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## EC05-473 Functional Foods

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# Functional Foods

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This Extension Circular defines functional foods. It reviews food label rules for functional foods, their physiologically active components, and their specific health benefits. Examples are provided of the advantages of whole food consumption compared to one isolated component. Key definitions are provided.

## Labeling

### Health claims

Functional foods can have a “brand” or label that claims to improve health and are regulated by the Food and Drug Administration (FDA). An FDA-approved Health Claim is granted when valid, very strong scientific evidence exists and scientific experts agree about a relationship between a food substance and a disease or health-related condition. Approved foods have convincingly demonstrated the benefits of their intended purpose when consumed at sufficient levels on a regular basis and as part of a generally well-balanced and healthful diet. One example of acceptable wording for the diet-disease relationship between dietary saturated fat and cholesterol, and coronary heart disease is: “While many factors affect heart disease, diets low in saturated fat and cholesterol may reduce the risk of this disease.” For a complete list of the FDA-approved Health Claims, see *Table I*.

With notification to FDA, a food producer also may use a Health Claim if based on current, published authoritative statements from federal scientific bodies such as Centers

Just as consumers grew weary of hearing about the bombardment of foods that contain unhealthy, disease-causing components, researchers and nutrition educators have shifted their focus to the study and promotion of functional foods. Foods that have physiologically active components, which can improve one’s health and prevent disease beyond that of one’s essential daily nutritional requirements, are called functional foods. These physiologically active components are known as nutraceuticals. Anthocyanin is an example of a nutraceutical in blueberries. Nutraceuticals also can be purified to make a dietary supplement or added to another food to increase the amount of those substances in the food.

Functional foods symbolize the widespread belief that healthy eating is a good way to reduce the risk of chronic illness. Development of and demand for functional foods are soaring because of our aging population, high health care costs and evidence that diet can lower disease risks. The functional foods market around the world is estimated to be greater than \$100 billion a year and growing. Research about consumer attitude toward functional foods completed by the International Food Information Council (IFIC) indicated that individuals try to eat more functional foods when they are more aware of the food’s health benefit and believe it. Ninety-three percent of over 1,000 adults believed that some foods have health benefits beyond basic nutrition and 85 percent were interested in learning more about these foods. Including functional foods in one’s diet may be safer, cheaper and more acceptable to people. It may have the potential to delay or decrease the dose of a medicine.

Functional foods contain nutrients and other helpful components that have been part of the diet of large populations for many centuries, and they are generally recognized as safe. It is very important that functional foods remain safe for everyone and under all conditions regardless of the serving size. The practice of eating functional foods with added herbal ingredients requires caution and consultation with a physician, because some herbs can interfere with other medications and cause side effects that could be life-threatening. Dietary supplement sales have been decreasing, however, while functional food sales have been increasing. Consumers are becoming aware that a particular plant constituent cannot maintain its level of biological activity after extraction, drying and compaction into a pill or capsule. Consumers are realizing that the bioactive food components act together with other dietary elements, enhancing each other’s absorption and activity to promote overall health.

**Table I.**

### FDA-approved Health Claims — granted when very strong scientific evidence exists between a food or food substance and a disease or health-related condition

A diet with enough calcium and a reduced risk of osteoporosis
A diet low in total fat and a reduced risk of some cancers
A diet low in saturated fat and cholesterol and a reduced risk of coronary heart disease
A diet rich in fiber-containing grain products, fruits and vegetables and a reduced risk of some cancers
A diet low in sodium and a reduced risk of hypertension
A diet high in potassium and a reduced risk of hypertension and stroke
A diet rich in fruits and vegetables and a reduced risk of some cancers
A diet adequate in the synthetic form of folate or folic acid and a reduced risk of neural tube birth defects
Use of sugarless gum containing sugar alcohols and a reduced risk of tooth decay, especially when compared with foods high in sugars and starches
A diet rich in fruits, vegetables and grain products that contain fiber, especially soluble fiber, and a reduced risk of coronary heart disease
A diet rich in foods that contain fiber from whole oats, including oatmeal, oat bran, and oat flour, and a reduced risk of coronary heart disease
A diet rich in foods that contain fiber from psyllium and a reduced risk of coronary heart disease
A diet that includes 25 grams of soy protein daily and that also is low in saturated fat and cholesterol and a reduced risk of coronary heart disease
A diet containing 1.3 grams of plant sterol esters or 3.4 grams of plant stanol esters daily and a reduced risk of coronary heart disease
A diet rich in whole-grain foods and a reduced risk of coronary heart disease and certain cancers

