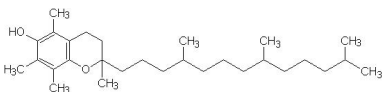
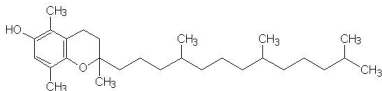
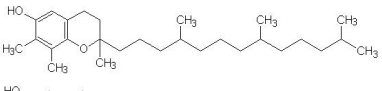
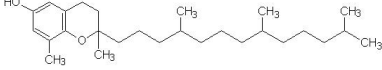


Further Product Name

Natural Mixed Tocopherols Concentrate

General Characterization

Covi-ox T-50 EU is a clear brownish-red viscous oil with mild taste and odor. It contains natural mixed tocopherols which are obtained from edible vegetable oils by suitable physical means. Covi-ox T-50 EU is intended for use as an antioxidant in the dietary supplement and food industry.

Molecular structure	Name	Empirical formula	Mol weight	CAS
	d-alpha-tocopherol	C ₂₉ H ₅₀ O ₂	430.69	59-02-9
	d-beta-tocopherol	C ₂₈ H ₄₈ O ₂	416.66	16698-35-4
	d-gamma-tocopherol	C ₂₈ H ₄₈ O ₂	416.66	54-28-4
	d-delta-tocopherol	C ₂₇ H ₄₆ O ₂	402.64	119-13-1

The typical tocopherol composition is:

- 14 % d- α -tocopherol
- 2 % d- β -tocopherol
- 60 % d- γ -tocopherol
- 24 % d- δ -tocopherol

Due to the variability of vegetable oil feedstocks from which the tocopherols are derived, slight variations to this typical composition will be found. Wide variations are not expected but they may occur.

Standards

Covi-ox T-50 EU meets the monograph requirements of the current National Formulary (NF, Tocopherols Excipient) and FCC (RRR-Tocopherols Concentrate, Mixed, Low-alpha-Type) and of the European Community (E 306, Tocopherol-rich Extract). Certified "Circle U"Kosher and Halal. Produced under ISO 9001 Certification, current US food GMP and FDA Dietary Supplement GMPs.

This product is PCR negative.

Covi-ox T-50 EU is generally permitted as a food additive under pertinent European food regulations (Commission Directive 95/2/EC as amended). National regulations must be observed.

The U.S. FDA has generally recognized tocopherols as safe (GRAS) as a nutrient and as a preservative (21 CFR, Part 182.8890 and 182.3890).

Composition / Ingredients

Natural mixed tocopherols*
Sunflower oil

mainly derived from soy beans

Due to the natural raw material and the manufacturing process applied, other vegetable oil constituents may be present.

Assay

1 g of Covi-ox T-50 EU contains not less than 500 mg of total tocopherols of which not less than 80 % are non-alpha-tocopherols.

Characteristic Values

The specifications stated below finally and conclusively describe the properties of the product.

Quality control data

Data which is used for quality release and is specified for each batch.

Assay (mg/g total tocopherols)	min. 500	BASF Method Hj01
Assay (mg/g non-alpha-tocopherols)	min. 400	BASF Method Hj01
Acidity* (ml)	max. 1.0	USP
Identification (NF method B)	pass	USP

* analysed on random audit sample basis

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Additional product descriptive data

Data which is proven statistically but not determined regularly.

Heavy Metals* (as Pb)	max. 10 ppm	USP <231> Method II
Specific Rotation* [alpha]D25	min. +20°	USP
Sulphated Ash* (%)	max. 0.1	Ph.Eur
Lead* (mg/kg)	max. 2	ICP/MS
Arsenic* (mg/kg)	max. 3	ICP/MS
Mercury* (mg/kg)	max. 0.1	AAS
Cadmium* (mg/kg)	max. 1	
Residual Solvents, USP <467>*	conforms	GC

* analysed on random audit sample basis

Microbiology

Total aerobic microbial count	< 1000 CFU/g	USP <61>
Yeasts and moulds	< 100 CFU/g	USP <61>
E. coli	negative/10 g	USP <61>
Staphylococci, coagulase-positive	negative/10 g	USP <61>
Salmonella	negative/10	USP <61>
Coliforms	< 10 CFU/g	FDA BAM

Nutritional Information

for 100g of product

Energy	1749 kJ / 425 kcal	USA/EU*
Calories from fat (kcal)	425	USA
Calories from saturated fat (kcal)	68	USA
Total fat (% , g)	47.3	USA/EU
Saturated fatty acids** (% , g)	7.6	USA/EU
Monounsaturated fatty acids** (% , g)	12.9	EU
Polyunsaturated fatty acids** (% , g)	26.7	EU
Trans fat (% , g)	< 0.1	USA
Total Carbohydrates (% , g)	0	USA/EU
Dietary fiber (% , g)	0	USA/EU
Sugar (% , g)	0	USA/EU
Polyols (% , g)	0	EU
Starch (% , g)	0	EU
Protein by Kjeldahl (% , g)	0	USA/EU
Moisture (% , g)	0.1	USA
Ash (% , g)	0.0	USA
Vitamin C (mg)	< 1.0	USA
Cholesterol by GC (mg)	< 1.0	USA/EU
Sodium (mg)	0.3	USA/EU
Potassium (mg)	< 0.1	USA
Other, Tocopherols*** (% , g)	52.6	USA

* requirements according to different regions, EU: European Union

** calculated as triglyceride

*** Tocopherols have no caloric value

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Application & Properties

Covi-ox T-50 EU is used as a natural antioxidant in a wide variety of food products and in industrial applications. The product has low volatility, excellent carry-through effect and is completely miscible with oils and fats.

Covi-ox T-50 EU should be added as early in the production process as possible.

The amount of Covi-ox T-50 EU to be used will vary with each particular application. For most oils and fats, the recommended concentration of tocopherols in the product will range from 100 ppm to 400 ppm relative to the fat or oil content. For oils containing highly polyunsaturated fatty acids, tocopherol concentrations of up to 2000 ppm relative to the oil content may be necessary. It is recommended to test 3 different mixed tocopherol concentrations to determine the optimum level which gives the desired antioxidant protection for each individual product.

Mixed tocopherols tend to darken over time, therefore it is recommended that in capsule applications, an amber shell is used.

Solubility

Insoluble in water; sparingly soluble in ethanol, miscible with organic solvents, vegetable oils and fats.

Storage, Packaging and Shelflife

Storage Conditions

Store in tightly closed containers, cool and dry (15-30° C, i.e. 60 - 85° F, do not refrigerate). Protect from heat, light and oxygen.

Shelf life

The shelf life in sealed, original containers under normal storage conditions is at least 36 months after date of manufacture.

Unstable when exposed to oxygen and light, particularly in the presence of oxidizing agents or in alkaline media. The product darkens slowly upon exposure to air and light.

Packaging

The product is available in 10 kg plastic pails or 190 kg metal drums blanketed with inert gas.

Names

5,7,8-trimethyltolcol or RRR-alpha-tocopherol or d- α -tocopherol

5,8-dimethyltolcol or RRR-beta-tocopherol or d- β -tocopherol

7,8-dimethyltolcol or RRR-gamma-tocopherol or d- γ -tocopherol

8-methyltolcol or RRR-delta-tocopherol or d- δ -tocopherol

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