

SAFETY OF VITAMINS AND MINERALS

Over the past 20 years, there has been an abundance of data accumulating regarding the safety of vitamins and minerals. The data demonstrates that these nutrients are safe over a wide range of doses, though some nutrients can cause adverse reactions at high doses. However, few such cases have been reported. The FDA estimates that about 40% of the public uses nutritional supplements, a number that is growing yearly.

The most commonly used of all vitamin supplements is **Vitamin C**. Theoretically, very high doses of Vitamin C can cause the formation of oxalate kidney stones, but this happens rarely. The only real clinical side effect often observed with high doses of Vitamin C is a mild diarrhea, which is a good indicator of the dose that your body can tolerate. Some studies have shown that for illnesses that benefit from high doses of Vitamin C, the body can adapt to and tolerate higher and higher doses as its requirement for Vitamin C conditionally increases.

One of the vitamins most commonly discussed in relation to toxicity is **Vitamin A**. Many feel that doses should not exceed 25,000 IU (International Units) per day. However, for certain conditions, higher doses are recommended for brief periods of time. Studies have shown that high doses of Vitamin A can have beneficial effects against certain viruses. Your naturopathic doctor will be able to advise you as to the proper dose for you. Reports of serious adverse reactions to Vitamin A have been few. Acute toxicity occurred in Arctic explorers who consumed polar bear liver containing 2,000,000 IU of Vitamin A per 100 grams (3.5 ounces) of liver. Children given high doses have also shown symptoms of acute toxicity. Vitamin A should only be taken in small doses by pregnant women due to its ability to cause birth defects at normal adult doses. Toxic symptoms have been shown to occur with adult doses of 25,000 IU per day and child doses of 10,000 IU per day if there is no deficiency present. Early signs of toxicity include headaches, dry skin, nausea, diarrhea and hair loss.

The recommended daily allowance of **Vitamin D** is 400 IU per day, which is also the standard dose prescribed by naturopathic doctors. Extremely high doses of Vitamin D can cause an excess of calcium in the blood and urine, allowing calcium deposits to form in the body. Usually, this occurs with doses of 50,000 IU per day, much higher than the usual dose. Vitamin D toxicity is more likely to occur in infants and children. Acute overdosing can cause increased urination, nausea, diarrhea, loss of appetite, weakness, and dizziness.

Niacin is one of the B vitamins (vitamin B3). In general, there is little toxicity associated with water-soluble vitamins (B vitamins and Vitamin C) because the body can usually excrete excesses in the urine, as opposed to storing excess amounts in the body as with oil soluble vitamins (A, D, E, and K). However, large doses of some B vitamins can cause imbalances in others through excess excretion in the urine. In its nicotinic acid form, large doses of niacin can cause damage to the liver. This form can also cause a flushing of the skin accompanied by itching. The latter symptoms usually pass within 15 minutes and this reaction can be avoided completely by giving the niacinamide form of the vitamin.

Vitamin B6 (pyridoxine) appears to be safe at doses of 200 milligrams (mg) daily. Problems with the nervous system have been known to occur with daily doses of 2,000 mg, but have even been reported with daily doses as low as 500 mg.

Para-aminobenzoic acid (PABA) is a B vitamin, which has come to prominence for its usefulness in topical sun protection products, although it also has internal uses. Unlike most water-soluble vitamins, PABA can be stored in the tissues and chronic high doses of PABA can cause nausea or damage to liver, heart, and kidneys. Evidence suggests that **Vitamin E** has a low level of toxicity. The main concern is that high doses of Vitamin E raise blood pressure. One should also consult one's physician regarding Vitamin E dosage when taking anti-coagulant medications or prior to surgery.

Vitamin K has no symptoms of toxicity in its natural form. However, synthetic forms can cause red blood cells to break down, as well as cause flushing, sweating and chest constriction. It is felt that any form of Vitamin K can counteract anti-coagulant drugs because of its ability to cause calcium to be bound by glutamic acid.

As mentioned earlier, excessive levels of **calcium** in the presence of excessive levels of Vitamin D can cause calcium deposits in the body. It can also interfere with nerve and muscle function in excess, although it is required in adequate amounts for the healthy function of these organs.

Copper is a mineral necessary for the formation of hemoglobin, the compound that transports oxygen in red blood cells, but high levels can inhibit the body's usage of **zinc**, a mineral required for many enzymatic reactions. Excess can also cause various mental illnesses, high blood pressure, insomnia, senility and hypoglycemia. The recommended daily allowance is 2 milligrams, which is usually adequately provided by diet. Copper is also stored in the body. The main concern for supplementation is with infants who are being given cows' milk rather than being breast-fed.

Iodine is a mineral required for the synthesis of thyroid hormones. It also has antibacterial activity. However, large amounts of iodine can shut down the thyroid gland, causing symptoms such as weight gain, constipation, dry skin and hair and excessive menstrual bleeding.

Iron is required for the formation of healthy red blood cells and is another mineral that is safe within its therapeutic range, but can create problems if given in high amounts. More benign symptoms of excessive iron include constipation, headache, fatigue and weight loss. On a more serious level, excessive amounts can be stored in various tissues and damage heart, liver and pancreas. Some feel that iron should only be supplemented if there is a need, as in excessive menstrual bleeding or other forms of blood loss. Only certain anemias require or benefit from iron supplementation, although iron is often mistakenly prescribed for all anemias. It is also thought that bacteria benefit from iron, so supplementation should be avoided during bacterial infections, upholding the body's own natural response of sequestering iron away during such infections.

Phosphorous does not directly cause toxicity symptoms, but high intake (common in diets high in animal products and soft drinks) can impair the body's ability to use **calcium**, which is necessary for bones, muscles, nerves and blood clotting.

Selenium is a very valuable mineral, primarily because of its antioxidant capabilities. However, it is only needed in small amounts, although the required amount usually exceeds dietary intake. In the U.S., 12 cases of toxicity were reported when a manufacturer accidentally used 100 times the standard dose. However, the product was recalled and the error quickly corrected. The form of selenium also makes a difference, sodium selenite being the most problematic. Symptoms include problems with hair, teeth, nails, skin and energy levels.

All of these vitamins and minerals are safe and beneficial within their respective therapeutic ranges. While many nutrients have possible adverse reactions, these usually occur at dosages far surpassing amounts usually prescribed. In terms of fatalities due to poisoning, there has been only one possible occurrence of a fatality due to nutrient poisoning reported to a poison control center from 1983-1987, as compared to the 1132 reported cases of fatalities due to prescription and over-the-counter drugs during those years. Of course, that does not even begin to cover the vast number of adverse reactions people can have to almost every drug in existence. With that in mind, although it is certainly advisable to consult a knowledgeable health care provider regarding dosages of nutrients, for the most part, vitamins and minerals are very safe therapeutic agents.

Resources Gaby, Alan. Nutritional Therapy in Med. Practice. Nutrition Seminars, Seattle, WA. 2001.

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