, the ritual bread called “psadista” was prepared from flour, oil and wine and was offered to the gods. In general, barley bread was produced. Solon also reports that wheaten bread was produced only on festive days. Hesiod, Homer, Herodotus and other important historians and writers have been referred to bread. Moreover, since the 5th century B.C., Athenians could buy bread from bakeries, while in Rome the bakeries just appeared in the 2nd century. Romans were also the ones who created the first ovens in their craft form, especially during the time of Emperor Trajan (87-117 AD), where a mass production of bread was observed [9].

The importance of bread was recognized since that era, a fact reflected in the term “opso/prosfagi” which means the food that one eats with bread, as a supplement used for the rest of the meal [10].

Bread was also used as a symbol in many religions. It is reported in the Old Testament that when Israelites left Egypt and found themselves in the wilderness, God sent them a kind of bread called “manna” and the people survived thanks to it [11]. In the New Testament, the miracle of Christ, in which Christ with five breads and two fish was able to feed five thousand people, is mentioned [12]. Christ also likened himself as bread to his disciples and anyone who could eat it, he would have eternal life. In the Secret Supper Jesus blessed the bread, cut it into pieces and said, “take, eat, that is my body” [13].

The Industrial Revolution (18th-19th century)

brought rapid technological breakthroughs and significant changes in bakery. The production of new hard-grained cereals in America made it necessary to create stronger mills than that of watermills and windmills. The construction of roller mills that could grind hard wheat, led to the production of whiter flour. New varieties of wheat promising good quality bread were also studied and discovered. [14]

### 4. Bread

The Code of Food, Beverage and Shared Objects defines as “bread”, the product prepared by baking in special furnaces and under defined conditions of mass consisting of wheat flour, water, dough and a small amount of salt (Article 111, 2nd Edition, April 2014). Raw materials used for the bread production available for consumption should meet the terms and provisions of the Code. Where flour from another cereal or a mixture of cereal flour has been used for making bread, this bread must bear the name of such cereals, such as wheat bread with rye [15].

Flour is the main material in making of bread and its properties depend significantly on the properties of the grain from which it is produced. The chemical composition of the flour depends on the degree of milling. Increasing the degree of milling reduces the percentage of starch and increases the components present in the bark such as inorganic ingredients, insoluble fiber and vitamins [16, 17].

Wheat is the only cereal whose flour has the ability to form dough when contacted with water. As a result, flour has the exclusive property of shaping the structure and appearance of bakery products [17].

Flour consists of proteins, starch and other carbohydrate lipids, fiber, water and ash as well as low levels of vitamins, minerals and enzymes [18]. Its proteins, gliadins and glutenins interact with each other when mixed with water creating the gluten grid. The grid has the ability to bind the gases produced during fermentation or produced by chemical blowing agents in the form of bubbles and it swells causing the

bloating of the dough [9]. The amount of protein contained in the flour determines the amount of gluten to be formed, which, in turn determines the strength, shape and structure of the dough. Hard wheat has higher protein content than soft and therefore the first is used in bread production, as mentioned above [19]. In addition to the proteins that constitute 10-12% of the flour, most of it consists of starch (70-75%), while water is about 14%. It is also composed of non-starch polysaccharides (2-3%), with arabinoxylans and fats at a similar rate. Although at low contents, these ingredients are necessary for the production and quality of the bread [20].

Flour is the main ingredient of bread and creates the grid around which the other ingredients mix in proper proportions to form the dough [21]. The wheat is, furthermore, the only cereal whose flour has the ability to form dough when it comes into contact with water. As a result, the wheat flour has the exclusive property of shaping the structure and appearance of bakery products [17].

## 5. Bread's Nutritional Value

Since bread is a basic food of the daily human nutrition, various attempts have been made to prepare various types of it.

Wheat flour is the main ingredient of bakery. Hard wheat has high protein content and the corresponding flour is used to make bread and other goods, such as croissants, donuts etc. Soft wheat has low protein content and the corresponding flour is used for pastry preparations such as cakes, biscuits, etc. [9]

Some types of bread, such as the whole grain bread, have high fiber content, which enhances the digestive system's action. Rye has the largest amount of dietary fiber and as a result its products have a lower glycemic index compared to wheat products, making them suitable for diabetics [20].

From a nutritional point of view, the barley seed is low in fat, high in dietary fiber and contains essential amino acids in an amount equal to or greater than other

cereals. As such, barley flour is a beneficial food for health. In particular, barley  $\beta$ -glucans are proven to reduce blood cholesterol and glycemic load [22-23].  $\beta$ -glucan, which, as mentioned above, has a positive effect on health, is contained exclusively in barley and no in other cereals. In addition, barley is a source of tocoles (tocopherols and tocotrienols) that they have antioxidant activity [24].

