

## Probiotic as a bioactive ingredient in functional foods

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### Abstract

Consuming fermented milk drinks dates back to ancient times. Probiotics are one of the bioactive components that decide to give the food product the title of functional food. The viability of probiotic bacteria throughout the product's lifecycle depends on the pH, storage temperature and quality of the constituents of the basic product. Therefore, strains that are a functional component added to foods must additionally meet technological requirements. The first products in the form of fermented beverages containing the *Lactobacillus acidophilus* intestinal strain were produced by the industry in the second and third decade of the 20th century. Food products are a more effective carrier of probiotic bacteria than pharmaceutical preparations. Often the name "probiotic product" does not mean a cause and effect relationship between a food product and the human body, but only testifies to the presence of a probiotic in its composition and mainly serves marketing purposes.

### Streszczenie

Spożywanie fermentowanych napojów mlecznych sięga czasów starożytnych. Probiotyki są jednym z bioaktywnych składników decydujących o nadaniu produktowi spożywcemu miana żywności funkcjonalnej.

Żywotność bakterii probiotycznych w produkcji, przez cały czas jego przydatności do spożycia, zależy od pH, temperatury przechowywania oraz od jakości składników produktu bazowego. Dlatego też szczepy, które są składnikiem funkcjonalnym dodawanym do żywności muszą dodatkowo spełniać wymagania technologiczne. Pierwsze produkty w postaci napojów fermentowanych, zawierające szczep jelitowy *Lactobacillus acidophilus* były wytwarzane przez przemysł w drugiej i trzeciej dekadzie XX wieku. Produkty spożywcze są skuteczniejszym nośnikiem bakterii probiotycznych niż preparaty farmaceutyczne. Niejednokrotnie nazwa „produkt probiotyczny” nie oznacza związku przyczynowo skutkowego między produktem spożywczym a organizmem człowieka, ale świadczy jedynie o obecności probiotyku w jego składzie i służy głównie celom marketingowym.

## **Introduction**

Functional food has its roots in the Eastern philosophical tradition in which the distinction between medicine and food is obliterated. The intensive development of various fields of science dealing with nutrition and the interest of scientists from around the world to enrich food with ingredients that can have a beneficial effect on the functioning of the human body have contributed to the dissemination of concepts such as probiotics, prebiotics or synbiotics. Pharmaceutical companies, as well as producers of fermented dairy products, such as bio-yoghurts, kefir and acidophilic milk, promote the consumption of probiotics in the form of probiotic-containing preparations or food products. Consuming fermented milk drinks dates back to ancient times. In the Old Testament you can find a text about eating fermented meals, when Boaz invites Ruth to a meal consisting of bread dipped in sour soup. Already then, the fermented milk was undoubtedly an important drink, which can be demonstrated by the method of its administration "... in the great feasting bowl of the illustrious gave sour milk".

## **Functional food**

In the years 1996-1999, the European Union carried out the FUFLOSE project (Functional Food Science in Europe), whose task was to develop the scientific basis for the concept of functional food. The definition adopted in the final document says that "food can be considered functional if it has been proven to affect one or more functions of the body over the nutritional effect, which has the effect of improving health and well-being and / or reducing the risk of disease. Functional foods must resemble the form of conventional food and show beneficial effects in amounts that are expected to be normally consumed with the diet - they are not tablets or capsules, but part of the correct diet " [1].

The health promoting effect of functional foods may result from:

- from its natural richness in pro-health ingredients
- with the addition of ingredients beneficial to the body
- depriving it of substances harmful to the body

- to increase the bioavailability of health-promoting ingredients [2].

Bioactive substances determine the specific composition of functional foods and are a criterion of one of the many existing divisions, in which food can be distinguished: enriched, low energy, energy, probiotic, high-fiber foods or low-cholesterol or sodium foods [1]. Probiotics and prebiotics are one of the bioactive components that decide to give the food product the title of functional food, which due to its specific composition is called probiotic food (Fig.1). The viability of probiotic bacteria in the product, throughout its shelf life, depends on the pH, storage temperature and the quality of the constituents of the basic product. Therefore, the strains used in probiotic, which are a functional component added to foods, must additionally meet the technological requirements, which include:

- intensive growth on breeding grounds
- resistance to fixation procedures
- stability during the preparation and distribution of probiotic products
- good survivability during storage and transport procedures
- limited impact on the sensory quality of food [3].

