

Food Nutrients and Health

Dr. Mohamad Nizar Hamad*

Consultant of Arab Federation of Food Industries, Syria

***Corresponding Author:** Dr. Mohamad Nizar Hamad, Consultant of Arab Federation of Food Industries, Syria.

Received: November 01, 2017; **Published:** November 11, 2017

Healthful diets help children grow and perform well in school. A healthy diet allows adults to work productively and feel at their best. Good food choices can help to prevent chronic health issues such as heart disease, certain cancers, diabetes and stroke that are all leading causes of disability and death among humans. A proper diet can also reduce major risk factors for chronic diseases related to obesity, high blood pressure and/or high blood cholesterol.

Coronary Heart Disease by itself is the most common cause of death in the UK. In the year 2010, just below one in five male deaths and one in ten female deaths were from the said disease. According to the British Heart Foundation, heart and circulatory diseases cause more than a quarter of all deaths in the UK accounting for more than 179,000 death cases each year.

Essential Nutrients Contained in the World's Healthiest Foods

People require energy and certain essential nutrients. These nutrients are essential because the body cannot make them on its own and must be obtained from food. These nutrients include the following groups:

- Minerals such as calcium, potassium, iodine, iron, magnesium, chromium, copper, zinc and manganese. Vitamins (A, B6 Thiamin-B1, B2, Niacin, B3 B5, B12, C, D, E and K).
- Fibers, cysteine, enzymes, coenzyme Q, flavonoids, folate, choline, biotin, glutamine and lipoic acid.
- Omega-3 fatty acids.
- Pantothenic acid.
- Proteins.
- Riboflavin.
- Selenium.
- Tryptophan.

Why essential nutrients?

People require energy and certain essential nutrients. These nutrients are essential because the body cannot make them on its own and must obtain them from food such as biotin, niacin-B3, calcium, choline, chromium and pantothenic acid.

Foods also contain fiber and other components that are important for health. Each of these food components has a specific function in the body and they are all required for overall health. For example, people need calcium for strong bones, but many other nutrients also take part in building and maintaining bones. Essential nutrients are multiple to enlist. However, the following is merely a notation of most important ones:

Citation: Dr. Mohamad Nizar Hamad. "Food Nutrients and Health". EC Nutrition SI.01 (2017): 03-12.

- Vitamins: A, Thiamin-B1, Riboflavin-B2, Niacin-B3, B6, B12, C, E, D and K.
- Bulk minerals: Magnesium, Calcium, Phosphorus, Potassium, Sodium, Iodine and Potassium.
- Trace minerals: Arsenic, Boron, Chloride, Chromium, Cobalt, Copper, Iron, Manganese, Molybdenum, Selenium, Nickel, Silicon, Vanadium and Zinc.

The essentiality of certain minerals (Bromine, Fluorine, Lead and Tin) is still in question. Healthful diets help children grow, develop and perform well in school. A healthy diet allows adults to work productively and feel their best.

Good food choices can also help to prevent chronic diseases (heart disease, certain cancers, diabetes, and stroke) which are leading causes of disability and death. A proper diet can reduce major risk factors for chronic diseases such as obesity, high blood pressure and high blood cholesterol. A healthy diet allows adults to work productively and feel their best. Good food choices also can help in prevention of chronic diseases such as heart disease, certain cancers, diabetes and stroke.

Definitions of a nutrient and an essential nutrient?

Nutrients are molecules in food that all organisms need to make energy, grow, develop, and reproduce. Nutrients are digested and then broken down into basic parts to be used by the organism. There are two main types of nutrients, macronutrients and micronutrients. Macronutrients include carbohydrates, proteins, and fats. Micronutrients are vitamins and minerals.

An Essential Nutrient: A substance that must be obtained from the diet because the body cannot make it in sufficient quantity to meet its needs. The six essential nutrients include carbohydrates, protein, fat, vitamins, minerals and water. Foods also contain fiber and other components that are important for health. Each of these food components has a specific function in the body and they are all required for overall health. For example, people need calcium for strong bones, but many other nutrients also take part in building and maintaining bones. One cup of yogurt can be a creamy way to get your daily calcium.

