

FUNCTIONAL FOODS

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ABSTRACT

Scientific investigations have found a link between food and health, examining the impact of individual food elements on bodily systems. The phrase "functional food" originated in Japan and refers to foods with distinct positive properties. This presents an overview of functional components found in diverse foods, as well as their physiological effects and advantages. And also the people affected during the World War II without getting proper nutrition and died because of various diseases. The evidence showing the decrease in the deaths and increase on health benefits after the intake of functional foods is shown. Finally, the benefits of using functional foods in the future.

Keywords: Functional foods, Future aspects.

I. INTRODUCTION

The phrase "food" alludes from the element that are necessary for several vital regenerative processes, including energy building, nutrition provider, and aid for a range of metabolic activities like physical growth and maintenance. In the last two decades, there has been substantive move in being conscious about the nutritious affects health and wellbeing. This has resulted in the development of healthier supplements which decrease the risk of persistent sickness. Functional foods are typical foods that are modified to improve their health compared to unmodified meals. For decades, cultures have held beliefs in the mystical powers of food. Ancient documents demonstrate that certain foods can prevent or alleviate symptoms associated with nutritional deficiencies [1].

II. FUNCTIONAL FOODS

"Functional foods" are nutrient-rich foods that support a person's overall health and development. Consumption of such foods, which are fortified with nutritional and disease-preventing properties, has been shown to promote well-being, prolong life, and prevent chronic diseases.

"Functional food" means food that enhances health or cures disease by incorporating beneficial ingredients or replacing harmful ones. Foods may have naturally beneficial properties or have undergone functional or genetic changes. Functional foods allow customers to eat augmented meals in their natural condition rather than using liquid or capsule-based dietary supplements. Functional foods are either supplemented or fortified, restoring a food's nutrient content to its pre-processed levels. Progress in food and medical technology, as well as changing demographics and lifestyles, all contribute to the expansion of these items. However, public sensitivity and acceptance will determine if this new food concept becomes the next major stride forward in nutritional science or

simply another marketing device created by food makers. Understanding consumer behavior in this regard is critical for promoting public health and recognizing the influence of functional foods on health [2].

Health Canada describes these foods as "similar in appearance to conventional food, consumed as part of the usual diet, with demonstrated physiological benefits, and to reduce the risk of chronic disease beyond basic nutritional functions". The International Food Information Council (IFIC) defines functional foods that offer health benefits beyond basic nutrition [3]. While nutraceutical are becoming more popular, the health and scientific fields have yet to fully accept the concept. The definition of a functional food continues to be debated. It is argued by some that there is no scientific basis for classifying food as "good" or "bad." dietician argue that diets, not individual items, can be labeled as good or detrimental. It's dubious that a nonfunctional food exists [4].

III. GROWING POPULARITY OF FUNCTIONAL FOODS:

The development of functional foods is driven by a number of variables, including urbanization, shifting demographics, food security, the extinction of traditional food cultures, and the awareness of how one's own health is declining as a result of hectic schedules, bad eating habits, and market rivalry. The relationship between diet and health, self-medication, a lack of exercise, a growing body of knowledge from health authorities and the media, and advancements in nutritional science are among the factors influencing nutrition [1].

IV. OBJECTIVES OF FUNCTIONAL FOODS:

The study's aims are as follows:

- Identify essential concepts from the numerous definitions of functional foods.
- It is identifying and developing principles that push the boundaries of functional foods.
- We propose an explanation of functional food that incorporates cultural and chronological factors [5].

V. CLASSIFICATION OF FUNCTIONAL FOODS:

Table 1: Classification of functional foods with its examples

Classification	Examples
Staple foods	Carrot
refined foods	barely grain
Refined food including add on components	Calx-enhanced fruit extract



Fig 1: Examples of functional foods drawn from the software Biorender

There are five techniques for making a food product functional, as described below:

- Eliminating components that have been identified as harmful (e.g., allergenic proteins) during consumption [3].
- Improving the aggregation of wildly occurring component in a meal to achieve desired benefits, such as fortifying with micronutrients to exceed the mentioned daily intake [3].
- Including a non-nutrient component that has been proven to have therapeutic effects, such as non-vitamin antioxidants or prebiotic fructans, which are not typically found in most foods [3].
- Excessive intake of a macronutrient (e.g., fats) can be replaced with a component with proven benefits, such as modified starch [3].

