

FRI-LB-P-1-BFT(R)-01

INFLUENCE OF WHOLE GRAIN CEREALS ON HEALTH

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Abstract: *Today the market offer different types of food produced from whole grain cereals. According to numerous scientific studies, whole grain cereals have positive impact on human health (reducing the risk of cardiovascular diseases, reducing the risk of diabetes, reducing the chances of getting colon cancer). By using the whole grain cereals in the food production, a new type of food, functional food appears. Functional food is food that is consumed in everyday life, ie it is food that, in addition to nutritional values, positively influences one or more important functions of the body, by reducing the risks of certain diseases. Functional food is classified into several groups: unmodified and unprocessed food, enriched products, modified products and improved products. This paper provides a literature review of the impact of integrated cereals and functional foods on human health.*

Keywords: *whole grain, cereals, functional food.*

INTRODUCTION

Wholegrain cereals are part of the "healthy food" trend, due to the positive impact on the health (Fardet, A., Edmond, Rock, E. & Révész, C., 2008). The positive effect of the health status of ones organism is attributed to the different mechanisms of action of certain cereal ingredients. Although, the mechanisms of action are not yet fully explained, further researches are needed and the wholegrain cereals are considered to be most commonly (Cukelj, N., Putnik, P., Novotni, D., Ajredni, S., Voucko, B. & Curic, D., 2016):

- reducing the risk of cardiovascular diseases, due to the low glycemic index and the impact of soluble dietary fiber on blood cholesterol;
- reducing the risk of diabetes and regulate the level of glucose and insulin in state of already present diabetes, due to the low glycemic index;
- reducing the risk of colon cancer, due to soluble fibers that promote the growth of microflora, or the production of short chain fatty acids;
- regulate the work of the colon, due to the insoluble nutrients that increase the faecal mass;
- participate in prevention and treatment of obesity due to its low energy value and giving a sense of fullness in their consumption;
- having an antioxidant protective role.

Eating habits as well as trends in food production and food consumption have health, environmental and social impacts. The European Union is struggling with the features of modern-day illnesses, such as obesity, osteoporosis, cancer, diabetes, allergies, and dental problems.

Developed countries are also faced with aging-related problems, using high-energy food and an unbalanced diet. (Cencic, A. & Chingwaru, W., 2010). Food that positively affects the human health contains ingredients that help in specific functioning of the body. It's simple: food is fuel; food supplies the body with daily needed energy to carry out the daily functions and for normal metabolic processes. (El Sohaimy, A.S., 2012).

Thanks to its better understanding and recognition of the connection between nutrition and health, the interest in producing food products is increasing, which can significantly contribute to the prevention and treatment of certain diseases. By beginning the concept of proper nutrition through optimal nutrition, the development of food science and nutrition is constantly undergoing significant conceptual changes. (Mišan, A., 2009).

Regular consumption of wholegrain food produced from whole grain (integral) flour is thought to be associated with the reduction in human mortality.

Functional cereal products (grains) are grains such as wheat, corn, rice, oat, etc. which are modified in order to provide health benefits to people.

However, the perception of the people about using and acceptance of functional products is not sufficiently investigated and known, since the researches in this area to date are limited (Dean, M., Sherherd, R., Arvola, A., Vassallo, M., Winkelmann, M., Claupein, E., Lahtenmaki, L., Raats, M. M. & Saba, A., 2007).

On the path to optimal nutrition, which is an ambitious and long-term goal, the "functional food" seems a new, interesting concept. This concept should be built on solid scientific bases, while on the other hand being accepted by the consumers (Mišan, A., 2009).

It is considered that the beginning of the modern concept of functional food is in Japan in 1984, but understanding the food as a cure, certainly does not date from then. The father of medicine, Hippocrates, has set up this thesis 2500 years ago, and the ancient eastern civilizations traditionally associate certain groceries with specific health effects (Mišan, A., 2009).

According to the concept of functional foods, food products should show positive effects on one or two basic functions of the organism, help in the promotion of intellectual and physical ability, reduce the risk of disease and promote human health. However, functional food should not be seen as a factor that will solve health problems, but rather as a supplement to balanced nutrition and living activities (Čalić, S., Friganović, E., Maleš, V. & Mustapić A., 2011).

According to FUFOSE functional food is characterized by the following characteristics:

- Conventional or daily food or supplements; naturally present ingredients in food;
- proven beneficial effect on certain functions beyond the nutritional value of the product;
- Holds convincing scientific studies proving increased well-being and health and / or reduce the risk of disease and / or;
- Improving life quality, including physiological and psychological improvements (Roberfroid, B. M., 2010).

The World Health Organization (WHO) and food industry help inform the consumers about healthy lifestyles and how to reduce the risk of chronic illness. Functional food plays an important role in this part. It should meet the necessary nutritional needs, but also have a preventive role - to reduce disease by using raw materials that improve health and improve the physiological and metabolic effect (Maghaydah, S., Abdul-Hussain, S., Ajo, R., Obeidat, B. & Tawalbeh, Y., 2013).

The term "functional food" was first used in Japan in 1980 and it was referring food nutrients that have a beneficial physiological effect. In most countries there is no legal definition of "functional food", nor boundaries between conventional and functional food. Therefore, this is a challenge for both, nutritionists and food technologists (Čalić, S., Friganović, E., Maleš, V. & Mustapić A., 2011). There are many different definitions of functional food. The most simple one is: functional food can be called "functional" if in addition to the basic nutritional values affects one or more important body functions in a positive and satisfactory way, reducing the risks of certain diseases (Čalić, S., Friganović, E., Maleš, V. & Mustapić A., 2011).

So far, many researchers, academic organizations and industries have offered different definitions from very simple to very complex:

- Food that must prove the health benefits alongside other basic nutritional;
- Food similar and part of the daily diet, but be modified so that can satisfy the physiological role the daily diet can not satisfy (Siró, I., Kápolna, E., Kápolna, B. & Lugasi, A., 2008).

Scientific Concepts of Functional Food defines the food as functional, if it has a sufficiently proven positive influence on one or more functions in the body, beyond the nutritional effects and / or reduces the risk of illness. Functional foods must remain food, and this must be demonstrated through its effects on normal food consumption (Roberfroid, B. M., 2010).

In a broad concept of functional food, (Mišan, A., 2009) lists: natural nutritional rich food, food enriched with functional ingredients, food from which some ingredients have been removed, food in which the properties of certain components have changed, food in which the bioavailability of one or more components has been modified and all combinations of the mentioned above.

Čalić, S., Friganović, E., Maleš, V. & Mustapić A., 2011, classified functional food into several groups (Table 1).

Table 1. Classification of functional food

Whole food	The most simple form of functional food, food in a natural form.
Enriched products	Increasing the amount of present nutrients.
	Adding new nutrients or components that normally are not present in a particular food.
Altered food	Replacement of existing components and / or nutrients with nutrients that have better effect.
Enhanced commodities	Food in which one or more components are naturally enriched by using special cultivation conditions of the herbs, a new formulation of animal feed such as animal feeding, genetic manipulation, and so on.

CONCLUSION

Today, a large number of wholegrain products are offered on the market. It is believed that these products, because they are produced by wholegrain(integral) flour, have positive impact on human health through the prevention of various diseases. Since all parts of the grain are found in the integral flour, this type of flour has a large amount of biologically active substances (polyphenols, carotenoids, antioxidants, etc.). The trend of a new type of food - functional food has been steadily increasing. Functional food is food that, in addition to meeting the nutritional needs of the human organism, has positive influence on people's health.

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