

Functional Food: A Health-Promoting Concept

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ABSTRACT

The concept of functional foods revolves around the idea of nourishing the body beyond basic nutrition, offering health benefits that extend beyond mere sustenance. These foods are designed to promote well-being, prevent diseases, or support specific bodily functions beyond their traditional roles. Functional foods encompass a broad spectrum of items, ranging from natural whole foods to processed foods fortified with additional nutrients or bioactive compounds. These components could include vitamins, minerals, antioxidants, dietary fiber, probiotics, and omega-3 fatty acids, among others. The objective is to optimize health by providing additional nutrients or compounds that target particular health concerns. Functional foods enriched with omega-3 fatty acids, plant sterols, or soluble fiber can help lower cholesterol levels and reduce the risk of cardiovascular diseases. Probiotic-rich foods aid in maintaining a healthy gut flora, improving digestion, and enhancing the immune system. Certain foods containing antioxidants and omega-3 fatty acids may support cognitive function and reduce the risk of age-related cognitive decline. Foods fortified with vitamins C, D, and zinc can bolster the immune system, helping the body fight infections and illnesses. Nature of functional foods lies in their potential to bridge nutritional gaps, cater to specific health needs, and optimize overall well-being. These foods offer a proactive approach to health management, emphasizing the role of diet in disease prevention and health promotion. However, it's crucial to approach functional foods with discernment. Not all products claiming health benefits are backed by substantial scientific evidence. Additionally, individual responses to these foods may vary, making it essential to consider personal dietary needs and consult healthcare professionals or nutritionists for guidance. In essence, the concept of functional foods encompasses the integration of targeted nutrients and bioactive compounds into the diet to support and optimize various aspects of health, going beyond basic nourishment to enhance overall well-being and vitality.

Key Words : Functional foods, Probiotics, Prebiotics, Phytochemicals, Gut microbiota

INTRODUCTION

Concept Functional foods:

Functional foods are a category of food products that go beyond basic nutrition, offering additional health benefits beyond their traditional roles. These foods contain bioactive compounds that have the potential to positively impact health, contributing to disease prevention, and promoting overall well-being when consumed as part of a regular diet.

What sets functional foods apart is their intentional design to provide specific health benefits beyond basic nutrition. They can be natural foods, modified foods, or

fortified foods, enriched with biologically active components such as vitamins, minerals, antioxidants, probiotics, prebiotics, fiber, or phytochemicals.

1. The concept of functional foods revolves around:

Functional foods aim to enhance overall health and well-being by targeting specific aspects of health, such as cardiovascular health, digestive health, cognitive function, or immune support.

2. They are believed to reduce the risk of certain diseases or health conditions. For instance, foods enriched with omega-3 fatty acids might reduce the risk of heart disease, while those containing antioxidants might help combat oxidative stress and cell damage.

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3. These foods can contribute to improving bodily functions beyond basic nutrition, such as aiding digestion, supporting a healthy gut microbiome, or regulating cholesterol levels.

Functional foods encompass a diverse range of items, from natural sources like fruits, vegetables, whole grains, and nuts to processed foods fortified with added nutrients or bioactive compounds. For instance, yogurt with added probiotics, calcium-fortified orange juice, or cereals enriched with vitamins and minerals are all examples of functional foods.

However, it's important to note that while functional foods offer potential health benefits, not all claims about their effects are universally supported by robust scientific evidence. Therefore, consumers should exercise critical thinking and seek guidance from healthcare professionals or nutrition experts before significantly altering their diets or relying solely on functional foods for health improvements.

The concept of functional foods represents an evolving area of nutrition science, emphasizing the role of food in promoting health and well-being beyond mere sustenance. Malnutrition can have significant and distinct impacts on children and older people due to their different physiological and developmental needs.

Impact of Malnutrition on Children:

1. Malnutrition in early childhood can lead to stunted growth, both physically and cognitively. Lack of essential nutrients during critical developmental stages can impair cognitive abilities, motor skills, and overall growth potential.

