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Hub of health: Nutraceuticals and Functional Foods

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Abstract

Nutraceuticals and Functional foods are growing day a day from continent to continent. Rapid increase of its production in developed countries will have positive effect to the consumers. Foods containing functional and beneficial ingredients are listed. Consumption of these foods will certainly leads to good health and resistant to certain chronic diseases like CVD, CHD and cancer *etc.*

Keywords: nutraceuticals, functional foods

Introduction

At present there are no universally accepted definitions for nutraceuticals and functional foods, although commonality clearly exists between the definitions offered by different health-oriented professional organizations.

Nutraceuticals

The term nutraceutical is a hybrid word of nutrition and pharmaceutical. Reportedly, it was coined in 1989 by Stephen DeFelice and the Foundation for Innovation in Medicine [4]. Restated and clarified in a press release in 1994, its definition was "any substance that may be considered a food or part of a food and provides medical or health benefits, including the prevention and treatment of disease. Such products may range from isolated nutrients, dietary supplements and diets to genetically engineered 'designer' foods, herbal products, and processed foods such as cereals, soups, and beverages."

Health Canada nutraceuticals are a product that is "prepared from foods, but sold in the form of pills or powders (potions), or in other medicinal forms not usually associated with foods. A nutraceutical is demonstrated to have a physiological benefit or provide protection against chronic disease [7]."

According to FSSAI "Nutraceuticals" means a naturally occurring chemical compound having a physiological benefit or provide protection against chronic disease, isolated and purified from food or non-food source and may be prepared and marketed in the food-format of granules, powder, tablet, capsule, liquid or gel and may be packed in sachet, ampoule, bottle, etc. and to be taken as measured unit quantities.

Functional Foods

Functional food cannot be a single well-defined/well-characterisable entity. Moreover, if it is function driven rather than product driven, the concept is likely to be more universal and not too much influenced by local characteristics or cultural traditions.

Japan is the birthplace of the term 'functional food'. Moreover, that country has been at the forefront of the development of functional foods since the early 1980s [13].

According to the Japanese Ministry of Health and Welfare, FOSHU are

1. Foods that are expected to have a specific health effect due to relevant constituents, or foods from which allergens have been removed, and
2. Foods where the effect of such an addition or removal has been scientifically evaluated, and permission has been granted to make claims regarding the specific beneficial effects on health expected from their consumption.

Functional food has as many definitions as the number of authors referring to it.

These definitions go from simple statements such as

- Foods that may provide health benefits beyond basic nutrition [10]
- Foods or food products marketed with the message of the benefit to health [18]
- Everyday food transformed into a potential lifesaver by the addition of a magical ingredients [3].

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Very elaborate definitions such as

- Food and drink products derived from naturally occurring substances consumed as part of the daily diet and possessing particular physiological benefits when ingested [9].
- Food derived from naturally occurring substances that can and should be consumed as part of the daily diet and that serve to regulate or otherwise affect a particular body process when ingested [19].
- Food that encompasses potentially helpful products including any modified food or food ingredient that may provide a health benefit beyond that of the traditional nutrient it contains [5].
- Food similar in appearance to conventional food that is intended to be consumed as part of a normal diet, but has been modified to subserve physiological roles beyond the provision of simple nutrient requirements.

According to the International Food Information Council (IFIC), functional foods are “foods or dietary components that may provide a health benefit beyond basic nutrition [11].”

The International Life Sciences Institute of North America (ILSI) has defined functional foods as “foods that by virtue of physiologically active food components provide health benefits beyond basic nutrition [12].”

Health Canada defines functional foods as “similar in appearance to a conventional food, consumed as part of the usual diet, with demonstrated physiological benefits, and/or to reduce the risk of chronic disease beyond basic nutritional functions [7].”

The Nutrition Business Journal classified functional food as “food fortified with added or concentrated ingredients to functional levels, which improves health or performance [16].

Functional foods include enriched cereals, breads, sport drinks, bars, fortified snack foods, baby foods, prepared meals, and more.”

As noted by the American Dietetics Association in a position paper dedicated to functional foods, the term “functional” implies that the food has some identified value leading to health benefits, including reduced risk of disease, for the person consuming it [1].

One could easily argue that functional foods include everything from natural foods, such as fruits and vegetables endowed with antioxidants and fiber, to fortified and enriched

foods, such as orange juice with added calcium or additional carotenoids, to formulated ready-to-drink beverages containing antioxidants and immune-supporting factors.

