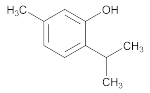
**Thimerosal**—*see Thimerosal General Monographs*

## Thymol



$C_{10}H_{14}O$ 150.22
Phenol, 5-methyl-2-(1-methylethyl)-.
Thymol.
*p*-Cymen-3-ol [89-83-8].

» Thymol contains not less than 99.0 percent and not more than 101.0 percent of $C_{10}H_{14}O$.

**Packaging and storage—**Preserve in tight, light-resistant containers.

**USP Reference standards** ⟨11⟩**—**
USP Thymol RS

**Identification—**

**A:** *Infrared Absorption* ⟨197K⟩.

**B:** It meets the requirements under *Melting range.*

**Melting range** ⟨741⟩: between 48° and 51°; but when melted, Thymol remains liquid at a considerably lower temperature.

**Limit of nonvolatile residue—**Volatilize about 2 g, accurately weighed, on a steam bath, and dry at 105° to constant weight: not more than 0.05% of residue remains.

**Assay—**Transfer about 100 mg of Thymol, accurately weighed, to a 250-mL iodine flask, and dissolve in 25 mL of 1 N sodium hydroxide. Add 20 mL of hot dilute hydrochloric acid (1 in 2), and immediately titrate with 0.1 N bromine VS to within 1 to 2 mL of the calculated endpoint. Warm the solution to between 70° and 80°, add 2 drops of methyl orange TS, and continue the titration slowly, swirling vigorously after each addition. When the color of the methyl orange is bleached, add 2 drops of 0.1 N bromine VS, shake for 10 seconds, add 1 drop of methyl orange TS, and shake vigorously. If the solution is red, continue the titration, dropwise and with shaking, until the color is discharged. Repeat the alternate addition of the titrant and the methyl orange TS until the red color is discharged after the addition of the TS. Each mL of 0.1 N bromine is equivalent to 3.755 mg of $C_{10}H_{14}O$.

**Titanium Dioxide**—*see Titanium Dioxide General Monographs*

## Tocopherols Excipient

» Tocopherols Excipient is a vegetable oil solution containing not less than 50.0 percent of total tocopherols, of which not less than 80.0 percent consists of varying amounts of beta, gamma, and delta tocopherols.

**Packaging and storage—**Preserve in tight containers, protected from light. Protect with a blanket of an inert gas.

**Labeling—**Label it to indicate the content, in mg per g, of total tocopherols and of the sum of beta, gamma, and delta tocopherols.

**USP Reference standards** ⟨11⟩**—**
USP Alpha Tocopherol RS

**Identification—**

**A:** Dissolve about 50 mg in 10 mL of dehydrated alcohol, add, with swirling, 2 mL of nitric acid, and heat at about 75° for 15 minutes: a bright red or orange color develops.

**B:** The retention time of the third major peak (i.e., the peak occurring just before that of the internal standard) in the chromatogram of the *Assay preparation* corresponds to that of the *Standard preparation*, both relative to that of the internal standard, as obtained in the *Assay*.

**Acidity—**Dissolve 1.0 g in 25 mL of a mixture of equal volumes of alcohol and ether (which has been neutralized to phenolphthalein with 0.1 N sodium hydroxide), add 0.5 mL of phenolphthalein TS, and titrate with 0.10 N sodium hydroxide until the solution remains faintly pink after being shaken for 30 seconds: not more than 1.0 mL of 0.10 N sodium hydroxide is required.

**Assay —**

*Internal standard solution*—Transfer about 600 mg of hexadecyl hexadecanoate, accurately weighed, to a 200-mL volumetric flask, dissolve in a diluting solution containing 2 volumes of pyridine and 1 volume of propionic anhydride, dilute with the diluting solution to volume, and mix.

