Carbazochrome Sodium Sulfonate contains not less than 98.0% and not more than 102.0% of $C_{10}H_{11}N_4NaO_5S$ (mol. wt.: 322.27), calculated on the anhydrous basis.

Description Carbazochrome Sodium Sulfonate occurs as orange-yellow, crystals or crystalline powder.

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

A solution of Carbazochrome Sodium Sulfonate (1 in 100) shows no optical rotation.

Melting point: about 210°C (with decomposition).

Identification (1) Determine the absorption spectrum of a solution of Carbazochrome Sodium Sulfonate (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.

(2) Determine the infrared absorption spectrum of Carbazochrome Sodium Sulfonate 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 Carbazochrome Sodium Sulfonate (1 in 100) responds to the Qualitative Tests (1) for sodium salt.

pH Dissolve 0.8 g of Carbazochrome Sodium Sulfonate in 50 mL of water by warming, and cool: the pH of this solution is between 5.0 and 6.0.

Purity (1) Clarity of solution—Dissolve 1.0 g of Carbazo chrome Sodium Sulfonate in 50 mL of water by warming, and allow to cool: the solution is clear. Perform the test with this solution as directed under the Ultraviolet-visible Spectrophotometry: the absorbance at 590 nm is not more than 0.070.

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

(3) Related substances—Dissolve 0.050 g of Carbazo chrome Sodium Sulfonate in 100 mL of water, and use this solution as the sample solution. Pipet 2 mL of the sample solution, add water to make exactly 200 mL, and use this solution as the standard solution. Perform the test with 10 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 the peak of carbazochrome sulfonate from the sample solution is not larger than the peak area of carbazochrome sulfonate from the standard solution.

Operating conditions—

Detector: An ultraviolet absorption photometer (wavelength: 360 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 to 10 μm in particle diameter).

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

Mobile phase: Dissolve 1.2 g of ammonium dihydrogenphosphate in 1000 mL of water, and filter through a membrane filter if necessary. To 925 mL of this solution add 75 mL of ethanol (95), shake, and adjust with phosphoric acid to a pH of 3.

Flow rate: Adjust the flow rate so that the retention time of carbazochrome sulfonate is between 6 and 8 minutes.

Selection of column: Dissolve 0.010 g each of Carbazochrome Sodium Sulfonate and carbazochrome in 100 mL of water by warming. Proceed with 10 μL of this solution under the above operating conditions, and calculate the resolution. Use a column giving elution of carbazochrome sulfonate and carbazochrome in this order with the resolution between these peaks being not less than 3.

Detection sensitivity: Adjust the detection sensitivity so that the peak height of carbazochrome sulfonate obtained from 10 μL of the standard solution composes about 5% of the full scale.

Time span of measurement: About 3 times as long as the retention time of carbazochrome sulfonate after the solvent peak.

Water 13.0 - 16.0% (0.3 g, direct titration).

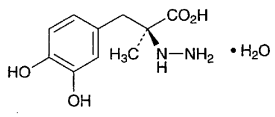
Assay Weigh accurately about 0.25 g of Carbazochrome Sodium Sulfonate, dissolve in 50 mL of water, apply to a chromatographic column, 10 mm in diameter, previously prepared with 20 mL of strongly acidic ion exchange resin for column chromatography (type H), and allow to flow at a rate of 4 mL per minute. Wash the column with 150 mL of water, combine the washing and the former effluent solution, and titrate with 0.05 mol/L sodium hydroxide VS (potentiometric titration). Perform a blank determination, and make any necessary correction.

Each mL of 0.05 mol/L sodium hydroxide VS
= 16.114 mg of $C_{10}H_{11}N_4NaO_5S$

Containers and storage Containers—Well-closed containers.

Carbidopa

カルビドパ



$C_{10}H_{14}N_2O_4.H_2O$: 244.24

(2*S*)-2-(3,4-Dihydroxybenzyl)-2-hydrazinopropanoic acid monohydrate [*38821-49-7*]

Carbidopa contains not less than 98.0% of $C_{10}H_{14}N_2O_4.H_2O$.

Description Carbidopa occurs as a white to yellowish white powder.

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

Melting point: about 197°C (with decomposition).