Essential nutrients

Foods also contain fibers and other components that are important for health. Foods high in fiber include many fruits, vegetables, beans and other legumes as well as whole grain products. Some snacks including popcorn and nuts are also high fiber. High-fiber foods help people to feel satisfied, improve digestion and lower bad cholesterol.

Each of the above-mentioned food components has a specific function in the body, as they are all required for overall health. For example, people need calcium for strong bones, but many other nutrients also take part in building and maintaining bones. Adequate calcium intake is necessary for strong and healthy bones. The current recommended calcium intake is between 1,000 mg and 1,300 mg per day. Moreover, two key nutrients are required to build a strong structure, Calcium and Vitamin D:

- Calcium supports your bones and teeth structure.
- Vitamin D improves calcium absorption and adds to bone growth.

The following major minerals are essential for human beings: Calcium, Phosphorus, Magnesium, Sulfur, Sodium, Chloride and Potassium. Two key nutrients are required to build a strong structure: calcium and vitamin D.

Calcium:

- Calcium supports your bones and teeth structure.
- Adequate calcium intake is also necessary for strong and healthy bones. (Vitamin D improves calcium absorption and bone growth).
- Good sources of calcium (more than 300 mg per serving) include any of the following: A-dairy food products such as low-fat milk, cheese and yogurt, B-dark green vegetables such as broccoli, kale and spinach, C-calcium-fortified foods (orange juice and breakfast cereals) and D-dietary supplements can also help fill gaps.

Functions of calcium in human body:

1. Bone and teeth formation,
2. Neural activity,
3. Skeletal muscle activity,
4. Cordial activity,
5. Smooth muscle activity,
6. Cell division and growth and
7. Coagulation of blood.

Adequate calcium intake is necessary for strong and healthy bones. The current recommended intake of calcium is between 1,000 mg and 1,300 mg per day. There are two key nutrients to build a strong structure: calcium and vitamin D:

- Calcium supports your bones and teeth structure.
- Vitamin D improves calcium absorption and bone growth.

The current recommended intake of calcium is between 1,000 mg and 1,300 mg per day.

Good sources (more than 300 mg per serving) of calcium include the following:

- Dairy products such as low-fat milk, cheese, and yogurt.
- Dark green vegetables such as broccoli, kale and spinach.
- In addition, calcium-fortified foods (orange juice and breakfast cereals) and
- Dietary supplements can also help fill gaps.

In addition, other nutrients take part in building and maintaining bones. These nutrients are called bone salts.

Bone salts: The crystalline salts present in bones are called hydroxyapatites, which contain calcium and phosphate. Apart from these substances, some other salts like sodium, potassium, magnesium and carbonate are also present in the bone. The said salts of bones strengthen the bone matrix. Other nutrients take part in building and maintaining bones: manganese, and phosphorus.

Manganese is a mineral found in several foods including nuts, legumes, tea, whole grains and leafy green vegetables. The world healthiest foods rich in manganese include rye, soybeans and oats. It is also found in spelt, brown rice, garbanzo beans, spinach, pineapple, pumpkin seeds, rye and tempeh.

Tempeh, like tofu, is a food product made from soybeans, but it actually has a higher nutritional content than tofu. The soybeans are packed into a cake that is easy to slice and cook. The high protein content of the product tempeh makes it a fantastic alternative to meat (with no cholesterol).

Manganese

This mineral is found in several foods including nuts, legumes, seeds, tea, whole grains and leafy green vegetables. It is considered an essential nutrient. The body requires the availability of this mineral in order to function properly. People use manganese as a medicine. Manganese assists a wide range of bodily functions, including the development of healthy bones, the way the body processes carbohydrates as well as its protective activity in the body.

