

# SEQENS

CONTINUUM OF PROGRESS

## VITAMIN E TPGS

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D- $\alpha$  tocopheryl polyethylene glycol 1000 succinate



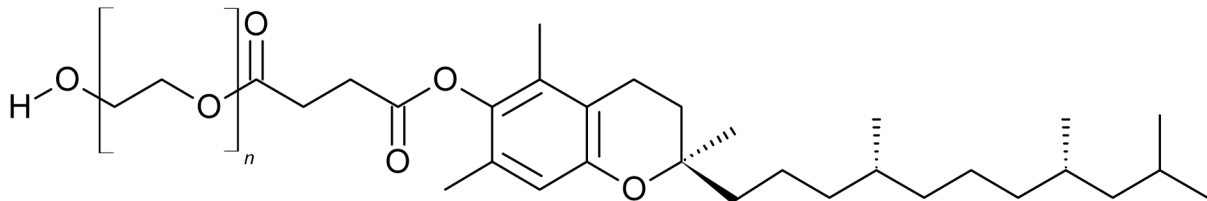
# VITAMIN E TPGS

Application field of Vitamin E-TPGS: Pharmaceutical, Nutraceutical, Food and beverage, Cosmetic and Personal Care, Animal nutrition.

## Chemical structure

**Chemical Name:** D- $\alpha$  tocopheryl polyethylene glycol 1000 succinate

**Synonym/acronym :** TPGS, Tocophersolan, Tocofersolan



## Properties of Vitamin E TPGS

**Vitamin E TPGS, a non-ionic surfactant, water soluble derivative of natural Vitamin E, is a multirole excipient for pharmaceutical drug delivery innovation.**

### Improving bioavailability

- Absorption enhancer
- P-gP inhibitor

### Surfactant properties

- Drug solubilizer
- Emulsifier
- Vehicle for lipid based formulation (SEDDS\* and SMEDDS\*\*)
- Plasticizer for hot Melt Extrusion
- Stabilizer for amorphous solid dispersion

### Source of Vitamin E

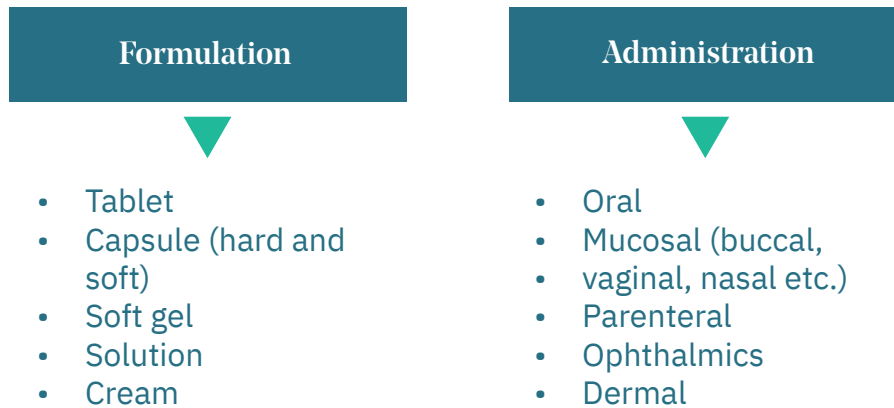
- API for Vitamin E (water soluble source of vitamin E)
- Antioxydant

\* SEDDS: Self-Emulsifying Drug Delivery

\*\* SMEDDS: Self-MicroEmulsifying Drug Delivery System



## Type of formulation and administration pathway



## Regulatory Status



## Physical and chemical properties

### Chemical Abstract Index Name

Poly(oxy-1,2-ethanediyl),  $\alpha$ -[4-[[[(2R)-3,4-dihydro-2,5,7,8-tetramethyl-2-[(4R,8R)-4,8,12-trimethyltridecyl]-2H-1-benzopyran-6-yl]oxy]-1,4-dioxobutyl]- $\omega$ -hydroxy-

