

# Fat and water-soluble vitamins essay sample

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## Fat and Water- Soluble Vitamins

Research the functions, importance, and role of fat- and water-soluble vitamins.

Identify the vitamin classification.

Why are vitamins an important part of daily nutrient intake? What are fat-soluble vitamins? What are high nutrient sources of these vitamins? What are the functions, benefits, deficiency risks, and toxicity risks of fat-soluble vitamins? What are water-soluble vitamins? What are high nutrient sources of these vitamins? What are the functions, benefits, deficiency risks, and toxicity risks of water-soluble vitamins? When it comes to vitamins, many people only think about the pills that you take in the morning to give yourself that daily amount your body requires, well that is a piece. Vitamins are classified into two groups, fat soluble (vitamin A, D, E and K) or water soluble (vitamin B and C). Each of the two groups plays specific roles as they determine how each vitamin acts within the body. Fat soluble vitamins are absorbed into the lipids (fats) that travel through the lymphatic system of the small intestines and into the blood stream to circulate through the body. These fat soluble vitamins are stored in the body's fatty tissues and liver and stay there till bodies uses the vitamins.

These vitamins tend to break down much slower. The body does not use all these vitamins every day so most people will not need vitamin supplements, but because the body doesn't use these vitamins every day and are stored for long periods of time there is a higher risk of toxicity. Eating a normal, well balanced diet will not lead to toxicity in healthy individuals', it becomes more

of a concern of people taking vitamin supplements that contain mega doses of vitamin A, D, E and K (Anderson & Young, 2008). Fat soluble vitamins are not lost when washing or cooking the foods that the nutrients and vitamins are in. Each fat soluble vitamin deficiency can and will affect people, pending on which vitamin the person may become deficient on: Vitamin D deficiency is called osteomalacia, which results from muscle weakness and weak bones. Other risks that increase may be certain cancers, autoimmune disease and hypertension. You can avoid vitamin D deficiency by spending some time outside in the sun. Vitamin E, which is almost impossible to produce, can cause nausea and digestive tract disorder. As vitamin E is very important as it protects vitamin A, C and fatty acids and prevents damage to cell membranes. Vitamin E can be obtained through food sources like vegetable oils, margarine, leafy vegetables, certain nuts and egg yolk. Vitamin K deficiency can create hemorrhaging as vitamin K helps blood to clot. Vitamin K is naturally produced by bacteria in the intestines and helps promote healthy bones, but be aware that people that may take antibiotics may lack vitamin K temporary as the antibiotic may kill some of the bacteria used to kill some infections. Excessive amounts of vitamin K can also cause the break down of red blood cells and create liver damage.

Water soluble vitamins (B-complex and vitamin C), unlike fat soluble vitamin dissolve in water and are not stored and our bodies are in continuous supply of them in our diets. These vitamins are purged in urine as we go to the bathroom. Other ways the vitamins are lost or destroyed is during food preparation or storage. The loss could be minimized with proper storage such as refrigeration and kept away from strong light (Anderson & Young,

2008). Unlike fat soluble vitamins, water soluble vitamins can really only be overdosed through supplementation, which is taking supplements beyond the levels recommended. The overdose and toxicity vary by vitamin. High doses of vitamin C causes nausea, diarrhea and abdominal cramps and with prolong use may also cause kidney stones. Vitamin B6 causes sensitivity to light and numbness in extremities or neuropathy and niacin causes flushing, hot flashes, nausea and dizziness (Jackson, 2011). Three known B-vitamin deficiencies are beriberi, pellagra and pernicious anemia, which are not common in the United States but can occur when people omit certain foods from their diet or over eat certain foods. These vitamins may be obtained but eating different vegetables, fruits, grains, nuts and dairy products. As the same with fat soluble vitamins, water soluble vitamins can have effects should you become deficient in certain vitamins: Vitamin C deficiency can cause easy bruising, dry skin, scurvy and sore joints but having too much may cause bloating, diarrhea, cramps and possible kidney stones. Vitamin C can be obtained through many fruits and dark green vegetables. B-Vitamins can be obtained in many grains, white rice, white flour and pastas. As with grains and rice, these products are normally washed or “polished” prior to being used, washes their outer layers. Because of this thiamin deficiency and beriberi increased. This only happened in some areas.

Overall fat soluble and water soluble vitamins are of great importance to one's body to help maintain, heal, and grow to stay healthy. As we look to avoid not to be deficient in our vitamins by eating the recommended daily allowance (RDA) and attempt to avoid taking supplements unless necessary since most of our food that we intake contain the necessary vitamins for a

healthy body. Of course should one need to take supplements if they are not meeting the RDA, but one should be aware that taking too much of a specific vitamin is just as bad as when one becomes deficient .

A (retinol) (provitamin A, such as beta carotene)

Vitamin A: liver, vitamin A fortified milk and dairy products, butter, whole milk, cheese, egg yolk. Provitamin A: carrots, leafy green vegetables, sweet potatoes, pumpkins, winter squash, apricots, cantaloupe. Helps to form skin and mucous membranes and keep them healthy, thus increasing resistance to infections; essential for night vision; promotes bones and tooth development. Beta carotene is an antioxidant and may protect against cancer. Mild: night blindness, diarrhea, intestinal infections, impaired vision. Severe: inflammation of eyes, keratinization of skin and eyes. Blindness in children. Mild: nausea, irritability, blurred vision.