2. Malnourished children are more susceptible to infections and illnesses. Deficiencies in key nutrients like vitamins and minerals weaken the immune system, making them more prone to diseases.

3. Malnutrition during childhood can have long-lasting effects on health. It can increase the risk of chronic diseases later in life, such as cardiovascular issues, diabetes, and impaired cognitive function.

4. Severe malnutrition in children, especially in developing countries, can lead to a higher risk of mortality due to increased vulnerability to infections and other complications.

Impact of Malnutrition on Older People:

1. Malnutrition in older adults can weaken the immune system, making them more susceptible to infections and slower in recovering from illnesses.

2. Malnutrition can lead to muscle wasting and frailty in older individuals. This increases the risk of falls, fractures, and overall functional decline.

3. Lack of proper nutrition may contribute to cognitive decline and an increased risk of conditions like dementia or Alzheimer's disease in older individuals.

4. Malnourished older adults may experience slower wound healing and have a higher risk of developing pressure ulcers or other complications.

5. Malnutrition can exacerbate existing chronic conditions such as diabetes, cardiovascular disease, and osteoporosis, leading to further complications.

Addressing malnutrition in both children and older people requires tailored interventions. For children, emphasis should be placed on providing adequate nutrition during critical developmental periods, while for older individuals, it's about ensuring proper nutrient intake to maintain health and prevent age-related decline. Access to nutritious food, education on proper nutrition, and healthcare interventions are crucial to mitigate the impact of malnutrition on these vulnerable populations.

Role in Addressing Malnutrition of Functional Food:

Functional foods play a vital role in addressing malnutrition by offering enhanced nutritional benefits beyond basic sustenance. Here's how they contribute:

Functional foods are often fortified with essential vitamins, minerals, and micronutrients. In regions where malnutrition is prevalent, these fortified foods can help combat deficiencies. For instance, fortified cereals with added vitamins and minerals can address specific nutrient gaps.

Functional foods can be designed to provide high-quality proteins, crucial for muscle development and overall health. Protein-fortified foods like fortified grains or legumes can help in areas where protein deficiency is a concern. Functional foods can be tailored to target specific nutrient deficiencies prevalent in certain populations. For instance, foods enriched with iron or folic acid can combat anemia and support healthy blood cell production. Some functional foods are formulated to improve the absorption of nutrients. They may include ingredients or compounds that enhance the bioavailability of essential vitamins and minerals, ensuring the body can utilize these nutrients more effectively. Functional foods cater to the nutritional needs of specific demographics like children, pregnant women, or the elderly. They are

designed to provide the necessary nutrients crucial for growth, development, or specific health requirements during different life stages. Functional foods can incorporate components that aid digestion and nutrient absorption, especially important in populations with digestive issues or impaired nutrient absorption. In regions or communities affected by malnutrition, incorporating functional foods into the diet can help combat deficiencies and improve overall health outcomes. However, while functional foods offer benefits, addressing malnutrition requires a comprehensive approach that includes education, access to diverse and nutritious foods, sanitation, and healthcare interventions tailored to specific nutritional needs.

Impact of Diabetes on Human Health:

Diabetes affecting multiple body systems and leading to complications if not managed properly. Here are some key ways diabetes can impact health:

1. Diabetes disrupts the body's ability to regulate blood sugar levels. Persistently high blood sugar (hyperglycemia) can damage blood vessels and nerves over time, leading to various complications.

2. Diabetes increases the risk of heart disease and stroke. High blood sugar levels can damage blood vessels and increase the risk of atherosclerosis (narrowing of arteries due to plaque buildup), leading to heart attacks and strokes.

3. Diabetes can damage the kidneys over time, leading to diabetic nephropathy. This condition can progress to kidney failure if left untreated, requiring dialysis or kidney transplantation.

