ethyl L-cysteine hydrochloride-*N*-ethylmaleimide complex from the standard solution.

Operating conditions—

Detector: An ultraviolet absorption photometer (wavelength: 250 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 25°C.

Mobile phase: A mixture of 0.02 mol/L monobasic potassium phosphate TS and acetonitrile (2:1).

Flow rate: Adjust the flow rate so that the retention time of ethyl L-cysteine hydrochloride-*N*-ethylmaleimide complex is about 4 minutes.

Selection of column: Dissolve 0.05 g of Ethyl L-Cysteine Hydrochloride, 0.01 g of L-cysteine hydrochloride and 0.05 g of *N*-ethylmaleimide in 25 mL of the mobile phase, and allow to stand for 30 minutes. Proceed with 2 μL of this solution under the above conditions, and calculate the resolution. Use a column giving elution of L-cysteine hydrochloride-*N*-ethylmaleimide complex, ethyl L-cysteine hydrochloride-*N*-ethylmaleimide complex and *N*-ethylmaleimide in this order, complete resolution of each component, and the resolution of the peaks of L-cysteine hydrochloride-*N*-ethylmaleimide complex and ethyl L-cysteine hydrochloride-*N*-ethylmaleimide complex being not less than 3.

Detection sensitivity: Adjust the detection sensitivity so that the peak height of ethyl L-cysteine hydrochloride-*N*-ethylmaleimide complex obtained from 2 μL of the standard solution is between 10 mm and 20 mm.

Time span of measurement: About 3 times as long as the retention time of ethyl L-cysteine hydrochloride-*N*-ethylmaleimide complex.

Loss on drying Not more than 0.5% (1 g, in vacuum, phosphorus oxide (V), 5 hours).

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

Assay Weigh accurately about 0.25 g of Ethyl L-Cysteine Hydrochloride, previously dried, transfer into a glass-stoppered flask, and dissolve in 10 mL of water previously freshly boiled and cooled to a temperature not exceeding 5°C in a stream of nitrogen. Add exactly 20 mL of 0.05 mol/L iodine VS, previously cooled to a temperature not exceeding 5°C, and allow to stand for 30 seconds, then titrate with 0.1 mol/L sodium thiosulfate VS, on cooling below 5°C (indicator: 1 mL of starch TS). Perform a blank determination, and make any necessary correction.

Each mL of 0.05 mol/L iodine VS
= 18.567 mg of $C_5H_{11}NO_2S.HCl$

Containers and storage Containers—Tight containers.

Ethylmorphine Hydrochloride

Dionin

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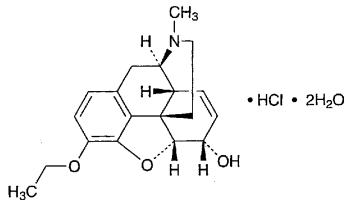

$C_{19}H_{23}NO_3.HCl.2H_2O$: 385.88

(5*R*,6*S*)-7,8-Didehydro-4,5-epoxy-3-ethoxy-17-methylmorphinan-6-ol monohydrochloride dihydrate [*125-30-4*, anhydride]

Ethylmorphine Hydrochloride contains not less than 98.0% of $C_{19}H_{23}NO_3.HCl$ (mol.wt.: 349.86), calculated on the anhydrous basis.

Description Ethylmorphine Hydrochloride occurs as white to pale yellow crystals or crystalline powder.

It is very soluble in methanol and in acetic acid (100), freely soluble in water, soluble in ethanol (95), sparingly soluble in acetic anhydride, and practically insoluble in diethyl ether.

It is affected by light.

Melting point: about 123°C (with decomposition).

Identification **(1)** Determine the absorption spectrum of a solution of Ethylmorphine Hydrochloride (1 in 10,000) 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 Ethylmorphine 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 Ethylmorphine Hydrochloride (1 in 50) responds to the Qualitative Tests (2) for chloride.

Optical rotation $[\alpha]_D^{20}$: −103 – −106° (0.4 g calculated on the anhydrous basis, water, 20 mL, 100 mm).

pH Dissolve 0.10 g of Ethylmorphine Hydrochloride in 10 mL of water: the pH of this solution is between 4.0 and 6.0.

Purity Related substances—Dissolve 0.20 g of Ethylmorphine Hydrochloride in 10 mL of diluted ethanol (95) (1 in 2), and use this solution as the sample solution. Pipet 0.5 mL of the sample solution, add diluted ethanol (95) (1 in 2) to make exactly 100 mL, and use this solution as the standard solution. Perform the test with these solutions as directed under the Thin-layer Chromatography. Spot 10 μL each of the sample solution and the standard solution on a plate of silica gel with fluorescent indicator for thin-layer chromatography. Develop the plate with a mixture of ethanol (99.5), toluene, acetone and ammonia solution (28)

(14:14:7:1) to a distance of about 10 cm, and air-dry the plate. Examine under ultraviolet light (main wavelength: 254 nm): the spots other than the principal spot from the sample solution are not more intense than the spot from the standard solution.

Water 8.0 - 10.0% (0.25 g, direct titration).