Corn flour is used to produce a variety of bakery products, such as bread, cakes, donuts and other products, most notably baby foods. It has high vitamin A content, almost ten times more than the other cereals, but it is also rich in carotenoids (lutein and zeaxanthin constitute 70% of carotenoids in corn) that act as antioxidants [25, 26].

Whole wheat flour also contains a significant percentage (up to 75%) of higher amounts of vitamins, minerals, antioxidants, fiber and other nutrients than that of commonly processed wheat flour, as these components are concentrated in the outer parts of the fruit [27, 28].

The increased demand for bread products also contributed to the manufacture of its functional products such as shown in Table 1:

## 6. Advantages—Disadvantages of Bread Consumption

The bread therefore represents an excellent source of complex carbohydrates, which provide the body the energy it needs and play an important role in balancing blood glucose levels [9].

Most types of bread contain low-value, low-fat vegetable protein. They also contain B vitamins, vitamin E and trace elements such as iron, potassium, calcium and selenium, that are greatly provided in the body. Vitamin B contributes significantly to the protein metabolism and cell replacement, vitamin E is an active antioxidant, iron is essential for growth and cell oxygenation and potassium for the balanced function of the cells. The calcium contributes to bone density and Selenium is a powerful antioxidant [19].

**Table 1 Functional bread products.**

1.	<i>Gluten-free bread</i>	Celiac disease, also known as gluten sensitization enteropathy, is a systemic autoimmune small bowel disorder caused by the consumption of cereals (wheat, barley, rye) containing gluten in people with genetic predisposition [29]. In all cases, and especially in celiac disease, treatment is the lifelong exclusion of gluten from nutrition. [30]. This created the need to produce gluten-free bread that should have quality features like those of the common wheat flour. The majority of gluten-free products are of lower quality to that of common wheat flour. Nutritionally they have lower concentrations of protein and fiber, but also vitamins and minerals [31, 32]. These products are often also lactose-free (nondairy-based gluten-free bread), as a large proportion of celiac patients experience lactose intolerance due to inadequate lactase production from damaged villi of the small intestine [33].
2.	<i>Bread with added fiber</i>	The benefits of dietary fiber to people's health are indisputable. Among these, the most effective glycemic control, cholesterol control, protection against cardiovascular disease, weight control, bowel function regulation, and colon cancer protection have been identified [34, 35]. According to European legislation (Regulation (EC) 1924/2006, 2006) the bread is characterized as a product rich in fiber and therefore positively affects the physiology of the body when it contains at least 6 g per 100 g of product. Beta-glucans, the water soluble fiber with high concentration in oats (3-8 g per 100 g dry weight) and barley (2-20 g per 100 g of dry weight), known for the ability to increase the viscosity of the solutions, are mainly used as functional fibers [36].
3.	<i>Bread with low or no added salt</i>	The bread is a rich secret source of sodium. A slice of white, wheat bread (28 g) contains 134 mg of sodium (Na), while a slice of rye bread (28.35 g) contains 171 mg of sodium (Na). By reducing salt content from the bread, which is a basic food, the total intake of salt decreases resulting in lowering blood pressure and in the long term, the decrease of the cardiovascular disease risk [37, 38]. According to European legislation, a food is labeled "low in salt" when it contains less than 0.3% salt [39]. Bread products with low or no salt addition have been studied and prepared. The taste of these products differs greatly from the taste of common bread and is not as enjoyable to consumers as the common bread [40].

However, bread is implicated in various conditions that burden the human body, as in the case of obesity. Bread contributes to obesity only when consumed in very large quantities and when it is part of an unbalanced diet. Obesity is also associated with diabetes mellitus [41]. Bread has a high glycemic index, greatly increasing sugar and insulin secretion, which in turn adds to obesity. In a balanced diet, carbohydrates should be about 50% and 2 slices of whole-wheat bread per day can be conveniently included in the daily diet [7, 20].

Gluten, which is contained in bread, causes celiac disease in gluten-sensitive people when they consume bread. They present diarrhea, weight loss, undernutrition, anemia, osteopenia, psychiatric disorders such as irritability and others. These patients should avoid eating grains containing gluten, such as barley, rye, oats and wheat [42, 43].

## 7. Conclusions

Bread eaten in balanced quantities not only does not contribute to obesity, but can provide the body with plenty of nutrients essential for its good function. Thus, when incorporated into a generally balanced, nutritious

diet, it can play an important role in helping consumers to achieve and maintain the objective of intake of specific calories daily.

Consumers, moreover, require today healthy, but also pleasant pastries. It is necessary to continue research in this field in order to prove the beneficial effects of their action on the body and health in general.

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