4. Diabetes can cause diabetic retinopathy, leading to vision problems and blindness. It can also increase the risk of other eye conditions such as cataracts and glaucoma.

5. Nerve damage (neuropathy) is a common complication of diabetes, leading to tingling, numbness, pain, or weakness, usually starting in the feet and gradually affecting other parts of the body.

6. Diabetes can cause poor circulation and nerve damage in the feet, leading to foot ulcers, infections, and, in severe cases, amputation.

7. Individuals with diabetes are prone to various skin conditions, such as bacterial and fungal infections, as well as slow-healing wounds.

8. Diabetes can affect the digestive system, leading to issues such as gastroparesis (delayed stomach

emptying), causing nausea, vomiting, and problems with blood sugar control.

9. Diabetes can impact mental health, leading to stress, anxiety, and depression, often due to the challenges of managing the condition and its associated complications.

10. Women with diabetes may experience complications during pregnancy, and diabetes can also impact sexual function and fertility in both men and women.

Managing diabetes effectively through lifestyle modifications in dietary level. Monitoring blood sugar levels, adhering to a healthy diet, staying physically active, and regular check-ups with healthcare professionals are crucial for managing diabetes and reducing its impact on health.

Role of Functional Food in Managing Diabetes:

Functional foods play a crucial role in managing diabetes by offering specific health benefits beyond basic nutrition. They are designed to positively impact physiological functions and help regulate blood sugar levels. Here are ways functional foods contribute to diabetes management:

Functional foods often contain components like fiber, omega-3 fatty acids, and certain antioxidants that can help stabilize blood sugar levels. For instance, foods high in soluble fiber, like oats and legumes, can slow down the absorption of glucose and help manage blood sugar spikes. Some functional foods, such as those rich in magnesium, chromium, and poly-phenols, may enhance insulin sensitivity. This helps the body use insulin more effectively, aiding in better blood sugar control. Functional foods that are low in calories but high in nutrients can support weight management, which is crucial for individuals with diabetes. Maintaining a healthy weight can improve insulin sensitivity and overall blood sugar control. Functional foods with a low glycemic index (GI) can help regulate blood sugar levels more effectively. Foods with a low GI cause a slower and lower rise in blood glucose levels after eating. Functional foods often prioritize nutrient density, providing essential vitamins, minerals, and antioxidants that contribute to overall health and well-being. This is particularly important for individuals with diabetes, as they might have increased nutrient needs. Some functional foods possess anti-inflammatory properties that can help reduce chronic inflammation often associated with diabetes.

Impact of Cancer on Human Health:

The impact of cancer on human health is profound and multifaceted, affecting individuals physically, emotionally, and psychologically. Here are some key aspects of how cancer impacts health:

1. Cancer can cause a range of physical symptoms depending on the type and stage of the disease. Symptoms may include pain, fatigue, weight loss, changes in appetite, difficulty swallowing, breathing problems, and more. The physical effects can vary widely and often depend on the location of the cancer and its progression.

2. Cancer treatments such as chemotherapy, radiation therapy, surgery, immunotherapy, and targeted therapies can lead to various side effects. These may include nausea, hair loss, fatigue, weakened immune system, cognitive changes (“chemo brain”), pain, and emotional distress.

3. A cancer diagnosis can have a significant emotional toll. Patients often experience anxiety, fear, depression, stress, and uncertainty about the future. Coping with the emotional challenges of a cancer diagnosis and treatment can be overwhelming for patients and their families.

4. Cancer and its treatments can affect a person’s overall quality of life. Physical symptoms, emotional distress, and changes in daily routines can impact one’s ability to work, socialize, engage in hobbies, and perform regular activities.

5. Cancer treatment can be expensive, leading to financial strain on individuals and families. Costs may include medical bills, medications, transportation to treatment centers, and lost income due to inability to work.

6. Cancer can affect relationships with family, friends, and caregivers. Caregivers may experience stress and burnout while trying to support their loved ones undergoing treatment.

