Perspectives on Functional Foods

INTRODUCTION

Hippocrates’s words: ‘Let food be thy medicine and medicine be thy food’ espoused almost 2500 years ago, cannot be any truer today. In Japanese and Chinese cultures, it is accepted that foods and medicine originated from the same source, based on similar theories and use. (Weng & Chen 1996, Arai 2002).

Since the early 20th century, scientists have identified the essential nutrients and established nutritional standards, with the objective of preventing nutritional deficiencies in populations. Recommended daily allowances (RDAs) or Reference Nutrition Intakes (RNIs) are the estimated average daily amounts of essential nutrients required to meet the physiological needs of most healthy people.

There is a growing interest in the relationship between diet and disease. For example, there has been increasing interest in the components in food other than nutrients. The Japanese have a term for these food and food components, called “FOSHU” or “foods for specified health uses”. FOSHU is a unique system that was introduced in 1991 in Japan, under the Nutrition Improvement Law and the world’s the first functional foods health claim approval regulation for finished products. Other terms used in place of “functional foods” include “medicinal foods”, “nutraceuticals”, “designer foods” and “pharmafoods”.

There is currently still no universally-accepted definition of
functional foods, although, it is generally understood that functional foods are “foods that by virtue of physiologically active food components provide health benefits beyond basic nutrition.” (‘Functional foods in Asia -- Current state and Issues’ - International Life Science Institution Southeast Asia Region.). However, it remains that functional foods are not a well-defined group of food products.

In the 1990s, the International Life Science Institute of Europe developed a European Commission Concerted Action project on functional foods - the Functional Food Science in Europe (FUFOSE) consensus. The project document proposes a working definition for functional foods which states that functional foods are not any form of dietary supplement, pills or capsules but are foods or component(s) of foods that:

1. have beneficial effects on body functions beyond adequate nutritional effects;
2. are relevant to the improved state and health and well being of the individual; and,
3. can reduce the risk of disease but not prevent disease.

Functional foods are consumed as part of the normal food consumption pattern of the individual and are not dietary supplements, pills or capsules. The functional foods would also have demonstrated their effects to the satisfaction of the scientific community.

Functional foods can be a natural food with component(s) that have been enhanced through special growing conditions or a food, to which a component has been added to provide benefits e.g. the addition of probiotic bacteria with proven health benefits to improve gut health.

Functional foods can be from both plant and animal sources, although at this point of time, there are more naturally-occurring health-enhancing substances of plant origin. Phytochemicals or biologically-active plant chemicals are known for their role in health enhancement. (ADA, 1995, Howard and Kritchevsky, 1997).

Oat products are a known dietary source of cholesterol-lowering soluble fiber b-glucan. Soy is a high protein source but also has cholesterol-lowering effects, as well as the isoflavones genistein and daidzein which are structurally similar to estrogenic steroids. The carotenoid lycopene found in tomatoes is noted to have a role in lowering cancer risk. The health benefits from garlic are also numerous including anticarcinogenic, antibiotic, anti-hypertensive and cholesterol lowering. (Srivastava et al., 1995). In the Asian culture, edible mushrooms such as shitake (Lentinus edodes) and others are said to have anti-tumor and anti cancer activities, as well as anti-viral and cholesterol-lowering effects.

Tea is recorded as a popular beverage as early as 2700 BC at the time of the Chinese emperor Shen Nung. The phytochemical, polyphenols in both green and black tea are acknowledged to possess anti-mutagenic, anti-diabetic, anti-oxidant, anti-bacterial and anti-inflammatory effects. The various ethnic groups in Asia have been using traditionally-functional products such as spices and herbs in their daily cooking as well as special foods to improve well-being and health. Spices and herbs such as turmeric, ginger, fenugreek, cumin, saffron, galangal, mint and others are commonly used in Indian and Southeast Asian cuisine to enhance the organoleptic and functional qualities of the food.

The Chinese, Japanese and Koreans have also a variety of herbs and spices included in their cuisine e.g. ginseng root and wolfberry in soups and meat dishes and capsaicin from red peppers in the delectable Korean kimchi.