World's healthiest foods rich in manganese include the following: brown rice, garbanzo bean, pineapples, pumpkin seeds, rye, soybeans, spelt, spinach and tempeh (Figure 1) which is prepared from soybeans and oats. Brown rice (or "hulled" or "un-milled" rice) is whole grain rice. It has a mild, nutty flavor and is chewier. Brown rice is more nutritious than the white virgin that goes rancid more

quickly. Tempeh like tofu is prepared from soybeans with a higher nutritional content. The whole soybeans are subjected to a fermentation process making there-by the product tempeh to maintain a higher and more easily digestible protein content than tofu. The resulting soybeans product is shaped into a cake that is easy to slice and cook. The high protein content of soybeans present in tempeh -with no cholesterol- makes it a fantastic alternative to meat.



Figure 1: Tempeh: A soy beans product.

Phosphorus

1. Works with calcium and magnesium to build and maintain strong bones and teeth.
2. Phosphorus plays a key role in releasing energy from food to fuel our body.

The other principal biological functions of phosphorus are as follows:

3. An essential component of bone, cartilage and the crustacean exoskeleton.
4. An essential component of phospholipids, nucleic acids, phosphoproteins (casein), high-energy phosphate esters (ATP), hexose phosphates, creatine phosphate and several key enzymes.
5. As a component of important biological substances, phosphorus plays a central role in energy and cell metabolism. Inorganic phosphates serve as important buffers to regulate the normal acid base balance (i.e. pH) of animal body fluids.

Dietary Sources of Phosphorus

Phosphorus is a mineral that helps build strong bones and teeth. It assists in the conversion of food into energy and plays a role in metabolism. Phosphorus is found in foods such as high-protein meats and dairy, whole grains as well as chocolate.

Within plant foods including cereals and oilseeds, 50 - 80% of the phosphorus occurs in the form of the calcium or magnesium salt of phytic acid; phytic acid being the hexa-phosphate ester of inositol. This organic form of phosphorus must first be hydrolyzed within the gastro-intestinal tract by the enzyme phytase to inositol and phosphoric acid before it can be utilized and absorbed by the animal. As with calcium the absorption of inorganic phosphorus salts is facilitated by high gastric acidity; the more soluble the salt the higher the availability and absorption of phosphorus.

Dietary sources of phosphorus include the following: di-calcium phosphate, bone meal (20 - 10% P); meat and bone meal, meat meal, white fish meal, shrimp meal, poultry by-product meal, dried poultry manure (5 - 2%), rice bran, rice polishing, wheat bran, wheat mill run, dried brewer's yeast, sunflower seed meal, cottonseed meal, rapeseed meal, sesame seed meal and dried de-lactose whey (2 - 1%).

Absorption of phosphorus

Although soluble phosphorus salts can be absorbed through the skin, fins and gills of fish and shrimp, the concentration of phosphorus in fresh and seawater is low, and consequently body phosphorus requirements are usually met from dietary sources. Within plant

foods, including cereals and oilseeds, 50 - 80% of the phosphorus occurs in the form of the calcium or magnesium salt of phytic acid which is the hexa-phosphate ester of inositol. This organic form of phosphorus must first be hydrolyzed within the gastro-intestinal tract by the enzyme phytase to yield inositol and phosphoric acid before it can be utilized and absorbed.

As with calcium the absorption of inorganic phosphorus salts is facilitated by high gastric acidity; the more soluble the salt the higher the availability and absorption of phosphorus. Although soluble phosphorus salts can be absorbed through the skin, fins and gills of fish and shrimp, the concentration of phosphorus in fresh and seawater is low, and consequently body phosphorus requirements are usually met from dietary sources. Within plant foods -including cereals and oilseeds 50 - 80% of the phosphorus occurs in the form of the calcium or magnesium salt of phytic acid; phytic acid being the hexaphosphate ester of inositol. This organic form of phosphorus should be first hydrolyzed within the gastro-intestinal tract by the enzyme phytase to inositol and phosphoric acid before it can be utilized and absorbed by the animal. As with calcium, the absorption of inorganic phosphorus salts is facilitated by high gastric acidity; the more soluble the salt the higher the availability and absorption of phosphorus.

