Evidence-based Vitamin C Usage

Name(s): Ascorbic acid, D-isoascrobic acid

Warning: Iron should not be taken at the same time as antioxidants.

Description: This is probably the most common water-soluble vitamin. Vitamin C is a simple compound composed of glucose and a carbon. Not all species need to consume ascorbic acid, only humans, guinea pigs, 1 species of birds and 1 species of monkeys. All the other species are able to synthesize this vitamin internally. Vitamin C is extremely sensitive to everything; however, it is stable in an acidic environment. The conversion of the inactive form of folic acid to the active form called folinic acid is dependent upon vitamin C. This vitamin is also known for its antioxidant properties. It protects thiamine, riboflavin, folate, pantothenic acid, vitamin A, and vitamin E from oxidation and destruction caused by free radicals.[1]

Absorption/Storage: Tensions and frustrations will deplete the small amounts of vitamin C that are available for use. Remember, the larger the dose the less absorbed. The reasoning behind this is since vitamin C is easily destroyed and since it is water-soluble, the body uses what is needed and the rest is excreted through urination and perspiration. There is no need to take a large amount when the body may not even use it and it is wasted. The mucous membranes of the mouth, stomach, and small intestine are the sites of absorption.[1]

Recommended Dietary Allowance/Dietary Reference Intake: [2]

Persons	U.S. (mg)
Birth to 3 years of age	15-50
4 to 8 years of age	25
9 to 13 years of age	45
Adolescent and adult males	75-90
Adolescent and adult females	65-75
Pregnant females	80-85
Breast-feeding females	115-120

Optimum Daily Allowance (Adult): 1000-3000 mg.[3]

Tolerable Upper Intake Levels: [2]

Persons	U.S. (mg)
Birth to 3 years of age	ND-400
4 to 8 years of age	650
9 to 13 years of age	1200
Adolescent and adult males	1800-2000
Adolescent and adult females	1800-2000
Pregnant females	1800-2000
Breast-feeding females	1800-2000

Principal Uses: Cancer prevention,[4-11] reduce risk for cardiovascular disease,[12-14] cataracts and macular degeneration (with zinc),[15-22] high cholesterol (decreases total cholesterol and increases HDL),[23-30] reduce cold symptoms,[31-40] prevent colds after heavy endurance exercise,[41,42] and glaucoma,[43,44] sunburn protection (with Vitamin E),[45-51] wound healing,[52-56] and scurvy.

Proposed Uses: Asthma, atherosclerosis, athletic performance (for exercise recovery), autism, cold sores, diabetes, dysmenorrhoea (plus vitamin B3 [niacin] and rutin), gastritis, gingivitis (periodontal disease) (in combination with flavonoids), immune function, influenza, iron-deficiency anaemia (as an adjunct to supplemental iron), lead toxicity, pancreatic insufficiency, pre- and post-surgery health (if deficient), preeclampsia (in combination with vitamin E; for high risk only), schizophrenia, skin ulcers, sprains and strains.[57]

Traditional Uses: Age-related cognitive decline, alcohol withdrawal support, amenorrhoea, bipolar disorder/manic depression, boils (recurrent furunculosis), chronic obstructive pulmonary disease (COPD), colon cancer (reduces risk), diabetic retinopathy (in combination with selenium, vitamin A, and vitamin E), ear infections (recurrent), eczema, gallstones, gout, hay fever, heart attack (for those not deficient), hepatitis, high blood pressure, HIV support (oral and topical), hives, hypoglycaemia, leukoplakia, low back pain, menopause, menorrhagia (heavy menstruation), morning sickness, Parkinson's disease (in combination with Vitamin E), peptic ulcer, progressive pigmented purpura (in combination with rutoside), prostatitis (acute bacterial prostatitis, chronic bacterial prostatitis), retinopathy (in combination with selenium, vitamin A and vitamin E), sickle cell anaemia, sinusitis, tardive dyskinesia, urinary tract infection and vitiligo.[57]

Healthy Sources:
High (40%+ US RDA): Acerola, asparagus, blackeye peas, broccoli, cabbage, cantaloupe, cauliflower, Brussels sprouts, Chinese cabbage, collard leaves, elderberries, sweet

green peppers, grapefruit, green onions, green peas, guavas, kale leaves, lemon juice, young lima beans, loganberries mangoes, mustard greens, New Zealand spinach, okra, oranges, papayas, parsley, radishes, raspberries, sweet red peppers, persimmons, red cabbage, strawberries, soybeans, spinach, Swiss chard, tangerines, turnip greens, turnips, watercress and yellow summer squash.[58]

Medium (25-39% US RDA): Honeydew melon and tomatoes.[58]

Contraindications: If you are taking this dietary supplement without a prescription, carefully read and follow any precautions on the label. For vitamin C, the following should be considered:

Allergies--Tell your health care professional if you have ever had any unusual or allergic reaction to ascorbic acid. Also, tell your health care professional if you are allergic to any other substances, such as foods, sulphites or other preservatives, or dyes.

