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Chapter

An Overview of Functional Food

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Abstract

Functional foods are responsible for the improvement of human health and can significantly reduce the probability of disease in the host body. Functional foods are directly or indirectly part of different food ingredients and can induce functional activities in the host biological system. Functional foods are present in fruits, vegetables, dairy, bakery, cereals and meat products. Functional foods are not additional food supplements, drugs or antibiotics, they are the main component of a normal human and animal diet. Functional foods are cost-effective and easily available in the market. Daily consumption of functional foods can prevent the gastrointestinal diseases and also provide ease against different acute and chronic diseases. Adequate administration of probiotics in a human food can convert a normal food into functional food. This chapter will highlight the effective role of functional food in an individual's daily life.

Keywords: functional food, GI health, probiotic, microflora

1. Introduction

Functional foods are significant for human health as it is a major source of essential nutrients and can be used as a food supplement [1]. Different fruits, vegetables, grains, fishes, dairy, and meat products are naturally considered as the major source of functional food, moreover, all these foods can provide nourishment to the host body (**Figure 1**) [2]. Studies suggested that, tea and chocolate are also the part of functional food due to the presence of active compounds in them [3]. Balanced diet plays a considerable role throughout the consumer's life, it is necessary for the individual's mental and physical health as it can maintain human body functions actively [4]. Functional food can positively affect the body of an organism, it can fulfill basic requirements of the body and protect the host body against different malnutrition diseases and can remove various harmful particles from the body [5]. Studies suggested that, functional food can be recognized as a food product, that can contribute to enhance the body's metabolic rate without affecting the normal functions of the body and can stabilize the physical appearance of the body [6]. In this recent era, functional foods are responsible to provide energy to the individual's body so that the growth and development of the body can proceed smoothly [7]. Functional food has

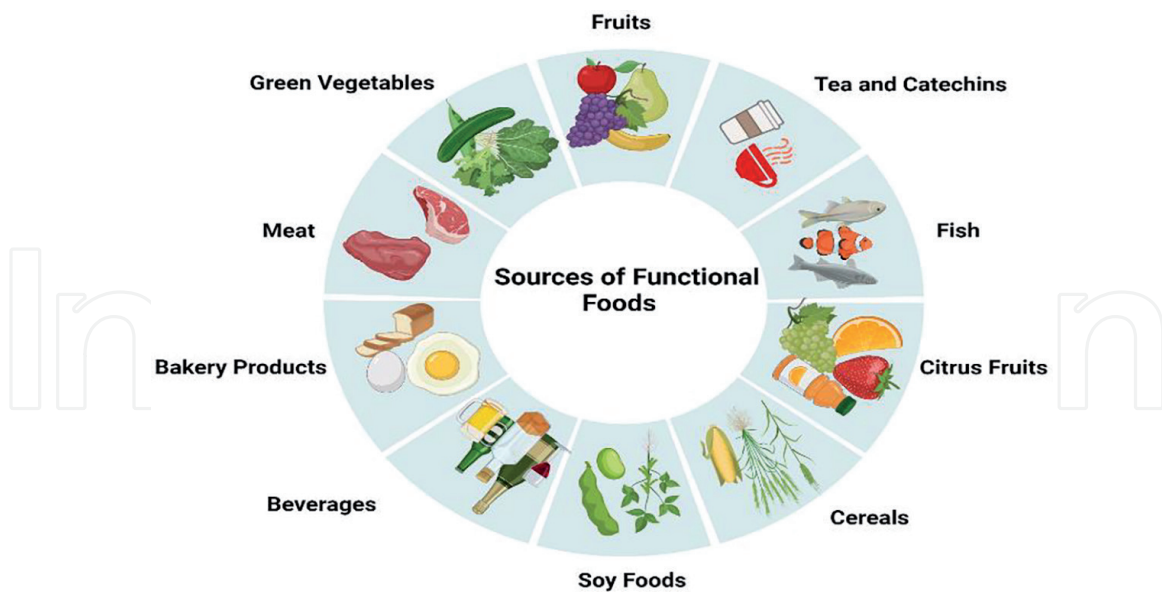


Figure 1.
Sources of functional foods.

the potential to mediate immune-modulatory response and subsequently decrease the risk of cardiovascular complications, osteoporosis, obesity and cancer which results to promote health promising effects in the individual's body [8]. Some of the examples of functional foods are vitamins, fortified food, fiber, minerals, peanuts, fruits and grain seed.

