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ProductInformation

(+)-α-Tocopherol acid succinate

Product Number **T 3126**
Store at Room Temperature

Product Description

Molecular Formula: $C_{33}H_{54}O_5$
Molecular Weight: 530.8
CAS number: 4345-03-3
Melting Point: approximately 76 °C
Extinction coefficient: E^M = 3,260 (292 nm, ethanol), 2,050 (284 nm)[1]
Synonyms: Vitamin E succinate, VES, RRR-α-tocopherol succinate[2]

Tocopherols are methyl-substituted hydroxychromans with a phytyl side chain.[3] This product is a semisynthetic succinate ester of α-tocopherol. It is prepared from natural sources using a by-product of the vegetable oil process called vegetable oil distillate (VOD) as its raw material.

Natural vitamin E is composed of two homologous series: 1) the tocopherols with a saturated side chain and 2) the tocotrienols with an unsaturated side chain. D-α-Tocopherol is the predominant form of vitamin E in plasma and tissues. Tocopherol, in general, has three asymmetric carbons, so there are eight possible diastereomers. Naturally occurring tocopherols have all three asymmetric carbons (2', 4', and 8' of the ring and phytol tail) in the R-configuration.[2] The four naturally occurring tocopherols, D-α-, D-β-, D-γ-, and D-δ-tocopherol, differ in the number and position of methyl groups on the 5', 7' and 8' positions. D-δ-Tocopherol, for example, has a methyl on the 8' position.

An α-tocopherol analog (called either Trolox™ or Trolox™ C), which has the hydrophobic side chain replaced by a carboxyl group is listed as Product No. 23,881-3. This strong antioxidant has some water solubility (0.5 mg/ml) in contrast to α-tocopherol, which is insoluble in water. The ring structure is identical to the α-tocopherol ring structure. It has antioxidant properties with several seed oils comparable to BHT, BHA, propyl gallate, and TBHQ.[4]

α-Tocopherol is a powerful inhibitor of the proliferation of estrogen receptor positive and estrogen receptor negative human breast cancer cell lines in a dose dependent manner *in vitro*.[2] Treatment at 15 µg/ml for 24 hours inhibited MDA-MB-435 cell proliferation by 71%. However, cells treated with this level of α-tocopherol exhibited reduced viability (81% vs. 96% for control cells).

This product has been shown to interact with cytosolic Protein Kinase C in vascular smooth muscle cells.[5]

A review of various published research studies suggests that this product may help ward off heart attacks. α-Tocopherol is carried with LDLs and shields LDL from oxidation by free radicals. This protection leads to a decrease in LDL oxidation, which is a major cause in triggering artery stenosis. Artery blockage is due to immune cells engulfing oxidized LDL, which causes swelling and accumulation of fatty masses within the artery walls. Vitamin E may help prevent this.

Isolation and analysis of tocopherols can be easily performed by a simple acetone extraction followed by HPLC.[6] A C_{18} ODS2 column is packed with 3 µm particles and a methanol:water (99:1) mobile phase is used for isolation, resulting in detection and easy measurement of α-, δ-, and γ-tocopherol peaks. Fluorescence detection was perfomed with 290 nm excitation and 330 nm emission wavelengths. (Product Nos. T 3251, T 2028, and T 1782 were used as controls).

The equivalent of 1 mg of (+)-α-tocopherol succinate is 1.21 International Units (IU). This powder contains approximately 1210 IU per gram.[7]

Precautions and Disclaimer

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

Preparation Instructions

This product is soluble in chloroform (50 mg/ml) or ethanol. It is practically insoluble in water; but it is soluble in ether, acetone, chloroform, and vegetable oils.[7] It is unstable to alkaline conditions.

Storage/Stability

Solutions of this product are stable at 4 °C for several months. Solutions should be protected from light.

References

1. Data for Biochemical Research, 3rd ed., Dawson, R. M. C., et al., Oxford University Press (New York, NY: 1986), p. 138.
2. Charpentier, A. et al., RRR-alpha-tocopheryl succinate inhibits proliferation and enhances secretion of transforming growth factor-beta (TGF-beta) by human breast cancer cells. Nutrition and Cancer, **19(3)**, 225-239 (1993).
3. Tan, B., and Brzuskiewicz, L., Anal. Biochem. **180(2)**, 368-373 (1989).
4. Cort, W.M., et al., Antioxidant activity and stability of 6-hydroxy-2,5,7, 8-tetramethylchroman-2-carboxylic acid. J. Am. Oil Chem. Soc., **52(6)**, 174-178 (1975).
5. Boscoboinik, D., et al., Inhibition of Cell Proliferation by α-Tocopherol, J. Biol. Chem., **266**, 6188-6194 (1991).
6. Koprivnjak, J.K., et al., Determination of α-, γ(+B), and δ-tocopherols in a Variety of Liver Tissues by Reverse Phase High Pressure Liquid Chromatography. Comp. Biochem. Physiol., **113B**, 143-148 (1996).
7. Martindale The Extra Pharmacopoeia, 30th ed., Reynolds, J. E. F., ed., The Pharmaceutical Press (London, England: 1993), p. 1061.

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