7. Even after successful treatment, cancer survivors may face long-term effects known as late effects. These can include physical and emotional issues that persist after treatment ends, impacting long-term health and well-being.

8. The fear of cancer returning (recurrence) can be a persistent concern for cancer survivors, impacting their mental health and quality of life.

Cancer impacts every aspect of a person’s life, and the effects are far-reaching. Managing cancer often involves a multidisciplinary approach, including medical treatment, emotional support, lifestyle changes, dietary

modification and ongoing care. Support from healthcare professionals, support groups, counselors, and loved ones is crucial for coping with the challenges of cancer and its impact on health and well-being.

Functional Food Role In Cancer Management:

Functional foods can play a supportive role in cancer management by offering certain health benefits that may help prevent the development of cancer or aid in treatment. While they aren’t a replacement for medical intervention, these foods can complement traditional cancer therapies. Here are ways functional foods contribute to cancer management:

Many functional foods are rich in antioxidants, such as vitamins C and E, selenium, and phytochemicals. These compounds help neutralize free radicals that can damage cells and contribute to cancer development. Chronic inflammation is linked to the development of cancer. Certain functional foods, like fatty fish (rich in omega-3 fatty acids) and fruits and vegetables (containing flavonoids and polyphenols), possess anti-inflammatory properties that may help reduce inflammation in the body. Functional foods with high nutrient content, such as fruits, vegetables, and whole grains, can bolster the immune system. A strong immune system is essential for the body’s ability to fight off cancer cells and aid in recovery during treatment.

Some functional foods contain probiotics and prebiotics that support a healthy gut microbiome. A balanced gut microbiota can positively influence the immune system and overall health, potentially impacting cancer development and treatment outcomes. Certain compounds found in functional foods, like sulforaphane in broccoli and curcumin in turmeric, may support DNA protection and repair mechanisms, reducing the risk of mutations that can lead to cancer. During cancer treatment, patients often experience side effects like nausea, fatigue, and weakened immunity. Functional foods that are easy to digest and rich in nutrients can help manage these side effects and support the body’s recovery. Obesity is a risk factor for certain types of cancer. Functional foods that aid in weight management, such as those high in fiber and low in processed sugars, can help reduce the risk of obesity-related cancers. It’s important to note that functional foods should be part of a comprehensive cancer management plan, including medical treatments, proper nutrition, and lifestyle modifications. Always consult with healthcare

professionals, including oncologists and registered dietitians, to determine the most suitable diet and nutritional plan tailored to individual needs and treatment regimens.

Impact of Heart Diseases in Health:

Heart disease can lead to various complications that affect different aspects of human health. Some of the primary complications include:

1. Occurs when a blocked artery interrupts blood flow to a part of the heart muscle, leading to damage or death of the heart tissue. This can cause chest pain, shortness of breath, and even be life-threatening.

2. It happens when the heart's pumping action becomes weaker, leading to the heart's inability to pump enough blood to meet the body's needs. This can cause symptoms like fatigue, shortness of breath, and fluid retention in the legs and lungs.

3. Irregular heartbeats or abnormal heart rhythms can occur due to heart disease. Arrhythmias can cause palpitations, dizziness, fainting, or, in severe cases, sudden cardiac arrest.

4. Heart disease, particularly conditions like atrial fibrillation, can lead to blood clots forming in the heart, which can then travel to the brain and cause a stroke by blocking blood flow.

5. A condition where narrowed arteries reduce blood flow to the limbs, usually the legs, causing pain, numbness, and sometimes tissue damage or infections.

6. Heart disease can lead to the weakening of the heart muscle (cardiomyopathy), affecting the heart's ability to pump blood effectively and potentially leading to heart failure.

7. Damage or defects in the heart valves can occur due to heart disease, causing symptoms like chest pain, fatigue, shortness of breath, and swelling in the ankles.

8. In severe cases, heart disease can lead to sudden cardiac arrest, where the heart suddenly stops beating effectively, leading to loss of consciousness and requiring immediate emergency treatment (CPR and defibrillation).