for Disease Control or National Institute of Health. Qualified Health Claims also are allowed by the FDA based on the weight of the scientific evidence for the food-disease relationship. When it does not meet the standard of significant scientific agreement, qualifying language or FDA disclaimers that describe the evidence supporting the claim must be used. An example is: "Supportive but not conclusive research shows that consumption of EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) omega-3 fatty acids may reduce the risk of coronary heart disease."

### Structure/function claim

Structure/Function Claims used for dietary supplements require FDA notification but not authorization. These claims describe the role of a nutrient or dietary ingredient that is intended to affect normal structure or bodily function in humans. Examples are "calcium builds strong bones" and "echinacea decreases cold and flu symptoms." The manufacturer of these supplements must state in a disclaimer that FDA has not evaluated the claim and the product is not intended to diagnose, treat, cure or prevent any disease as seen in *Figure 1*. In fact, the FDA bans all claims on foods or supplements that state the product can cure a disease.

\*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.

**Figure 1. Example of FDA disclaimer**

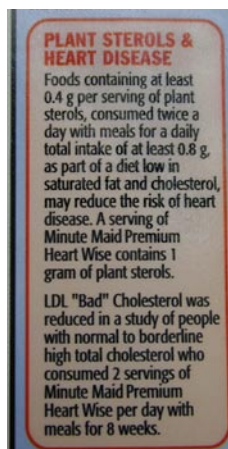
## Physiologically Active Food Components

Thousands of physiologically active food components have been identified in functional foods we eat. Each functional food has a different mixture of these active components, which usually are responsible for giving the food its aroma, flavor and color. The concentrations of these components in different functional foods can vary depending on the plant or animal variety. For instance, red, yellow and green apples and red, yellow and white onions all have different compositions. In addition, scientists have genetically engineered different strains of foods, such as golden rice versus iron-enriched rice, with different nutritional components. Plant or animal maturity and growth location also affects its nutritional composition. Finally, environmental conditions, such as storage, sunlight, processing and cooking, affect the chemical nature, bioactivity and bioavailability of the many compounds in foods. For example, lycopene absorption in the small intestine is greater after eating processed tomatoes compared to raw tomatoes.

Several categories of physiologically active food components or nutraceuticals from plant and animal sources, known as phytochemicals and zoochemicals respectively, are plant sterols and stanols, carotenoids, flavonoids, glucosinolates, omega-3 fatty acids, and pre- and probiotics. These will be discussed in detail below (also refer to *Table II*). These naturally occurring compounds have been shown to protect plants and animals from sunlight, bacteria and other environmental stresses and pathogens and, when eaten, may act similarly in humans.

### Plant sterols and stanols

Plant sterols and stanols have been known for their cholesterol-lowering properties for many years. These phytochemicals are essential components of plant cell membranes and can be



found in their natural forms in soybean oil, fruits, vegetables, nuts, cereals, legumes and other plant sources. In order to introduce more sterols and stanols into the diet, scientists have been able to extract them from their plant source and incorporate them in their natural form into foods, such as orange juice. Scientists also can modify them structurally to form plant sterol and stanol esters which are easier to incorporate into fat-containing foods. These esters maintain their ability to lower total cholesterol as well as reduce low density lipoprotein (LDL) cholesterol.

These esters act by blocking the absorption of cholesterol from the diet in the small intestine.

