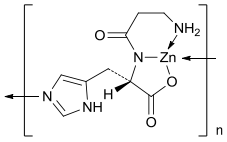
Polaprezinc

ポラプレジンク



$(C_9H_{12}N_4O_3Zn)_n$

catena-Poly[zinc-μ-[β-alanyl-L-histidinato(2-)-*N*,N^N,*O*:N^τ]]

[*107667-60-7*]

Polaprezinc contains not less than 98.0% and not more than 102.0% of polaprezinc ($C_9H_{12}N_4O_3Zn$: 289.60), and contains not less than 21.5% and not more than 23.0% of zinc (Zn: 65.38), calculated on the anhydrous basis.

Description Polaprezinc occurs as a white to pale yellow- white crystalline powder.

It is practically insoluble in water, in methanol, and in ethanol (99.5).

It dissolves in dilute hydrochloric acid, and in sodium hydroxide TS.

Identification **(1)** To 2 mL of a solution of Polaprezinc in 0.2 mol/L hydrochloric acid TS (1 in 1000) add 0.5 mL of a solution of sulfanilic acid in 1 mol/L hydrochloric acid TS (1 in 200), 0.5 mL of a solution of sodium nitrite (1 in 20) and 3 mL of sodium carbonate TS: a red color is produced.

(2) A solution of Polaprezinc in 0.2 mol/L hydrochloric acid TS (1 in 1000) responds to the Qualitative Tests <*1.09*> for zinc salt.

(3) Determine the infrared absorption spectrum of Polaprezinc as directed in the potassium bromide disk method under Infrared Spectrophotometry <*2.25*>, and compare the spectrum with the Reference Spectrum: both spectra exhibit similar intensities of absorption at the same wave numbers.

Optical rotation <*2.49*> $[\alpha]_D^{20}$: +8 ～ +9° (1 g calculated on the anhydrous basis, 3 mol/L hydrochloric acid TS, 50 mL, 100 mm).

Purity **(1)** Lead—Weigh accurately about 0.5 g of Polaprezinc, dissolve in 3 mL of dilute nitric acid, add water to make exactly 10 mL, and use this solution as the sample solution. Separately, pipet 0.5 mL, 1.0 mL, 1.5 mL and 2.0 mL of Standard Lead Solution, to each solution add 3 mL of dilute nitric acid and water to make exactly 10 mL, and use these solutions as the standard solutions. Perform the test with the sample solution and standard solutions as directed under Atomic Absorption Spectrophotometry <*2.23*> according to the following conditions, and calculate the amount of lead in the sample solution using a calibration curve obtained from the absorbances of the standard solutions: not more than 10 ppm.

Gas:

Combustible gas—Acetylene.

Supporting gas—Air.

Lamp: Lead hollow-cathode lamp.

Wavelength: 283.3 nm.

(2) Related substances—Dissolve 50 mg of Polaprezinc in 10 mL of 0.1 mol/L hydrochloric acid TS, 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 10 μL each of the sample solution and standard solution as directed under Liquid Chromatography <*2.01*> according to the following conditions. Determine each peak area by the automatic integration method: the peak area of L-histidine, having the relative retention time of about 0.38 to L-carnosine, obtained from the sample solution is not larger than 1/5 times of the peak area of L-carnosine from the standard solution, the area of the peak other than L-carnosine and the peak mentioned above, from the sample solution is not larger than 1/10 times of the peak area of L-carnosine from the standard solution. Furthermore, the total area of the peaks other than L-carnosine from the sample solution is not larger than the peak area of L-carnosine from the standard solution.

Operating conditions—

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

Time span of measurement: About 4 times as long as the retention time of L-carnosine, beginning after the solvent peak.

System suitability—

Test for required detectability: Pipet 2 mL of the standard solution, add the mobile phase to make exactly 20 mL. Confirm that the peak area of L-carnosine obtained with 10 μL of this solution is equivalent to 7 to 13% of that with 10 μL of the standard solution.

System performance: Dissolve 50 mg each of Polaprezinc and L-histidine in 10 mL of 0.1 mol/L hydrochloric acid TS, and add the mobile phase to make 100 mL. When the procedure is run with 10 μL of this solution under the above operating conditions, L-histidine and L-carnosine are eluted in this order with the resolution between these peaks being not less than 12.

System repeatability: When the test is repeated 6 times with 10 μL of the standard solution under the above operating conditions, the relative standard deviation of the peak area of L-carnosine is not more than 2.0%.

Water *<2.48>* Not more than 5.0% (0.2 g, volumetric titration, direct titration, stir for 30 minutes).

Assay **(1)** Weigh accurately about 25 mg of Polaprezinc, dissolve in 5 mL of 0.1 mol/L hydrochloric acid TS, add the mobile phase to make exactly 100 mL, and use this solution as the sample solution. Separately, weigh accurately about 20 mg of L-Carnosine RS, previously dried at 105℃ for 3 hours, dissolve in 5 mL of 0.1 mol/L hydrochloric acid TS, add the mobile phase to make exactly 100 mL, and use this solution as the standard solution. Perform the test with 10 μL each of the sample solution and standard solution as directed under Liquid Chromatography *<2.01>* according to the following conditions. Determine the peak areas, A_T and A_S, of L-carnosine in each solution.

Amount (mg) of polaprezinc ($C_9H_{12}N_4O_3Zn$)
$= M_S \times A_T / A_S \times 1.292$

M_S : Amount (mg) of L-Carnosine RS

Operating conditions—
Detector: An ultraviolet absorption photometer (wavelength: 210 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 45℃.
Mobile phase: Dissolve 1.4 g of potassium dihydrogen phosphate in 1000 mL of water, adjust to pH 3.5 with diluted phosphoric acid (1 in 100). Dissolve 2 g of sodium 1-octane sulfonate in 900 mL of this solution, and add 100 mL of acetonitrile for liquid chromatography.
Flow rate: Adjust so that the retention time of L-carnosine is about 15 minutes.
System suitability—
System performance: Dissolve 5 mg of L-histidine in 20 mL of the standard solution. When the procedure is run with 10 μL of this solution under the above operating conditions, L-histidine and L-carnosine are eluted in this order with the resolution between these peaks being not less than 12.
System repeatability: When the test is repeated 6 times with 10 μL of the standard solution under the above operating conditions, the relative standard deviation of the peak area of L-carnosine is not more than 1.0%.

(2) Zinc—Weigh accurately about 0.2 g of Polaprezinc, dissolve in 3 mL of dilute hydrochloric acid TS, and add water to make exactly 100 mL. Pipet 25 mL of this solution, add 10 mL of ammonia-ammonium chloride buffer solution (pH 10.7), and titrate *<2.50>* with 0.01 mol/L disodium dihydrogen ethylenediamine tetraacetate VS (indicator: 0.04 g of eriochrome black T-sodium chloride indicator).

Each mL of 0.01 mol/L disodium dihydrogen ethylenediamine tetraacetate VS
＝0.6538 mg Zn

Containers and storage Containers—Tight containers.

Change the following 9.01 Reference Standards (1) as follows:

L-Carnosine RS