L-Carbocisteine for Syrup

シロップ用 L–カルボシステイン

L-Carbocisteine for Syrup is a preparation for syrup, which is suspended before use.

It contains not less than 95.0% and not more than 105.0% of the labeled amount of L-carbocisteine ($C_5H_9NO_4S$: 179.19).

Method of preparation Prepare as directed under Syrups, with L-Carbocisteine.

Identification Dissolve an amount of L-Carbocisteine for Syrup, equivalent to 0.1 g of L-Carbocisteine, in 20 mL of 0.1 mol/L hydrochloric acid TS, shake for 15 minutes, then centrifuge, and use the supernatant liquid as the sample solution. Separately, dissolve 10 mg of L-carbocisteine in 2 mL of 0.1 mol/L hydrochloric acid TS, and use this solution as the standard solution. Perform the test with these solutions as directed under Thin-layer Chromatography *<2.03>*. Spot 1 μL each of the sample solution and standard solution on a plate of silica gel for thin-layer chromatography. Develop the plate with a mixture of 1-butanol, water and acetic acid (100) (3:1:1) to a distance of about 10 cm, and air-dry the plate. Spray evenly a solution of ninhydrin in acetone (1 in 50) on the plate, and heat the plate at 80℃ for 5 minutes: the principal spot obtained from the sample solution and the spot from standard solution are purple in color and their *R*f values are the same.

Uniformity of dosage units *<6.02>* Perform the test according to the following method: it meets the requirement of the Content uniformity test.

To the total amount of the content of 1 package of L-Carbocisteine for Syrup, add $4V/5$ mL of 0.1 mol/L phosphate buffer solution (pH 7.0), stir for 30 minutes, and add 0.1 mol/L phosphate buffer solution (pH 7.0) to make exactly V mL so that each mL contains about 5 mg of L-carbocisteine ($C_5H_9NO_4S$). Centrifuge this solution, pipet 8 mL of the supernatant liquid, add exactly 2 mL of the internal standard solution, then add water to make 50 mL, and use this solution as the sample solution. Proceed as directed in the Assay.

Amount (mg) of L-carbocisteine ($C_5H_9NO_4S$)
$= M_S \times Q_T/Q_S \times V/8$

M_S: Amount (mg) of L-carbocisteine for assay taken

Internal standard solution—A solution of nicotinamide (7 in 10,000).

Dissolution *<6.10>* Perform the test at 50 revolutions per minute according to the Paddle method, using 900 mL of water as the dissolution medium: the dissolution rate of L-Carbocisteine for Syrup in 15 minutes is not less than 85%.

Start the test with accurately weighed amount of L-Carbocisteine for Syrups, equivalent to 0.5 g of L-carbocisteine ($C_5H_9NO_4S$), withdraw not less than 20 mL of the dissolution medium at the specified time after starting the test, and filter through a membrane filter with a pore size not exceeding 0.45 μm. Discard not less than 10 mL of the first filtrate, and use the subsequent filtrate as the sample solution. Separately, weigh accurately about 25 mg of L-carbocisteine for assay, previously dried at 105℃ for 2 hours, dissolve in water to make exactly 50 mL, and use this solution as the standard solution. Perform the test with exactly 5 μL each of the sample solution and standard solution as directed under Liquid Chromatography *<2.01>* according to the following conditions, and determine the peak areas, A_T and A_S, of L-carbocisteine in each solution.

Dissolution rate (%) with respect to the labeled amount of L-carbocisteine ($C_5H_9NO_4S$)
$= M_S/M_T \times A_T/A_S \times 1/C \times 1800$

M_S: Amount (mg) of L-carbocisteine for assay taken
M_T: Amount (g) of L-Carbocisteine for Syrups taken
C: Labeled amount (mg) of L-carbocisteine ($C_5H_9NO_4S$) in 1 g

Operating conditions—

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

Flow rate: Adjust so that the retention time of L-carbocisteine is about 3 minutes.

System suitability—

System performance: When the procedure is run with 5 μL of the standard solution under the above operating conditions, the number of theoretical plates and the symmetry factor of the peak of L-carbocisteine are not less than 2300 and not more than 2.0, respectively.

System repeatability: When the test is repeated 6 times with 5 μL of the standard solution under the above operating conditions, the relative standard deviation of the peak area of L-carbocisteine is not more than 1.0%.

Assay Weigh accurately an amount of powdered L-Carbocisteine for Syrups, equivalent to about 0.5 g of L-carbocisteine ($C_5H_9NO_4S$), add 80 mL of 0.1 mol/L phosphate buffer solution (pH 7.0), shake for 30 minutes, and add 0.1 mol/L phosphate buffer solution (pH 7.0) to make exactly 100 mL. Centrifuge this solution, pipet 8 mL of the supernatant liquid, add exactly 2 mL of the internal standard solution, then add water to make 50 mL, and use this solution as the sample solution. Separately, weigh accurately about 40 mg of L-carbocisteine for assay, previously dried at 105℃ for 2 hours, dissolve in 8 mL of 0.1 mol/L phosphate buffer solution (pH 7.0), add exactly 2 mL of the internal standard solution, then add water to 50 mL, and use this solution as the standard solution. Perform the test with 20 μL each of the sample

solution and standard solution as directed under Liquid Chromatography <2.01> according to the following conditions, and calculate the ratios, Q_T and Q_S, of the peak area of L-carbocisteine to that of the internal standard.

$$\text{Amount (mg) of L-carbocisteine } (C_5H_9NO_4S) = M_S \times Q_T / Q_S \times 25/2$$

M_S: Amount (mg) of L-carbocisteine for assay.

Internal standard solution: A solution of nicotinamide (7 in 10,000).

Operating conditions—

Detector: An ultraviolet absorption photometer (wavelength: 240 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 μm in particle diameter).

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

Mobile phase: Dissolve 1.0 g of sodium 1-octane sulfonate in 2000 mL of diluted phosphoric acid (1 in 1000). To 900 mL of this solution add 100 mL of acetonitrile for liquid chromatography.

Flow rate: Adjust so that the retention time of L-carbocisteine is about 4 minutes.

System suitability—

System performance: When the procedure is run with 20 μL of the standard solution under the above operating conditions, L-carbocisteine and the internal standard are eluted in this order with the resolution between these peaks being not less than 4.

System repeatability: When the test is repeated 6 times with 20 μL of the standard solution under the above operating conditions, the relative standard deviation of the ratio of the peak area of L-carbocisteine to that of the internal standard is not more than 1.0%.

Containers and storage Containers—Hermetic containers.

Add the following to 9.41 Reagents, Test Solutions:

L-Carbocisteine $C_5H_9NO_4S$ [Same as the namesake monograph]