The FDA has approved the Health Claim: "When consumed as part of a low saturated fat and low cholesterol diet, foods containing  $\geq 0.65$  grams per serving of plant sterol esters or  $\geq 1.7$  grams per serving of plant stanol esters, eaten twice a day with meals for a total daily intake of at least 1.3 grams of plant sterol esters (0.8 grams free sterol) or 3.4 grams of plant stanol esters (2.1 grams free stanol), may reduce the risk of coronary heart disease and may reduce cholesterol levels." Plant sterols and stanols and their ester forms can be found in margarine spreads, such as Benecol®, salad dressings, snack bars and Minute Maid Premium Heart Wise Orange Juice.

No additional cholesterol-lowering benefits have been found with intakes beyond the FDA recommended 3.4 grams per day. Plant sterols and stanols do not affect high density lipoprotein (HDL) cholesterol or triglyceride levels. Until further long-term data has been collected on whether sterols and stanols interfere with fat-soluble vitamin absorption, the American Heart Association (AHA) recommends limiting the intake of these compounds to adults diagnosed with high cholesterol.

### Carotenoids

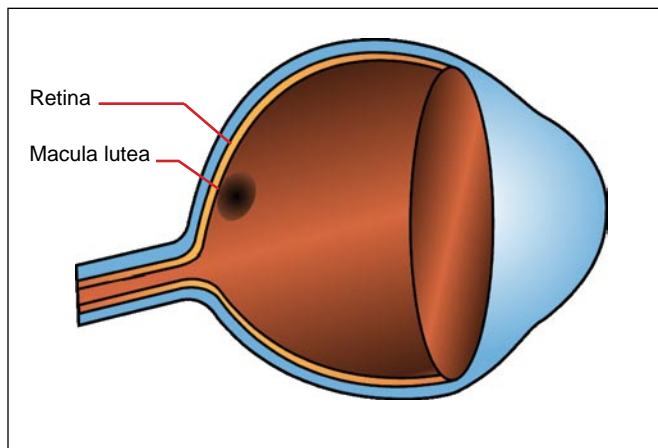
Carotenoids are plant pigments that are responsible for the vibrant yellow, orange and red colors of many fruits and vegetables. Out of more than 600 identified carotenoids, 50-60 can be transformed in the body into Vitamin A. Carotenoids are most famous for their potent antioxidant powers. Oxidation is the process that makes iron rust and causes fruit to turn brown. It is a normal bodily process that produces a type of internal pollution called free radicals. These unstable compounds can damage the cells of the body and, in turn, can leave the body more vulnerable to cancer, heart disease and the aging process. Even though the body has internal methods to counteract and stabilize these free radicals, it is beneficial to offset this damage and help prevent disease by obtaining additional antioxidant protection through the dietary intake of more carotenoid-rich fruits and vegetables every day. A few minutes of cooking helps release carotenoids in foods and makes them easier to absorb.

### Lutein



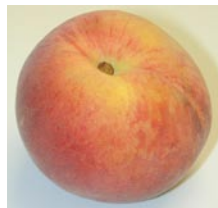
Lutein is a carotenoid pigment that is found in high amounts in kale, spinach, collard greens, turnip greens, Romaine lettuce and broccoli. It is an antioxidant that promotes healthy skin and eyes. Some of the lutein

ingested is deposited in the macula of the eye, represented in *Figure 2*, where it filters or absorbs damaging high-energy blue light from the sun or indoor lighting and helps prevent age-related macular degeneration (AMD). AMD is the leading cause of blindness in older Americans. Studies have shown that an increased consumption of lutein causes serum lutein levels to increase and lutein concentration in the macula to increase. An increased consumption of lutein can decrease the risk of developing AMD. Lutein also is deposited in the skin where it decreases tissue damage and inflammation from ultra-violet light from the sun.



**Figure 2. Illustration of the eye, including macula lutea**

### Beta-carotene



Beta-carotene is the major carotenoid. It is a Vitamin A precursor that helps maintain healthy eyes. It also functions as a powerful antioxidant that helps reduce the risk of cancer and heart disease. Foods rich in beta-carotene often are deep yellow or orange in color, such

as carrots, sweet potatoes, apricots, cantaloupe and peaches. Dark green leafy vegetables also are rich in beta-carotene but the yellow/orange pigment is overshadowed by the more dominant green chlorophyll pigment.

