Functional foods or nutraceuticals

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Abstract
Clarifies the definition of functional foods and outlines some of the better-known ones now in the marketplace.

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Background

Functional foods or nutraceuticals are new terms which have entered the vocabulary on nutrition over the last few years in the UK.

While functional foods have been recognised in such countries as Japan for a number of years with specialised foods having specific health benefits being available over the last 15 years they have only been recognised in the UK over the last five years.

Recognition of this area is escalating with companies such as Volactive (a division of Volac International) even stating “functional food products” on its letterheads. A journal of Functional Foods and Nutraceuticals has been launched and articles on the subject are beginning to appear in other nutritional journals. A conference on the topic of Functional Foods was held by the British Nutrition Foundation in the Spring of 1999 and other conferences are due to follow.

Expert groups on functional foods

The European Commission Concerted Action on Food Science in Europe (FUSOSE) was set up to establish a scientific basis to the new areas of functional foods. The group is co-ordinated by the International Life Sciences Institute of Europe. It had its first meeting in April 1996 in France.

The group aims to:
- Assess critically the science base required to provide evidence that specific nutrients and food components positively affect target functions in the body.
- Examine the available science from a function-driven perspective rather than a product-driven one.
- Reach consensus on targeted modifications of food and food constituents and options for their application.

Definition of functional foods

While there is no recognised definition of functional foods, they are generally defined as having health promoting benefits in addition to their nutritive value.

The EC Concerted Action Group on Functional Food Science in Europe suggested
a definition for food which could be regarded as “functional” as being one that has been satisfactorily demonstrated to beneficially affect one or more functions in the body, beyond adequate nutritional effects, in a way which is relevant to either an improved state of health and wellbeing and/or a reduction of disease risk.

Functional foods should remain foods or beverages and not pills or capsules.

The definition of functional foods is most easily understood and fits best to food ingredients which have little or no nutritive value but provide demonstrative physiological benefits. Examples of such products are “pro-biotics” which contain live micro-organisms such as the lactic acid bacteria which have been found to have beneficial effects on gut micro flora.

There are also “pre-biotics” which contain substrates upon which the “pro-biotic” bacteria live.

However, while examples of foodstuffs such as Yakult, a drink (produced by Yakult UK), or LC1, a yogurt or custard-like food (produced by Nestlé), could both be classed as one of the functional foods called pro-biotics due to the beneficial bacteria they contain, products containing the bacteria in a capsule form such as may be purchased in pharmacies and health food shops would not usually be defined as functional foods.

Confusion regarding functional foods

There is a great deal of confusion regarding functional foods, as the whole concept is a new one.

As general foodstuffs such as meat or fruit with a known nutritive value would, by the above definition, have no recognition as a functional food, this can lead to great confusion. Also there is increasing research on these foods and components within them may have elements which could enable them to be considered to act as functional foods.

Additionally a number of different foods from “yogurts” to “spreads” have been considered to be defined as functional foods. Functional foods do not clearly fit into any food education models such as the Balance of Good Health developed by the Health Education Authority, which shows the food groups on a plate and which forms the approach which is recommended to comprise the basis for nutritional education.

Therefore it is not surprising that there are major confusions arising in the mind of scientists, marketing experts and consumers as regards functional foods.

Therefore it is vital that information on functional foods is correctly communicated not just to consumers but also to those involved in nutritional education and also health promotion such as doctors and nurses.

Scientific approaches

For any company to be able to make claims about a functional food the health benefits of the ingredients must be proved.

Such proof must be established by correctly planned scientific studies which demonstrate unequivocal benefits to an aspect of health.

Communication of information on functional foods to consumers

Consumers require to be informed about the benefits of functional foods. Therefore any effective education process for consumers requires both long-term investment and commitment from both marketing experts keen to promote food by proven health attributes it possesses and also people involved in nutritional education.

A study of UK consumers using 200 housewives in the UK, France and Germany showed that they had no understanding of functional foods and that they considered their level of health on perceived energy levels, physical appearance, absence of illness, weight, bowel movements and blood pressure.

Examples of functional food ingredients

Pro-biotics

Yogurt-like products, for example, LC1, and drinks, for example, Yakult already mentioned contain pro-biotic strains of bacteria which alter the natural bacterial population of the gut in a beneficial way.

The bacteria that are present in the products are present in enhanced numbers and able to survive the digestive process so that they arrive intact in the colon.
Improvements from pro-biotic bacteria are said to include enhancement of the immune system and thus protection against viral and bacterial infections. Those suffering from gastro-intestinal tract disorders such as irritable bowel syndrome have also used such products with beneficial effects.

**Pre-biotics**
Non-digestible oligosaccharides assist in the development of pro-biotic bacterial populations and these substrates upon which pro-biotic bacteria thrive are known as pre-biotics.

**Phytochemicals**
These products are found in plants at a low concentration, for example, in fruit and vegetables.
They have a wide range of benefits such as has been used in herbal medicine (phytomedicine) for some considerable time. Products in this range include the so-called “fat burners” which are caffeine containing products, ephedrine containing herbs, capsaicinoids such as red pepper and other substances found in other plant foods. Fat burners are considered to be beneficial in assisting weight loss.

Phytochemicals, such as phyto-oestrogens found in products such as soya, linseed and red clover, have been used in preventing menopausal symptoms such as flushing.
Foodstuffs containing these, such as breads, have been developed and even recipes for cakes and buns regularly feature in women’s magazines.

**Vitamins**
Among this group supplements of folic acid during pregnancy have been extremely well documented as being preventive in the development of neural tube defects. Additionally there is work being undertaken on associates of folate and colorectal cancer and heart disease. The Health Education Authority have been extremely involved in promoting education on the benefits of folic acid during pregnancy and also in management of supplementation of foodstuffs by manufacturers.

**Polyunsaturated fatty acids (PUFAs)**
Studies have shown that there is an inverse correlation between oily fish intake and ischaemic heart disease.

This has led to further studies being carried out on the use of micro encapsulated n-3 PUFA, such as are found in oily fish, being incorporated into foods such as bread, biscuits and soup.

Eggs enriched with n-3 PUFA have also been developed by the use of hen foods rich in such substances.

**Fibres**
Fibre or non-starch polysaccharides (NSP) are considered important in bowel health and to reduce the risk of bowel cancer.

**Sulphur containing compounds**
Compounds containing sulphur are important antioxidants in the cells. It is therefore considered that sulphur containing amino acids and other similar substances may have a beneficial effect on the immune system.

**Phytoestrogens**
These are similar to oestrogens and found in plants. They include isoflavones, found in soya beans and red clover. Therefore soya beans provide useful quantities of phytoestrogens and those populations where there is significant use of these soya products are found to have a reduced risk of breast cancer and also reduction of postmenopausal symptoms.

Other products containing phytoestrogens are linseeds, red clover and other beans and seeds. Breads containing linseeds are now available and red clover supplements.

**Plant sterols**
Plant sterols are similar in structure to cholesterol. They are found in soya bean oils and have been found to reduce LDL cholesterol.

The widely available spread Benecol is enriched with plant sterols and has been shown to assist in reducing cholesterol levels.

**Summary**
The whole area of nutrition is a fast growing one and functional foods are an aspect of this, and one which is likely to expand and provide new challenges for nutritional educators.

**References**