



Are Functional Foods Essential for Sustainable Health?

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Editorial

Food and diet play a key role in health and disease. The Harvard School of Public Health pinpoints the importance of a quality diet in health maintenance. They have proposed first the “Healthy Eating Pyramid” and more recently the “Healthy Eating Plate” to give detailed guidance of a balanced meal (Figure 1). The “Healthy Eating Plate” divides a plate in 4 parts: half of the plate for vegetables and fruits, a quarter for whole grains and the other quarter for healthy proteins. According to research done at Harvard School of Public Health following the Healthy Eating Pyramid and Healthy Eating Plate guidelines can lead to a lower risk of heart disease and premature death [1].

Spanish Society for Community Nutrition (SNEC) has proposed a new Healthy Eating Pyramid, which includes food recommendations and healthy lifestyle advices (Figure 2) [2]. On top of the pyramid, a new tip appears regarding nutritional supplements, nutraceuticals and functional foods. Moreover, the SENC recommends healthy culinary practices such as steaming, grilling and oven cooking, and a sustainable diet committed to the environment. This is the first time that an official nutrition group emphasizes on the healthy culinary techniques as a part of the nutritional guidelines, highlighting the importance of this issue in human health; as well as, the incorporation of nutraceuticals and functional foods.

What are functional foods?

The concept of functional foods was proposed by a Japanese academic society in the early 1980's, and the legislation for the functional foods was first implemented as FOSHU, which means “Foods for Specified Health Use” [3]. In 1991, the Ministry of Health, Labor and Welfare established the FOSHU labeling regulation [4]. Originally, foods that have the ability of modulating the body function and therefore contribute to the prevention of a disease were called Functional Foods [5]. It is widely understood that foods claim such biological effect beyond ordinary nutritional effects, based on scientific validation [5]. Figure 3 summarizes the steps needed for collecting enough scientific evidences for the validation of functional foods [6].

The European Food Safety Authority (EFSA) defines functional foods as: “A food, which beneficially affects one or more target functions in the body, beyond adequate nutritional effects, in a way that is relevant to either an improved state of health and well-being and/or reduction of risk of disease. A functional food can be a natural food or a food to which a component has been added or removed by technological or biotechnological means, and it must demonstrate their effects in amounts that can normally be expected to be consumed in the diet” [7].

Another category of healthy foods, commercially available in the European Union, is that referred as Food for Specific Groups (FSGs) (Regulation (EU) No 609/2013). The FSGs regulation includes a limited number of well established categories of foods that are considered as essential for certain vulnerable groups of the population: “processed cereal based food and baby food”; “food for special medical purpose”; infant formula and follow-up formula”; and “total diet replacement for weight control” [8]. Therefore, FSGs are not considered as functional foods since the former are intended for people with particular requirements while functional foods, according to EFSA definition, are for the global healthy population and aim to reduce the risk of diseases.

Experts belonging to the Functional Food Center, USA (FFC) currently define functional foods as “natural or processed foods that contain known or unknown biologically active compounds, which, in defined, effective, and non-toxic amounts, provide a clinically proven and documented health benefit utilizing specific biomarkers for the prevention, management, or treatment of chronic disease or its symptoms” [9]. In this context bioactive compounds, which are considered as a backbone of the functional foods, are understood as “primary and secondary metabolites of nutritive and non-nutritive natural components generating health benefits by preventing or

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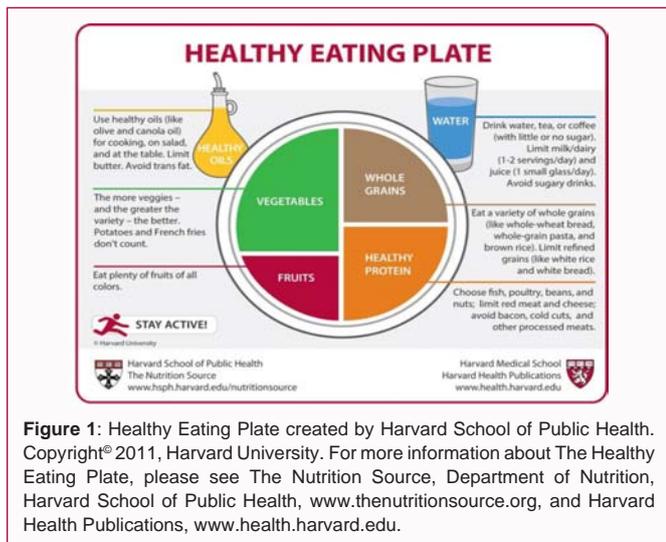


Figure 1: Healthy Eating Plate created by Harvard School of Public Health. Copyright© 2011, Harvard University. For more information about The Healthy Eating Plate, please see The Nutrition Source, Department of Nutrition, Harvard School of Public Health, www.thenutritionsource.org, and Harvard Health Publications, www.health.harvard.edu.