VI. KEY CONCEPTS OF FUNCTIONAL FOODS:

- A. Health advantages:** Health benefits are mentioned in 26 of the selected definitions, indicating their major importance. Only two definitions state that health benefits must be shown, but they do not specify the type of proof needed. The health advantages mentioned in the criteria, where indicated, could be characterized as improving target function or lowering the risk of certain diseases [5].
- B. Food characteristics:** It indicates that the composition of the diet is a key component. Nearly all analogue include a term "food." Roughly one-third state that a functional food should resemble or seem like a wild meal. Some nearly demand the food to be secured, enhanced, or include an component, whereas dross involve removing sensitivities or components that are hazardous to health if consumed in excess. More than half of the definitions include the concept of food [5].
- C. The functional level:** All foods perform certain nutritional roles. However, according to more than half of the definitions chosen, what make a food functional are benefits other than its basic nutritional capabilities. To emphasize the importance of this idea, Roberfroid (2002) recommends that food be regarded through its function rather than as a product or through its physical characteristics [5].
- D. Consumption patterns:** The final idea identified was the pattern of consumption, which appeared in nine of the definitions chosen this idea states that functional food needs to be a part of a normal diet or fit into a particular regional or cultural context .when it comes to consumption patterns. Therefore, a meal that is deemed useful in one nation could not be in another. [5].

VII. FUNCTIONAL FOODS AND ITS CHARACTERISTICS:

- Nuts, whole grains, blueberry, and sweet potatoes decrease the chance of cardiovascular disease ,diabetes mellitus, and rised blood pressure. In spite of there is evidence that foods including wheat, nuts and fruit fibre can reduce the possibility of getting heart disease and cancer [4].
- Non grains such as pineapple, kale, mangoes, falafel, tofu, hummus and cereals provide numerous health benefits. The advantages of functional foods encompass not just natural meals but also innovative culinary styles. According to Gould, lowering cholesterol through low calorie diets and lipid lowering agents, controlling high blood pressure, and quitting smoulder can reinforce plaque and decrease coronary occurrence and Ischemic chest pain, leading to higher survival rates than elective, invasive revascularization procedures [4].
- Carotenoids, flavonoids, indoles, and isothiocyanates present in cruciferous vegetables may also play a role in reported protection [4].
- Plants contain many carotenoids. These molecules, which lack vitamin A action, can affect several biological activities, such as antioxidants, cell growth regulation, gene expression, and immunity. Indole-3-carbinol, a carotene found in crops like cabbage, broccoli, and Brussels sprouts, has been shown to have anti carcinogenic

qualities in animal studies. Recent studies suggest that indole-3-carbinol may be a safe and effective treatment for pulmonary diseases [4].

Table 2: Examples of functional foods and its physiological effects

Functional food examples	Physiological effects
Soy protein, omega 3 fatty acids.	Lipid lowering
Cruciferous vegetables, Moringa	Detoxification
Tomatoes, fatty fishes like salmon and tuna	Inflammatory effects
Cinnamon, Turmeric, Cranberry juice	Microbial effects
Avocado, Eggs, Mushroom	Estrogenic effects
Micro greens, Herbs, Species	Proliferative effects

VIII. MARKET SIZE OF FUNCTIONAL FOODS

In 2014–15, the Indian functional food and beverage industry was estimated to be worth between '46 billion and '49 billion, with a growth rate of 14–15%. Functional beverages have become the rapid-expanding segment in the industry in recent years, with a projected CAGR of 21.7% by 2018. This market is dominated by foods that promote gut health, including probiotic, prebiotic, and synbiotic. Additionally, products that promote cardiovascular health by decreasing cholesterol and hypertension are becoming increasingly popular. Nation faces trace mineral crisis, all most half of the population undernourished and the largest section with decrease birth weight infants worldwide [6].

