

(3) To 0.1 g of Camostat Mesilate add 0.2 g of sodium hydroxide, fuse by gentle heating, and continue to heat for 20 to 30 seconds. After cooling, add 0.5 mL of water and 3 mL of dilute hydrochloric acid, and heat: the gas evolved changes moistened potassium iodate-starch paper to blue.

Melting point 194 – 198°C

Purity (1) Heavy metals—Dissolve 1.0 g of Camostat Mesilate in 40 mL of water by warming, and add 2 mL of dilute acetic acid and water to make 50 mL. Perform the test using this solution as the test solution. Prepare the control solution with 2.0 mL of Standard Lead Solution and 2 mL of dilute acetic acid (not more than 20 ppm).

(2) Arsenic—Dissolve 2.0 g of Camostat Mesilate in 20 mL of 2 mol/L hydrochloric acid TS by heating in a water bath, and continue to heat for 20 minutes. After cooling, centrifuge, take 10 mL of the supernatant liquid, and use this solution as the test solution. Perform the test using Apparatus B (not more than 2 ppm).

(3) Related substances—Dissolve 0.030 g of Camostat Mesilate in 10 mL of ethanol (95), and use this solution as the sample solution. Pipet 1 mL of the sample solution, add ethanol (95) to make exactly 200 mL, and use this solution as the standard solution. Perform the test with these solutions as directed under the Thin-layer Chromatography. Spot 10 μ L each of the sample solution and the standard solution on a plate of silica gel for thin-layer chromatography. Develop the plate with a mixture of ethyl acetate, water and acetic acid (100) (3:1:1) to a distance of about 10 cm, and air-dry the plate. Allow the plate to stand overnight in iodine vapor: the spots other than the principal spot from the sample solution are not more intense than the spot from the standard solution.

Loss on drying Not more than 1.0% (1 g, silica gel, 105°C, 3 hours).

Residue on ignition Not more than 0.20% (1 g).

Assay Weigh accurately about 0.05 g each of Camostat Mesilate and Camostat Mesilate Reference Standard, previously dried, and dissolve each in water to make exactly 50 mL. Pipet 5 mL each of these solutions, add exactly 5 mL of the internal standard solution, and use these solutions as the sample solution and the standard solution, respectively. Perform the test with 2 μ L each of the sample solution and the standard solution as directed under the Liquid Chromatography according to the following conditions, and calculate the ratios, Q_T and Q_S , of the peak area of camostat to that of the internal standard.

$$\begin{aligned} & \text{Amount (mg) of } C_{20}H_{22}N_4O_5 \cdot CH_4O_3S \\ & = \text{amount (mg) of Camostat Mesilate} \\ & \quad \text{Reference Standard} \\ & \quad \times \frac{Q_T}{Q_S} \end{aligned}$$

Internal standard solution—A solution of butyl parahydroxybenzoate in ethanol (95) (1 in 1500).

Operating conditions—

Detector: An ultraviolet absorption photometer (wavelength: 265 nm).

Column: A stainless steel column 4.6 mm in inside diameter and 15 cm in length, packed with octadecylsilanized silica gel for liquid chromatography (5 μ m in particle diameter).

Column temperature: A constant temperature of about 25°C.

Mobile phase: A mixture of methanol, a solution of sodium 1-heptane sulfonate (1 in 500), a solution of sodium lauryl sulfate (1 in 1000) and acetic acid (100) (200:100:50:1).

Flow rate: Adjust the flow rate so that the retention time of camostat is about 10 minutes.

System suitability—

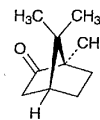
System performance: When the procedure is run with 2 μ L of the standard solution under the above operating conditions, camostat and the internal standard are eluted in this order with the resolution between these peaks being not less than 5.

System repeatability: When the test is repeated 6 times with 2 μ L of the standard solution under the above operating conditions, the relative standard deviation of the ratios of the peak area of camostat to that of the internal standard is not more than 1.0%.

Containers and storage Containers—Tight containers.

d-Camphor

d-カンフル



$C_{10}H_{16}O$: 152.23
(1*R*,4*R*)-Bornan-2-one [464-49-3]

d-Camphor contains not less than 96.0% of $C_{10}H_{16}O$.

Description *d*-Camphor occurs as colorless or white, translucent crystals, crystalline powder or masses. It has a characteristic, agreeable odor, and a slightly bitter taste, followed by a pleasant, cooling sensation.

It is freely soluble in ethanol (95), in diethyl ether and in carbon disulfide, and slightly soluble in water.

It slowly volatilizes at room temperature.

Identification Dissolve 0.1 g of *d*-Camphor in 2 mL of methanol, add 1 mL of 2,4-dinitrophenylhydrazine TS, and heat for 5 minutes on a water bath: an orange-red precipitate is formed.

Optical rotation $[\alpha]_D^{20}$: +41.0 – +43.0° (5 g, ethanol (95), 50 mL, 100 mm).

Melting point 177 – 182°C

Purity (1) Water—Shake 1.0 g of *d*-Camphor with 10 mL of carbon disulfide: the solution is clear.

