

### Contents at a glance

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#### Learning objectives :

Students will be able

- 1) To identify functional food products .
- 2) To critically analyze the health claims made on the labels of these products.
- 3) To learn and give examples of functional foods.
- 4) To learn the classification of functional foods.

functional properties can help to promote well-being and even reduce the risk of developing certain disorders like obesity, hypertension, heart related diseases, etc. World Health Organization (WHO) stresses the importance of a healthy diet in preventing non-communicable diseases. Healthy diet is not just about limiting certain components of concern such as saturated or trans fatty acids or simply delivering nutrient intake. It also includes those elements that may provide an extra benefit.



**Fig. 16.1 : Food as medicine**

“Let your food be your medicine” said Hippocrates. Today food has become important beyond its basic nutrition, cultural pleasure of feeding a family and greeting friends in a social meeting. Products intended to cure diseases are medicinal products and not foods. But on the other hand, a healthy diet consisting of foods with

#### Need of functional food :

In the fast moving modern world of today, which is rapidly progressing towards industrialization and urbanization, need of functional food has become apparent due to drastic changes in lifestyle.

#### Definition of functional food :

Functional food is any fresh or processed food claimed to have a health promoting and/ or disease preventing property beyond the basic nutritional function of supplying nutrients.

## 16.1 Classification of functional foods

Functional food has been classified into four categories: conventional foods, modified foods, medical foods, and foods for health use.

- 1) **Conventional foods:** Conventional foods are the most basic of the functional foods because they have not been modified by enrichment or fortification. They are still in their natural state. Most whole fruits and vegetables fall into this category because they are rich in phytochemicals such as lycopene and lutein, fibre, as well as other beneficial compounds (vitamins, minerals and antioxidants) e.g. tomato is a functional food because it contains bioactive compound called Lycopene. Lycopene is associated with reduction of cancer. Traditional natural way of making curd in earthen pots gives probiotic effect.
- 2) **Modified foods:** Modified foods are enriched, fortified, supplemented or enhanced with nutrients or other beneficial ingredients. Calcium-fortified orange juice, folic acid enriched breads and margarine supplemented with plant sterols are the modified foods. Omega-3 enriched bread (adding flax seed) is also considered as functional food. High fibre biscuits fortified with oat flakes are good for cancer and diabetic patients.
- 3) **Medical foods:** These foods need a doctor's prescription and are not available over the counter to consumers but can be taken through medical representative. They are specially formulated foods given either orally or through tube feeding under medical supervision e.g. malted baby food, ORS preparations for diarrhoea patients.
- 4) **Foods for special dietary use:** Foods for special dietary use are similar to these medical foods, but they are available

commercially and do not require the supervision of a health care provider. These foods fulfill special dietary needs that are due to specific health conditions, such as celiac disease, lactose intolerance, obesity, anemic condition, etc. Gluten-free foods, and other foods designed to for weight loss are considered for special dietary use. Infant foods are also grouped in this category. Lactating mothers are advised to have *shatavari* extract to get easy flow of milk.

Few examples of functional foods available in Indian market (Table 16.1) are such as gluten free *atta*, probiotic yoghurt, fruit juices (natural, ayurvedic and smoothies), green tea (rich of antioxidant), vegan milk (lactose free), Omega-3 fatty acids in flax seed, fish oil enriched breads, plant sterol and stanol-enriched margarine, calcium-enriched milk, caffeine-enriched beverages like sports drinks. Some examples of functional foods with their health claims and active ingredients are illustrated in table-16.2

### Do You Know?

Dry pulses do not contain any ascorbic acid, while germinated/ sprouted green pulses do contain ascorbic acid which has a potential antioxidant property.

## 16.2 Health benefits of functional foods

Functional foods have numerous health benefits and disease preventive effects e.g. treatment of cancer, atherosclerosis and cardiovascular disease (CVD), anti- ageing, immune boosting as well as managing diabetes. The health promoting effect is because of the presence of bioactive constituents.

Functional foods offer great potential to improve health and/or help prevent certain diseases when taken as part of a balanced diet and healthy lifestyle.

### Probiotics :

Probiotic bacterial are beneficial or friendly bacteria that are naturally present in some of our foods or are added to processed foods for their health benefits.

By probiotics, we mean beneficial bacteria like *Lactobacillus* species found in the intestine which combat harmful pathogens and provide additional health benefits.

### Benefits of probiotics:

1. Reduce diarrhoea and irritable bowl syndrome
2. Reduce symptoms of colds
3. Improves digestion

### Sources of probiotics:

Fermented milk products such as curd, yogurt and buttermilk.

### Prebiotics :

Prebiotics are special indigestible soluble fibres present in plant foods that support the growth of probiotic bacteria without being affected by cooking or digestive processes.

### Benefits of prebiotics:

Indirectly prebiotics confer numerous health benefits.

1. Reducing prevalence of infectious diseases
2. Reduces antibiotic associated diarrhoea.
3. Reduces risk of CVD and colon cancer.
4. Prebiotics provide satiety, reduce weight and thus helps in prevent of obesity.