IX. EFFECTS OF FUNCTIONAL FOOD IN JAPAN:

Japan is the sole nation possessing a process for regulatory acceptance of nutraceutical foods. The Japanese term "Foods for Specified Health Use" encompasses nutritional components for specified health benefits. The Japanese Ministry of Health and Welfare recognizes FOSHU. Research has contributed to diverse definitions of functional foods that differ from simple to complicated and are recommend by dominion, academic bodies, and commercial entities worldwide [1]. After World War II, Japanese eating habits became more westernized. As a result, the source of demise resembled those found in Europe and America. Deaths from hemorrhagic stroke have dropped, yet deaths from heart disease have risen. Lifestyle-related disorders, including cerebral vasculopathy, cardiovascular disease, hyper-lipidemia, raised blood pressure, weak bones, diabetes mellitus, and malignant tumors, can affect those who live a long life. Dietary changes contribute to the development of certain disorders. Food and its components are known to promote physiological and biological well-being. The Japanese cancer pattern has shifted, with stomach cancer decreasing and colon and breast cancer rapidly increasing [8].

X. REASONS FOR PUBLIC INTEREST:

Rising healthcare costs, new laws, and scientific advancements contribute to the growing popularity of functional meals. Healthcare accounts for less than 14% of the US Gross domestic product. Many people believe that eating poorly leads to bad health and increased medical expenses. Dietary variables, such as coronary heart disease and some malignancies, have been related to substantial causes of death in Americans. While it is unrealistic to expect meals to serve as "magic bullets" against illnesses, it is also dangerous to ignore signs of unhealthy eating habits. [1]

Ischemic heart disease is the leading source of demise now a days. It causes less than 44% of mortality and a significant portion of grief in north america. It causes three quarters of heart disease and less than 70% of mortality in individuals over 75 years old. As the global population ages, there will be more concern about reducing the possibility of demise and disorder from the sickness. According to a current appraise, coronary heart disease costs \$259 billion annually. Although the exact function of nutrition in this condition is unclear, a tiny percentage of those who change their diet could significantly save on health costs. According to Tucker and Miguel, upgrading the nutriment of certain individuals can lead to lower healthcare expenditures. While cutting hospital costs is vital, preventive nutrition interventions may have a greater influence on healthcare expenditures [1].

Dietary behaviors have been linked to less than 60% of malignancies in women and more than 40% in males. Dietary components, both essential and non-essential, may impact cancer risk. Reducing the risk of cancer, which affects less than 25% of Americans, can significantly lower healthcare expenses [1].

XI. FUTURE ASPECTS OF FUNCTIONAL FOODS:

Functional foods are now available and are expected to become more prevalent in the future. Functional food research and development are driven by the food business, consumers, and governments. Scientific advancements, especially in nutrition, are crucial for creating innovative food solutions that improve body functioning and consumer health. Previous research in this sector has proven to be robust and effective. Finally, functional food science presents numerous prospects, but its success and impact on public health rely on consumer acceptance of goods based on objective and subjective criteria, such as flavor, convenience, trust, and legitimacy [7].

XII. CONCLUSION:

Functional foods have characteristics comparable to traditional foods and can be consumed as part of a balanced meal plan. They are said to provide physiological advantages such as boosting health or staying away from disease, in addition to providing nutrients. Functional food, whether developed through genetic manipulation, feeding trials, or fortification with various components, can positively impact health and disease prevention. Functional foods not only improve nutrition but also prevent lifestyle disorders like hypertension, diabetes, and cardiovascular disease caused by high cholesterol. Linking people's knowledge of traditional food preparation and its health advantages with food production organizations can lead to creative goods and a win-win situation.

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