

Product Information

DL- α -Tocopherol acetate

Catalog Number **T3376**

Storage Temperature 2–8 °C

CAS RN 7695-91-2

Synonym: Vitamin E acetate

Product Description

Molecular Formula: C₃₁H₅₂O₃

Molecular Weight: 472.74

Physical form: Yellow, viscous liquid

Boiling Point: >200 °C

Density: 0.96 g/ml

Extinction coefficient: E^{mm} = 3.26 (292 nm, ethanol),
2.05 (284 nm)¹

Tocopherols are methyl-substituted hydroxychromans with a phytyl side chain.² Natural vitamin E is composed of two homologous series:

1. the tocopherols with a saturated side chain
2. the tocotrienols with an unsaturated side chain

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 phytyl 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.

D- α -tocopherol is the predominant form of vitamin E in plasma and tissues. This product is a semi-synthetic acetate ester of naturally occurring α -tocopherol.

(\pm)-6-Hydroxy-2,5,7,8-tetramethylchromane-2-carboxylic acid (Catalog Number 238813) is an α -tocopherol analog that has the hydrophobic side chain replaced by a carboxyl group. 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.³

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*.⁴ Treatment at 15 μ g/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

α -Tocopherol is carried with LDL 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.

Isolation and analysis of tocopherols can be easily performed by acetone extraction followed by HPLC.⁶ A C₁₈ ODS2 column is packed with 3 μ m 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 performed using 290 nm for excitation and 330 nm for emission (\pm)- α -tocopherol, Catalog Number T3251; [+]- δ -tocopherol, Catalog Number T2028; and [+]- γ -tocopherol, Catalog Number T1782, were used as controls).

One mg of DL- α -tocopherol acetate is equivalent to 1.00 International Units. This product contains ~1,000 I.U. per gram.⁷

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation Instructions

This product is practically insoluble in water. It is unstable to alkaline conditions.

It is miscible with chloroform or ethanol (100 μ l/ml), yielding a clear, colorless to faint yellow solution. It is also miscible with ether, acetone, chloroform, and vegetable oils.

Storage/Stability

Solutions of this product remain active at 2–8 °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. Tan, B., and Brzuskiwicz, L., Separation of tocopherol and tocotrienol isomers using normal- and reverse-phase liquid chromatography. *Anal. Biochem.*, **180(2)**, 368-373 (1989).
3. 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).
4. Charpentier, A., et al., RRR- α -tocopheryl succinate inhibits proliferation and enhances secretion of transforming growth factor- β (TGF- β) by human breast cancer cells. *Nutrition and Cancer*, **19(3)**, 225-239 (1993).
5. Boscoboinik, D., et al., Inhibition of cell proliferation by α -tocopherol, *J. Biol. Chem.*, **266(10)**, 6188-6194 (1991).
6. Koprivnjak, J.F., et al., Determination of α -, γ (+ β), and δ -tocopherols in a variety of liver tissues by reverse phase high pressure liquid chromatography. *Comp. Biochem. Physiol.*, **113(1)**, 143-148 (1996).
7. Martindale The Extra Pharmacopoeia, 30th ed., Reynolds, J. E. F., ed., The Pharmaceutical Press (London, England: 1993), p. 1061.

VNC,MWM,RXR,MAM 10/10-1

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