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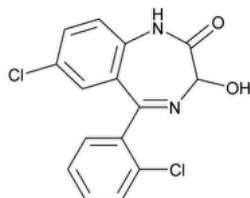
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Lorazepam


 $C_{15}H_{10}Cl_2N_2O_2$ 321.16

2H-1,4-Benzodiazepin-2-one, 7-chloro-5-(2-chlorophenyl)-1,3-dihydro-3-hydroxy-, (±)-;

(±)-7-Chloro-5-(o-chlorophenyl)-1,3-dihydro-3-hydroxy-2H-1,4-benzodiazepin-2-one CAS RN[®]: 846-49-1; UNII: O26FZP769L.

DEFINITION

Lorazepam contains NLT 98.0% and NMT 102.0% of lorazepam ($C_{15}H_{10}Cl_2N_2O_2$), calculated on the dried basis.

IDENTIFICATION

- **A. SPECTROSCOPIC IDENTIFICATION TESTS (197), Infrared Spectroscopy:** 197A or 197K
- **B.** The retention time of the major peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the Assay.

ASSAY

Change to read:

PROCEDURE

Mobile phase: [Acetonitrile](#), [glacial acetic acid](#), and [water](#) (50: 1.2: 50)**Diluent:** [Methanol](#) and [water](#) (75:25)**Standard solution:** 0.1 mg/mL of [USP Lorazepam RS](#) in *Diluent***Sample solution:** 0.1 mg/mL of Lorazepam in *Diluent*

Chromatographic system

(See [Chromatography \(621\), System Suitability](#).)**Mode:** LC**Detector:** UV 230 nm**Column:** 4.6-mm × 25-cm; 5-μm packing [L1](#)

Temperatures

▲Autosampler:▲ (USP 1-Dec-2021) 4°**Column:** 5°**Flow rate:** 1 mL/min**Injection volume:** 5 μL**▲Run time:** NLT 8 times the retention time of lorazepam▲ (USP 1-Dec-2021)

System suitability

Sample: *Standard solution***▲▲** (USP 1-Dec-2021)

Suitability requirements

Tailing factor: NMT ▲1.5▲ (USP 1-Dec-2021)**Relative standard deviation:** NMT 2.0%

Analysis

Samples: *Standard solution* and *Sample solution*Calculate the percentage of lorazepam ($C_{15}H_{10}Cl_2N_2O_2$) in the portion of Lorazepam taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times 100$$

 r_U = peak response of lorazepam from the *Sample solution*

r_s = peak response of lorazepam from the *Standard solution*

C_s = concentration of [USP Lorazepam RS](#) in the *Standard solution* (mg/mL)

C_u = concentration of Lorazepam in the *Sample solution* (mg/mL)

Acceptance criteria: 98.0%–102.0% on the dried basis

IMPURITIES

- [RESIDUE ON IGNITION \(281\)](#): NMT 0.3%

Change to read:

- **ORGANIC IMPURITIES**

Mobile phase and Diluent: Prepare as directed in the Assay.

System suitability solution: 3.2 mg/mL of [USP Lorazepam RS](#) and 32 µg/mL each of [USP Lorazepam Related Compound A RS](#), [USP Lorazepam Related Compound B RS](#), [USP Lorazepam Related Compound C RS](#), [USP Lorazepam Related Compound D RS](#), and [USP Lorazepam Related Compound E RS](#) in *Diluent*

▲ **Sensitivity solution:** 0.16 µg/mL of [USP Lorazepam Related Compound B RS](#) in *Diluent* ▲ (USP 1-Dec-2021)

Standard solution: ▲ 3.2 ▲ (USP 1-Dec-2021) µg/mL of [USP Lorazepam RS](#) in *Diluent*

Sample solution: 3.2 mg/mL of Lorazepam in *Diluent*

Chromatographic system: ▲ Proceed as directed in the Assay, except for *Injection volume*. ▲ (USP 1-Dec-2021)

Injection volume: 100 µL

System suitability

Samples: *System suitability solution*, ▲ *Sensitivity solution*, ▲ (USP 1-Dec-2021) and *Standard solution*

[NOTE—See [Table 1](#) for the relative retention times.]

▲ ▲ (USP 1-Dec-2021)

Suitability requirements

Resolution: NLT 1.2 between lorazepam related compound A and lorazepam related compound E, *System suitability solution*

▲ ▲ (USP 1-Dec-2021)

Relative standard deviation: NMT 5% for lorazepam, *Standard solution*

▲ **Signal-to-noise ratio:** NLT 10 for lorazepam related compound B, *Sensitivity solution* ▲ (USP 1-Dec-2021)

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of each impurity in the portion of Lorazepam taken:

$$\text{Result} = (r_u/r_s) \times (C_s/C_u) \times (1/F) \times 100$$

r_u = peak response of each impurity from the *Sample solution*

r_s = peak response of lorazepam from the *Standard solution*

C_s = concentration of [USP Lorazepam RS](#) in the *Standard solution* (mg/mL)

C_u = concentration of Lorazepam in the *Sample solution* (mg/mL)

F = relative response factor for any given impurity (see [Table 1](#))

Acceptance criteria: See [Table 1](#).

Table 1

Name	Relative Retention Time	Relative Response Factor	Acceptance Criteria, NMT (%)
Lorazepam	1.0	1.0	—
Lorazepam related compound D	1.4	1.0	0.15
Lorazepam related compound A	1.7	1.0	0.10