

Antares

Vitamin E TPGS FG

Properties and Applications



FOOD AND BEVERAGE



DIETARY SUPPLEMENTS



ANIMAL NUTRITION



PERSONAL CARE & COSMETICS

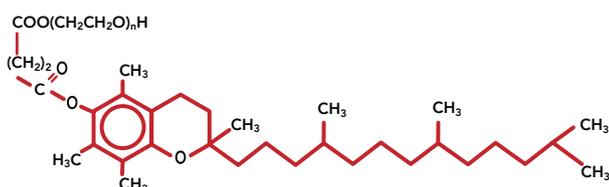
Antares vitamin E TPGS (d- α -tocopheryl polyethylene glycol 1000 succinate), is a water-soluble derivative of the natural form of d- α -tocopherol. In addition to serving as water-soluble source of vitamin E, TPGS has unique properties due to its dual combination of lipophilicity and hydrophilicity, similar to a surface-active agent. Its applications include formulation of lipophilic and poorly soluble nutrients and natural compounds and enhanced absorption and bioavailability. TPGS has a proven record of safety and efficacy in dietary supplements, food and beverage, personal care and cosmetics, and animal nutrition products.

Properties

Chemical properties

Antares vitamin E TPGS is the polyethylene glycol 1000 ester of d- α -tocopheryl succinate.

Chemical structure



Chemical name	d- α -tocopheryl polyethylene glycol 1000 succinate
Synonyms/Acronyms	Vitamin E TPGS or TPGS; Tocophersolan (INCI and USAN)
Molecular weight	1513 (approx)
d- α -tocopherol	25% minimum weight basis; range 25-30% d-a-tocopherol
Chemical stability	Stable when exposed to oxygen, heat, light, or oxidizing agents and under the conditions of heat sterilization. Unstable to alkali

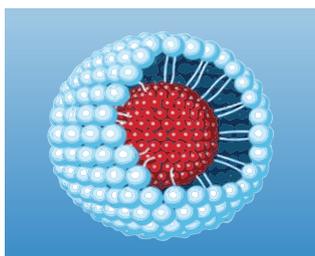
Physical properties

Antares vitamin E TPGS is a pale yellow water-soluble waxy solid with low melting point.

Physical form	Waxy solid, white to light tan (as solid)
Specific gravity	1.06 at 45°C, approximate
Melting point	38 °C approximate (range 37-41)
Solubility in water	Soluble (up to 20 weight %)
Heat stability	Stable up to approximately 199 °C
Sterilization	Stable when exposed to approximately 125 °C for 1 hour
Viscosity	Constant and low viscosity within a wide range of concentration and temperature (10 - 20% TPGS weight basis in water, 20 - 45°C)
Solubility	Forms solutions with water at concentrations up to approximately 20% (weight basis) beyond which liquid crystalline phases may form

Surfactant, forms micelles

As an amphiphile, vitamin E TPGS emulsifies lipids and helps solubilize poorly soluble compounds. In addition, it forms micelle like particles which increase absorption and bioavailability.



Micelles in aqueous solution sequester in their center the hydrophobic tail regions and other lipophilic compounds. In the human body, formation of micelles is essential for the absorption of lipids.

Nutritional characteristics

Vitamin E TPGS supplies in water-soluble form the natural d- α -tocopherol which is universally accepted as more potent than the synthetic form dl- α -tocopherol.

Vitamin E TPGS supplies 372-447 IU/g from 250-300 mg d- α -tocopherol/g. Published clinical studies showed that Vitamin E TPGS is absorbed well by patients with liver and pancreatic insufficiency which causes malabsorption of vitamin E.

The A summary of the nutritional characteristics which may be used in labeling products containing vitamin E TPGS is available at www.tpgs.com.

Applications

Vitamin E TPGS offers unique advantages in product development.

1. Supplies in water-soluble form, ethanol free, natural d- α -tocopherol and does not affect the taste and color of foods and especially drinks. Natural d- α -tocopherol is universally accepted as more potent than the synthetic form dl- α -tocopherol.
2. Emulsifies and enhances the absorption of other lipophilic nutrients and nutraceuticals.



Food and Beverage

Vitamin E TPGS is used to fortify foods and formulate nutrients and nutraceuticals especially beverages, sports drinks, juices and water. Major applications include:

- Beverages, sports drinks, juices and water fortified with vitamin E or multivitamin/mineral and nutraceuticals. As water soluble, ethanol free, with neutral taste and water, TPGS is preferable over other products especially in water and clear drinks.
- Foods such as bars, puddings, yogurt and others which aim to supply highly absorbable vitamin E and other lipophilic nutrients and nutraceuticals.



Animal Nutrition

Vitamin E TPGS supplies highly absorbable and bioavailable vitamin E for animals which do not absorb efficiently the traditional forms of vitamin E including zoo animals, especially elephants and black rhinoceros and other animals and pets that require highly absorbable and bioavailable vitamin E. Major applications include:

- High vitamin E supplements in the form of liquid, powder, gel, tablet and others.
- Premixes, concentrates and other forms that can be used in feed fortification.



Dietary Supplements

Vitamin E TPGS has been used to formulate supplements especially those designed to overcome malabsorption of vitamin E and other lipophilic nutrients and nutraceuticals. Major applications include:

- Liquid vitamin E or liquid multivitamin/mineral supplements.
- Other forms of vitamin E or multivitamin/mineral dietary supplements such as tablets, softgels, bars and others.



Personal Care and Cosmetics

The properties of vitamin E TPGS as emulsifier, solubilizer and formulation excipient, coupled with its safety profile make it a strong formulation tool for topical including cosmetics. Major applications include:

- Creams, lotions and other products for topical application of vitamin E and other formulated actives.
- Eye drops, nasal sprays, syrups and others primarily in formulating active compounds.

Safety and regulatory status

Vitamin E TPGS has a record of safety based on decades of use in animals and humans and on reported toxicology studies. Studies in humans included dosing of cholestatic children at 25 IU/kg/day (equivalent to 64 mg TPGS/kg/day) for over two years. It is safe for transportation, storage and handling. Vitamin E TPGS has a self affirmed GRAS (Generally Recognized As Safe) status when used as an oral dietary supplement of vitamin E. The United States Pharmacopeia published a monograph for vitamin E TPGS in the USP/NF Supplement #9 dated of November 15, 1998.

In Canada, vitamin E TPGS is approved as a form of vitamin E. In the European Community it is approved as API (Active pharmaceutical Ingredient); for the treatment of vitamin E deficiency due to digestive malabsorption in pediatric patients; and for use in foods for special medical purposes. In Japan it is approved as a pharmaceutical excipient for oral drug formulations.

Packaging, storage and shelf-life

Antares Vitamin E TPGS is available in 1 kg, 5 kg, and 15 kg tamper-evident, plastic-sealed containers. The containers are heat tolerant to at least 50 °C. The containers may be stored in room temperature and should be opened only when necessary and with extreme care to avoid contamination. Antares Vitamin E TPGS FG is labeled with a 4 year shelf-life from the date of manufacturing when stored in the original sealed unopened container.

Selected literature

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Contact information

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Our web site provides additional information and access to documents including:

- Material Safety Data Sheet (MSDS - USA and international)
- Nutrient Data Sheet, Kosher Certificate
- Allergen Statement
- Residual Solvents (Organic Volatile Impurities, OVI)
- Current Good Manufacturing Practices (cGMP) Statement
- Certificate of Analysis (COA)

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