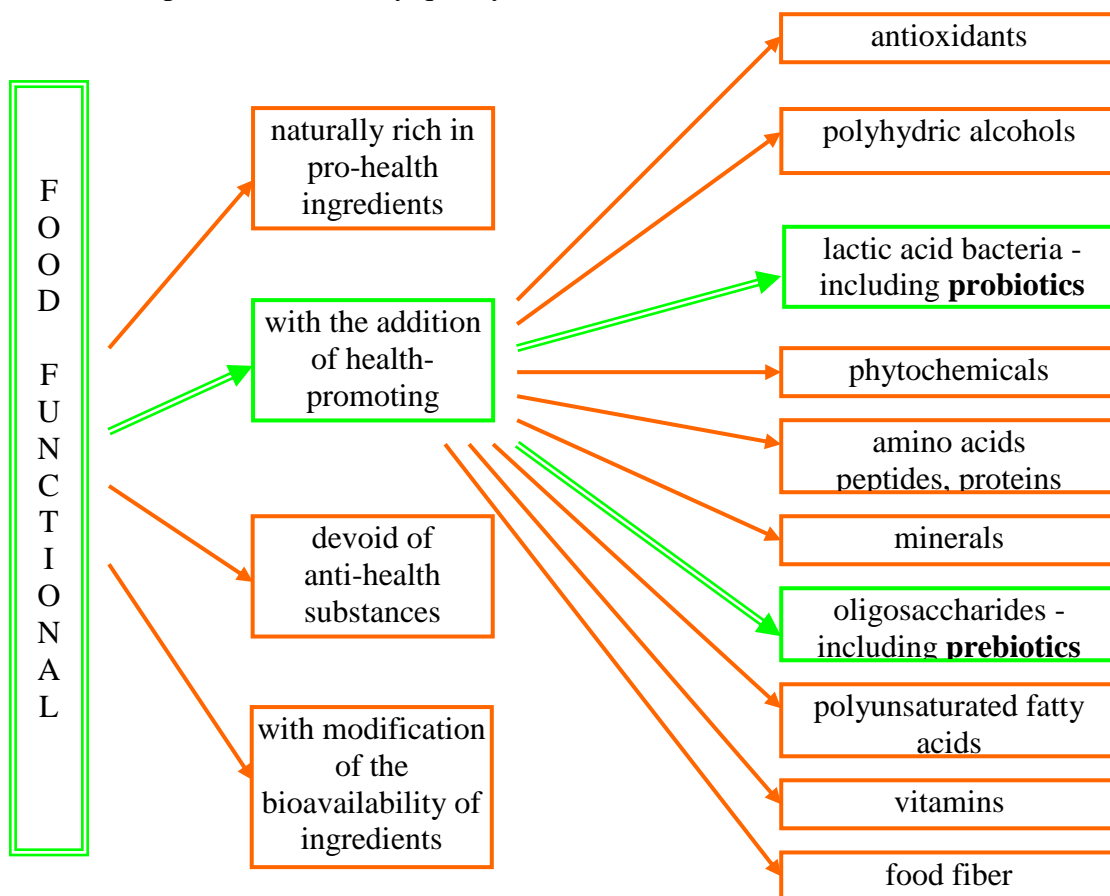


Fig. 5. Functional food - bioactive ingredients

Own elaboration based on [1,2,4].

The first products in the form of fermented beverages containing the *Lactobacillus acidophilus* intestinal strain were produced by the industry in the second and third decades of the 20th century. The use of "new generation" fermented beverages was limited to the medical area in which they served as a therapeutic role. In the 1970s, the use of probiotic strains of the genus *Lactobacillus* and *Bifidobacterium* in vaccines for the fermentation of milk beverages began, and the obtained products were given the title of "probiotic drinks". In this way, dairy drinks, while maintaining their full nutritional value, gained additional pro-health properties. They result from a lower content of lactose and more free amino acids. In addition, during the fermentation process, protein chains are reduced, thanks to which milk proteins are better absorbed and may lose the allergenic effect [3]. In addition, during the fermentation process, protein chains are reduced, thanks to which milk proteins are better absorbed and may lose their allergenic effect. The rationality of milk enrichment with probiotics and prebiotics and the principles of its use are presented in the independent documents of ESPGHAN and American Academy of Paediatrics (AAP - American Academy of Paediatrics) [5]. According to FAO / WHO recommendations, the amount of probiotic strain in a fermented milk product during its shelf life cannot be lower than  $10^8$ CFU / 1g [3]. Other milk products containing probiotics are curd cheese and maturing. In addition to dairy products, they are also used in cereal products and in fermented fruit and vegetable drinks such as: tomato juice, beet juice, cabbage juice, carrot juice, banana-milk drink or fermented soya drink [6,7,8,9]. The latest fermented products also contain the addition of prebiotics such as: FOS, GOS or lactose. The most commonly used prebiotic is inulin and oligo fructose [4,10].

Strains that have such a wide application in time do not always have a documented probiotic effect. There are no clinical trials that do not exclude the probiotic strain, but result in the lack of dependence of the sciences on their recommendation [11]. FAO / WHO defines the requirements to be met by probiotic strains, defines how they are to be added to products and provides labelling requirements for products containing a probiotic.

According to the guidelines from 2002. the marking should have:

- the name of the strain (it can be either a collection or a trade)
- the minimum amount of viable probiotic bacteria in the final shelf-life
- the recommended daily dose of the product
- expected health effects (clinically documented) [3].

Often the name "probiotic product" does not mean a cause and effect relationship between a food product and the human body, but only testifies to the presence of a probiotic in its composition and mainly serves marketing purposes. Regulation of the European Parliament

(1924/2006 / EU) is the first legal act regulating the producer's declaration on the health-promoting effect of the product on the organism [12]. It obliges the food producer to submit product health claims to the European Food Safety Authority (EFSA), where the commission assesses compliance with scientific research and the acceptance of the declaration. This procedure also includes statements regarding probiotic products. Work is in progress on the preparation of a list of health claims regarding food, from which the consumer will be able to obtain information on admissible health claims. The European Food Information Council (EUFIC) publishes the scientific journal "Contemporary food", which is devoted to food and nutrition issues, and the scientific information contained therein is passed on to the consumer in a clear and clear way [13]. Food products are a more effective carrier for probiotic bacteria than pharmaceutical preparations [4].

### **Summary**

Consumption of probiotic functional food by people without a load, for a longer period of time restores intestinal eubiotism and regulates the physiological processes of the digestive tract, favourably affects the immune system and reduces the risk of cancer. The consequence of probiotic is to improve overall health. More and more often pro-health mechanisms of probiotic strains are used in the prevention and therapy of diseases.

Considering the fact that at the present moment, the vast majority of functional food products do not yet have health claims but only declarations of suitability, it should be recognized that the leaflet attached to the article may contain suggestive information and the effectiveness of the purchased product is a matter of chance.

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