



Centurion
UNIVERSITY

Functional Foods

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BACKGROUND

- Humans for centuries have attributed to diet and foods as a functional role in health.
- Understanding of the relationships between food, physiological function and disease have progressed in recent years, particularly over the past decade.
- Growing interest in the role that nutrition plays in our state of well being has led to the development and marketing of a growing spectrum of products called “nutraceuticals” and “functional foods.”

INTRODUCTION

- A **functional food** is a food given an additional function.
- "Functional Food is a Natural or processed food that contains known biologically-active compounds which when in defined quantitative and qualitative amounts provides a clinically proven and documented health benefit.
- Functional foods includes processed food or foods fortified with health-promoting additives, like "vitamin-enriched" products.

FUNCTIONAL FOODS AS NUTRACEUTICALS

- ❑ Nutraceuticals are functional foods which don't only provide mere health benefits but helps in effective prevention and treatment of different diseases.
- ❑ Nutraceuticals have been claimed to have a physiological benefit or provide protection against the following diseases:-
 - Cardiovascular agents
 - Antiobese agents
 - Antidiabetics
 - Anticancer agents
 - Immune boosters
 - Chronic inflammatory disorders
 - Degenerative diseases

CONCEPT OF FUNCTIONAL FOODS

- The “functional food” concept was developed in
 - Japan at the early 1980s and as “food for
 - specified health use (FOSHU)” was established in 1991.
- Defined as “any food or ingredient that has a positive impact on an individual’s health, physical performance, or state of mind, in addition to its nutritive value”.
- Should be naturally occurring, can be consumed as part of the daily diet, and when ingested should enhance or regulate a particular biological process or mechanism to prevent or control specific diseases.

CONCEPT OF NUTRACEUTICAL FOODS

- Dr Stephen DeFelice, founder and chairman of the Foundation for Innovation in Medicine located in Cranford, New Jersey, coined the term "Nutraceutical" from "Nutrition" and "Pharmaceutical" in 1989,
- defined as ‘a food or part of food, that provides medical or health benefits, including the prevention and treatment of disease.
- Nutraceuticals are natural bioactive, chemical compounds that have health promoting, disease preventing or medicinal properties.

- components that not only maintain, support, and normalize any physiological or metabolic function, but can also potentiate, antagonize, or otherwise modify physiological or metabolic functions.
- non-specific biological therapies, used to promote wellness, prevent malignant processes and control symptoms.

CEREALS AS FUNCTIONAL FOOD

- In recent years, cereals and their ingredients are accepted as functional foods as they provide dietary fibre, proteins, energy, vitamins, minerals, antioxidants etc.
- Most common cereal based functional foods and nutraceuticals: wheat, barley, buckwheat, oat, brown rice



- The outer bran layer of cereals is rich in B vitamins and phytonutrients such as flavonoids and indoles, along with a small amount of protein. The endosperm is predominantly carbohydrate, and the germ layer is concentrated with minerals such as iron and zinc, along with the antioxidant vitamin E.
- Preventing cancer and CVDs, reducing tumour incidence, reducing blood pressure, risk of heart disease, cholesterol and fat absorption rate, delaying gastric emptying, providing gastrointestinal health- protective effects of cereals.

BUCKWHEAT

- Cholesterol reducing effects, antihypertension effects, improve constipation and obesity conditions
- Approved as antihaemorrhagic and hypotensive drug
- Used against circulatory disorders, and as vasculoprotector, known to have anti-inflammatory properties
- Antioxidative properties



LEGUMES AS FUNCTIONAL FOODS

- Pulses and legumes have been recognized as part of functional foods.
- Pulses are the main source of protein and besides these, it is also good sources of vitamins, minerals, omega-3 fatty acids and dietary fibre or non-starch polysaccharides (NSP).
- contain non-nutrient bioactive phytochemicals that have health-promoting and disease-preventing properties.



- Non nutritive compounds in legumes are non-starch polysaccharides (NSP), phytosterols, saponins, isoflavones, a class of phytoestrogens, phenolic compounds and antioxidants such as tocopherols and flavonoids.



