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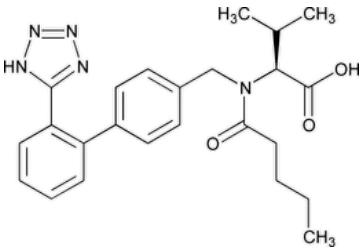
# Valsartan



$C_{24}H_{29}N_5O_3$ 435.52

L-Valine, *N*-(1-oxopentyl)-*N*-[[2'-(1*H*-tetrazol-5-yl)[1,1'-biphenyl]-4-yl]methyl]-;

*N*-[*p*-(*o*-1*H*-Tetrazol-5-ylphenyl)benzyl]-*N*-valeryl-L-valine CAS RN®: 137862-53-4; UNII: 80M03YXJ7I.

**DEFINITION**

Valsartan contains NLT 98.0% and NMT 102.0% of valsartan ($C_{24}H_{29}N_5O_3$), calculated on the anhydrous basis.

**IDENTIFICATION**

***Change to read:***

• **A.** ▲**Spectroscopic Identification Tests ⟨197⟩, *Infrared Spectroscopy*: 197M**▲ (CN 1-May-2020)

• **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**

• **Procedure**

**Mobile phase:** Acetonitrile, glacial acetic acid, and water (500:1:500)

**Standard solution:** 0.5 mg/mL of USP Valsartan RS in *Mobile phase*

**Sample solution:** 0.5 mg/mL of Valsartan in *Mobile phase*

**Chromatographic system**

(See *Chromatography ⟨621⟩, System Suitability*.)

**Mode:** LC

**Detector:** UV 273 nm

**Column:** 3.0-mm × 12.5-cm; 5-µm packing L1

**Flow rate:** 0.4 mL/min

**Injection volume:** 10 µL

**System suitability**

**Sample:** *Standard solution*

**Suitability requirements**

**Relative standard deviation:** NMT 2.0%

**Analysis**

**Samples:** *Standard solution* and *Sample solution*

Calculate the percentage of valsartan ($C_{24}H_{29}N_5O_3$) in the portion of Valsartan taken:

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

$r_U$ = peak response of the *Sample solution*

$r_S$ = peak response of the *Standard solution*

$C_S$ = concentration of USP Valsartan RS in the *Standard solution* (mg/mL)

$C_U$ = concentration of Valsartan in the *Sample solution* (mg/mL)

**Acceptance criteria:** 98.0%–102.0% on the anhydrous basis

**IMPURITIES**

- **Residue on Ignition ⟨281⟩:** NMT 0.1%
- **Procedure 1: Limit of Valsartan Related Compound A**

**Mobile phase:** *n*-Hexane, 2-propanol, and trifluoroacetic acid (850:150:1)

**System suitability solution:** 0.04 mg/mL each of USP Valsartan Related Compound A RS and USP Valsartan RS in *Mobile phase*

**Standard solution:** 0.01 mg/mL of USP Valsartan Related Compound A RS in *Mobile phase*

**Sample solution:** 1 mg/mL of Valsartan in *Mobile phase*. Sonicate for 5 min.

**Chromatographic system**

(See *Chromatography ⟨621⟩, System Suitability*.)

**Mode:** LC

**Detector:** UV 230 nm

**Column:** 4.6-mm × 25-cm; 5-µm packing L40

**Flow rate:** 0.8 mL/min

**Injection volume:** 10 µL

**System suitability**

**Sample:** *System suitability solution*

**Suitability requirements**

**Resolution:** NLT 2.0 between valsartan related compound A and valsartan

**Relative standard deviation:** NMT 5% for valsartan related compound A peak

**Analysis**

**Samples:** *Standard solution* and *Sample solution*

Calculate the percentage of valsartan related compound A in the portion of Valsartan taken:

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

$r_U$ = peak response of valsartan related compound A from the *Sample solution*

$r_S$ = peak response of valsartan related compound A from the *Standard solution*

$C_S$ = concentration of USP Valsartan Related Compound A RS in the *Standard solution* (mg/mL)

$C_U$ = concentration of Valsartan in the *Sample solution* (mg/mL)

**Acceptance criteria:** NMT 1.0% of valsartan related compound A.

- **Procedure 2: Limit of Valsartan Related Compound B, Valsartan Related Compound C, and Other Related Compounds**

