3050 Spruce Street
Saint Louis, Missouri 63103 USA
Telephone 800-325-5832 • (314) 771-5765
Fax (314) 286-7828
email: techserv@sial.com
sigma-aldrich.com

ProductInformation

Ascorbic acid

Product Number **A 7506**
Store at Room Temperature

Product Description

Molecular Formula: $C_6H_8O_6$
Molecular Weight: 176.1
CAS Number: 50-81-7
pK_a: 4.17 and 11.57[1]
Melting Point: 190-192 ºC[1]
Extinction Coefficient: E^{mM} = 7.0 (265 nm, water), 7.5 (245 nm, acid)[2]
Rotation: +20.5º to +21.5º (100 mg/ml H_2O, 25 ºC) [3]
Synonym: Vitamin C

Ascorbic acid is a powerful water-soluble antioxidant that is vital for the growth and maintenance of all body tissues. Vitamin C plays a vital role in the production of collagen, an important cellular component of connective tissues, muscles, tendons, bones, teeth, and skin. It catalyzes the hydroxylation of prolyl and lysyl residues in the collagen polypeptide chains, allowing interaction of the collagen subunits, adding structural stability to the collagen fibers.[8] In addition, ascorbic acid has a detoxifying effect on liver.[9]

It is also required for the synthesis of the neurotransmitters, norepinephrine and serotonin. It catalyzes the conversion of dopamine to norepinephrine and the conversion of tryptophan to serotonin. Ascorbic acid is also necessary for the synthesis of steroid hormones and carnitine, and for the conversion of cholesterol to bile acids. It has been shown to enhance iron bioavailability.

Ascorbic acid also promotes healthy cell development, proper calcium absorption, and normal cell growth and repair. It assists in the prevention of blood clotting and bruising, and strengthens capillary walls.

A review of the properties of L-ascorbic acid has been published.[4, 5, 6] Test procedures used to determine vitamin C in juices and foods have been described.[7]

Precautions and Disclaimer

For Laboratory Use Only. Not for drug, household or other uses.

Preparation Instructions

This product is soluble in water (50 mg/ml), yielding a clear solution.

Storage/Stability

Aqueous solutions are stable only in the absence of oxygen. Aqueous solutions are most stable at pH 5-6, and very unstable at alkaline pH.[2] Degradation is markedly increased in the presence of transition metal ions, especially Cu^{2+} and Fe^{3+}. The first stage of oxidation of L-ascorbic acid to dehydroascrobic acid is reversible and the biological acitivity is retained. Further oxidation to 2,3-diketogulonic acid is not reversible and the activity is lost.[6]

References

1. The Merck Index, 11th ed., Entry# 855.
2. Data for Biochemical Research, 3rd ed., Dawson, R. M. C., et al., Oxford University Press (New York, NY: 1986), p. 116.
3. United States Pharmacopeia USP XXI NF XVI, United States Pharmacopeial Convention (Rockville, MD: 1984), p. 75.
4. Al-Meshal, I. A. and Hassan, M. A., Analytical Profiles of Drug Substances, **11**, 45-78 (1982).
5. Levine, M., New Concepts in the Biology And Biochemistry of Ascorbic Acid. N. Engl. J. Med., **314(14**), 892-902 (1986).
6. Omura, H., and Yamafuji, K., in Methodicum Chimicum, Vol. 11, Pt. 2, Korte, F., and Goto, M., eds., Academic Press (New York, NY: 1977), p. 115.

7. AOAC Official Methods of Analysis, 15th ed., Helrich, K., ed., Association of Official analytical Chemists (Arlington, VA: 1990), p. 1058-1061.
8. Hutton, J.J., et al., Cofactor and substrate requirements of collagen proline hydroxylase, Arch. Biochim. Biophys. **118**, 231-240 (1967).
9. Lewin, S., Vitamin C: its molecular biology and medical potential. By Academic Press (London, New York, San Francisco: 1976), Chapter 4: Biological activity and potential.

CMH/NSB 5/03