

Micro-nutrients



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Micronutrients and their functions, as well as the best food sources

Vitamins are organic substances or groups of related substances found in many foods. They're essential nutrients required in very small amounts to maintain good health. Do you know the best food sources of vitamin C, thiamine, folic acid or magnesium? Do you eat five portions of vegetables and fruit per day? Are you getting enough calcium and vitamin D from your diet to protect your bone health? This pamphlet will guide you on the best food sources of vitamins and minerals to optimize your diet before you consider supplementation at an additional cost.

What are nutrients and micronutrients?

- It is the building blocks of whole foods and other biologically active constituents that are essential for the growth and development of our bodies and the maintenance of its functions.
- Each nutrient has functions and is needed in various quantities. The quantities or nutritional requirements differ between groups of people, and between individuals. These differences are related to an individual's age, sex, height, level of activity and health status.
- The classes of nutrients are macronutrients, **micronutrients** (**vitamins and minerals**), non-nutritive substances and water.
- Vitamins and minerals are micronutrients needed by the body in smaller quantities.

Vitamins, minerals, non-nutritive substances ~ Eat plenty of vegetables and fruit every day. These are organic compounds that cannot be synthesised by the body (*with the exception of a few such as Vitamin D and vitamin K*). They are essential in adequate amounts for the control of metabolic processes, including the metabolism of fats, carbohydrates and protein, into energy.

- Fat-soluble vitamins (*vitamin A, D, E, K*)
- Water-soluble vitamins (*thiamine, riboflavin, niacin, pyridoxine, folate, cobalamin, pantothenic acid, biotin, vitamin C*)
- Non-nutritive substances (*does not provide energy, but may have beneficial effects on your health*) are the phytochemicals that also provide the colour, taste and aroma to fruits and vegetables, starches and pulses. More than 2000 plant pigments are considered phytochemicals and include flavonoids, carotenoids and anthocyanins.

Tips

- Eat a variety of different foods from all the food groups.
- Choose fortified or enriched maize and cereal products.
- Eat at least five portions of fruit and vegetables per day every day! **HERE, MORE IS BETTER!**
- Choose at least one yellow-orange and one dark green vegetable daily.
- Buy vegetables in season, since they are more affordable. Eat a variety of fruit and vegetables. Try a new vegetable and fruit each week.
- Always wash raw fruit and vegetables in clean / safe water.
- Eat the skins where possible.
- Commercially canned or frozen vegetables are also healthy and can be used as a substitute for fresh vegetables.
- Do not leave cut vegetables and fruit in water long before cooking.
- Dairy products and milk are very important for calcium, phosphorus and vitamin D intake.

Use the adjacent table below to plan a healthy varied diet that provides the micronutrients that you need.



For more information on healthy living kindly contact
Nutrition Information Centre Stellenbosch University (Nicus)
 on **021 933 1408** or send an email to nicus@sun.ac.za