These complications can significantly impact a person's health, leading to reduced quality of life, increased risk of disability, hospitalizations, and even mortality if not properly managed. Prevention through lifestyle modifications, modification in dietary, regular medical check-ups, and appropriate treatment can help reduce the risk of complications and improve outcomes for individuals with heart disease. Early detection and intervention play a crucial role in preventing or managing

these complications.

Role of Functional Food in Heart Disease:

Functional foods play a vital role in managing and preventing heart disease, the leading cause of death globally. These foods contain specific compounds and nutrients that can positively impact heart health in various ways:

Functional foods like oats, barley, legumes, and certain fruits (e.g., apples, citrus fruits) contain soluble fiber that helps lower LDL cholesterol (often referred to as "bad" cholesterol) levels. This reduction in LDL cholesterol can decrease the risk of plaque buildup in arteries, reducing the chances of heart disease and stroke. Foods rich in potassium (bananas, leafy greens, sweet potatoes) and magnesium (nuts, seeds, whole grains) help regulate blood pressure. Maintaining healthy blood pressure levels reduces the strain on the heart and lowers the risk of heart disease.

Some functional foods, particularly those high in omega-3 fatty acids like fatty fish (salmon, mackerel), flaxseeds, and walnuts, possess anti-inflammatory properties. Chronic inflammation contributes to heart disease, and these foods can help reduce inflammation in the body. Berries, nuts, and certain vegetables are rich in antioxidants such as vitamins C and E, which help protect blood vessels from damage caused by free radicals. This protection reduces the risk of atherosclerosis, a condition where arteries narrow due to plaque buildup. Functional foods like fatty fish, almonds, and olive oil contain healthy fats (omega-3s, monounsaturated fats) that can improve blood lipid profiles, including increasing HDL cholesterol ("good" cholesterol) levels and reducing triglycerides. Functional foods that are nutrient-dense and high in fiber can aid in weight management. Maintaining a healthy weight reduces the risk of developing heart disease.

Foods containing natural blood-thinning properties, such as garlic and turmeric, may help reduce the risk of blood clot formation, which can lead to heart attacks and strokes. Incorporating functional foods into a balanced diet can contribute significantly to heart health. They work synergistically to provide various benefits that collectively support cardiovascular well-being. However, it's essential to combine these foods with an overall healthy lifestyle, regular exercise, and avoidance of smoking to effectively reduce the risk of heart disease. Always consult with a healthcare professional or registered dietitian before

making significant dietary changes, especially if managing existing heart conditions or risk factors.

In Conclusion, Functional Foods:

1. *Offer Additional Health Benefits:* These foods contain bioactive compounds that go beyond providing basic nutrition. They are designed to support specific bodily functions, promote overall health, and potentially prevent diseases.

2. *Bridge Nutritional Gaps:* Functional foods address deficiencies or imbalances in the diet by providing concentrated doses of beneficial components that might be lacking in regular diets. This bridges the gap between nutritional requirements and actual intake.

3. *Reflect Advancements in Food Science:* The development of functional foods reflects the advancements in food science, including fortification techniques, understanding bioavailability, and exploring the impacts of various bioactive compounds on human health.

4. *Require Informed Consumption:* Consumers should approach functional foods with discernment, recognizing that not all claims are universally supported by robust scientific evidence. Consulting healthcare professionals or nutrition experts can provide guidance for integrating these foods into a balanced diet.

5. *Hold Potential for Health Promotion:* While the concept of functional foods holds immense promise, ongoing research and evidence-based studies are crucial to validate health claims and understand the long-term effects on health and well-being.

Functional foods are continuously evolving, showcasing the potential for food to serve as a tool for enhancing health and preventing diseases. With further

scientific exploration and consumer education, these foods have the potential to play a significant role in promoting holistic well-being and supporting a proactive approach to health management.

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