### Sources of prebiotics:

Whole grain specially oats, wheat bran, soyabean, flax seeds, carrots, citrus fruits, etc.

**Table 16.1 : Functional foods available in Indian market.**

Name of the product	Health claim	Examples
Gluten free atta/Low gluten atta	Good for patients with gluten protein allergy or celiac disease	Brown rice, jowar, wheat free atta flour
Probiotic drinks	Improves digestion, immunity gives longer life	Live bacteria of <i>lactobacillus</i> species.
Multigrain cereals	Cholesterol management	Rich in fiber, bran and resistant starch
Vegan milk e.g almond, soya	Weight management	Rich in protein and calcium
Beverages like green tea and smoothies	Good for nervous system, Rich in vitamin and minerals	Green tea, fruit, rich source of mineral, vitamins, antioxidant and polyphenols.



### 16.3 Examples of functional foods :

Some examples of functional food are presented in table 16.2

#### Do You Know ?

To treat gastro-intestinal health complaints probiotics and prebiotics foods are well known options.

**Table 16.2 : Foods with functional component along with their potential health benefits.**

Functional food	Functional component	Potential health benefits
Tomatoes, watermelon	Lycopene (as antioxidant)	Lower risk of prostate cancer
Citrus fruits	Flavanones (as antioxidant)	Reduced risk of some cancers
Soy-based foods	Isoflavones (as polyphenols)	Lowers LDL, total cholesterol and triglycerides, and improves HDL
Cranberries	Proanthocyanidins (as antibacterial agent)	Lower risk of urinary tract infection
Fatty fish	Omega-3 fatty acids Polyunsaturated fatty acids	Reduced risk of cardiovascular disease
Whole grain foods/ multigrain foods	High bran/fiber	Reduced risk of cardiovascular disease, cancer, and mortality from all causes, diabetes and constipation patients
Ginger	Gingerol and shogaol (as antioxidant, antibacterial agent)	Reduces throat infection.
Turmeric	Curcumin (as antioxidant, antibacterial, natural colourant)	Reduces skin diseases and used in cosmetics

#### Points to remember

- Functional foods provide additional health benefits that may reduce disease risk and promote optimal health.
- Examples of functional food might include many fruits and vegetables, enriched bread, calcium-fortified orange juice, oats (lower cholesterol), fatty fish (omega-3 fatty acids), margarines with plant stanols and special foods for allergies or health conditions etc.
- Conventional foods are unmodified whole foods, including fruits, nuts and vegetables
- Modified foods are modified through fortification, enrichment or enhancement, such as calcium-fortified orange juice, folate-enriched bread, margarines with plant stanols or sterol esters
- Medical foods are used under physician supervision for a specific medical condition, e.g. special dietary formulas for diabetes or liver conditions
- Special dietary foods are used for specific conditions, such as infant formulas, allergies, gluten free and lactose free.
- Some benefits of functional foods are to reduce the risk of certain diseases, lower cholesterol, risk of heart disease and may help with weight control.

- Probiotics are beneficial bacteria found in the intestine which combat harmful pathogens and provide additional health benefits.

- Prebiotics are special indigestible soluble fibres present in plant foods that support the growth of probiotic bacteria without being affected by cooking or digestive processes.

## Exercise

### Q.1 a) Select the most appropriate option:

- Conventional foods is a type of \_\_\_\_\_ food.  
(functional, junk, fast )
- \_\_\_\_\_ has been enriched, fortified, supplemented or enhanced with nutrients or other beneficial ingredients.  
(modified, medical, conventional)
- \_\_\_\_\_ is an example of modified food.  
(Tomato, omega-3 fatty acid enriched bread, plain bread)

### (b) Match the following:

A		B	
i.	Watermelon	a.	Flavanones
ii.	Citrus	b.	Omega-3 fatty acids
iii.	Fatty fish	c.	Lycopene
iv.	Curd	d.	Prebiotic
v.	Oats	e.	Probiotic
		f.	Antioxidant

### (c) State whether the following statements are true or false:

- Functional food have health promoting properties.
- Lycopene lowers the risk of cancers.
- Prebiotics are not at all useful.
- Medical food has to be given under the supervision of a physician.

### Q.2 Answer in brief

- Name the classification of functional foods
- Modified foods

### Q.3 Short answer questions

#### Define

- Functional foods
- Conventional food
- Probiotics
- Prebiotics

### Q.4 Long answer question

- Explain the classification of functional foods in detail

### ❖ Project :

- Classify functional foods in different way (enriched foods, modified foods, health claims, etc.)
- Prepare a recipe for breakfast rich in probiotics and lunch enriched with prebiotics and healthy functional dinner.
- Choose one particular type of functional food sold in your local supermarket. Find two other products in that range and describe the information that is on the label for consumers. Use the computer to help you list and compare the nutritional information on a chart. Do any of these foods have 'warning' statements?

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