Food	Content of Phosphorus (g per 100 g edible portion)
Fishes and Shellfishes	(388)
Vegetables	(326)
Meats	(244)
Fruits	(157)
Cereals	(138)
Confectioneries	(113)
Seasonings and Spices	(80)
Pulses	(73)
Milks	(52)
Algae	(47)
Beverages	(43)
Potatoes and Starches	(40)
Nuts and Seeds	(37)
Mushrooms	(36)
Nuts and Seeds	(37)
Eggs	(20)
Prepared Foods	(16)
Sugars and Sweeteners	(8)
Oils	(7)

Table 1: Foods with High and Low Content of Phosphorus.

Magnesium

Works with calcium to maintain healthy bones, it helps release energy from food and to absorb nutrients, as well as regulating mood, nerve and muscle function. Magnesium may play a role in the prevention and/or treatment of the following health conditions: Coronary artery disease, Arrhythmia, Mitral valve prolapse, Congestive heart failure, Hypertension, Diabetes, Osteoporosis, Muscle cramping, Chronic fatigue, Depression, Anxiety, Asthma and Fatty liver disease (NASH).

Benefits of magnesium are far greater than previously imagined

Some early signs of magnesium deficiency to keep an eye out for include:

1- Loss of appetite, 2- Headache, 3- Nausea and vomiting and 4- Fatigue and weakness.

Green leafy vegetables like spinach and Swiss chard are excellent sources of magnesium, as are some beans, nuts and seeds (almonds, pumpkin seeds, sunflower seeds and sesame seeds). Avocados are also a good source of magnesium. Juicing vegetables is an excellent option to ensure attainment of them in your diet.

Five foods with the highest content of magnesium: The foods with highest magnesium content as per a typical serving are the following: halibut, mackerels, boiled spinach, bran, breakfast cereals and almonds.

Sulfur is the sixth most abundant macro-mineral in breast milk and the third most abundant mineral based on percentage of total body weight. The sulfur-containing amino acids (SAAs) are the following: methionine, cysteine, cysteine, homocysteine and taurine. There is strong evidence that sulfur deficiency plays a role in diseases ranging from Alzheimer's to cancer and heart disease.

Particularly intriguing is the relationship between sulfur deficiency and muscle wasting, a signature of end-stage cancer, AIDS, Crohn's disease and chronic fatigue syndrome.

The Roles of Sodium in Human Nutrition?

The sodium in salt plays a key role in several body functions. Sodium is a mineral that your body must have in order to function properly. The primary source of dietary sodium is sodium chloride, or salt more than three-quarters of which comes from processed foods. Although sodium is vital to a number of routine body functions, too much can have adverse effects, particularly for people who are sensitive to sodium. Excessive sodium can cause hypertension, which in turn can lead to other health problems. Closely related to sodium's role in the maintenance of normal fluid levels is the part it plays in controlling body's blood volume and thus blood pressure.

Your body constantly monitors sodium concentrations and blood volume

If blood either volume or sodium levels get too high, your body stimulates your kidneys to excrete excess sodium, returning blood volume to normal levels. Based on an analysis of dietary data, a team of nutritionists in 2004 reported on the major sources of sodium in the diets of Americans.

Seventy-seven percent of the sodium comes from processed foods, while another 12 percent occurs naturally in certain fresh foods such as celery, clams and buttermilk. Another 6 percent comes from salt added at the dining room table and 5 percent is usually added to food during home preparation and cooking.

The USDA's "Dietary Guidelines for Americans 2010" advises keeping sodium intake to a daily maximum of 2,300 milligrams for adults to age fifty and then cutting back to a maximum of 1,500 milligrams for those 51 or older.