Pregnancy--It is especially important that you are receiving enough vitamins when you become pregnant and that you continue to receive the right amount of vitamins throughout your pregnancy. Healthy foetal growth and development depend on a steady supply of nutrients from mother to foetus. However, taking too much vitamin C daily throughout pregnancy may harm the foetus.

Breast-feeding--It is especially important that you receive the right amounts of vitamins so that your baby will also get the vitamins needed to grow properly. You should also check with your doctor if you are giving your baby an unfortified formula. In that case, the baby must get the vitamins needed some other way. However, taking large amounts of a dietary supplement while breast-feeding may be harmful to the mother and/or baby and should be avoided.

Children--Problems in children have not been reported with intake of normal daily-recommended amounts.

Older adults--Problems in older adults have not been reported with intake of normal daily-recommended amounts.

Medicines or other dietary supplements--Although certain medicines or dietary supplements should not be used together at all, in other cases they may be used together even if an interaction might occur. In these cases, your health care professional may want to change the dose, or other precautions may be necessary. Tell your health care professional if you are taking any other dietary supplement or any prescription or non-prescription (over-the-counter [OTC]) medicine.

Other medical problems--The presence of other medical problems may affect the use of vitamin C. Make sure you tell your health care professional if you have any other medical problems, especially:

- Blood problems--High doses of vitamin C may ca use certain blood problems
- Diabetes mellitus (sugar diabetes)--Very high doses of vitamin C may interfere with tests for sugar in the urine
- Glucose-6-phosphate dehydrogenase (G6PD) deficiency--High doses of vitamin C may cause haemolytic anaemia
- Kidney stones (history of)--High doses of vitamin C may increase risk of kidney stones in the urinary tract.[59]

Interactions:

Decreases Vitamin Availability:	Ampicillin, epinephrine and oral corticosteroids,[57] aspirin, indomethacin, oral contraceptives, tetracyclines,[57,60] alcohol, charcoal, copper (high dose) and fibre supplements.[60]
Increases Vitamin Availability:	Bioflavinoids, calcium, magnesium.[3] and selenium.[60]
Is Decreased By Vitamin Availability:	Amphetamines, Cardec DM, side effects of clozapine, fenofibrate, minocycline and tacrine,[57] cardiotoxicity of doxorubicin, warfarin,[57,60] antipsychotic agents, beta blockers, L-carnitine, copper, side effects of ulcer medications,[60] and excretion of drugs that are weak acids.[61]

Is Increased By Vitamin Availability:	Acetaminophen, carbidopa, chemotherapy drug effectiveness, levodopda, isosorbide mononitrate efficacy over time, neuroleptic drugs, nitroglycerine efficacy over time, perphenazine,[57] flavinoids, vitamins A, B6, E,[60] excretion of drugs that are weak bases,[61] iron,[62] and elimination of amphetamines and phencyclidine.[63]
Adverse Reactions:	Iron and phenothiazines.[60]

Deficiency: The need for vitamin C was discovered by sailors that were out to sea and they were becoming ill. These men were experiencing bleeding gums, easy bruising, and as it went along their muscles and joints became unstable. The only thing they had left to eat were limes. As these sailors consumed these limes their health began to improve. Come to find out, what these men were experiencing was a vitamin C deficiency known as scurvy and the limes they were eating contained vitamin C. Other complications that might be experienced are tangled and dry hair, nosebleeds, swollen or painful joints, slow healing of wounds, and problems with the teeth.[1]

Toxicity/Side Effects: Along with its needed effects, a dietary supplement may cause some unwanted effects. Although not all of these side effects may occur, if they do occur, they may need medical attention.

Check with your health care professional as soon as possible if the following side effect occurs:

Less common or rare--with high doses
- Side or lower back pain

Other side effects may occur that usually do not need medical attention. These side effects may go away during treatment as your body adjusts to the dietary supplement. However, check with your health care professional as soon as possible if any of the following side effects continue or are bothersome:

Less common or rare--with high doses [1 gm/day or more]
- Diarrhoea; dizziness or faintness (with the injection only); flushing or redness of skin; headache; increase in urination (mild); nausea or vomiting; stomach cramps

Other side effects not listed above may also occur in some individuals. If you notice any other effects, check with your health care professional.[59]

Treatment For Overdose: Activated charcoal with a laxative. Dilution with water or milk may minimise chances of oesophageal injury.[63]

Storage: To store this dietary supplement:
- Keep out of the reach of children.
- Store away from heat and direct light.
- Do not store in the bathroom, near the kitchen sink, or in other damp places. Heat or moisture may cause the dietary supplement to break down.
- Do not keep outdated dietary supplements or those no longer needed. Be sure that any discarded dietary supplement is out of the reach of children.[59]

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