

Functional Foods and Lifestyle Diseases

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Received: October 13, 2017; Published: October 24, 2017

The tenet “Let food be the medicine and medicine be the food”, was espoused by Hippocrates, the father of medicine nearly 2,500 years ago is gaining more attention because of increased health consciousness of people. Consumers are progressively more interested in the health promoting role of specific foods or physiologically- active food components, so-called functional foods. A large part of world population is fighting against diseases characteristic of a contemporary age, such as osteoporosis, obesity, diabetes, cancer, cardiovascular diseases (CVD), allergies and dental problems. The use of functional foods/nutraceutical/food supplements in extenuating health problems, especially in the gastrointestinal (GI) tract is of utmost importance. Some beneficial microorganisms (such as probiotics) play a significant role in the host health due to their participation in immunological, nutritional and physiological functions [1].

Lactic fermentation products, incorporated in the functional foods are categorised into 3 groups based on their mode of action: probiotics, prebiotics and biogenics. Probiotics are viable microorganisms such as *Lactobacilli* and *Bifidobacteria*, which are involved in improving the intestinal bacterial balance. Prebiotics, which are non-digestible food ingredients, such as oligosaccharides and dietary fiber, constructively affect the host by stimulating the growth or activities of probiotics in the colon and thereby help to improve the health of the hosts. Biogenics, which are biologically active peptides, such as immune-potentiators, plant flavonoids, etc. improve the health of the hosts by variation of intestinal microbiota. Thus, functional foods regulate various biological activities such as appetite and absorption, stresses; prevention of diseases such as diabetes, cholesterolemia and cancer; and prevent aging through immune-stimulation as well as inhibition of carcinogenesis, mutagenesis, oxidation processes, cholesterolemia and intestinal putrefaction [2]. Many functional foods have been reported to be effective in prevention and treatment of CVD. The most common functional foods that have been found to be of considerable importance in cardiovascular patients are dietary fiber, long-chain n-3 fatty acids, phytochemicals and nutrients based on vegetable proteins such as soy proteins [3].

Following CVD, cancer is the second foremost cause of death in most prosperous countries. There were 13.3 million new cases of cancer in 2010 which were predicted to cost about US\$ 290 billion and cost was expected to increase to US\$ 458 billion in the year 2030 on basis of World Economic Forum in 2011. More than half of these cancer cases and resulting deaths worldwide are considered being avertable. Many evidences of association between functional foods and cancer have been reported. For example, S-allyl cysteine of garlic and lycopene from tomatoes in combination form suppressed the development of chemically induced gastric cancer by modulation of apoptosis-associated proteins (reduced Bcl-2/Bax ratio). Similarly, grouping of vitamin D₃ with genistein inhibited the growth of prostate cancer cells at much lower concentration than when these substances were provided individually. There are very few studies conducted worldwide to see the effects of functional foods on cancer or related states [4].

Type 2 diabetes is an intricate metabolic disorder with both short- and long-term undesirable complications. There are growing evidences that functional foods and their bioactive compounds can be used as complementary treatment for type 2 diabetes mellitus. Numerous *in vitro*, animal models and human studies, have confirmed that functional foods and nutraceuticals may recover postprandial hyperglycemia and adipose tissue metabolism by modulating carbohydrate and lipid metabolism. Functional foods may also improve insulin resistance and dyslipidemia, and attenuate inflammatory processes and oxidative stress and subsequently could prevent the development of long-term diabetes complications including cardiovascular disease, nephropathy, neuropathy and retinopathy [5]. Several

foods with functional properties for prevention of type 2 diabetes, have already been identified (fruit, vegetables, wholegrain foods, low saturated fat products, low glycemic index starchy foods etc). Therefore, a healthy diet based on functional foods can serve as a novel and ample dietary approach for management of type 2 diabetes [6].

People in order to improve their own health and well-being are progressively looking toward functional foods. The field of functional foods, however, is in its childhood. Claims about health benefits of functional foods must be based on sound scientific criteria [7]. Research into functional foods will not improve public health unless the benefits of the foods are efficiently communicated to the consumers. The Harvard School of Public Health (Boston, Mass) and the International Food Information Council Foundation (Washington, D.C.) recently released a set of communication guidelines, aimed at journal editors, scientists, journalists, interest groups, and others for improving public understanding about functional foods and their importance in prevention of lifestyle diseases [8]. Therefore, the functional foods whose health benefits are supported by adequate scientific authentication have the prospective to be an increasingly important constituent of a healthy lifestyle and will be beneficial in improving the nutritional status of society.

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Volume 11 Issue 6 October 2017

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