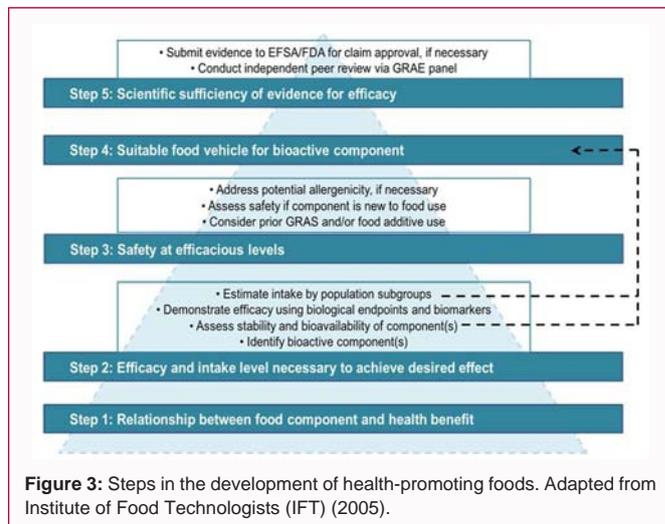


Figure 3: Steps in the development of health-promoting foods. Adapted from Institute of Food Technologists (IFT) (2005).

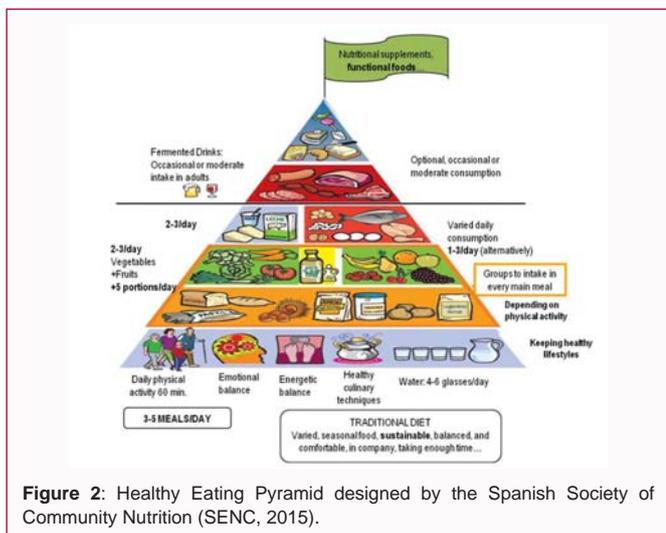


Figure 2: Healthy Eating Pyramid designed by the Spanish Society of Community Nutrition (SENC, 2015).

5. Food in which the bioavailability of one or more of its components has been increased to improve the assimilation of a health promoting component.

Nowadays most popular functional food ingredients worldwide are:

1. Probiotics, prebiotics and symbiotics
2. Dietary fiber
3. Omega 3 fatty acids, oleic acids and phytosterols
4. Phytoestrogens
5. Phenolic compounds

How are health benefits of foods communicated to the population?

Nutritional and health claims are used to legally highlight particular beneficial effects made on foods with enough scientific evidence to declare on the product label or advertising. Regulation (EC) No 1924/2006 establishes the European rules on nutrition and health claims [7]. The Regulation started to apply on the 1st of July 2007. Food bearing claims that could mislead consumers are prohibited on the EU market. Moreover, the regulation promotes innovation and ensures fair competition.

What are Health Claims?

A health claim is any statement about a relationship between food and health. In Europe, EFSA is responsible for evaluating the scientific evidence that supports health claims.

EFSA authorizes health claims based on scientific evidence and that can be easily understood by consumers, which are as follows:

1. The so-called “Function Health Claims” relating to the growth, development and functions of the body; referring to psychological and behavioral functions and on slimming or weight-control.
2. The so-called “Risk Reduction Claims” on reducing a risk factor in the development of a disease. For example, plant stanol esters have been shown to reduce blood cholesterol. Blood cholesterol is a risk factor in the development of coronary heart disease.
3. Health “Claims referring to children’s development”. For

managing chronic disease or its symptoms” [9].

