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Introductory Chapter: Functional Foods

Vasiliki Lagouri

1. Functional foods definitions

The first definition of functional foods has been established in Japan. In 1991, the Japanese law entered the work definition “foods for specified health use” (FOSHU) which allowed the first health claims on the food labeling. The FOSHU can be foods which exhibit health effect, used as foods in a diet, and are in the form of foods not as supplements [1].

A second definition of functional foods developed by the “Functional Food Science in Europe” (FUFOSE): “Functional food is a food with certain beneficial effects on one or more target functions in the body beyond the basic nutritional effects with a result the improved health state and well being or reduction of risk of diseases. It is consumed as a part of a normal diet and is not used in the form of pill or capsule or any other form of dietary supplement” [2].

Recently, the Functional Food Center (FFC) introduced a new definition for functional foods as: “Natural or processed foods that contains known or unknown biologically-active compounds; which, in defined, effective non-toxic amounts, provide a clinically proven and documented health benefit for the prevention, management, or treatment of chronic disease” [3]. In this definition, first functional foods can be natural or processed. Second, bioactive compounds, which are considered to be the source of the functionality of the foods, are secondary metabolites occur in food usually in small amounts that act synergistically to benefit health. Specifically, bioactive compounds may “exert antioxidant, cardio-protective and chemo-preventive effects” [4].

US does not have a formal definition for functional foods. The terms nutraceuticals or dietary supplements or medical foods are often used, thus functional foods cannot be regulated differently from other food products. Despite the government agencies, national and international organizations proposed their own definitions for functional food. The lack of a consistent definition between countries has led to unregulated publishing of health claims in functional foods and there exists an overall unclear definition of what “functional food” is between scientists, government officials, and the consumers. It is imperative that the food scientists should reconsider the meaning of functional food and agree upon a new formal definition for functional food.

In practice, a functional food can be a natural food, a food to which a health-promoting component has been added or from which a component for specific health reasons has been removed, a food in which a component has been modified by technological or chemical means to provide a specific health benefit, or a food in which the bioavailability of a component has been modified, or a combination of any of them.

Although the terms “nutraceutical” and “functional food” are used commonly around the world, there is no consensus on their meaning. According to

the Bureau of Nutritional Sciences, of the Food Directorate of Health Canada, the following definitions have been proposed: A functional food is similar in appearance to, or may be, a conventional food, is consumed as part of a usual diet, and is demonstrated to have physiological benefits and/or reduce the risk of chronic disease beyond basic nutritional functions. Nutraceutical is a product produced from foods but sold in powders, pills, and other medicinal forms not generally associated with food and demonstrated to have physiological benefits or provide protection against chronic disease. Functional food is clearly a different category than a nutraceutical, a pharmafood, or a dietary supplement. It is a food not a drug since it has beneficial health effects usually disease preventive and not therapeutic properties [5].

2. Functional foods categories

The functional foods of plant or animal origin according to their action can be categorized as:

1. Vitamins and minerals fortification (e.g., vit C, folic acid, calcium, iron).
2. Cholesterol reduction (e.g., omega-3 fatty acids, phytosterols).
3. Dietary fiber (e.g. nondigestible carbohydrates and lignin).
4. Probiotics, prebiotics, and synbiotics (e.g., yoghurt, kefir, fruits, vegetables).
5. Phytochemicals (e.g., phenolic compounds, carotenoids, lycopene) [6].

Functional foods can be in many forms. Some may be conventional foods with bioactive components that can now be identified and linked to positive health effects. Some may be fortified or enhanced foods, specifically formulated to reduce disease risk. Consumers can already choose from a wide variety of foods that contain functional components either inherently (e.g., soy protein, fish, olive oil) or through fortification (e.g., folate-fortified milk). As additional bioactive components are identified, the opportunities for developing functional foods will be broad [7]. Foods that naturally provide a bioactive substance may be enhanced to increase the level present in the food (e.g., eggs with increased levels of omega-3 fatty acids). On the other side, foods that do not naturally contain a bioactive substance can be fortified (e.g., calcium-fortified orange juice).

3. Functional foods development

According to the FCC, a few steps have been suggested to be followed in order to bring the functional foods to the market [3]:

1. Study the link between the particular food component and health benefits.
2. In vitro and in vivo studies with nonliving and animal specimens.
3. Human studies which involve human appropriate dosages of bioactive compounds and testing for adverse side effects.

4. Development of the appropriate food vehicle.
5. Marketing the product to the public and educating about the health benefits.
6. Long-term studies on populations for the overall product effectiveness.
7. Measurement of the public attitudes toward functional food.

Scientific understanding of the way in which specific food components affect body processes involved in health and well-being enables the development of markers that could confirm the impact of the new food products and could also be used in their safety assessment [8]. The development of functional foods using the innovative food technology and biochemical methods can offer beneficial effects to the consumers for well-being and reduction of the risk of disease. The design and the operation of such studies need to be carefully performed in order to give the scientific evidence for the approval of the health claims and the successful production of new functional foods. The development of functional foods, with their accompanying health claims, will proceed with progress in food regulation, which is the means to guarantee the validity of the claims as well as the safety of the food. Science in itself cannot be regulated and functional food science provides only the scientific basis for these regulations [9].

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