The said guidelines also recommend a maximum intake of 1,500 milligrams for people of any age who are African-American or who have hypertension, diabetes or chronic kidney disease. Chloride is found in many chemicals and other substances in the body. An important part of salt is found in many foods and it is used in cooking. Table salt (sodium chloride) is a very important part of our diet. In addition to its nutritional qualities, it is used as a preservative and a flavor enhancer. Many of our foods would taste very different without it, even foods that we do not think of as being salty, like bread and milk. It's such an important part of our diet the tongue has evolved a specialized receptor to detect it.

The Roles of Potassium in Human Nutrition

Potassium helps maintain blood pressure. It is needed for muscle contraction and nerve impulse transmission. Potassium helps in the performance of digestion processes. Potassium is required so that the body works properly. Potassium is a very important mineral for the human body as per the following functions:

Citation: Dr. Mohamad Nizar Hamad. "Food Nutrients and Health". EC Nutrition SI.01 (2017): 03-12.

- Building proteins and muscles,
- Breaking down and use of carbohydrates,
- Maintaining normal body growth,
- Controlling both of the electrical activity and the heart acid-base balance. Many foods contain potassium.

All meats (red meat and chicken) and fish such as salmon, cod, flounder and sardines are good sources of potassium. Soy products and Veggie burgers are also good sources of potassium. Vegetables including broccoli, peas, lima beans, tomatoes, potatoes (especially their skins), sweet potatoes and winter squash are all good sources of potassium.

Fruits that contain significant amounts of potassium include citrus fruits, cantaloupe, bananas, kiwi, prunes, and apricots. Dried apricots contain more potassium than fresh apricots. Milk, yogurt and nuts are also excellent sources of potassium. People with kidney problems, especially those on dialysis, should not eat too many.

Selenium and Human Nutrition

Selenium is an essential trace mineral that assists with cognitive function and fertility. It is important for many bodily processes including cognitive function. To prevent selenium-deficiency diseases in livestock, the element is added to animal feed as required and approved for all species. The element contributes to thyroid hormone metabolism and DNA synthesis. It is present in human tissue, mostly in skeletal muscles. It helps protect against oxidative damage and infection. Human dietary selenium intakes are sub-optimal in many countries but are considered adequate if they reach the currently adopted Recommended Dietary Allowances (RDAs). Their upward revision will be required if the health benefits of selenium are to be fully utilized. Selenium can be found in nuts, tuna, beef, spaghetti, turkey, chicken, eggs, cottage cheese, oatmeal, rice, bread, walnuts and cheddar cheese.

What is a vitamin?

A vitamin is any of a group of organic substances essential in small quantities to normal metabolism, found in minute amounts in natural foodstuffs or sometimes produced synthetically: deficiencies of vitamins produce specific disorders.

A list of vitamins

Vitamin A, Vitamin B1, Vitamin B2, Vitamin B3, Vitamin B5, Vitamin B6, Vitamin B7, Vitamin B9, Vitamin B12, Vitamin C, Vitamin D, Vitamin E, Vitamin K, Biotin, Folic acid, Pantothenic acid and Niacin.

Vitamin A in healthful diets

Nutrients should come primarily from foods. Foods, which are nutrient-dense, contain not only the vitamins and essential minerals, but also dietary fibers and other naturally occurring substances that have positive health effects. Dietary supplements may be advantageous in specific situations to increase the intake of a specific vitamin or mineral.

Foods	Vitamin A per 100 g edible portion
Anglerfish* (liver, raw)	8300 µg
Ayu sweetfish (cultured, viscera, baked)	6000 µg
Chicken offal (liver, raw)	14000 µg
Swine offal (liver, raw)	13000 µg

Table 2: Foods High in Vitamin A (Retinol), per 100g edible portion.