### Lycopene



Lycopene is a red-pigmented carotenoid found in tomatoes, watermelon, red peppers and pink grapefruit. It is an extremely powerful antioxidant that protects against many types of cancers by preventing oxidative damage to the DNA and by preventing the progres-

sion of cancer at an early stage. Lycopene is most known for its association with a decreased risk of developing prostate cancer in men. Several large studies have shown that men who consume tomato products twice weekly compared to no consumption and men with higher blood lycopene levels have a decreased risk of suffering from prostate cancer. Although inconclusive, evidence is beginning to mount in favor of the role of lycopene in the prevention of cardiovascular disease (CVD). Research confirms that cooking or processing tomatoes enhances the body's absorption of lycopene; thus, tomato sauce and spaghetti sauce also are excellent lycopene sources.

### Flavonoids

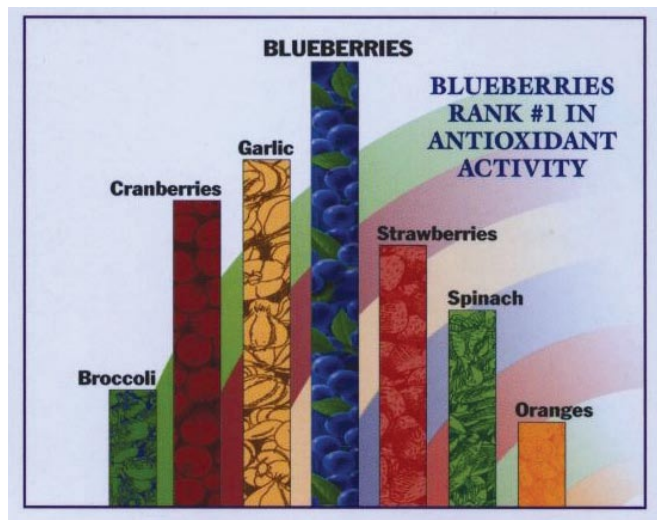
Another large family of protective phytochemicals that contribute to the color, flavor and aroma of fruits and vegetables is the flavonoids. They also are known as polyphenolic compounds and have exhibited antioxidant, anti-carcinogenic and enzyme altering capabilities. Various research studies have indicated, but not proven, their roles in protecting the blood vessels, in stopping or impeding the growth of malignant cancer cells, as a natural antibiotic, in delaying aging effects, in decreasing symptoms of arthritis and in decreasing risk of heart disease. They are used in foods as a preservative to prevent oxidation of fats and also can destroy certain food-borne bacteria. Excellent sources of flavonoids are green tea, blueberries, cranberries, soybeans, citrus fruits, cabbage, peppers, legumes, onions, garlic, oregano and red wine.

### Anthocyanins



Anthocyanins, a type of flavonoid, are water-soluble pigments that give raspberries, blueberries, strawberries, cherries, grapes, radishes and red cabbages their deep red, blue and purple colors. They are powerful

antioxidants, as illustrated in *Figure 3*, which can protect against heart disease, stroke damage, and the initiation and promotion of cancer. Although not proven, these compounds are linked to the retardation of aging, specifically to the improvement of motor skills, reversal of short-



**Figure 3. Antioxidant potential of anthocyanin-rich fruit**

term memory loss and improvement of night vision. Cranberries are well known for their ability to prevent urinary tract infections. Proanthocyanidins, which are found in high concentrations in cranberries, decrease the ability of bacteria to adhere to the cells that line the urinary tract. Even though the scientific evidence is good in humans, the quantity of studies is smaller than the FDA likes; thus, more studies in humans are needed to confirm these health benefits in humans.

### Catechins



Catechins are polyphenolic flavonoid compounds associated with a decreased risk of heart disease and cancer. One catechin with very high free radical scavenging activity is (-)-epigallocatechin-3-gallate, and it is capable of interrupting communication signals needed for survival of cancer cells, such as in blood vessel growth. Green tea, black tea and cocoa are foods extremely rich in catechins. These foods have strong antioxidant activities, are popular worldwide and are virtually nontoxic.