Identification (1) Dissolve 0.01 g of Carbidopa in 250 mL of a solution of hydrochloric acid in methanol (9 in 1000). Determine the absorption spectrum of the solution as directed under the Ultraviolet-visible Spectrophotometry at the wavelengths between 240 nm and 300 nm, and compare the spectrum with the Reference Spectrum or the spectrum of a solution of Carbidopa Reference Standard prepared in the same manner as the sample solution: both spectra exhibit similar intensities of absorption at the same wavelengths.

(2) Determine the infrared absorption spectrum of Carbidopa 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.

Optical rotation $[\alpha]_D^{20}$: $-21.0 - -23.5°$ (1 g, aluminum (III) chloride TS, 100 mL, 100 mm).

Purity (1) Heavy metals—Proceed with 2.0 g of Carbidopa 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).

(2) Related substances—Dissolve 0.050 g of Carbidopa in 70 mL of the mobile phase, by warming and using ultrasonication, if necessary. After cooling, add the mobile phase to make 100 mL, and use this solution as the sample solution. Pipet 1 mL of the sample solution, add the mobile phase to make exactly 100 mL, and use this solution as the standard solution. Perform the test with 20 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 from both solutions by the automatic integration method: the total area of all peaks other than the peak of carbidopa from the sample solution is not larger than the peak area of carbidopa from the standard solution.

Operating conditions—

Detector, column, temperature of column, mobile phase, flow rate, and selection of column: Proceed as directed in the operating conditions in the Assay.

Detection sensitivity: Adjust the detection sensitivity so that the peak height of carbidopa from 20 μL of the standard solution is about 10% of the full scale.

Time span of measurement: About 3 times as long as the retention time of carbidopa.

Loss on drying 6.9 - 7.9% (1 g, in vacuum not exceeding 0.67 kPa, 100°C, 6 hours).

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

Assay Weigh accurately about 0.05 g each of Carbidopa and Carbidopa Reference Standard (determined separately the loss on drying in the same manner as for Carbidopa), and dissolve each in 70 mL of the mobile phase, by warming and using ultrasonication, if necessary. After cooling, add the mobile phase to make exactly 100 mL, and use these solutions as the sample solution and the standard solution, respectively. Perform the test with 20 μL each of the sample solution and the standard solution as directed under the Liquid Chromatography according to the following conditions, and determine the peak areas, A_T and A_S, of carbidopa in each solution.

Amount (mg) of $C_{10}H_{14}N_2O_4.H_2O$
= amount (mg) of Carbidopa Reference Standard, calculated on the dried basis

$$\times \frac{A_T}{A_S} \times 1.080$$

Operating conditions—

Detector: An ultraviolet absorption photometer (wavelength: 280 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 (7 μm in particle diameter).

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

Mobile phase: To 950 mL of 0.05 mol/L sodium dihydrogenphosphate TS add 50 mL of ethanol (95), and adjust the pH to 2.7 with phosphoric acid.

Flow rate: Adjust the flow rate so that the retention time of carbidopa is about 6 minutes.

Selection of column: Dissolve 0.05 g each of Carbidopa and methyldopa in 100 mL of the mobile phase. Proceed with 20 μL of this solution under the above operating conditions, and calculate the resolution. Use a column giving elution of methyldopa and carbidopa in this order with the resolution between these peaks being not less than 0.9.

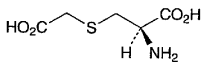
System repeatability: When the test is repeated 6 times with the standard solution under the above operating conditions, the relative standard deviation of the peak areas of carbidopa is not more than 1.0%.

Containers and storage Containers—Tight containers.

Storage—Light-resistant.

L-Carbocisteine

L-カルボシステイン



$C_5H_9NO_4S$: 179.19

(2*R*)-2-Amino-3-carboxymethylsulfanylpropanoic acid

[*638-23-3*]

L-Carbocisteine, when dried, contains not less than 98.5% of $C_5H_9NO_4S$.

Description L-Carbocisteine occurs as a white crystalline powder. It is odorless, and has a slightly acid taste.

It is very slightly soluble in water, and practically insoluble in ethanol (95).

It dissolves in dilute hydrochloric acid or in sodium hydroxide TS.

Melting point: about 186°C (with decomposition).

Identification (1) To 0.2 g of L-Carbocisteine add 1 mL of lead acetate TS and 3 mL of water, shake, add 0.2 g of sodium hydroxide, and heat over a flame for 1 minute: a dark brown to black precipitate is formed.

(2) Determine the infrared absorption spectrum of L-Carbocisteine as directed in the potassium bromide disk method under the Infrared Spectrophotometry, and com-