The Nutrition Business Journal states that it uses the term nutraceutical for anything that is consumed primarily or particularly for health reasons. Based on that definition, a functional food would be a kind of nutraceutical. On the other hand, Health Canada states that Based on this definition and how functional foods are characterized, as noted previously, nutraceuticals would be distinct from functional foods.

The model health claims that are as follows [7]:

1. Calcium and Osteoporosis: Regular exercise and a healthy diet with enough calcium helps teen and young adult white and Asian women maintain good bone health and may reduce their high risk of osteoporosis later in life. In order to make the claim on the label the food must satisfy the following specific nutritional standards:

- The food must be ‘high’ in calcium.
- The calcium must be assimilable.
- The food or supplement must not contain more phosphorus than calcium on a weight per weight basis.

Table 1: Composition of Calcium in Certain Foods

Food Source	mg/100g
Finger Millet	344
Cow Milk	107-133
Dried Skimmed Milk	1280
Horse gram	287
Bengal gram whole	202
Black gram	154
Soya bean	240
Almond	230

Source: Ref's. 14 & 17

2. Dietary Lipids and Cancer: Development of cancer depends on many factors. A diet low in total fat may reduce the risk of some cancers. In order to make the claim on the label the food must satisfy the following specific nutritional standards:

- The food must meet the requirements for a ‘low fat’ food.
- Fish and game meat may meet the requirements for ‘extra lean’ instead of ‘low fat.’

Table 2: Omega 3 Fatty acid composition in various foods

Food Source	LNA	EPA	DHA	TO3FA
Lake Trout Siscowet	1.6	1.2	1.8	4.6
Mackerel Atlantic	0.1	0.9	1.6	2.6
Salmon, Atlantic farmed	0.1	0.6	1.2	1.9
Tuna, Bluefin	0.0	0.4	1.2	1.6
Egg yolk	0.7	0.1	0.7	1.5
Milk, Human	0.6	0.0	0.2	0.8
Walnut	10.4	0.0	0.0	10.4
Soya bean	3.2	0.0	0.0	3.2
Flax seed	23	-	-	23
Chia seed	11.52	-	-	11.52
Flax oil	57	-	-	57

Source: Ref's. 15, 20 & 21

3. Sodium and Hypertension: Diets low in sodium may reduce the risk of high blood pressure, a disease associated with many factors. In order to make the claim on the label the

food must satisfy the following specific nutritional standard

- The food shall meet the requirements of a ‘low sodium’ food.

4. Dietary saturated fat and cholesterol and risk of coronary heart disease

Development of heart disease depends upon many factors, but its risk may be reduced by diets low in saturated fat and cholesterol and healthy lifestyles. In order to make the claim on the label the food must satisfy the following specific nutritional standards:

- The food must meet the requirements for a 'low saturated fat', 'low cholesterol' and 'low fat' food.
- Fish and game meat may meet the requirements for 'extra lean' instead of 'low fat' food.

5. Fiber-containing grain products, fruits and vegetables and cancer

Low fat diets rich in fiber-containing grain products, fruits and vegetables may reduce the risk of some types of cancer, a disease associated with many factors (In order to make the claim on the label the food must satisfy the following specific nutritional standards:

- The food must meet the requirements for a 'low fat' food.
- The food must meet the requirements for a 'good source' of dietary fiber without fortification.
- Food must be, or contain, a grain product, fruit or vegetable.

Table 3: Selected sources of fiber for use in food applications

Source	Total dietary fiber ^a (%)
Grain	
Barley	35-70
Corn	50-95
Oats	15-95
Rice	30-80
Wheat	10-65
Legumes	
Soya bean	45-75
Peas	50-95
Peanuts	50-55
Vegetables	
Potato pectin	50-55
Sugar beet	60-80
Tomato	42-65
Tapoica	70
Fruits	
Apples	43-60
Black currant	43
Citrus ^b	25-70
Cranberry	6-8
Date	44-52
Fig	12-64
Peach	10
Pear	13-14
Prune	16-57
Raisin	6-8
Raspberry	2-5
Nuts and seeds	
Almond	2-12
Flaxseed	30-40
Hazel nut	2-3

Source: Ref. 2 ^b Sweet Orange, Lime

6. Fruits, vegetables and grain products that contain fiber, particularly soluble fiber, and risk of coronary heart disease:

Diets low in saturated fat and cholesterol and rich in fruits, vegetables and grain products that contain some types of dietary fiber, particularly soluble fiber, may reduce the risk of heart disease, a disease associated with many factors. In order to make the claim on the label the food must satisfy the following specific nutritional standards:

- The food must meet the requirements for a 'low saturated fat,' 'low cholesterol,' and 'low fat' food.
- The food must contain at least 0.6 gram soluble fiber per reference amount customarily consumed without fortification. The content of soluble fiber must be declared on the nutrition information panel.
- The food must be or contain a grain product, fruit or vegetable.