2. Why positive intake of functional food is necessary?

Functional foods are important to the human body as other basic needs. A balanced diet is responsible to keep the human body active and fit. According to the current investigations, individuals cannot consume a balanced diet due to their busy and care-less attitudes. An appropriate balanced diet can significantly provide beneficial components to the human health [9]. Less consumption of functional food and individual's false lifestyle can induce health deteriorating effects and multiple diseases which include cardiovascular disease, high blood pressure, and type 2 diabetes (**Figure 2**). An unbalanced diet may also contribute to the poor psychological health and memory [10].

2.1 Fitness associated with functional food

Most developed aspects that promote the health of the individuals by consuming functional food may include a positive change in the physical and mental health. Several parameters can actively participate and ensure the normal health which include; gastrointestinal health, intellectual health, physiological health and somatic health. The risk of different diseases (e.g., cardiovascular disease, type 2 diabetes, metabolic disease and musculoskeletal disease) can also be reduced by consuming an adequate amount of functional food [11]. According to the United States study, functional foods are those types of foods that contain biologically active components which can maintain the normal gut microflora and detoxify the harmful chemicals from the host body [12]. Consumer demands must be taken into account when functional foods are designed, functional foods may be found in approximately all

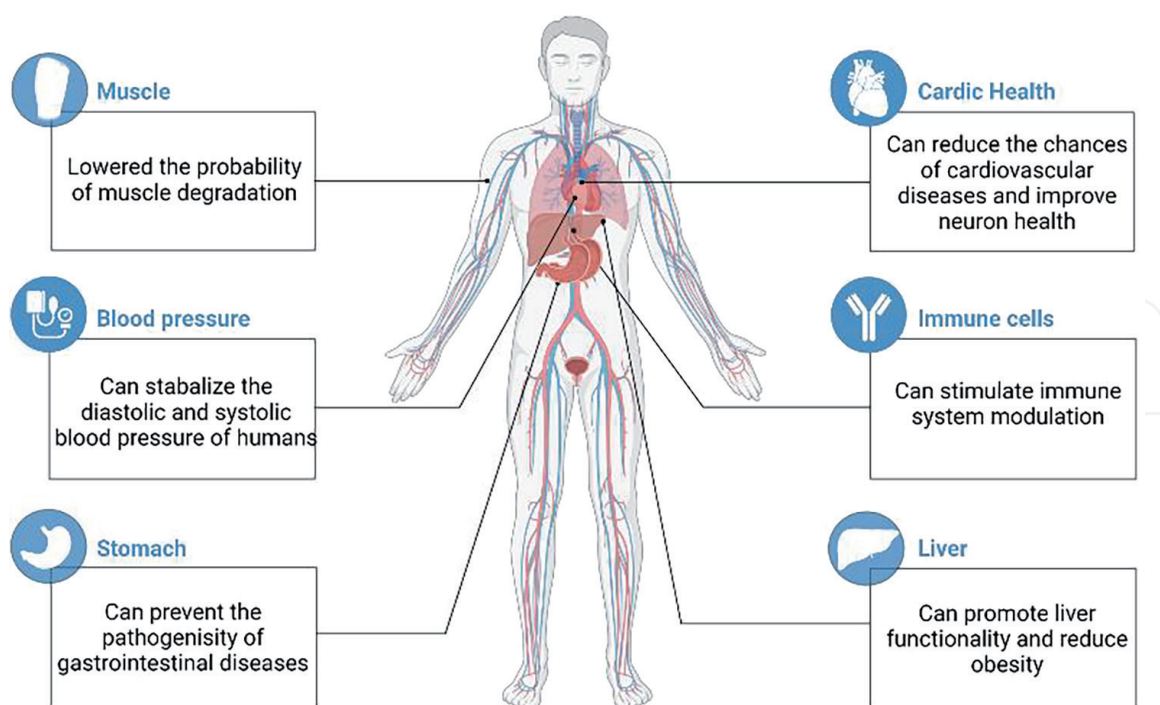


Figure 2.
Applications of functional foods.

food types. Almost every type of functional food is produced but their access towards customers is not consistent [13]. Functional food can be produced from dairy, sweet products, cold drinks, bakery, vitamins, minerals, plant source, animal source and many other due to its much importance in our monotonous life [14]. The producers classify it into two groups, i.e., conservative foodstuff and cheered nutrition.