**Anglerfish: A fish that lures prey with a fleshy lobe on a filament arising from the snout, typically with a very large head, wide mouth and a small body and tail.*

Sources of vitamin A include the following: Liver (Pâté), paprika, red pepper, cayenne, chili powder, sweet potatoes, carrots and dark leafy greens, butternut, squash, dried herbs, lettuce, dried apricots and cantaloupe. Whole grains, and fat-free or low-fat milk and milk products are also included in the same category. Many fruits, vegetables and dairy products are also good sources of vitamin A. Some ready-to-eat breakfast cereals are fortified with vitamin A. The following food items are also included in same category: lean meats, poultry, seafood, beans and peas, eggs and nuts and seeds. Beef liver contains high amounts of vitamin A. Other sources of the nutrient include some fish, beans, and nuts. Limit consumption of solid fats (saturated fats and trans- fats), cholesterol, salt (sodium) and added sugars, as well refined grains. It is so important to stay within your calorie needs.

Lamprey (raw): The sea lamprey (*Petromyzon marinus*) is a parasitic lamprey found in the northern Atlantic Ocean along shores of Europe and North America, in the western Mediterranean Sea and in the Great Lakes. It is brown, gray or black on its back and white or gray on the underside and can grow up to 90 cm (35.5 in) long: 8200 µg.

Ayu sweetfish (cultured, viscera, raw): 4400 µg.

Swine (liver paste), butternut squash, dried herbs, lettuce, dried apricots and cantaloupe.

Meat and other proteins

When we think about meat and other proteins, we are primarily concerned with the digestibility of the protein, the amount of B vitamins and minerals as well as the absence of inflammatory compounds.

Cooking meat and other foods containing proteins significantly improves their digestibility. The B vitamin content of meat greatly depends on the cooking method used and the heat applied during cooking. B vitamins are water soluble, meaning they can easily be “washed out” of meat cooked in water by boiling. They are also unstable when subjected to heat and will be degraded into compounds that are not necessarily harmful and not useful to the body. With prolonged cooking times at high temperatures, B vitamins in roasted, grilled, or broiled meat may decline by as much as 40 percent.

Roasting is a good option because the meat juices can be collected and consumed. When grilling these foods contained nutrients are often lost in drippings in dippings. Still, these may be better than water-based methods. Simmering has been shown to result in the loss of up to 60 percent of B vitamins,

Few studies have been performed on minerals in cooked meats, but there is a consensus that minerals are reasonably well retained. Manganese, copper, iron and zinc are thought to be the most stable ones. One study found that most minerals in pork loin increased in content with boiling but subsequently decreased when the cooking process was carried on at higher temperatures. Around 71°C (160°F) seemed to be the sweet spot that provided the peak content for most minerals.



Figure 2: The oxidation of iron atoms in myoglobin.

Antioxidant-rich fats, acidic mediums like wine, vinegar or citrus, natural sweeteners like honey, herbs and spices can all help prevent the formation of toxic compounds.

Cooking temperature also matters as HCA (Hydroxy Citric Acid) content closely parallels the degree of doneness of the meat. In other words, rare meat has much lower levels of said HCA than well-done meat. AGEs follow a similar pattern, as they form when the meat browns (Figure 2). This darkening effect is due to the oxidation state of the iron atoms in myoglobin, a direct result of the Mallard's reaction.

Fats

The primary concern with fats is its liability to oxidation. When oxidized fats are consumed, they become incorporated into circulating lipids and cell membranes. This is thought to be the initiating event in atherosclerosis which is a state of an arteriosclerosis characterized by atheromatous deposits in and fibrosis of the inner layer of the arteries. Poly-unsaturated fats are the most prone to oxidative damage at high temperatures. These can be found in oils used in cooking or in the food itself, in the case of meat and fish.

Omega-3 fatty acids are particularly fragile. Frying tuna has been shown to degrade omega-3s by 70 to 85 percent, while baking or boiling fish has been shown to preserve more omega-3 fatty acids than frying.