- demand for bean products is growing because of the presence of several health-promoting compounds in edible bean products known as saponins which are naturally occurring compounds widely distributed in all cells of legume plants
- saponins have the ability to:
 - ❖ Help protect the human body against cancers
 - ❖ Lower cholesterol
 - ❖ Lower blood glucose responses

SOYBEANS

- In 1999, FDA approved a health claim for the cholesterol-lowering properties of soy protein.
- American Heart Association (AHA) recommended that patients with elevated cholesterol should include soy protein foods in their diets.
- Soy has phytoestrogens called isoflavones.
- Soy isoflavones are believed to play a role in prostate cancer, where supplementation with isoflavones has shown a reduction in prostate cancer risk in studies.
- Soy isoflavones, and possibly soy proteins as well, are believed to play a role in bone health.

- There is also the biologically active non-isoflavone component of soy that has received much attention in past years— soy protein.
- The protein part is believed to be responsible for the additional benefits seen from soy consumption, which are:
 - ❖ Cholesterol-lowering effects
 - ❖ Blood pressure-lowering effects
 - ❖ Reduction of cancer risks
 - ❖ Favorable effects on kidney function

VEGETABLES AS FUNCTIONAL FOOD

- Vegetables are rich in fiber, vitamins, minerals, carotene, pigments, flavonoids, all of which are important for maintaining our health and prevention and/or treatment of various diseases.
- Low in calorific value, yet rich in vital components



TOMATOES

- Lycopene is the pigment principally responsible for the deep-red color of ripe tomato fruits and tomato products.
- Consumption of tomatoes and tomato products containing lycopene have been shown to be associated with decreased risk of chronic diseases like cancer and cardiovascular diseases in several studies.
- Tomato paste and other processed tomato products are even more effective than fresh tomatoes in preventing prostate cancer.
- This is because processing converts much of the trans-form of lycopene found in fresh tomatoes into the cis-form, which is much more readily taken up in

- The evidence suggests that the anti-proliferative properties of lycopene may extend its effects to other types of cancer, beyond just that of prostate cancer, preventing heart disease, inhibits cholesterol synthesis and enhances the breakdown of the bad cholesterol, low-density lipoprotein (LDL).



FRUITS AS FUNCTIONAL FOODS

- Fruits are nature's wonderful gift to mankind; indeed, medicines packed with vitamins, minerals, anti-oxidants and many phyto-nutrients.
- Fruits are low in calories and fat and provide plenty of soluble dietary fibers which consequently helps in prevention of chronic diseases like obesity, diabetes, CVDs, hypertension etc.
- Fruits contain many **anti-oxidants** like *poly-phenolic flavonoids, vitamin-C, and anthocyanin* offer protection against aging, infections and some diseases like Alzheimer's disease, colon cancers, weak bones (osteoporosis)

MANGO

- Mango fruit is rich in pre-biotic dietary fiber, vitamins, minerals, and *poly-phenolic flavonoid* antioxidant compounds.
- Mango fruit is an excellent source of **Vitamin- A**, vitamin-B6 (pyridoxine), vitamin-C and vitamin- E and flavonoids like *beta-carotene, alpha- carotene, and beta-cryptoxanthin*.
- Consumption of mango is essential for maintenance of healthy skin, healthy vision, prevention of CVDs and cancer.
- Fresh mango is a rich source of potassium which is an important component of cell and body fluids that helps controlling heart rate and blood pressure.



PROBIOTICS AS FUNCTIONAL FOOD

- Probiotics which means for life in Greek, is one of the approach to inhibit harmful m/os in our body and is widely used as functional foods.
- Probiotic approach involves the consumption of live bacterial cells mainly lactic acid producing bacteria(Lactobacillus or Bifidobacterium genera) in foods or dietary supplements.
- Probiotic yoghurt are known to exert +ve response towards lactose-intolerant people.
- Probiotics are known to exerts many health benefits beyond inherent general nutrition. Some of them are
:-
 - lowering of blood pressure
 - Stimulants of immune systems

- Lowering of blood lipid (obesity, CVDs etc).
- Increases calcium absorption from the intestine.
- Lowering of harmful enzyme activities of colonic bacteria.
- Decreases carcinogenicity.