Should you have any comments on our range of consumer leaflets, please write to Sarita van Wyk at:
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Vitamins & Minerals	Functions	Let's Shop - Best Food Sources
Vitamin B1 - Thiamin	Necessary to help the body maximize the use of carbohydrates, its major source of energy. Essential for the proper functioning of the heart, nervous system and muscle coordination.	Oats, lean meat (<i>especially pork</i>), offal, whole grain products.
Vitamin B2 - Riboflavin	Aids in carbohydrate, protein and fat metabolism. Promotes growth, needed for healthy eyes, hair, skin and nails.	Milk, liver, eggs, fortified maize meal and enriched breakfast cereals.
Vitamin B3 - Niacin	Required for fat, carbohydrate and protein metabolism. Aids in brain function, keeps nervous system healthy.	Liver, peanut butter, nuts, chicken, beef, tuna, barley, rice, fortified maize meal and enriched breakfast cereals.
Vitamin B5 - Pantothenic acid	Essential for metabolism of fats, carbohydrates and protein and to make fatty acids and cholesterol.	Whole grains, legumes, brewer's yeast, eggs, organ meats.
Vitamin B6 - Pyridoxine	Essential for amino acid and carbohydrate metabolism. Helps the nervous system function properly. Aids in the production of red blood cells.	Wheat bran, liver, brown rice, sunflower seeds, tuna, banana, brewer's yeast, fortified maize meal and enriched breakfast cereals.
Vitamin B12 - Cobalamin	Forms and generates red blood cells, needed for DNA synthesis, maintains a healthy nervous system.	Liver, offal, oily fish, and beef.
Folate	Works with B12 to protect and develop the nervous system, production of RNA and DNA. Needed to produce red blood cells for babies in utero.	Brewer's yeast, liver, dark green leafy vegetables, lentils, chickpeas, kidney beans, nuts, fortified maize meal and enriched breakfast cereals.
Vitamin C	Collagen production. Required for healthy skin, bones, cartilage, teeth and blood vessels. Promotes healing, aids iron absorption.	Guava, canned guava, broccoli, green leafy vegetables, citrus fruits, kiwi and papaya.
Biotin	Essential for energy production and the metabolism of fats and protein. Required for healthy skin and hair.	Eggs, organ meats, brewer's yeast, legumes and nuts.
Vitamin A	Required for healthy skin, eyes and hair. Helps the body resist infection and maintains healthy mucous membranes.	Liver, carrots, dairy foods, sweet potato, pumpkin, mangoes, spinach, fortified maize meal and enriched breakfast cereals.
Vitamin D	Needed for calcium and phosphorus absorption and for healthy bones and teeth.	Dairy products, canned sardines, herrings, tuna, sunflower seeds, egg yolk, fish oils.

Vitamins & Minerals	Functions	Let's Shop - Best Food Sources
Vitamin E	Natural antioxidant, helps healing, prevents scarring. Keeps nerves and red blood cells healthy. Protects cell membranes.	Sunflower seeds, sunflower seed oil, safflower oil, peanut oil, olive oil, almonds and peanut butter.
Calcium	A major component of bones and teeth. Necessary for the clotting of blood, blood pressure regulation, and enzyme regulation.	Dairy products, canned sardines eaten with their bones, enriched soy drinks or orange juice.
Iron	An essential component of haemoglobin, a protein which enables red blood, cells to carry oxygen throughout the body.	Red meat, chicken, liver, fortified maize meal and enriched breakfast cereals, spinach, dried fruits.
Magnesium	In combination with phosphorus and sodium, required for muscle and nerve function. Needed for energy. Maintains bone structure, regulates calcium balance.	Whole wheat bread, nuts, oats, peanut butter, and seeds.
Sodium	Works with potassium to regulate fluid and acid/alkali balance. Responsible for nerve and muscle function.	Table salt
Potassium	Works with sodium to regulate the body's fluid balance, maintains normal blood pressure, heartbeat and nerve impulses.	Spinach, potato, tomato (<i>fresh, puree, canned</i>), sweet potato, banana, mango, grapes.
Phosphorus	Builds and maintains teeth and bones. Plays an essential role in muscle and nerve function and in the quick release of energy.	Meat, fish, dairy products, nuts, whole wheat bread, seeds, nuts.
Zinc	Improves immunity and healing. Needed for healthy eyes, skin, nails, for growth and sexual development, the activity of enzymes, DNA and protein synthesis.	Shellfish, seafood, red meat, liver.
Copper	Needed in brain and red blood cell function, connective tissue synthesis.	Seafood, liver.
Iodine	Essential component of the thyroid hormones which regulates metabolic rate, growth and promote protein synthesis.	Seafood, iodized salt.
Selenium	Works with Vitamin E.	Seafood, organ meats, eggs, whole grain.
Fluorine	Protects teeth against dental decay.	Fluorinated water, tea leaves.