*Standard preparations*—[NOTE—Use low-actinic glassware.] Transfer 12-, 25-, 37-, and 50-mg portions of USP Alpha Tocopherol RS, accurately weighed, to separate 50-mL conical flasks having 19/38 standard-taper ground-glass necks. Pipet 25 mL of the *Internal standard solution* into each flask, mix, and reflux for 10 minutes under water-cooled condensers.

*Assay preparation*—[NOTE—Use low-actinic glassware.] Transfer about 60 mg of Tocopherols Excipient, accurately weighed, to a 50-mL conical flask similar to the flasks used in preparing the *Standard preparations*, add 10.0 mL of *Internal standard solution*, mix, and reflux for 10 minutes under a water-cooled condenser.

*Chromatographic system* (see *Chromatography* ⟨621⟩)—The gas chromatograph is equipped with a flame-ionization detector and contains a 4-mm × 2-m borosilicate glass column packed with 2% to 5% liquid phase G2 on 80- to 100-mesh support S1AB utilizing either a glass-lined sample introduction system or on-column injection. The column is maintained isothermally at a temperature between 245° and 265°, and the injection port and detector block temperatures are maintained at about 10° higher than the column temperature. The flow rate of dry carrier gas is adjusted to obtain a hexadecyl hexadecanoate peak 30 to 32 minutes after sample introduction. [NOTE—Cure and condition the column as necessary.]

*System suitability*—Chromatograph a sufficient number of injections of the *Assay preparation*, as directed under *Calibration*, to ensure that the resolution, *R,* between the major peaks occurring at retention times of approximately 0.50 (delta tocopheryl propionate) and 0.63 (beta plus gamma tocopheryl propionates), relative to hexadecyl hexadecanoate at 1.00, is not less than 2.5.

*Calibration*—Chromatograph 2- to 5-µL portions of each *Standard preparation*, and record the peak areas as directed for *Procedure*. Calculate the relative response factor, *F* , for each concentration of the *Standard preparation* taken by the formula:

$$(A_S / A_D)(C_D / C_S)$$

in which $C_D$ and $C_S$ are the concentrations, in mg per mL, of hexadecyl hexadecanoate and of USP Alpha Tocopherol RS, respectively, in the *Standard preparation*. Successively chromatograph a sufficient number of portions of each *Standard preparation* to ensure that the factor, *F,* is constant within a range of

2.0%. Prepare a relative response factor curve by plotting *F* versus the alpha tocopheryl propionate peak area.

*Procedure*—Inject a suitable portion (2 µL to 5 µL) of the *Assay preparation* into the chromatograph, and record the chromatogram. Measure the areas under the 4 major peaks occurring at relative retention times of approximately 0.50, 0.63, 0.76, and 1.00, and record the values as $a_\delta$, $a_{\beta\gamma}$, $a_\alpha$, and $a_D$, corresponding to delta tocopheryl propionate, beta plus gamma tocopheryl propionates, alpha tocopheryl propionate, and hexadecyl hexadecanoate, respectively. Calculate the quantity, in mg, of each tocopherol form in the Tocopherols Excipient taken by the formulas:

$$\text{delta tocopherol} = (10C_D / F)(a_\delta / a_D);$$

$$\text{beta plus gamma tocopherols} = (10\ C_D / F)(a_{\beta\gamma} / a_D);$$

$$\text{alpha tocopherol} = (10C_D / F)(a_\alpha / a_D)$$

in which *F* is obtained from the relative response factor curve (see *Calibration*) for each of the corresponding areas under the delta, beta plus gamma, and alpha tocopheryl propionate peaks produced by the *Assay preparation*. [NOTE—The relative response factor for delta tocopheryl propionate and for beta plus gamma tocopheryl propionates has been determined empirically to be the same as for alpha tocopheryl propionate.]