FUNCTIONAL FOOD AND FORTIFICATION

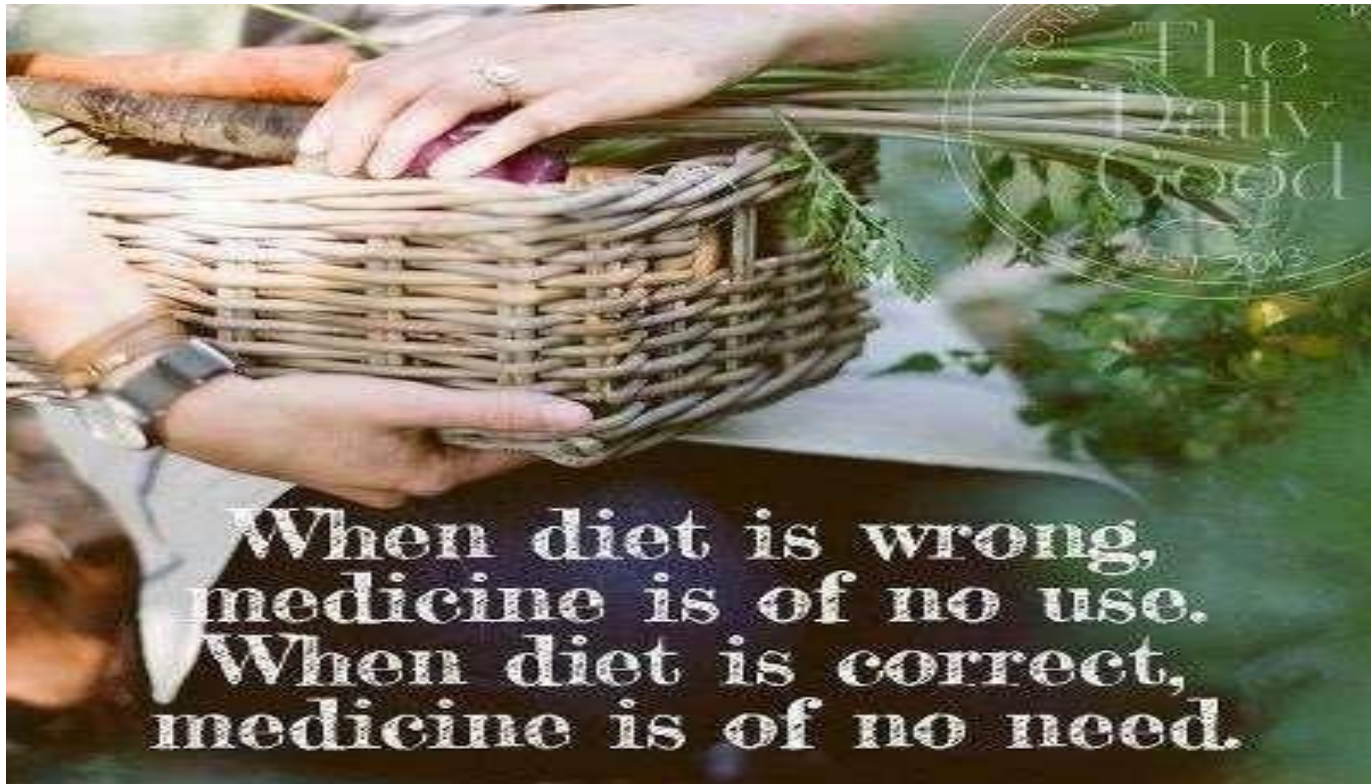
- Foods are fortified and enriched with different essential ingredients to make it functionally bioactive for promoting health status of consumer
- Products considered functional generally do not include products where fortification has been done to meet government regulations and the change is not recorded on the label as a significant addition ("invisible fortification").
- Some of the fortified food used as functional food and their health benefits :-

- Juices with calcium reduces risk of osteoporosis and reduces hypertension
- Grains with folic acid reduces risk of heart disease and neural tube birth defects.
- Infant formulas with iron reduces risk of iron deficiency.
- Grains with added fiber reduces risk of certain cancers and heart disease; reduces cholesterol and constipation; increases blood-glucose control
- Juices with added fiber reduces risk of certain cancers and heart disease; reduces cholesterol, hypertension, and constipation.
- Foods containing sugar alcohols in place of sugar reduces risk of tooth decay.

CONCLUSION

- Functional food offers great potential to improve health and/or help prevent certain diseases when taken as part of balanced diet and healthy lifestyle.
- Thus, a functional food for one consumer can act as a nutraceutical for another consumer.
- Many food products containing components with health benefits are being incorporated with many other beneficial components for desirable physiological change.

- Functional foods are on peak demands due to increasing consumer awareness for healthy living, ageing population, increasing health care cost, advancing scientific evidence that diet can affect on prevalence and progression of disease.
- Although the dangerous effects of many foods like soy, honey mustn't be overlooked; nutraceuticals and functional foods should be taken under proper supervision of nutritionist or other medical assistant if possible.



THANK YOU