

Functional Foods – An aspect of a comprehensive approach to good health

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Abstract

To eat is necessity and to eat intelligently is an art. Our body is usually compared with a machine, just as machine requires fuel to carry out different functions and repair, in the same way our body also requires fuel and maintenance. Question is what kind of fuel; healthy and nutritious food and if the emphasis is on functional foods than most of our health related problems can be sorted out. Increased cases of obesity, diabetes, heart stroke amongst younger generation and that too in school going children is really alarming and time has come to find out its cure. Maintenance of good health and sense of wellbeing are top priorities for many people and there has been a growing interest in the health promoting role of certain foods above their nutritional value. This chapter deals with the importance of “food as medicine” which is somewhere lost due to advent of drug therapy. Functional foods of plant and animal origin, type and their importance is particularly highlighted as an eye opener to the generations to come.

Keywords: Functional foods, health, nutritional value, drug therapy

History

The beauty of “food as medicine” is that the choice to heal and promote health can begin as soon as the next meal and is known since 2500 years ago. However, this philosophy became extinct in 19th century with the advent of modern drug therapy. In the 1900s, the important role of diet in disease prevention and health promotion came to the forefront once again. The concept was first developed in Japan in the 1980s when, faced with escalating health care costs, the Ministry of Health and Welfare initiated a regulatory system to approve certain foods with documented health benefits in hopes of improving the health of the nation’s aging

population (1). These foods, which are eligible to bear a special seal, are now recognized as Foods for Specified Health Use (FOSHU). In 1994, the National Academy of Sciences' Food and Nutrition Board defined functional foods as "any modified food or food ingredient that may provide a health benefit beyond the traditional nutrients it contains" (2). The International Life Sciences Institute defines them as "foods that, by virtue of the presence of physiologically-active components, provide a health benefit beyond basic nutrition" (3). In a 1999 position paper, the American Dietetic Association defined functional foods as foods that are "whole, fortified, enriched or enhanced" but more importantly, states that such foods must be consumed as "part of a varied diet on a regular basis, at effective levels" for consumers to reap their potential health benefits (4). It totally depends on us to decide the type of food which is either the most powerful form of medicine or the slowest form of poison and in the coming years the needs of the hour is leave medicines in the chemist shop and cure the disease with food.

Functional Foods from animal sources

Animal products are an important field in the development of functional foods. It is a well-known fact that they are rich source of various nutrients and along with that their role as functional food cannot be ignored. Now a day people are really aware about the side effects of chemicals used in making drugs and medicines and are shifting their focus towards keeping them healthy through their food and diet. For non-vegetarian population functional foods from animal source is not less than a miracle. Below here are enumerated various animal foods depicting their value as functional food.

Fish

Apart from an inexpensive source of animal protein, its flesh contains polyunsaturated fatty acids, which are known to reduce cholesterol level of blood and saves human beings from many coronary problems. Omega-3 (n-3) fatty acids are an essential class of polyunsaturated fatty acids (PUFAs) derived primarily from fish oil and other fatty fish such as salmon, tuna, mackerel, sardines and herring (5). The two primary (n-3) fatty acids are eicosapentaenoic acid (EPA; 20:5) and docosahexaenoic acid (DHA; 22:6). DHA is an essential component of the phospholipids of cellular membranes, especially in the brain and retina of the eye, and is necessary for their proper functioning. DHA is particularly important for the development of



these two organs in infants (6), and the FDA cleared the use of DHA and arachidonic acid for use in formula for full-term infants (7).

Probiotics

The concept of fermented dairy products cannot be skipped which is known as probiotics. Probiotics are the beneficial microorganism in the host animal that improves its intestinal microbial balance (8). Probiotics are known for their anti-carcinogenic, hypo-cholesterolemic and antagonistic action against enteric pathogens (9). It has been observed that lactic acid cultures can decrease the activity of faecal enzymes (azoreductase, nitroreductase) that are responsible for development of colon cancer.

Prebiotics

In addition to probiotics, there is growing interest in fermentable carbohydrates that feed the good microflora of the gut. The prebiotics are non digestible food ingredients that beneficially affect the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon and thus improves host health,” may include starches, dietary fibers, other non absorbable sugars, sugar alcohols, and oligosaccharides (10). Of these, oligosaccharides have received the most attention, and numerous health benefits have been attributed to them (11). Oligosaccharides consist of short chain polysaccharides composed of three and 10 simple sugars linked together. They are found naturally in many fruits and vegetables (including banana, garlic, onions, milk, honey, artichokes).

Synbiotics

Newer still is the concept of “synbiotics,” which are mixtures of probiotics and prebiotics that beneficially affect the host by improving the survival and implantation of live microbial dietary supplements in the gastrointestinal tract, by selectively stimulating the growth and/or by activating the metabolism of one or a limited number of health-promoting bacteria, and thus improving host welfare (8).