(2) Chlorinated compounds—Mix 0.20 g of finely powdered *d*-Camphor with 0.4 g of sodium peroxide in a dry, hard glass test tube. Suspend the tube at an angle of 45° by means of a clamp placed at the upper end, and heat the tube gently, starting near the upper end, and gradually bringing the heat toward the lower part of the tube until incineration is complete. Dissolve the residue in 20 mL of warm water,

acidify with 12 mL of dilute nitric acid, and filter the solution into a Nessler tube. Wash the test tube and the filter with three 5-mL portions of hot water, adding the washings to the filtrate. After cooling, add water to make 50 mL, then add 1 mL of silver nitrate TS, mix well, and allow to stand for 5 minutes: the turbidity of the solution does not exceed that of the following control solution.

Control solution: Prepare in the same manner as described above, using 0.20 mL of 0.01 mol/L hydrochloric acid VS.

(3) Non-volatile residue—Heat 2.0 g of *d*-Camphor on a water bath until sublimation is complete, then dry the residue at 105°C for 3 hours: the mass of the residue does not exceed 1.0 mg.

Assay Weigh accurately about 0.1 g each of *d*-Camphor and *d*-Camphor Reference Standard, add exactly 5 mL each of the internal standard solution, dissolve in dehydrated methanol to make 100 mL, and use these solutions as the sample solution and the standard solution. Perform the test with 2 μ L each of these solutions as directed under the Gas Chromatography according to the following conditions, and calculate the ratios, Q_T and Q_S , of the peak area of *d*-camphor to that of the internal standard.

$$\begin{aligned} \text{Amount (mg) of } C_{10}H_{16}O \\ = \text{amount (mg) of } d\text{-Camphor Reference Standard} \\ \times \frac{Q_T}{Q_S} \end{aligned}$$

Internal standard solution—A solution of methyl salicylate in ethanol (99.5) (1 in 25).

Operating conditions—

Detector: A hydrogen flame-ionization detector.

Column: A glass column 3 mm in inside diameter and 3 m in length, which is packed with 10% of polyethylene glycol 20 M for gas chromatography supported on 180- to 250- μ m mesh silanized siliceous earth for gas chromatography.

Column temperature: A constant temperature of about 160°C

Carrier gas: Nitrogen

Flow rate: Adjust the flow rate so that the retention time of *d*-camphor is about 6 minutes.

System suitability—

System performance: When the procedure is run with 2 μ L of the standard solution under the above operating conditions, *d*-camphor and the internal standard are eluted in this order with the resolution between these peaks being not less than 7.

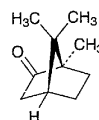
System repeatability: When the test is repeated 6 times with 2 μ L of the standard solution under the above operating conditions, the relative standard deviation of the ratios of the peak area of *d*-camphor to that of the internal standard is not more than 1.0%.

Containers and storage Containers—Tight containers.

dl-Camphor

Synthetic Camphor

dl-カンフル



and enantiomer

$C_{10}H_{16}O$: 152.23

(1*RS*,4*RS*)-Bornan-2-one [21368-68-3]

dl-Camphor contains not less than 96.0% of $C_{10}H_{16}O$.

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Identification Dissolve 0.1 g of *dl*-Camphor in 2 mL of methanol, add 1 mL of 2,4-dinitrophenylhydrazine TS, and heat for 5 minutes on a water bath: an orange-red precipitate is formed.

Optical rotation $[\alpha]_D^{20}$: $-1.5 - +1.5^\circ$ (5 g, ethanol (95), 50 mL, 100 mm).

Melting point 175 – 180°C

Purity (1) Water—Shake 1.0 g of *dl*-Camphor with 10 mL of carbon disulfide: the solution is clear.

(2) Chlorinated compounds—Mix 0.20 g of finely powdered *dl*-Camphor with 0.4 g of sodium peroxide in a dry, hard glass test tube. Suspend the tube at an angle of 45° by means of a clamp placed at the upper end, and heat the tube gently, starting near the upper end, and gradually bringing the heat toward the lower part of the tube until incineration is complete. Dissolve the residue in 20 mL of warm water, acidify with 12 mL of dilute nitric acid, and filter the solution into a Nessler tube. Wash the test tube and the filter with three 5-mL portions of hot water, adding the washings to the filtrate. After cooling, add water to make 50 mL, then add 1 mL of silver nitrate TS, mix well, and allow to stand for 5 minutes: the turbidity of the solution does not exceed that of the following control solution.

Control solution: Prepare in the same manner as described above, using 0.20 mL of 0.01 mol/L hydrochloric acid VS.

(3) Non-volatile residue—Heat 2.0 g of *dl*-Camphor on a water bath until sublimation is complete, then dry the residue at 105°C for 3 hours: the mass of the residue does not exceed 1.0 mg.

Assay Weigh accurately about 0.1 g each of *dl*-Camphor and *dl*-Camphor Reference Standard, add exactly 5 mL each of the internal standard solution, dissolve in dehydrated methanol to make 100 mL, and use these solutions as the sample solution and the standard solution, respectively. Per-