In the USA, the definition of Nutraceuticals includes “functional foods” – i.e. foods that provide a specific health benefit based on their ingredients. Nutraceuticals are natural, bioactive chemical compounds that have health-promoting, disease-preventing or general medicinal properties. Food and Drug Administration (FDA) regulates nutraceuticals under a different set of rules when compared with those covering “conventional” foods and drug products. As observed, FDA does not have a separate definition for functional foods. This has been one of the obstacles identified by FFC experts for regulating such category of foods in USA [10].

Although there is not a unique and global definition for the functional food category, they can be generally classified as follows:

1. Natural food with improved composition by employing particular agronomical conditions.
2. Food including a health-promoting component.
3. Food from which a component has been removed to produce less adverse effects on health.
4. Food in which the nature of one or more of its components has been chemically improved for obtaining health benefits.

example, vitamin D is needed for the normal growth and development of bone in children.

What are Nutrition Claims?

Nutrition claim means any claim, which states, suggests or implies that a food has a particular beneficial nutritional property due to:

1. The energy (calorific value) it:
 - a) provides
 - b) provides at a reduced or increased rate
 - c) does not provide
2. The nutrients or other substances it:
 - a) contains
 - b) contains in reduced or increased proportions
 - c) does not contain

Nutrition claims are only permitted if they are listed in the Annex of Regulation (EC) No 1924/2006, lastly amended by Regulation (EU) No 1047/2012 [11].

Since functional foods are generally understood as those that claim such biological effect beyond ordinary nutritional effects based on scientific validation, nutritional claims may not be considered adequate to identify functional foods. In contrast, health claims such as function claims and risk reduction claims may allow to easily identify such category of foods.

Other obstacles that make difficult the identification and regulation of functional foods are:

1. Depending on the health claims of functional foods, they can be regulated within several categories: conventional food, medicine, dietary supplements, food additives, etc.
2. Current regulations should adequately reflect all foods: natural food, processed food, healthy food, functional food, and medical food.
3. These food categories should be understandable for the public and help for the further development of a functional food category.

What is Sustainable Health and how can be achieved

According to the information available nowadays, we propose for the first time a definition for the term “sustainable health” as: “a healthy and active ageing avoiding the risk of diseases”. Healthy foods and particularly functional foods are needed to achieve this goal. Sustainable health may be accomplished by delivering high quality care and improved public health without exhausting natural resources or causing severe ecological damage. Sustainable health can also be achieved by protecting and improving health now and for future generations using different strategies such as a healthy nutrition that may be based on functional foods. Plans for minimizing the environmental impact on health and nutrition are also needed [12].

An unhealthy diet and some eating behaviors such as snacking/eating frequency, binge-eating patterns and eating out have been linked to high risk of obesity and finally to Type 2 Diabetes (T2D) [13]. Obesity is a chronic disease characterized by the expansion of adipose tissue and inflammatory component [14]. Several epidemiologic studies reveal a parallel increase of the twin epidemics of obesity and

diabetes which is a chronic disease characterized by derangement in glucose metabolism and abnormalities in fat and protein metabolism [15]. Diabetes is broadly classified under two categories, type 1 (T1D) and type 2 (T2D). The latter is a progressive condition in which the body becomes resistant to the normal effects of insulin and/or gradually loses the capacity to produce enough insulin in pancreas [16]. T2D is the most common type of diabetes representing 90-95% of all cases. Most of the patients suffering T2D are overweight or obese. The International Diabetes Federation calculated that the diabetic population worldwide will reach 645 million by 2040, which is equivalent to 1 to 10 adults [17]. On the other hand, the World Health Organization (WHO) estimates that, globally, 422 million adults aged over 18 years were living with diabetes in 2014. Insulin sensitivity and glucose uptake can be improved through regular physical activity and healthy diets that include sufficient dietary fiber [18]. FSGs regulation abolished the concept of diabetic foods. Consequently, the development and design of functional foods for reducing the risk of chronic diseases such as diabetes and disability, which refers to diabetes occurring in the context of obesity, have a key role for achieving a global sustainable health.

Alzheimer's disease, and dementia, will represent the greatest challenge to the health service in the future. Dementia is a gradual decline of how the brain functions. One of the world's most rapidly ageing and long-lived societies, authorities, health care professionals and researchers are bracing for a dementia time bomb [19,20]. Therefore, they have to focus their efforts on the identification of those individuals who are most likely to develop this disease in the future and to promote strategies for reducing the risk of such diseases. Functional food market may play also an important role on that matter for contributing to a sustainable health [9,10,20,21]. In conclusion, healthy foods and, particularly functional foods, may play an important role on health sustainability. However, a harmonized definition and regulations are needed to achieve this goal.

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