Vitamin C (Ascorbic acid)

Top Food Sources per Calorie (*WHF* p. 794)					
Food	Sv. Size	Cals	Amt (gms)	DV (%)	Vit or Min/Cal. (Density)
Bell peppers	1 cup	25	174.8	291.3	211.1
Parsley	2 TBS	3	10	16.6	110.8
Broccoli	1 cup	44	123.4	205.7	84.8
Strawberries	1 cup	43	81.7	136.1	56.7
Cauliflower	1 cup	29	54.9	91.5	57.8
Lemon juice	.25 cup	15	28.1	46.8	55.2
Romaine lettuce	2 cups	16	26.9	44.8	51.4
Brussel sprouts	1 cup	61	96.7	161.2	47.7
Papaya	1 each	119	187.9	313.1	47.5

Public Health Recommendations (*IMNAS*)				
RDA (age group)	RDA/AI* (amt.) (in mg/d)	Sugg. Optimal RDA	UL (in mg/d)	Toxicity
Infants 0–6 mo.	40		ND	Short-term: usually 10> g Long-term >3 g/day (*TXTNM* p. 1391)
Infants 7–12 mo.	50		ND	
Children 1–3 yrs	15		400	
Children 4–8 yrs	25		650	
Males 9–13 yrs	45		1,200	
Males 14–18 yrs	75		1,800	
Males 19+ yrs	90		2,000	
Females 9–13 yrs	45		1,200	
Females 14–18 yrs	65		1,800	
Females 19+ yrs	75		2,000	
Pregnancy ≤ 18 yrs	80		1,800	
Pregnancy 19–30 yrs	85		2,000	
Pregnancy 31–50 yrs	85		2,000	
Lactation ≤ 18 yrs	115		1,800	
Lactation 19–30 yrs	120		2,000	
Lactation 31–50 yrs	120		2,000	

Kale	1 cup	36	53.3	88.8	43.9
Kiwifruit	1 each	46	57	95	36.9
Cantaloupe	1 cup	56	67.5	112.5	36.2
Oranges	1 each	62	69.7	116.2	34
Grapefruit	0.5 each	60	66	110	33
Cabbage	1 cup	33	30.2	50.3	27.4
Tomatoes	1 cup	38	34.4	57.3	27.3
Swiss chard	1 cup	35	31.5	52.5	27
Collard greens	1 cup	49	34.6	57.6	21
Raspberries	1 cup	60	30.8	51.3	15.3
Asparagus	1 cup	43	19.4	32.4	13.5
Celery	1 cup	19	8.4	14	13.1
Spinach	1 cup	41	17.6	29.4	12.8
Pineapple	1 cup	76	23.9	39.8	9.4
Green beans	1 cup	44	12.1	20.2	8.3
Summer squash	1 cup	36	9.9	16.5	8.3

Functions of Vitamin C

- Helps protect cells from free radicals (*WHF* p. 794)
- Regenerates vitamin E supplies (*WHF* p. 794)
- Improves iron absorption (*WHF* p. 794)
- Lowers risk of cancer (*WHF* p. 794)
- Promotes tissue healing and tissue integrity (*NTMP* p. 22)
- Enhances immune function (*NTMP* p. 22)
- Functions as an antioxidant (*NTMP* p. 22)
- Helps to manufacture adrenal cortical hormones, polysaccharide and collagen (p. 114)
- Forms bones, teeth, cartilage, and keeps up capillary permeability (*NON* p. 114)
- Prevents oxidation of nutrients within the body (*NON* p. 114)
- Promotes growth and wound healing (*NON* p. 114)
- Forms white blood cells which fight infection (*NON* p. 115)
- Detoxifies drugs and environmental poisons in the system (*NON* p. 115)
- Fights off emotional and environmental stress and protects the circulatory system from fat deposits (*NON* p. 115)

Causes and Symptoms of Deficiency

- A common contributor to vitamin C deficiency is an inadequate intake of vitamin C-rich fruits and vegetables (*WHF* p. 795).
- An increased risk of vitamin C deficiency can result from smoking and exposure to second hand smoke (*WHF* p. 795).
- High levels of toxic exposure can be a risk factor for a deficiency in vitamin C because the body uses vitamin C, potentially depleting it, when the body is exposed to large amounts of toxins (*WHF* p. 795).
- Aspirin may promote vitamin C deficiency (*NTMP* p. 24).
- High doses of vitamin C might interfere with some narcotics and some general anesthetics (*NTMP* p. 24).