### Quercetin



Quercetin is a flavonoid that possesses potent antioxidant activities believed to be responsible for its association with decreased risk of heart disease, cancer and stomach disease. Quercetin protects cells from damages caused by oxidized LDL-cholesterol. It inhibits the growth of ovarian, breast and colon cancer cells and induces tumor cell death by increasing enzyme activity that will inactivate cancer causing compounds. This antioxidant prevents injury to the stomach and promotes healing of stomach ulcers. Much of the research with quercetin has involved animals, cell culture and epidemiological studies. More clinical/human studies are needed to identify health benefits in humans. High levels of quercetin are found in onions, green apples, broccoli, garlic, pears, grapes, green tea and red wine.

### Isoflavones



Isoflavones are flavonoids found in soybeans. Other sources include yams, carrots, barley, grapefruit, chickpeas and other legumes. They often are referred to as phytoestrogens. As a phytoestrogen they mimic estrogen hormone, by reducing menopausal symptoms and increasing bone density. Isoflavones also may reduce the impact of estrogen on hormone-sensitive cancers. This effect is not certain since some phytoestrogenic compounds, such as genistein from soy, have been shown to stimulate the growth of human breast cancer cells in a laboratory setting. Isoflavones in soy also are antioxidants that may help, along with the protein in soy, prevent cardiovascular disease. Soy isoflavones can inhibit the oxidation of LDL-cholesterol, prevent blood clotting and lower the bad LDL-cholesterol concentration. The FDA has permitted the Health Claim that diets low in saturated fat and cholesterol, and which include

25 grams of soy protein a day, may reduce the risk of heart disease. For a particular food to make this claim it must have at least 6.25 grams of soy protein per serving. An example of a food containing at least 6.25 grams of soy protein per serving is soy nuts as seen in *Figure 4*.

Nutrition Facts	
Serving Size: 1/3 Cup (30g)	
Servings Per Container: About 6	
Amount Per Serving	
<b>Calories</b> 110	Calories from Fat 50
	<b>% Daily Value*</b>
<b>Total Fat</b> 6g	<b>9%</b>
Saturated Fat 1g	<b>5%</b>
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 100mg	<b>4%</b>
<b>Total Carbohydrates</b> 9g	<b>3%</b>
Dietary Fiber 5g	<b>21%</b>
Sugars 3g	
<b>Protein</b> 9g	

**Figure 4. Soy protein-rich soynuts**

### Glucosinolates



Indoles and isothiocyanates are two main categories of glucosinolates, also known as cancer-fighters. Cruciferous vegetables, such as broccoli, cabbage, cauliflower, Brussels sprouts, kale, watercress, radishes, turnips, rutabagas and kohlrabi, have high levels of glucosinolates. Indoles are sulfur-containing compounds that contribute to the strong smells and flavors found in these vegetables. They have important roles in cancer prevention by actually binding to carcinogens and activating enzymes that destroy the carcinogens. Indole-3-carbinol is particularly protective against hormone-induced cancers, such as breast cancer. Isothiocyanates suppress tumor growth, especially those induced by chemical cancer-causing agents. Sulforaphane, a potent isothiocyanate, not only inhibits tumors by the induction of enzymes that eliminate many types of cancer-causing free radicals, but also can be helpful in maintaining stomach health. Sulforaphane can kill different strains of the ulcer-causing *Helicobacter pylori* bacteria. Additionally, it has been shown to protect the stomach against abnormal tissue growth by again activating detoxification enzymes.

### Omega-3 fatty acids



Omega-3 fatty acids are polyunsaturated fatty acids found in cell membranes, especially in the brain and retina. They are needed for normal growth and development. Omega-3 fatty acids promote dilation of blood vessels, decrease blood clotting, lower triglycerides and decrease inflammation. They can possibly help those at risk for cancer, rheumatoid arthritis and cardiovascular disease. The American Heart Association recommends eating two (3-ounce) servings of fatty fish weekly, since they contain high amounts of the omega-3 fatty acids, EPA and DHA fatty acids.

