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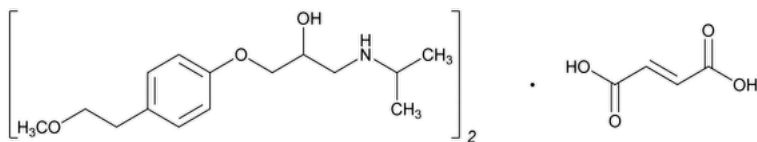
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Metoprolol Fumarate


 $(C_{15}H_{25}NO_3)_2 \cdot C_4H_4O_4$ 650.80

2-Propanol, 1-[4-(2-methoxyethyl)phenoxy]-3-[(1-methylethyl)amino]-, (±)-, (E)-2-butanedioate (2:1) (salt);

(±)-1-(Isopropylamino)-3-[p-(2-methoxyethyl)phenoxy]-2-propanol fumarate (2:1) (salt) CAS RN®: 119637-66-0.

DEFINITION

Metoprolol Fumarate contains NLT 98.0% and NMT 102.0% of metoprolol fumarate $[(C_{15}H_{25}NO_3)_2 \cdot C_4H_4O_4]$, calculated on the dried basis.

IDENTIFICATION

Change to read:

- **A.** ▲ [SPECTROSCOPIC IDENTIFICATION TESTS \(197\)](#), [Infrared Spectroscopy: 197K](#) ▲ (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

Solution A: 1.3 g/L of sodium dodecyl sulfate in 0.1% (w/v) phosphoric acid**Solution B:** Acetonitrile**Mobile phase:** *Solution A* and *Solution B* (60:40)**Standard solution:** 1 mg/mL of [USP Metoprolol Fumarate RS](#) in *Mobile phase***Sample solution:** 1 mg/mL of Metoprolol Fumarate in *Mobile phase*

Chromatographic system

(See [Chromatography \(621\)](#), [System Suitability](#).)**Mode:** LC**Detector:** UV 223 nm**Column:** 4.6-mm × 15-cm; 5-μm packing L7**Column temperature:** 30°**Flow rate:** 1 mL/min**Injection volume:** 10 μL**Run time:** 10 min

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 2**Relative standard deviation:** NMT 0.73%

Analysis

Samples: *Standard solution* and *Sample solution*Calculate the percentage of metoprolol fumarate $[(C_{15}H_{25}NO_3)_2 \cdot C_4H_4O_4]$ in the portion of Metoprolol Fumarate taken:

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

 r_U = peak response of metoprolol from the *Sample solution* r_S = peak response of metoprolol from the *Standard solution* C_S = concentration of [USP Metoprolol Fumarate RS](#) in the *Standard solution* (mg/mL) C_U = concentration of Metoprolol Fumarate in the *Sample solution* (mg/mL)

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

IMPURITIES

• **RESIDUE ON IGNITION (281):** NMT 0.1%

• **ORGANIC IMPURITIES**

Solution A: 1.3 g/L of sodium dodecyl sulfate in 0.1% (w/v) phosphoric acid

Solution B: Acetonitrile

Mobile phase: See [Table 1](#).

Table 1

Time (min)	Solution A (%)	Solution B (%)
0	60	40
8	60	40
13	10	90
13.1	60	40
16	60	40

Diluent: *Solution A* and *Solution B* (60:40)

System suitability solution: 5 µg/mL each of [USP Metoprolol Fumarate RS](#), [USP Metoprolol Related Compound A RS](#), [USP Metoprolol Related Compound B RS](#), and [USP Metoprolol Related Compound C RS](#) in *Diluent*

Standard solution: 2.5 µg/mL each of [USP Metoprolol Fumarate RS](#), [USP Metoprolol Related Compound A RS](#), [USP Metoprolol Related Compound B RS](#), [USP Metoprolol Compound C RS](#), and [USP Metoprolol Related Compound D RS](#) in *Diluent*

Sample solution: 1 mg/mL of Metoprolol Fumarate in *Diluent*

Chromatographic system

(See [Chromatography \(621\)](#), [System Suitability](#).)

Mode: LC

Detector: UV 223 nm

Column: 4.6-mm × 15-cm; 5-µm packing L7

Column temperature: 30°

Flow rate: 1 mL/min

Injection volume: 10 µL

System suitability

Samples: *System suitability solution* and *Standard solution*

Suitability requirements

Resolution: NLT 1.5 between metoprolol related compound A and metoprolol related compound B; NLT 2.5 between metoprolol related compound B and metoprolol related compound C, *System suitability solution*

Relative standard deviation: NMT 2.0% for metoprolol, metoprolol related compound A, metoprolol related compound B, metoprolol related compound C, and metoprolol related compound D, *Standard solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the corresponding metoprolol related compound in the portion of Metoprolol Fumarate taken:

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

r_U = peak response of the corresponding metoprolol related compound in the *Sample solution*

r_S = peak response of the corresponding metoprolol related compound in the *Standard solution*

C_S = concentration of the corresponding [USP Metoprolol Related Compound RS](#) in the *Standard solution* (µg/mL)

C_U = concentration of Metoprolol Fumarate in the *Sample solution* (µg/mL)

Calculate the percentage of any unspecified impurity in the portion of Metoprolol Fumarate taken:

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

r_U = peak response of each unspecified impurity in the *Sample solution*