Severe: growth retardation, enlargement of liver and spleen, loss of hair, bone pain, increased pressure in skull, skin changes.

D

Vitamin D-fortified dairy products, fortified margarine, fish oils, egg yolk. Synthesized by sunlight action on skin. Promotes hardening of bones and teeth, increases the absorption of calcium. Severe: rickets in children; osteomalacia in adults.

Mild: nausea, weight loss, irritability.

Severe: mental and physical growth retardation, kidney damage, movement of calcium from bones into soft tissues. E

Vegetable oil, margarine, butter, shortening, green and leafy vegetables,

wheat germ, whole grain products, nuts, egg yolk, liver. Protects vitamins A and C and fatty acids; prevents damage to cell membranes. Antioxidant. Almost impossible to produce without starvation; possible anemia in low birth-weight infants. Nontoxic under normal conditions.

Severe: nausea, digestive tract disorders.

K

Dark green leafy vegetables, liver; also made by bacteria in the intestine

Helps blood clot

Excessive Bleeding

None Reported

(Anderson & Young, 2008)

Water-soluble vitamins and their characteristics.

Common food sources

Major functions

Deficiency symptoms

Overconsumption symptoms

Stability in foods

Vitamin C (ascorbic acid)

Citrus fruits, broccoli, strawberries, melon, green pepper, tomatoes, dark green vegetables, potatoes. Formation of collagen (a component of tissues), helps hold them together; wound healing; maintaining blood vessels, bones, teeth; absorption of iron, calcium, folacin; production of brain hormones, immune factors; antioxidant. Bleeding gums; wounds don't heal; bruise easily; dry, rough skin; scurvy; sore joints and bones; increased infections. Nontoxic under normal conditions; rebound scurvy when high

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doses discontinued; diarrhea, bloating, cramps; increased incidence of kidney stones. Most unstable under heat, drying, storage; very soluble in water, leaches out of some vegetables during cooking; alkalinity (baking soda) destroys vitamin C. Thiamin (vitamin B1 )

Pork, liver, whole grains, enriched grain products, peas, meat, legumes. Helps release energy from foods; promotes normal appetite; important in function of nervous system. Mental confusion; muscle weakness, wasting; edema; impaired growth; beriberi. None known.

Losses depend on cooking method, length, alkalinity of cooking medium; destroyed by sulfite used to treat dried fruits such as apricots; dissolves in cooking water. Riboflavin (vitamin B2)

Liver, milk, dark green vegetables, whole and enriched grain products, eggs. Helps release energy from foods; promotes good vision, healthy skin. Cracks at corners of mouth; dermatitis around nose and lips; eyes sensitive to light. None known.

Sensitive to light; unstable in alkaline solutions.

Niacin (nicotinamide, nicotinic acid)

Liver, fish, poultry, meat, peanuts, whole and enriched grain products. Energy production from foods; aids digestion, promotes normal appetite; promotes healthy skin, nerves. Skin disorders; diarrhea; weakness; mental confusion; irritability. Abnormal liver function; cramps; nausea; irritability.

Vitamin B6 (pyridoxine, pyridoxal, pyridoxamine)

Pork, meats, whole grains and cereals, legumes, green, leafy vegetables. Aids in protein metabolism, absorption; aids in red blood cell formation;

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helps body use fats. Skin disorders, dermatitis, cracks at corners of mouth; irritability; anemia; kidney stones; nausea; smooth tongue. None known.

Considerable losses during cooking.

Folacin (folic acid)

Liver, kidney, dark green leafy vegetables, meats, fish, whole grains, fortified grains and cereals, legumes, citrus fruits. Aids in protein metabolism; promotes red blood cell formation; prevents birth defects of spine, brain; lowers homocystein levels and thus coronary heart disease risk. Anemia; smooth tongue; diarrhea.

May mask vitamin B12 deficiency (pernicious anemia).

Easily destroyed by storing, cooking and other processing.

Vitamin B12

Found only in animal foods: meats, liver, kidney, fish, eggs, milk and milk products, oysters, shellfish. Aids in building of genetic material; aids in development of normal red blood cells; maintenance of nervous system. Pernicious anemia, anemia; neurological disorders; degeneration of peripheral nerves that may cause numbness, tingling in fingers and toes. None known.

Pantothenic acid

Liver, kidney, meats, egg yolk, whole grains, legumes; also made by intestinal bacteria. Involved in energy production; aids in formation of hormones. Uncommon due to availability in most foods; fatigue; nausea, abdominal cramps; difficulty sleeping. None known.



About half of pantothenic acid is lost in the milling of grains and heavily refined foods. Biotin

Liver, kidney, egg yolk, milk, most fresh vegetables, also made by intestinal bacteria. Helps release energy from carbohydrates; aids in fat synthesis.

Uncommon under normal circumstances; fatigue; loss of appetite, nausea, vomiting; depression; muscle pains; anemia. None known.

(Anderson & Young, 2008)

## References

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