Residue on ignition Not more than 0.1% (0.5 g).

Assay Weigh accurately about 0.5 g of Ethylmorphine Hydrochloride, and dissolve in 50 mL of a mixture of acetic anhydride and acetic acid (100) (7:3), and titrate with 0.1 mol/L perchloric acid VS (potentiometric titration). Perform a blank determination, and make any necessary correction.

Each mL of 0.1 mol/L perchloric acid VS
= 34.986 mg of $C_{19}H_{23}NO_3$.HCl

Containers and storage Containers—Tight containers.
Storage—Light-resistant.

Etilefrine Hydrochloride

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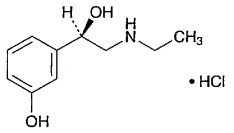

and enantiomer

$C_{10}H_{15}NO_2$.HCl: 217.69
(*RS*)-2-Ethylamino-1-(3-hydroxyphenyl)ethanol monohydrochloride [*943-17-9*]

Etilefrine Hydrochloride, when dried, contains not less than 98.0% of $C_{10}H_{15}NO_2$.HCl.

Description Etilefrine Hydrochloride occurs as white crystals or crystalline powder. It is odorless and has a bitter taste.

It is very soluble in water, freely soluble in ethanol (95), sparingly soluble in acetic acid (100), and practically insoluble in diethyl ether.

The pH of a solution of Etilefrine Hydrochloride (1 in 10) is between 3.8 and 5.8.

It is gradually colored by light.

Identification **(1)** To 1 mL of a solution of Etilefrine Hydrochloride (1 in 5000) add 1 mL of a freshly prepared solution of 2,6-dibromoquinonechlorimide in ethanol (95) (1 in 4000) and 5 drops of ammonia TS: a blue color develops.

(2) To 5 mL of a solution of Etilefrine Hydrochloride (1 in 20,000) add 2 mL of a solution of 4-nitrobenzenediazonium fluoroborate (1 in 2000), 5 mL of boric acid-potassium chloride-sodium hydroxide buffer solution, pH 9.2, and 5 mL of acetone: a red color develops.

(3) Dissolve 5 mg of Etilefrine Hydrochloride in 100 mL of diluted hydrochloric acid (1 in 1000). Determine the absorption spectrum of the solution 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.

(4) A solution of Etilefrine Hydrochloride (1 in 1000) responds to the Qualitative Tests for chloride.

Melting point 119 - 124°C

Purity **(1)** Clarity and color of solution—Dissolve 0.5 g of Etilefrine Hydrochloride in 50 mL of water: the solution is clear and colorless.

(2) Sulfate—Perform the test with 0.6 g of Etilefrine Hydrochloride. Prepare the control solution with 0.35 mL of 0.005 mol/L sulfuric acid VS (not more than 0.028%).

(3) Heavy metals—Dissolve 1.0 g of Etilefrine Hydrochloride in 30 mL of water and 2 mL of acetic acid (100), adjust with sodium hydroxide TS to a pH of 3.3, add water to make 50 mL, and perform the test. Prepare the control solution with 2.0 mL of Standard Lead Solution (not more than 20 ppm).

(4) Arsenic—Prepare the test solution with 1.0 g of Etilefrine Hydrochloride, according to Method 1, and perform the test using Apparatus B (not more than 2 ppm).

Loss on drying Not more than 1.0% (1 g, 105°C, 4 hours).

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

Assay Weigh accurately about 0.3 g of Etilefrine Hydrochloride, previously dried, dissolve in 25 mL of acetic acid (100), add 40 mL of acetic anhydride, and titrate with 0.1 mol/L perchloric acid VS (potentiometric titration). Perform a blank determination.

Each mL of 0.1 mol/L perchloric acid VS
= 21.770 mg of $C_{10}H_{15}NO_2$.HCl

Containers and storage Containers—Tight containers.
Storage—Light-resistant.

Etilefrine Hydrochloride Tablets

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Etilefrine Hydrochloride Tablets contain not less than 93% and not more than 107% of the labeled amount of etilefrine hydrochloride ($C_{10}H_{15}NO_2$.HCl: 217.69).

Method of preparation Prepare as directed under Tablets, with Etilefrine Hydrochloride.

Identification **(1)** To a quantity of powdered Etilefrine Hydrochloride Tablets, equivalent to 5 mg of Etilefrine Hydrochloride according to the labeled amount, add 25 mL of water, and filter. Proceed with 1 mL of the filtrate as directed in the Identification (1) under Etilefrine Hydrochloride.

(2) Dilute 5 mL of the filtrate obtained in (1) with water to make 20 mL. Proceed with 5 mL of this solution as directed in the Identification (2) under Etilefrine Hydrochloride.

(3) To a quantity of powdered Etilefrine Hydrochloride Tablets, equivalent to 5 mg of Etilefrine Hydrochloride according to the labeled amount, add 60 mL of diluted hydrochloric acid (1 in 1000), shake well, add 40 mL of diluted hydrochloric acid (1 in 1000), and filter. Determine the absorption spectrum of the filtrate as directed under the Ultraviolet-visible Spectrophotometry, using diluted hydrochloric