Salmon, tuna, mackerel, sardines, herring and rainbow trout are all examples of fatty fish. Omega-3 eggs, walnuts, canola oil, soybean oil and flaxseed are other sources of omega-3 fatty acids. Fish oil supplements are another choice but their use has led to increased risk of bleeding, impaired diabetic control and other dangers when taken in large amounts. Food sources of omega-3 fatty acids are the best choice.

### Pre- and probiotics



Prebiotics and probiotics have been associated with enhanced gastro-intestinal (GI) tract health. Probiotic foods contain live microorganisms which survive passage through the upper GI tract. One of their known benefits is to reduce the severity of diarrhea. Examples of foods with probiotic properties are fermented dairy products, such as milk and yogurt, containing the lactic acid-producing bacteria, *Lactobacillus acidophilus*. Since the bacteria can convert lactose (milk sugar) to lactic acid, these products may improve tolerance to lactose as well. Prebiotic foods contain an indigestible food ingredient, such as inulin or fructooligosaccharides, which benefits the consumer by stimulating the production of good bacteria or microorganisms in the colon. The good bacteria can help improve one's bowel function. Onions, garlic, wheat, ripe bananas and Jerusalem artichokes are good prebiotic sources. Yogurt with added inulin or fructooligosaccharides also is a good prebiotic source.

## Functional Foods in Your Diet

Research indicates that consumption of the total food is definitely more advantageous than consumption of only one isolated component. A mixture of polyphenols from cranberry fruit, including anthocyanins, proanthocyanidins and flavonols, demonstrated significantly more activity against human tumor cell lines than each individual phytochemical from the cranberry. Consumption of tomatoes in rats was related to a 26 percent lower risk of prostate cancer than control rats; whereas, only minimal protection was found with consumption of purified lycopene alone. Along with lycopene, other carotenoids and polyphenols in tomatoes provide protection against cancer as well. Broccoli's cancer protection is provided by sulforaphane, quercetin and s-methylcysteine sulfoxide that all enhance each other's bioactivity. The antidepressant effects of hypericin in St. John's wort is enhanced by the flavonoid rutin and bisanthraquinone.

The antioxidant and cancer prevention effects of green tea are produced by the many catechins it contains, as well as many other phenolic compounds such as gallic acid, coumaric acid, caffeic acid and quercetin. Oats, including oat bran, rolled oats or whole oat flour, could be helpful for diabetic, blood pressure and weight control. Oats have been approved by the FDA as a Health Claim for their role in lowering cholesterol and decreasing one's risk for coronary heart disease. Oats contain beta-glucan, an oat soluble fiber shown to decrease cholesterol in a dose-dependent manner.

In addition, oats contain other disease-fighting components such as the antioxidant avenanthramide, the Vitamin E antioxidants tocotrienols and tocopherols, the phytoestrogen lignan and saponins.

Many compounds in onions, including the fructan fructooligosaccharide, the flavonoids quercetin and kaempferol, and the sulfur-containing compounds capaenes, thiosulfinate and diallyl sulfide, are responsible for many health properties. These health properties include antioxidation, healing of stomach ulcers, cardiovascular disease protection, maintenance of GI tract health, anti-inflammation, antibacterial action and cancer protection. In central Georgia, where Vidalia onions are grown, the death rates from stomach cancer are half the average U.S. rate. Walnuts have been shown to protect against cardiovascular disease. Researchers have hypothesized that this decreased risk of cardiovascular disease from eating walnuts is from a combination of the fatty acid composition, the high concentration of the protein component arginine, Vitamin E, dietary fiber, beta-sitosterol and many other phytochemicals.