## Tolu Balsam Syrup

» Prepare Tolu Balsam Syrup as follows (see *Pharmaceutical Compounding—Nonsterile Preparations* ⟨795⟩).

| | |
|---|---|
| Tolu Balsam Tincture | 50 mL |
| Magnesium Carbonate | 10 g |
| Sucrose | 820 g |
| Purified Water, a sufficient quantity, to make | 1000 mL |

Add the Tincture all at once to the Magnesium Carbonate and 60 g of the Sucrose in a mortar, and mix. Gradually add 430 mL of Purified Water with trituration, and filter. Dissolve the remainder of the Sucrose in the clear filtrate with gentle heating, strain the syrup while warm, and add sufficient Purified Water through the strainer to make the product measure 1000 mL, and mix.
NOTE—Tolu Balsam Syrup may also be prepared as follows. Place 760 g of the Sucrose in a suitable percolator, the neck of which is nearly filled with loosely packed cotton, moistened after packing with a few drops of water. Pour the filtrate, obtained as directed in the preceding instructions, on the Sucrose, and regulate the outflow to a steady drip of percolate. When all of the liquid has run through, return portions of the percolate, if necessary, to dissolve all the Sucrose. Then pass enough Purified Water through the cotton to make the product measure 1000 mL, and mix.

**Packaging and storage**—Preserve in tight containers, and store at controlled room temperature.

**Labeling**—The label states the Latin binomial name and, following the official name, the part of the plant source from which the article was derived.

**Acid value**—Take 2% of solution, add phenolphthalein TS, and titrate with 0.5 N alcoholic potassium hydroxide VS: the acid value is between 112 and 168.

**Alcohol content,** *Method II* ⟨611⟩: between 3.0% and 5.0% of $C_2H_5OH$.

## Tolu Balsam Tincture

» Tolu Balsam Tincture is prepared from Tolu Balsam obtained from *Myroxylon balsamum* (*L.*) *Harms var. balsamum* (Fam. Fabaceae). Prepare Tolu Balsam Tincture as follows (see *Pharmaceutical Compounding—Nonsterile Preparations* ⟨795⟩).

| | |
|---|---|
| Tolu Balsam | 200 g |
| to make | 1000 mL |

Prepare Tolu Balsam Tincture as directed for *Process M* under *Tinctures* (see *Pharmaceutical Dosage Forms* ⟨1151⟩), using alcohol as the menstruum.

**Packaging and storage**—Preserve in tight, light-resistant containers, and store at controlled room temperature. Avoid exposure to direct sunlight and to excessive heat.

**Labeling**—The Label states the Latin binomial name and, following the official name, the part of the plant source from which the article was derived.

**Alcohol content,** *Method I* ⟨611⟩**:** between 77.0% and 83.0% of $C_2H_5OH$.

## Tragacanth

**DEFINITION**

Tragacanth is the dried gummy exudation from *Astragalus gummifer* Labillardière, or other Asiatic species of *Astragalus* (Fam. Leguminosae).

**IDENTIFICATION**

- **A.** Add 1 g to 50 mL of water: it swells and forms a smooth, nearly uniform, stiff, opalescent mucilage free from cellular fragments.

**IMPURITIES**

- **Lead** ⟨**251**⟩**:** NMT 10 ppm
- **Heavy Metals,** *Method II* ⟨**231**⟩**:** NMT 20 ppm

**SPECIFIC TESTS**

- **Microbial Enumeration Tests** ⟨**61**⟩ and **Tests for Specified Microorganisms** ⟨**62**⟩**:** It meets the requirements for absence of *Salmonella* species and *Escherichia coli*.
- **Botanic Characteristics**

  **Tragacanth:** It is flattened, lamellated, frequently curved fragments or straight or spirally twisted linear pieces from 0.5 to 2.5 mm in thickness. It is white to weak yellow in color, translucent, and horny in texture. Its fracture is short. It is rendered more easily pulverizable by heating to 50°. It is odorless.

  **Histology:** Pieces of Tragacanth softened in water and mounted in water or glycerin show numerous lamellae and a few starch grains.

  **Powdered tragacanth:** It is white to yellowish white. When examined in water mounts, it shows numerous angular frag-