There are a number of physiologically-active components in animal produce. Omega-3(n=3) fatty acids are a class of polyunsaturated fatty acids (PUFA) derived from fish oils.
Such n-3 fatty acids were observed in the 1970s to play a role in lowering the incidence of cardiovascular disease (Bang and Dyerberg, 1972). Dairy products such as milk and cheese are the best source of calcium and essential nutrients for the prevention of osteoporosis. Fermented dairy products, also known as probiotics, were defined as ‘live microbial feed supplements which have beneficial effects on the host animal by improving its intestinal microbial balance.’ (Fuller, 1994)

REGULATORY ISSUES

The Third International Workshop on Functional Foods was organized by the International Life Sciences Institute Southeast Asia region and held in Kuala Lumpur, Malaysia in July 2006. The 38 participants from Southeast Asia, Australia, China, Japan, Korea and New Zealand gave an update of their countries functional food-related activities.

In Japan, as of June 2006, 589 food items have been registered under the FOSHU system. The labeling of information for a balanced diet of foods with health claims including reduction of disease risk claims is now possible.

In Korea, the Korea Food and Drug Administration authorizes pre-market approvals of health and functional foods, based on efficacy of ingredients and their safety. In China, functional foods with health claims are approved based on the five main principles of traditional use, safety, functionality, quality control and scientific evidence. From 1996 until 2005, the Ministry of Public Health had approved 7,457 products as functional foods related to improvements in health and well being.

In Indonesia, the National Agency for Drug and Food Control evaluates all scientific evidence on bioactive compounds such as their physiology, beneficial effects and appropriate dosage of the products for the beneficial effects, before approval is given. In the U.S., the Food and Drug Administration evaluates all functional food health claims. In 1990, the US Congress adopted the Nutrition Labeling and Education Act which encompasses the regulation of health claims on foods.

Others countries are also looking into the regulatory mechanisms for functional foods.

SAFETY ISSUES

In Asia, most of the functional foods are foods that have been part of the traditional diet and thus are considered as “tried and tested” and presumed safe for consumption. However, recently a number of biologically-active compounds considered and consumed as functional foods have shown to be carcinogenic at high concentrations e.g. allylthiocyanate...
(Ames et al., 1990). Thus, the concentration of the active compounds in functional foods is an important factor in the qualification of the associated health claims. In the case of soy protein and its beneficial effects on cardiovascular diseases for instance, the FDA has indicated in 1998 that based a daily level of 25g of soy protein, individual food qualified to bear such claims must contain 6.25 g of soy protein with a minimum of 12.5 mg of total isoflavones per serving. Therefore, claims and health benefits of functional foods must be based on sound scientific evidence (Clydesdale, 1992)

However, the complexity of foods, lifestyle, metabolic changes and the lack of disease biomarkers all point to the need for additional research, to substantiate and validate functional foods health claims.

**SUBSTANTIATING THE NUTRITION AND HEALTH CLAIMS OF FUNCTIONAL FOOD**

The International Life Science Institute Southeast Asia facilitated the consolidation of substantiation of claims for the Asia region. This was done in accordance to the Food and Agriculture Organisation (FAO) and World Health Organisation (WHO) Codex Health Claims format.

The institute also recommended that additional studies be required for proper substantiation and that the following guidelines are followed:

1. studies should be conducted on whole functional foods that is in the form to be consumed rather than on extracted components;
2. foods with added functional ingredient(s) may not need to undergo individual studies provided they show bioequivalency to the primary study;
3. statements from recognized health authorities and accepted texts on nutrient function claims based on the definition by Codex health claims may be permitted;
4. scientific substantiation applications of other functional claims should be based on human observational or intervention studies and not on in vitro or animal studies; and that,
5. any disease-risk reduction would require additional data from randomized double-blind placebo controlled trials or if that is not possible, data from appropriately
designed intervention studies may be accepted.

CONCLUSION

The growing economic interest in functional foods is complemented by the increase in their trade and marketing. There have been numerous international scientific debates and discussions in the last decade, driving research in functional foods in the US, Europe and Asia. The FAO and WHO are involved in the discussions and also in the coordination of information and substantiation of health claims. A key area of consideration is communication - research findings of nutrition, safety and health must be communicated clearly to all stakeholders such as scientists, journalists, the food industry, the regulators and administrators and most importantly to the consumer. Communication can never be enough in this domain.

About the Author

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References