3. Functional foods for the development of child health

Functional foods can also be considered as a nutritional additive which provide an ease to the parents for the growth and development of their children. The deficiency of nutritional additives can significantly affect the biological condition of the child and can lead to cause fluctuations in the normal blood pressure levels, cardiac rate and sugar levels [15]. Feeding mothers should have to maintain the nutritional needs of their bodies and should properly consume protein, carbohydrates, n-3, n-6 polyunsaturated fatty acids (PUFAs), amino acids and micronutrients (folic acid, iron, zinc, and iodine) so that, the health of the infant can also be ensured [16].

3.1 Effect of diet on children's growth and development

In the early stages of a child's development, more energy and nutrition are required as the child's metabolic rate is much low during this period. n-3 and n-6 PUFAs and trace minerals, such as iron, zinc, and iodine can affect the sensory functions of the child's body [17]. However, developmental probiotic-based functional food can play a key role in the growth and development of the child mental and physical health. Moreover, more consumption of oligosaccharides and insulin via functional food can significantly normalize the gastrointestinal health of the pediatricians in the early years of their development [18].

3.2 Nourishment impact on immunity

A balanced nutritious diet can positively affect the immune system of the host throughout their life span, nutritional components such as antioxidants, vitamins, trace elements copper zinc calcium and potassium functions boost growth and development and give strength to the immune system of immune-compromised patients [19].

4. Design of functional Food

4.1 Conservative foodstuff

Conservative foodstuffs are those foodstuffs that contain regular or whole-food components and provide functional constituents for example antioxidants, fatty acids, vitamins and minerals. A healthy diet contains more bioactive complexes and less dangerous constituents like pollutants, metabolites, insecticides, and fertilizers. Organic food helps to maintain a balanced lifestyle and reduces the risk of unindustrialized products. The purpose of these foods is to improve the nutritional quality [20].

4.2 Functional Foods - Phytochemicals and Health Promoting Potential

In this recent era, industrialized foods are more likely to be used as compared to traditional due to its easy making and availability. Dry and fresh seasonal fruits and vegetables, nuts, seeds, beans and sages are the predictable beneficial functional foods that contains bioactive substances that are beneficial and show positive effects on health [21].

4.3 Cheered nutrition

“Food protection” denotes that the accumulation of nutrients content is high as compared to the original food. Food protection is also called as the accumulation of nutrients to overcome the need for nutrients during food processing. Food fortification is usually done at the industrial level but also possible in homes [22].

The deficiency of micronutrients can be resolved with the consumption of adequate functional food which is useful for the improvement of human health. At global scale it is needed to improve micronutrient shortage, nutritional configurations, invention and advertising of potential foodstuff and functional food management domains [23].

5. Role of probiotics in functional food

Vitamins such as A, C and E act as antioxidants. These vitamins enhance oxidation progression due to their antioxidant activities. Approximately, about 2 billion people in the whole world are micronutrient deficient, moreover, their risks of death and development of different co-morbidities have subsequently increased. Food fortification by functional foods ensures the availability of nutrients and promote a healthy life. This technique is effective for the consumption of minerals, vitamins and other nutrients to fulfill the functional food need.

Functional food in addition to probiotics are living microbes that are administered into the body of the host and can stabilize the normal flora of the human gut.

However, new probiotics are in a developing phase for more progressive and concentrated investigations [24]. Functional food having probiotics as a major ingredient has the tendency to decrease the severity of gastrointestinal infections, it can also provide relief against lactose xenophobia and improve the gut functionality of the host and remarkably save the host from diarrheal associated diseases. Probiotics stimulate good bacterial growth. However, they are previously existing the gut and can transform metabolic accomplishments. They are also capable to increase the levels of short-chain fatty acids formed in the colon and also have the tendency to enhance mineral absorption, i.e., calcium and magnesium preservatives decrease the effectiveness of probiotics health risk [25]. The association of probiotics and prebiotics in a potential way is defined as symbiotic. The presence of glucose and sucrose in a functional food can significantly reduce the severity of pain in the host body. Caffeine can improve cognitive performance, alertness, memory, and other psychiatric performances. Cognitive performance and mental health maintenance in older individuals may be improved by consuming specifically vitamins B [26]. People often experience the association between sleep and normal foods with high carbohydrate food consumption. Tryptophan, an amino acid can reduce the sleepy condition of the individuals, while tyrosine and tryptophan can help in rehabilitation and are the part of functional food. Many ingredients, such as n-3 fatty acids, S-adenosylmethione (S-AdoMet), and folic acid were considered as possible functional ingredients to improve depression [27].