The variety-rich Mediterranean diet also is a prime example of how the benefits from the sum are greater than the benefits from the individual parts. The Mediterranean diet is rich in flavonoids from nuts. It contains many phenolic compounds and beneficial fatty acids from olive oil. It also is well-known for its abundance of grapes, berries and red wine that are rich in stilbenes, proanthocyanins, catechins and other flavonoid and antioxidant compounds. The interaction between these compounds in the many functional foods is thought to promote the cardiovascular health seen in this population (see sample menu). Since these bioactive food compounds work together and with other dietary elements and have different protective roles, such as the elimination of free radicals, the elimination of carcinogens, the ability

### Sample menu rich in functional foods

- Breakfast:** Bowl of oatmeal with walnuts, wheat germ and frozen raspberries  
Omega-3 rich eggs  
Whole wheat toast  
Skim milk  
Orange juice
- Lunch:** Tuna salad on whole wheat bread  
Garden salad including leafy lettuce, tomatoes, carrots, purple onion and bell pepper  
Skim milk  
Green apple
- Supper:** Round steak  
Brown rice  
Broccoli  
Red wine  
Cantaloupe
- Optional snacks:**  
Nuts, yogurt, fruit and green tea

to decrease cholesterol, the promotion of gastro-intestinal health and the reduction of inflammation, it is always recommended for one to consume a variety of healthy functional foods daily.

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## Key Definitions

- Antioxidant** Substance that protects against oxidation and free-radical damage to cells and tissues, including DNA
- Bioactivity** A given compound's effect on a living organism or on living tissue
- Carcinogen** Substance or agent that is capable of causing cancer
- Enzyme** Proteins in the body that accelerate the rate of chemical reactions but are not altered in the process
- Functional food** Foods that contain physiologically active compounds that provide health benefits beyond basic nutrition
- Nutraceutical** Physiologically active components in food that have health-promoting, disease-preventive or medical properties and can be purified to make a dietary supplement or added to a food to increase the amount of those substances in the food
- Phytochemical** Substances in plants that may possess health-protective effects in the plants and in humans if consumed
- Polyphenol** Compounds whose special structure allows them to actively scavenge throughout the body and stabilize damaging free radicals
- Zoochemical** Substances in animals that may possess health-protective effects in the animals and in humans if consumed



**Table II.****Functional food facts**

Functional food	Bioactive component	Health benefit	Recommended intake
Fortified margarines, salad dressings, snack bars and orange juice	Plant sterols and stanols or their esters	Reduce total and LDL (low density lipoprotein) cholesterol	1.3 g/day sterol esters or 0.8 g/day free sterol, 3.4 g/day stanol esters or 2.1 g/day free stanol
Psyllium	Soluble fiber	Reduce total and LDL cholesterol	1 g/day
Soy	Protein and isoflavones	Reduce total and LDL cholesterol	25 g/day
Whole oat products	Beta-glucan	Reduce total and LDL cholesterol	3 g/day
Fatty fish	Omega-3 fatty acids	Reduce triglycerides and reduce heart disease cardiac deaths and heart attacks	Two fatty fish meals per week, approximately 6 ounces
Garlic	Organosulfur compounds	Reduce total and LDL cholesterol	600-900 mg/day or approximately 1 fresh clove daily
Cranberry	Proanthocyanidins	Reduce urinary tract infections	300 ml/day or 10 ounces of 27% juice, 1.5 cups fresh berries, 1 ounce dried cranberries or 1/2 cup cranberry sauce
Jerusalem artichoke, onion, ripe banana	Prebiotics or fructooligosaccharides	Improved gastro-intestinal health	3-10 g/day
Green tea, black tea	Catechins	Reduce risk of certain types of cancer	4-6 cups/ day
Dark green leafy vegetables, such as spinach, kale and collard greens	Lutein	Reduce risk of age-related macular degeneration	6 mg/day
Tomatoes and processed tomato products	Lycopene	Reduce prostate cancer risk	1/2 cup daily
Cruciferous vegetables, such as cabbage	Glucosinolates such as indoles	Reduce risk of certain types of cancer	1/2 cup daily
Grape juice or red wine	Resveratrol	Reduce platelet aggregation or clots	8-16 ounces/day
Fermented dairy products	Probiotics	Improved gastro-intestinal health	1 to 2 billion colony-forming units per day
Tree nuts such as walnuts	Monounsaturated fatty acids and Vitamin E	Reduce risk of coronary heart disease	1-2 ounces daily

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