Functional foods from plant sources

It has been found that a plant-based diet can reduce the risk of chronic disease, particularly cancer. In 1992, a review of 200 epidemiological studies (12) showed that cancer risk in people consuming diets high in fruits and vegetables was only one-half that in those

consuming few of these foods. It is now clear that there are components in a plant-based diet other than traditional nutrients that can reduce cancer risk. (13) identified more than a dozen classes of these biologically active plant chemicals, now known as “phytochemicals.”

Oats

Oat products are a widely studied dietary source of the cholesterol-lowering soluble fiber β -glucan. There is now significant scientific agreement that consumption of this particular plant food can reduce total and low density lipoprotein (LDL) cholesterol, thereby reducing the risk of coronary heart disease (CHD).

Soy

Soy has been in the spotlight during the 1990s. Not only is soy a high quality protein, as assessed by the FDA’s “Protein Digestibility Corrected Amino Acid Score” method, it is now thought to play preventive and therapeutic roles in cardiovascular disease (CVD), cancer, osteoporosis, and the alleviation of menopausal symptoms. Several classes of anti-carcinogens have been identified in soybeans, including protease inhibitors, phytosterols, saponins, phenolic acids, phytic acid, and isoflavones (14). Of these, isoflavones (genistein and daidzein) are particularly noteworthy because soybeans are the only significant dietary source of these compounds.

Flaxseed

Among the major seed oils, flaxseed oil contains the most (57%) of the omega-3 fatty acid, α -linolenic acid. Recent research, however, has focused more specifically on fiber associated compounds known as lignans. The two primary mammalian lignans, enterodiols and their oxidation product, enterolactone, are formed in the intestinal tract by bacterial action on plant lignan precursors (15). Flaxseed is the richest source of mammalian lignan precursors (16). Because enterodiols and enterolactone are structurally similar to both naturally-occurring and synthetic estrogens, and have been shown to possess weakly estrogenic and anti-estrogenic activities, they may play a role in the prevention of estrogen dependent cancers.

Consumption of flaxseed has also been shown to reduce total and LDL cholesterol (17; 18), as well as platelet aggregation (19).

Tomatoes



The mechanisms by which lycopene could influence cancer risk are related to its antioxidant function. Lycopene is the most efficient quencher of singlet oxygen in biological systems (20). The antioxidant function of lycopene may also explain the recent observation in a multi-center European study that adipose tissue levels of carotenoids were inversely associated with risk for myocardial infarction (21).

Garlic

Garlic (*Allium sativum*) is likely the herb most widely quoted in the literature for medicinal properties. The health benefits of garlic are numerous, including cancer chemopreventive, antibiotic, antihypertensive, and cholesterol-lowering properties (22). The characteristic flavor and pungency of garlic are due to an abundance of oil and water-soluble, sulfur-containing elements, which are also likely responsible for the various medicinal effects ascribed to this plant. Several epidemiologic studies show that the garlic may be effective in reducing human cancer risk (23). Garlic has also been advocated for the prevention of CVD, possibly through antihypertensive properties.

Citrus Fruits

Several studies have shown that citrus fruits are protective against a variety of human diseases including cancers. Although oranges, lemons, limes, and grapefruits are a principal source of such important nutrients as vitamin C, folate, and fiber (24) have suggested that another component is responsible for the anticancer activity. Citrus fruits are particularly high in a class of phytochemicals known as the limonoids (25).

Cranberry

Cranberry juice has been recognized as efficacious in the treatment of urinary tract infections since 1914, in which benzoic acid-rich fruit caused acidification of the urine (26). Recent investigations have focused on the ability of cranberry juice to inhibit the adherence of *Escherichia coli* to uroepithelial cells (27).

Conclusion

Functional foods are of prime concern today in all the government and private research institutes around the world and are putting great efforts in identifying how different functional foods and food ingredients might help in preventing chronic diseases and maintain



our health. This definitely reduces expenditure on hospital and health centres thereby making an individual to live healthy life in a better way. Nutrigenomics is again an upcoming discipline for future functional foods research and development which investigate interaction between diet and development of diseases based on individuals genetic profile. One more technology that is influencing the future of functional foods is biotechnology which is used in developing crops that have great potential in improving health of millions throughout the world. Health-conscious consumers are increasingly seeking functional foods in an effort to control their own health and well-being. The field of functional foods, however, is in its infancy. Claims about health benefits of functional foods must be based on sound scientific criteria (28). Research into functional foods will not advance public health unless the benefits of the foods are effectively communicated to the consumer and then consumers should try to inculcate habit of including functional foods in the diet. Consumer should realize their importance on long term basis and just not consider them as miraculous foods that can improvise health in few minutes. Moreover diet is only one aspect of healthy living, it should also include regular exercise according to age, lifestyle .Also one has to avoid tobacco, smoking, drug addiction taking stress etc. Also not to forget is that functional foods must remain food and cannot be categorized as drugs.

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