**Mobile phase:** Proceed as directed in the *Assay*.

**Standard solution:** 1 µg/mL each of USP Valsartan RS, USP Valsartan Related Compound B RS, and USP Valsartan Related Compound C RS in *Mobile phase*

**Sample solution:** 0.5 mg/mL of Valsartan in *Mobile phase*

**Chromatographic system:** Proceed as directed in the *Assay*, except for the following.

**Detector:** UV 225 nm

**System suitability**

**Sample:** *Standard solution*

**Suitability requirements**

**Resolution:** NLT 1.8 between valsartan related compound B and valsartan

**Relative standard deviation:** NMT 10.0% for valsartan related compound B and NMT 2.0% for valsartan

**Analysis**

**Samples:** *Standard solution* and *Sample solution*

Calculate the percentage of valsartan related compound B and valsartan related compound C in the portion of Valsartan taken:

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

$r_U$ = peak response of valsartan related compound B or valsartan related compound C from the *Sample solution*

$r_S$ = peak response of valsartan related compound B or valsartan related compound C from the *Standard solution*

$C_S$ = concentration of USP Valsartan Related Compound B RS or USP Valsartan Related Compound C RS in the *Standard solution* (mg/mL)

$C_U$ = concentration of Valsartan in the *Sample solution* (mg/mL)

Calculate the percentage of any other impurity in the portion of Valsartan taken:

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

$r_U$ = peak response of any other impurity from the *Sample solution*

$r_S$ = peak response of valsartan from the *Standard solution*

$C_S$ = concentration of USP Valsartan RS in the *Standard solution* (mg/mL)

$C_U$ = concentration of Valsartan in the *Sample solution* (mg/mL)

**Acceptance criteria:** See *Table 1*.

**Table 1**

| Name | Acceptance Criteria, NMT (%) |
|---|---|
| Valsartan related compound B[a] | 0.2 |
| Valsartan related compound C[b] | 0.1 |
| Any other individual impurity[c] | 0.1 |
| Total impurities[c] | 0.3 |

[a] *N*-Butyryl-*N*-{[2'-(1*H*-tetrazole-5-yl)biphenyl-4-yl]methyl}-L-valine.

[b] *N*-Valeryl-*N*-{[2'-(1*H*-tetrazole-5-yl)biphenyl-4-yl]methyl}-L-valine benzyl ester.

[c] Excluding valsartan related compound A.

## SPECIFIC TESTS

- **Water Determination, *Method I* ⟨921⟩:** NMT 2.0%
- **Absorbance**

**Analytical wavelength:** 420 nm

**Sample solution:** A 1-in-20 solution of valsartan in methanol

**Acceptance criteria:** The absorbance divided by the path length is NMT 0.02.

## ADDITIONAL REQUIREMENTS

- **Packaging and Storage:** Preserve in tight containers, and store at controlled room temperature. Protect from moisture and heat.
- **USP Reference Standards ⟨11⟩**

USP Valsartan RS

USP Valsartan Related Compound A RS

*N*-Valeryl-*N*-{[2'-(1*H*-tetrazole-5-yl)biphenyl-4-yl]methyl}-D-valine.

$C_{24}H_{29}N_5O_3$ 435.52

USP Valsartan Related Compound B RS

*N*-Butyryl-*N*-{[2'-(1*H*-tetrazole-5-yl)biphenyl-4-yl]methyl}-L-valine.

$C_{23}H_{27}N_5O_3$ 421.49

USP Valsartan Related Compound C RS

*N*-Valeryl-*N*-{[2'-(1*H*-tetrazole-5-yl)biphenyl-4-yl]methyl}-L-valine benzyl ester.

$C_{31}H_{35}N_5O_3$ 525.64

**Auxiliary Information** - Please check for your question in the FAQs before contacting USP.

| Topic/Question | Contact | Expert Committee |
|---|---|---|
| VALSARTAN | Documentary Standards Support | SM22020 Small Molecules 2 |
| REFERENCE STANDARD SUPPORT | RS Technical Services<br>RSTECH@usp.org | SM22020 Small Molecules 2 |

**Chromatographic Database Information:** Chromatographic Database

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