It is recommended to use heat-stable fats when cooking at higher temperatures (frying, roasting, grilling, broiling, or stir-frying). Saturated fats like lard, tallow and butter are the most heat stable. Coconut oil has also been shown to hold up to oxidative damage. High-quality avocado oil and extra-virgin olive oil are also good choices due to their high antioxidant content.

Vegetables

Things get a little trickier with vegetables, as the chemistry is very different from one vegetable to the next. The major factors to consider with cooking vegetables include:

- The amount of the tow vitamins: B and C,
- The amount and availability of antioxidants and polyphenols,
- The amount of antinutrients,
- The formation of inflammatory compounds and
- Resistant starch formation.

Vitamin C is abundant in many vegetables, yet it is very unstable when heated. Boiling causes more loss of vitamin C than any other cooking method. One study found that broccoli, spinach and lettuce lose up to 40 to 55 percent of their vitamin C when boiled compared to 21 to 28 percent loss when microwaved and 8 to 14 percent loss when steamed. Another study found that stir-frying resulted in about a 60 percent loss of vitamin C from red cabbage.

Less is known about the effects of cooking vegetables on B vitamins and minerals. Water-based methods of cooking will cause these to leach out into the surrounding water. Gentler cooking methods or microwaving may be the way to go for B vitamins. One study found that microwaved turnip greens retained more B vitamins than greens blanched in boiling water.

As for antioxidants, it depends on the vegetable. One may consider the following findings:

- Microwaving is the best method for retaining antioxidant activity in mushrooms.
- Steaming is best at preserving antioxidants and cancer-fighting glucosinolates in broccoli and cabbage. Boiling increases the antioxidants and carotenoids in carrots and does a better job of preserving said roots than frying or steaming.

Since microwaved, steamed or boiled vegetables do not taste as good as stir-fried or grilled vegetables the addition of oil, butter or meat juice gravy after cooking may behold an easy solution, or to cook the vegetables most of the way before stir-frying for the last few minutes of cooking.

Cooking and cooling potatoes causes some of their starch to convert into resistant starch. This is one instance where frying may be beneficial, as frying potatoes converts the starch into resistant starch, which feeds good gut bacteria and has a lower glycemic index.

Fruits

In most cases a fruit is best eaten raw. Many fruits are an excellent source of vitamin C, which is extremely sensitive to heat.

Nutrient synergy matters

It is important to point out that we do not consume foods in isolation. Rarely one consumes a grilled steak without something else along with it! This is where nutrient synergy comes into play. Cruciferous vegetables, chlorella tablets (Figure 3), the omega-3s, the polyphenols in red wine, tea, and coffee have all been shown to Figure 3- *Chlorella pyrosoda*.



Figure 3: *Chlorella pyrosoda*.

Protect against the negative effects of HCAs (Health Care Answering Services). Antioxidant absorption is also dramatically enhanced by the addition of fat:

- Absorption of beta-carotene is 75 percent in stir-fried carrots, compared to just 11 percent in raw carrots.
- Blood Trans and Cis-lycopene levels increased by 82 percent and 40 percent, respectively, when tomatoes were consumed sautéed in olive oil, compared to zero percent and 15 percent when the same product units were consumed without oil.

Putting the matter altogether

There is no perfect cooking method that retains all of the nutrients in a food. However, cooking meat for shorter periods at lower temperatures will result in the most nutrient retention and least formation of inflammatory compounds. Therefore, take the time to marinate in advance and pay attention to nutrient synergy.

The best method to cook vegetables is that by which you will actually eat them. If that means stir-frying your broccoli in butter instead of steaming, so do it that way. At the end of the day, your enjoyment of food matters and vegetables cooked using any method are better than no vegetables at all.

*Brown rice (“hulled” or “un-milled” rice) is whole grain rice. It has a mild nutty flavor, chewier, more nutritious than white rice. This product becomes rancid more quickly because the bran and germ of which are removed in order to make the resulting product (white rice) containing fats do not spoil becoming rancid. Any rice, including long-grain, short-grain, or sticky rice, may be eaten as brown rice.