

PRODUCT DATA SHEET

rac-alpha-Tocopherol

Catalog No: 1072

Common Name: 5,7,8,-Trimethyltolcol

Source: synthetic

Solubility: chloroform, ethanol, hexane,
methanol

CAS No: 10191-41-0

Molecular Formula: C₂₉H₅₀O₂

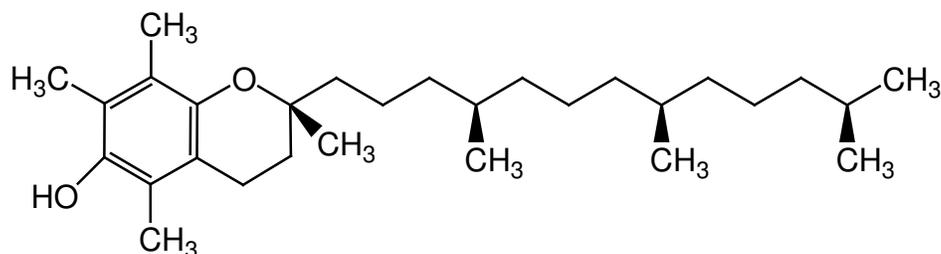
Molecular Weight: 431

Storage: -20°C

Purity: TLC > 95%; GC > 98%; HPLC >98%;
identity confirmed by MS

TLC System: chloroform/methanol (97:3)

Appearance: liquid



Application Notes:

Alpha-tocopherol is one of the eight forms of vitamin E and contains three methyl groups attached to the chromanol ring. Of all the forms of vitamin E, *alpha*-tocopherol is preferentially retained by the liver in animals and undergoes slower catabolism in cells. It has been found that *alpha*-tocopherol inhibits the activity of protein kinase C, an enzyme involved in cell proliferation and differentiation in smooth muscle cells, platelets, and monocytes. Other functions of *alpha*-tocopherol include gene regulation, up-regulation of mRNA or protein synthesis, and preventing the uptake of the harmful 7-hydroxycholesterol into cells.¹ Although the antioxidant activity of *alpha*-tocopherol *in vitro* has long been established it appears that this may not be one of its primary functions *in vivo*.² Vitamin E is involved in immune function, cell signaling, regulation of gene expression, and other metabolic processes. Vitamin E also inhibits lipid oxidation by donating its phenolic hydrogen to lipid free radicals.³ Antioxidant activity *in vivo* is normally *alpha*>*beta*>*delta*>*gamma* but the antioxidant potency may depend on various chemical and physical situations.⁴ The *ortho*-methyl substitution of the chromanol head plays a vital role in the antioxidant activity of tocopherols while the phytyl tail is very important for proper positioning in the biomembranes. The antioxidant properties of vitamin E may delay memory loss in Down's syndrome patients due to their protection from harmful oxidation caused by excess activity of superoxide dismutase. Vitamin E is only naturally produced in plants, algae, and some cyanobacteria and is therefore an important dietary nutrient for humans and animals.

Selected References:

1. R. Brigelius and M. Traber "Vitamin E: Function and Metabolism" *The FASEB Journal*, Vol. 13(10) pp. 1145-1155, 1999
2. A. Azzi "Molecular mechanism of α -tocopherol action" *Free Radical Biology and Medicine*, Vol. 43:1 pp. 16-21, 2007
3. G. W. Burton and K. Ingold Autoxidation of biological molecules. 1. Antioxidant activity of vitamin E and related chain-breaking phenolic antioxidants *in vitro*, U. J. Am. Chem. Soc., 103, 6472-6477, 1981
4. Anchalee Sirikhachornkit, Jai W. Shin, Irene Baroli, and Krishna K. Niyogi Replacement of *alpha*-tocopherol by *beta*-tocopherol enhances resistance to photo-oxidative stress in a xanthophyll-deficient strain of *Chlamydomonas reinhardtii*, *Eukaryotic Cell*, doi:10.1128, 2009

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