area of procaine hydrochloride to that of the internal standard.

Amount (mg) of $C_{13}H_{20}N_2O_2.HCl$
= amount (mg) of procaine hydrochloride for assay
$\times \frac{Q_T}{Q_S}$

Internal standard solution—A solution of caffeine in the mobile phase (1 in 1000).

Operating conditions—

Detector: An ultraviolet absorption photometer (wavelength: 254 nm).

Column: A stainless steel column about 6 mm in inside diameter and about 15 cm in length, packed with octadecylsilanized silica gel for liquid chromatography (5 μm in particle diameter).

Column temperature: A constant temperature of about 40°C.

Mobile phase: Adjust the pH of 0.05 mol/L potassium dihydrogenphosphate to 3.0 with phosphoric acid, and add an amount of sodium 1-pentane sulfonate to make a solution of 0.1%. Prepare a mixture of this solution and methanol (4:1).

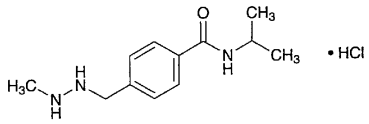
Flow rate: Adjust the flow rate so that the retention time of procaine hydrochloride is about 10 minutes.

Selection of column: Proceed with 5 μL of the standard solution under the above operating conditions, and calculate the resolution. Use a column giving elution of procaine and the internal standard in this order with the resolution between these peaks being not less than 8.

Containers and storage Containers—Hermetic containers.

Procarbazine Hydrochloride

塩酸プロカルバジン



$C_{12}H_{19}N_3O.HCl$: 257.76
N-Isopropyl-4-(*N'*-methylhydrazinomethyl)benzamide monohydrochloride [*366-70-1*]

Procarbazine Hydrochloride, when dried, contains not less than 98.5% of $C_{12}H_{19}N_3O.HCl$.

Description Procarbazine Hydrochloride occurs as white to light yellowish white crystals or crystalline powder.

It is freely soluble in water, soluble in methanol, slightly soluble in ethanol (95), and practically insoluble in diethyl ether.

Melting point: about 223°C (with decomposition).

Identification (1) Dissolve 0.01 g of Procarbazine Hydrochloride in 1 mL of diluted copper (II) sulfate TS (1 in 10), and add 4 drops of sodium hydroxide TS: a green precipitate is formed immediately, and the color changes from green through yellow to orange.

(2) Determine the absorption spectrum of a solution of Procarbazine Hydrochloride in 0.1 mol/L hydrochloric acid TS (1 in 100,000) as directed under the Ultraviolet-visible Spectrophotometry, and compare the spectrum with the Reference Spectrum: both spectra exhibit similar intensities of absorption at the same wavelengths.

(3) Determine the infrared absorption spectrum of Procarbazine Hydrochloride, previously dried, as directed in the potassium chloride disk method under the Infrared Spectrophotometry, and compare the spectrum with the Reference Spectrum: both spectra exhibit similar intensities of absorption at the same wave numbers.

(4) A solution of Procarbazine Hydrochloride (1 in 20) responds to the Qualitative Tests for chloride.

pH Dissolve 0.10 g of Procarbazine Hydrochloride in 10 mL of water: the pH of this solution is between 3.0 and 5.0.

Purity (1) Clarity and color of solution—Dissolve 1.0 g of Procarbazine Hydrochloride in 10 mL of water: the solution is clear and colorless to pale yellow.

(2) Heavy metals—Proceed with 1.0 g of Procarbazine Hydrochloride according to Method 4, and perform the test. Prepare the control solution with 2.0 mL of Standard Lead Solution (not more than 20 ppm).

(3) Arsenic—Dissolve 1.0 g of Procarbazine Hydrochloride in 6 mL of 0.1 mol/L hydrochloric acid TS and 4 mL of ethanol (95), use this solution as the test solution, and perform the test using Apparatus B (not more than 2 ppm).

(4) Related substances—Dissolve 0.050 g of Procarbazine Hydrochloride in 5 mL of a solution of L-cysteine hydrochloride in diluted methanol (7 in 10) (1 in 200), and use this solution as the sample solution. Pipet 1 mL of the sample solution, add a solution of L-cysteine hydrochloride in diluted methanol (7 in 10) (1 in 200) to make exactly 50 mL, and use this solution as the standard solution. Perform the test with these solutions as directed under the Thin-layer Chromatography. Immerse slowly, by inclining, a plate of silica gel with fluorescent indicator for thin-layer chromatography in a solution of L-cysteine hydrochloride in diluted methanol (7 in 10) (1 in 200), allow to stand for 1 minute, lift the plate from the solution, dry it in cold wind for 10 minutes, then in warm wind for 5 minutes, and then dry at 60°C for 5 minutes. After cooling, spot 5 μL each of the sample solution and the standard solution on the plate. Develop the plate with a mixture of methanol and ethyl acetate (1:1) to a distance of about 12 cm, and air-dry the plate. Examine under ultraviolet light (main wavelength: 254 nm): not more than 1 spot other than the principal spot and the spot of the starting point from the sample solution appears, and is not more intense than the spot from the standard solution.

Loss on drying Not more than 0.5% (1 g, 105°C, 2 hours).

Residue on ignition Not more than 0.10% (1 g).

