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Eucalyptus Oil

CAS RN[®]: 8000-48-4.

DEFINITION

Eucalyptus Oil is obtained by steam distillation and rectification from the fresh leaves or the fresh terminal branchlets of various species of *Eucalyptus* rich in 1,8-cineole. The species mainly used are *Eucalyptus globulus* Labill., *Eucalyptus polybractea* R.T. Baker, and *Eucalyptus smithii* R.T. Baker. It contains NLT 70.0% and NMT 95.0% of eucalyptol (1,8-cineole, C₁₀H₁₈O).

IDENTIFICATION

Change to read:

- **A.** [▲SPECTROSCOPIC IDENTIFICATION TESTS \(197\), Infrared Spectroscopy: 197F▲](#) (CN 1-MAY-2020)
- **B. IDENTITY BY AROMA SUBSTANCE PROFILE:** The retention times of the (+)-α-pinene, β-pinene, (R)-(-)-α-phellandrene, (R)-(+)-limonene, and eucalyptol peaks of the *Sample solution* correspond to those of the *Standard solution*, as obtained in the test for *Content of Aroma Substances* in the Assay.

ASSAY

• **CONTENT OF AROMA SUBSTANCES**

Standard solution A: 1.0 μL/mL of (+)-α-pinene, 0.5 μL/mL of β-pinene, 0.5 μL/mL of sabinene, 0.5 μL/mL of (R)-(-)-α-phellandrene, 1.0 μL/mL of (R)-(+)-limonene, 5 μL/mL of [USP Eucalyptol RS](#), and 5 mg/mL of [USP Camphor RS](#) in heptane

Standard solution B: 0.01 μL/mL of (R)-(+)-limonene in heptane

Sample solution: 20 μL/mL of Eucalyptus Oil in heptane

Chromatographic system

(See [Chromatography \(621\), System Suitability.](#))

Mode: GC

Detector: Flame ionization

Column: 0.25-mm × 60-m fused-silica capillary; 0.25-μm layer of phase G16

Temperatures

Injection port: 220°

Detector: 220°

Column: See [Table 1](#).

Table 1

Initial Temperature (°)	Temperature Ramp (°/min)	Final Temperature (°)	Hold Time at Final Temperature (min)
60	—	60	5
60	5	200	5

Carrier gas: Helium

Flow rate: 1.5 mL/min

Injection type: Split ratio, 1:50

Injection volume: 1 μL

System suitability

Sample: *Standard solution A*

[NOTE—The relative retention times are listed in [Table 2](#).]

Table 2

Name	Relative Retention Time
(+)- α -Pinene	0.64
β -Pinene	0.80
Sabinene	0.83
(R)-(-)- α -Phellandrene	0.91
(R)-(+)-Limonene	0.98
Eucalyptol	1.00
Camphor	1.58

Suitability requirements

Resolution: NLT 1.5 between (R)-(+)-limonene and eucalyptol

Analysis

Samples: *Standard solution A, Standard solution B, and Sample solution*

Identify the peaks in the *Sample solution* based on those in *Standard solution A* as well as in [Table 3](#).

Table 3

Name	Relative Retention Time
β -Myrcene	0.86–0.90
γ -Terpinene	1.05–1.07
<i>p</i> -Cymene	1.12–1.13
Terpinen-4-ol	1.68
α -Terpineol	1.82

β -Myrcene elutes before (R)-(-)- α -phellandrene and after sabinene; γ -terpinene and *p*-cymene elute between eucalyptol and camphor; and terpinen-4-ol and α -terpineol elute after camphor.

Calculate the percentage of (+)- α -pinene [β -pinene, sabinene, (R)-(-)- α -phellandrene, (R)-(+)-limonene, or eucalyptol] in the portion of Eucalyptus Oil taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times 100$$

r_U = peak response of (+)- α -pinene [β -pinene, sabinene, (R)-(-)- α -phellandrene, (R)-(+)-limonene, or eucalyptol] from the *Sample solution*

r_S = peak response of (+)- α -pinene [β -pinene, sabinene, (R)-(-)- α -phellandrene, (R)-(+)-limonene, or eucalyptol] from the *Standard solution*

C_S = concentration of (+)- α -pinene [β -pinene, sabinene, (R)-(-)- α -phellandrene, (R)-(+)-limonene, or [USP Eucalyptol RS](#)] in the *Standard solution* ($\mu\text{L/mL}$)

C_U = concentration of Eucalyptus Oil in the *Sample solution* ($\mu\text{L/mL}$)

Calculate the percentage of camphor in the portion of Eucalyptus Oil taken:

$$\text{Result} = (r_U/r_S) \times [C_S/(C_U \times D)] \times 100$$

r_U = peak response of camphor from the *Sample solution*

r_S = peak response of camphor from the *Standard solution*

C_S = concentration of [USP Camphor RS](#) in the *Standard solution* (mg/mL)