Table 4: Total and Soluble Fiber Content of Selected Cereal Brans

Crude bran source (100 g)	Total dietary fiber (g)	soluble fiber (g)
Wheat bran	42	3
Oat bran	16	7
Rice bran	22-24	3-9
Corn bran	85	2-3

Source: Ref.22

7. Fruits and vegetables and cancer

Low fat diets rich in fruits and vegetables (foods that are low in fat and may contain dietary fiber, vitamin A and vitamin C) may reduce the risk of some types of cancer, a disease associated with many factors. Broccoli is high in vitamins A and C and it is a good source of dietary fiber. In order to make the claim on the label the food must satisfy the following specific nutritional standards:

- The food must meet the requirements of a 'low fat' food.
- The food must qualify as a 'good source' of vitamin A, vitamin C or dietary fiber without fortification.
- The food must be or contain a fruit or vegetable.

8. Folate and neural tube defects: Healthful diets with adequate folate may reduce a woman's risk of having a child with a brain or spinal cord birth defect. In order to make the claim on the label the food must satisfy the following specific nutritional standards:

- The food shall meet or exceed the requirements for a 'good source' of folate (i.e., provides 10 to 19 percent of the daily value per reference amount of food).
- The food shall not contain more than 100 percent of the RDI for vitamin A as retinol or preformed vitamin A and vitamin D per serving or per unit.

9. Dietary sugar alcohol and dental caries

For packages with total surface area available for labeling of less than 15 square inches: 'Useful only in not promoting tooth decay.' For packages with total surface area available for labeling of 15 or more square inches: 'Frequent between meal consumption of foods high in sugars and starches promotes tooth decay. The sugar alcohols in (name of food) do not promote tooth decay'. It should be noted that sugar free (sorbitol) chewing gum manufacturers had been using the claim 'Does not promote tooth decay' for almost 30 years with no interference from the FDA. The promulgation of this claim thus gave regulatory credence to this practice. In order to make the claim on the label the food must satisfy the following specific nutritional standards:

- The sugar alcohol in the food must be xylitol, sorbitol, mannitol, maltitol, isomalt, lactitol, hydrogenated starch hydrolysates, hydrogenated glucose syrups, erythritol or a combination of these.
- The food must contain less than 0.5 gram of sugar per reference amount customarily consumed and per labeled serving.
- The sugar-alcohol containing food must not lower plaque pH below 5.7 by bacterial fermentation either during consumption or up to 30 minutes after consumption as measured by in vivo tests.

10. Soluble fiber from certain foods and risk of coronary heart disease: Diets low in saturated fat and cholesterol that include soluble fiber from (name of whole oat or psyllium source and, if desired, the name of the food product) may reduce the risk of heart disease warns that the label should state that the consumer should consume adequate quantities of water if the fiber source is from psyllium. One should also note that the oat health claim was promulgated first and when the psyllium claim was finalized, the two were combined, thus in effect there are actually promulgated final health claim regulations found in the Federal Register. In order to make the claim on the label the food must satisfy the following specific nutritional standards:

- The food product must contain one or more of the whole oat foods: oat bran, rolled oats or whole oat flour, and the whole oat foods shall contain at least 0.75 grams of soluble fiber per reference amount customarily consumed of the food product; or psyllium husk (as defined in the regulations), and the psyllium food shall contain at least 1.7g of soluble fiber per reference amount customarily consumed of the food product.

- The amount of soluble fiber must be declared in the nutrition label.
- The food must meet the requirements for a 'low saturated fat', 'low cholesterol' or 'low fat' food.

Conclusion

In the present scenario, people are looking for the quick remedy in order to get deliverance from their diseases. As we all know that prevention is better than cure, considering this statement in view, taking diet containing above mentioned foods will keep them away from disorders and to make them disease free and therefore it is suggested to consume the foods that are rich in abundance of vital ingredients which leads to good health and reduces illness.

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