In most cases, only animal or clinical research can be used to determine the viability of probiotics. According to the clinical research, per day consumption of probiotics via functional foods has typically been linked to promote human health. The beneficial effects of probiotics depend upon the nature of probiotic bacteria present in the functional food which ensures the development and survivability of itself in the functional food product [28]. However, several food additives such as aromatic compounds, salts, sugars, sweeteners and preservatives induce the probability of probiotic health risk [29]. The growth and survival of probiotics have been halted when chemicals and food additives interact with probiotics present in functional food. Oligosaccharide based functional foods can stimulate the growth of lactobacillus and bifido-bacteria and induce health-promoting effects in the host body [30].

6. Improvement in functional food

Functional food production includes several distinct phases such as operational purchaser implementation, customers functional food demands, foodstuffs with vigor quality all these are recommended for the hands-on capability to encourage health outside the endowment of indispensable nutrients, that are important for the nutritional development of individuals living in less developed and remote areas [31]. FDA plays a significant role in improving health conditions by increasing the quality of functional food components, supported the formation of healthy food production and increased the buyer need and requirements such as omega-3 fatty acids, soy protein, plant sterols, and dietary fibers. In the recent past, a large number of functional food items for consumption breaks the stereotype of functional food quality. Unconscious cardiac health, invulnerable body functions, bone health are the focus of stabilized health conditions [32]. Deep ideas about the understanding of the materials for a successful product development is all needed for functional food production. Steps involved in the functional food development have been depicted in **Figure 3**. It is the time to improve the technique and those mechanisms which regulate health

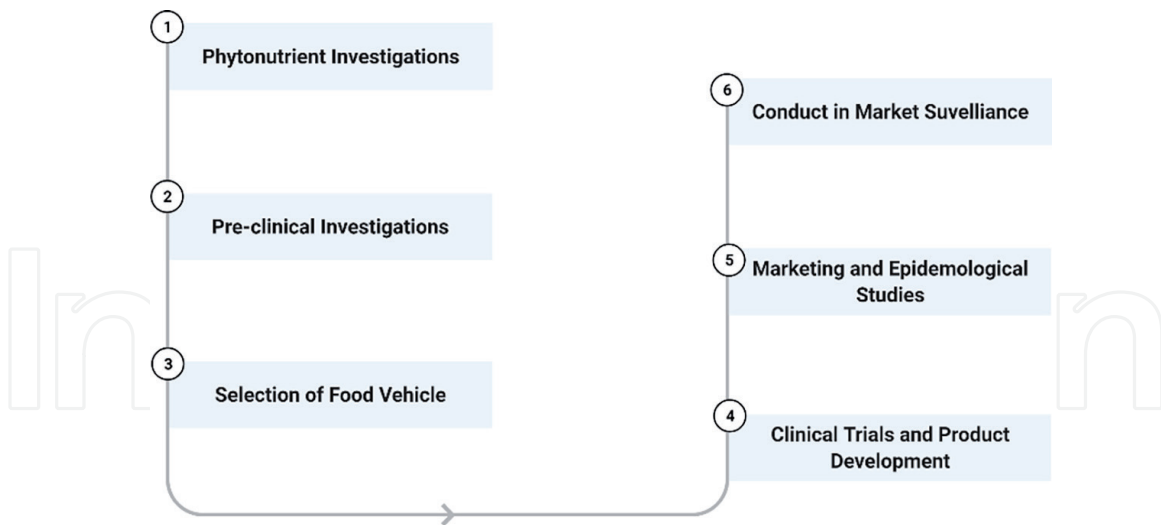


Figure 3.
Steps involved in the development of functional food product.

beneficial functional food [32]. Functional food can be used in a variety of ways. So many functional food products “are best for human’s life which can treat common gastrointestinal and colon diseases and ultimately promote the health of slivery glands of children, improving their intellectual capacity and can provide favorable healthy environment. Despite this, functional foods are also helpful in biomarker formation for cognitive, interactive, and psychosomatic purposes which results to stimulate and support host body to treat general health disorders like obesity and high blood pressure [33].

7. Conclusion

In this recent era, the demand of functional food has remarkably increased due to its health-promoting effects. Busy daily routines and improper diet are the primary reason for the development of various health-related abnormalities. Enhanced administration of functional foods in terms of fruits, vegetables, meat and other nutritious products can significantly halt the pathogenicity of different diseases and their co-morbidities due to their antioxidant and anti-inflammatory effects.

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Conflict of interest

The authors declare no conflict of interest.

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