**Empirical Formula:**  $C_{33}O_5H_{54}(CH_2CH_{20}O)_n$

**CAS :** 9002-96-4

**Molecular weight:** ~1.5 kDa

**Melting Point:** 36-42 °C

**Physical form:** waxy solid with low melting point

**Color:** white to light tan

**Vitamin E content (D- $\alpha$ -tocopherol):** 25 % minimum weight basis; standard range 25-30 %

# More about Vitamin E TPGS

## Publications (General studies)

Vitamin E TPGS and its applications in nutraceuticals Andreas M. Papas, in Nutraceuticals (Second Edition), 2021

Recent developments in d- $\alpha$ -tocopheryl polyethylene glycol succinate-based nanomedicine for cancer therapy, Drug Delivery, 24:1, 1831-1842

Ghosh I, Michniak-Kohn B. A comparative study of vitamin E TPGS/HPMC supersaturated system and other solubilizer/polymer combinations to enhance the permeability of a poorly soluble drug through the skin. Drug Dev IndPharm. 2012 ; 38(11): 1408-16.

Kaur L, Jain SK, Singh K. Vitamin E TPGS based nanogel for the skin targeting of high molecular weight anti-fungal drug: development and in vitro and in vivo assessment. RSC Adv. 2015; 5: 53671-86.

Zhiping Zhang and al, Recent Advances in the Application of Vitamin E TPGS for Drug Delivery, , Theranostics, 8(2): 464-84, 2018

Meng X, Liu J, Yu X, et al. (2017). Pluronic f127 and d-alpha-tocopheryl polyethylene glycol succinate (TPGS) mixed micelles for targeting drug delivery across the blood brain barrier. Sci Rep 7:2964.

Pham, Cuong & Cho, Cheong-Weon. (2017). Application of D- $\alpha$ -tocopheryl polyethylene glycol 1000 succinate (TPGS) in transdermal and topical drug delivery systems (TDDS). Journal of Pharmaceutical Investigation. 47. 111-121. 10.1007/s40005-016-0300-x.

Jae-Young Lee, Wie-Soo Kang, Jingpei Piao, In-Soo Yoon, Dae-Duk Kim and Hyun-Jong Cho; Soluplus®/TPGS-based solid dispersions

## Publications (Safety studies)

Monice Zondlo Fiume, Final Report on the Safety Assessment of Tocopherol, Tocopheryl Acetate, Tocopheryl Linoleate, Tocopheryl Linoleate/Oleate, Tocopheryl Nicotinate, Tocopheryl Succinate, Dioleoyl Tocopheryl Methylsilanol, Potassium Ascorbyl Tocopheryl Phosphate, and Tocophersolan; International Journal of Toxicology, (2002), 21(Suppl. 3), 51-116.

National Cancer Institute, "One-Year Chronic Oral (Intubation) Study In Dogs and Rats", (National Institute of health, Bethesda M. D., 1994).

Friman, S., Leandersson, P., Tagesson, C., and Svanvik, J. Biliary Excretion of Different Sized Polyethylene Glycols in the Cat. J Hepatology, 1990, 11: 215-220.

Bland, J. and Prestbo, E. Vitamin E : Comparative absorption studies, International Clinical Nutrition review, 1984, 4(2), 82-86.

Krasavage W.J., Terhaar C.J., d-alpha-Tocopheryl poly(ethylene glycol) 1000 succinate. Acute toxicity, subchronic feeding, reproduction, and teratologic studies in the rat Journal of Agricultural and Food Chemistry, (1977), 25(2), 273-8.

Final Report on the Safety Assessment of Tocopherol, Tocopheryl Acetate, Tocopheryl Linoleate, Tocopheryl Linoleate/Oleate, Tocopheryl Nicotinate, Tocopheryl Succinate, Dioleoyl Tocopheryl Methylsilanol, Potassium Ascorbyl Tocopheryl Phosphate, and Tocophersolan. International Journal of Toxicology, (2002), 21(Suppl. 3), 51-116. M. Zondlo Fumie

Shepard, K.P. Acute toxicity of vitamin E TPGS., HAEL No. 89-0117, November 28, 1989. Toxicological Sciences Laboratory, Health and Environment Laboratories, Eastman Kodak Company, Rochester, NY, USA.

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