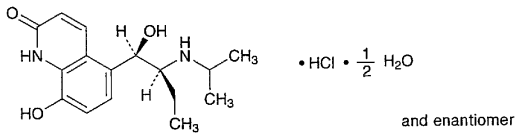
Assay Weigh accurately about 0.15 g of Procarbazine Hydrochloride, previously dried, place in a glass-stoppered flask, dissolve in 25 mL of water, add 25 mL of hydrochloric acid, and cool to room temperature. To this solution add 5 mL of chloroform, and titrate, while shaking, with 0.05 mol/L potassium iodate VS until the purple color of the chloroform layer disappears. The end point is reached when the red-purple color of the chloroform layer no more reappears within 5 minutes after the purple color disappeared.

Each mL of 0.05 mol/L potassium iodate VS
= 8.592 mg of $C_{12}H_{19}N_3O.HCl$

Containers and storage Containers—Tight containers.

Procaterol Hydrochloride

塩酸プロカテロール



and enantiomer

$C_{16}H_{22}N_2O_3.HCl.\frac{1}{2}H_2O$: 335.83
8-Hydroxy-5-[(1*RS*,2*SR*)-1-hydroxy-2-isopropylaminobutyl]quinolin-2(1*H*)-one monohydrochloride hemihydrate [*62929-91-3*, anhydride]

Procaterol Hydrochloride contains not less than 98.5% of $C_{16}H_{22}N_2O_3.HCl$ (mol. wt.: 326.82), calculated on the anhydrous basis.

Description Procaterol Hydrochloride occurs as white to pale yellowish white crystals or crystalline powder.

It is soluble in water, in formic acid and in methanol, slightly soluble in ethanol (95), and practically insoluble in diethyl ether.

The pH of a solution of Procaterol Hydrochloride (1 in 100) is between 4.0 and 5.0.

It is gradually colored by light.

Melting point: about 195°C (with decomposition).

The solution of Procaterol Hydrochloride (1 in 20) shows no optical rotation.

Identification **(1)** Determine the absorption spectrum of a solution of Procaterol Hydrochloride (7 in 1,000,000) as directed under the Ultraviolet-visible Spectrophotometry, and compare the spectrum with the Reference Spectrum: both spectra exhibit similar intensities of absorption at the same wavelengths.

(2) Determine the infrared absorption spectrum of Procaterol Hydrochloride as directed in the potassium bromide disk method under the Infrared Spectrophotometry, and compare the spectrum with the Reference Spectrum: both spectra exhibit similar intensities of absorption at the same wave numbers.

(3) A solution of Procaterol Hydrochloride (1 in 50) responds to the Qualitative Tests for chloride.

Purity **(1)** Clarity and color of solution—Dissolve 1.0 g of Procaterol Hydrochloride in 30 mL of water: the solution is clear, and has no more color than the following control solution.

Control solution: To 3.0 mL of Ferric Chloride Stock CS add water to make 50 mL.

(2) Heavy metals—Proceed with 2.0 g of Procaterol Hydrochloride according to Method 2, and perform the test. Prepare the control solution with 2.0 mL of Standard Lead Solution (not more than 10 ppm).

(3) Related substances—Dissolve 0.10 g of Procaterol Hydrochloride in 100 mL of diluted methanol (1 in 2), and use this solution as the sample solution. Pipet 1 mL of the sample solution, add diluted methanol (1 in 2) to make exactly 100 mL, and use this solution as the standard solution. Perform the test with 2 μL each of the sample solution and the standard solution as directed under the Liquid Chromatography according to the following conditions. Determine each peak area of these solutions by the automatic integration method: the total area of the peaks other than procaterol from the sample solution is not larger than the peak area of procaterol from the standard solution.

Operating conditions—

Detector: An ultraviolet absorption photometer (wavelength: 254 nm).

Column: A stainless steel column about 4 mm in inside diameter and about 25 cm in length, packed with octadecylsilanized silica gel for liquid chromatography (5 μm in particle diameter).

Column temperature: A constant temperature of about 40°C.

Mobile phase: Dissolve 0.87 g of sodium 1-pentanesulfonate in 1000 mL of water. To 760 mL of this solution add 230 mL of methanol and 10 mL of glacial acetic acid.

Flow rate: Adjust the flow rate so that the retention time of procaterol is about 15 minutes.

Selection of column: Dissolve 0.020 g each of Procaterol Hydrochloride and threoprocaterol hydrochloride in 100 mL of diluted methanol (1 in 2). To 15 mL of this solution add diluted methanol (1 in 2) to make 100 mL. Proceed with 2 μL of this solution under the above operating conditions, and calculate the resolution. Use a column giving elution of procaterol and threoprocaterol in this order with the resolution of these peaks being not less than 3.

Detection sensitivity: Adjust the detection sensitivity so that the peak height of procaterol obtained from 2 μL of the standard solution is not less than 10 mm.

Time span of measurement: 2.5 times as long as the retention time of procaterol after the solvent peak.

Water 2.5 - 3.3% (0.5 g, direct titration).

Residue on ignition Not more than 0.10% (1 g).

Assay Weigh accurately about 0.25 g of Procaterol Hydrochloride, add 2 mL of formic acid, dissolve by warming, and add exactly 15 mL of 0.1 mol/L perchloric acid VS. Add 1 mL of acetic anhydride, heat on a water bath for 30 minutes, cool, add 60 mL of acetic anhydride, and titrate the excess perchloric acid with 0.1 mol/L sodium acetate VS (potentiometric titration). Perform a blank determination.

Each mL of 0.1 mol/L perchloric acid VS
= 32.682 mg of $C_{16}H_{22}N_2O_3.HCl$

Containers and storage Containers—Well-closed containers.

Storage—Light-resistant.