Events that indicate a need for more vitamin C-rich food include

- Poor wound healing (*WHF* p. 794)
- Frequent colds or infections (*WHF* p. 794)
- Lung-related problems (*WHF* p. 794)
- Tendency to bruise easily (*PNH* p.26)
- Joint pains (*PNH* p.26)
- Lack of energy (*PNH* p.26)
- Poor digestion (*PNH* p.26)

Symptoms of full-blown vitamin C deficiency disease include

- Bleeding gums (*WHF* p. 795)
- Skin discoloration due to ruptured blood vessels (*WHF* p. 795)

Impact of Cooking, Storage, and Processing

- Because vitamin C is very sensitive to air, water, and temperature, consuming foods rich in vitamin C in their raw, fresh state will maximize intake of the vitamin (*WHF* p. 794).
- 25% of vitamin C can be lost from blanching or freezing and then thawing fruits and vegetables (*WHF* p. 795).
- More than 50% of vitamin C can be lost by cooking fruit and vegetables for 10–20 minutes (*WHF* p. 795).
- 2/3 of vitamin C can be lost when fruits and vegetables are canned and reheated (*WHF* p. 795).

Toxicity:

- Reports have indicated that Vitamin C has perhaps the lowest toxicity of all vitamins (*TXTNM* p. 1391).
- In relation to food and diet, vitamin C has no documented toxicity effects. 2,000 milligrams (2 grams) is the Tolerable Upper Intake Level (UL) for vitamin C is, which is an amount difficult to achieve through food sources alone (*WHF* p. 795).
- In the short term, taking more than 10g/ day of vitamin C can lead to abdominal pain, diarrhea, flatulence, and nausea (*NTMP* p. 25; *TXTNP* p. 1390). Acute illness may increase the "bowel tolerance" dose of vitamin C, which varies from individual to individual (*NTMP* p. 25).

- Reducing the dose, taking vitamin C in divided doses, taking the vitamin with meals, or using buffered forms of vitamin C may help eliminate gastrointestinal side effects (*NTMP* 25).
- High doses of vitamin C can increase the absorption of iron (*TXTNP* p. 1390), so if one is prone to iron overload vitamin C ingestion could cause problems (*NTMP* p. 25).
- Large doses of vitamin C can also interfere with some laboratory test parameter such as stool occult blood, glucose, serum B_{12}, bilirubin, aminotransferases) (*TXTNP* p. 1390; *NTMP* p. 25).
- In extremely rare cases, taking high levels of vitamin C (more than 3g/day) in the long term can lead to an increase in oxalate and uric acid levels (*TXTNP* pp. 1390–1391).
- Though there is some evidence to support the role of vitamin C in preventing kidney stones, those who have a rare genetic defect in oxalate metabolism, are undergoing hemodialysis, or suffering from recurrent kidney stones, severe kidney disease, or gout may be at increased risk for kidney stones from high doses (*NTMP* p. 25).
- Breast-fed infants may develop colic if their mother ingests large doses of vitamin C" (*NTMP* p. 25).
- Though controversial, some reports suggest that "rebound scurvy" can occur after abrupt cessation of large doses of vitamin C. The claim that rebound scurvy can occur in infants whose mother took large doses of vitamin C during pregnancy is also questionable (*NTMP* p. 25; *TXTNP* p. 1391).
- Though there is no clinical evidence to support that large doses of vitamin C in people with inflammatory diseases (e.g., Crohn's disease or rheumatoid arthritis) can interact with metal ions, resulting in a "proantioxidant consequence," there is theoretical concern that such a consequence could occur (*TXTNM* p. 1391).

Date Discovered

First isolated in 1928 by Albert Szent-Gyorgi, vitamin C was identified as the "antiscorbutic principle" (ENS p. 60)

Book Reference List:
(with abbreviations. for reference citing)

1. The World Healthiest Foods (WHF)
2. Textbook of Natural Medicine (TXTNM)
3. Nutritional Therapy in Medical Practice (NTMP)
4. Natural Medicine, Optimal Wellness (NMOW)
5. Prescription for Nutritional Healing (PNH)
6. Alternative Medicine, the Definitive Guide (AMDG)
7. What the Drug Companies Won't Tell You and Your Doctor Doesn't Know (DrugCo)
8. Putting it All Together: The New Orthomolecular Nutrition (*NON*)
9. Orthomolecular Medicine for Everyone (OME)
10. Juiceman's Power of Juicing (JPJ)
11. Juice Alive (JA)
12. Dr. Jensen's Juicing Therapy (DJJT)
13. Fresh Vegetable and Fruit Juices (FVFJ)
14. Institute of Medicine at the National Academy of Sciences (IMNAM)
15. Encyclopedia of Nutritional Supplements (ENS)