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Miconazole Nitrate Topical Powder

DEFINITION

Miconazole Nitrate Topical Powder contains NLT 90.0% and NMT 110.0% of the labeled amount of miconazole nitrate ($C_{18}H_{14}Cl_4N_2O \cdot HNO_3$).

IDENTIFICATION

• **A.**

Sample: Transfer nominally 100 mg of miconazole nitrate from Topical Powder to a 50-mL beaker, disperse in 40 mL of *methanol*, and mix for a minimum of 5 min. Allow to settle for 5–10 min and filter into a 100-mL beaker. Evaporate on a steam bath or by a rotary evaporator to dryness. Dry the residue at 105° for 10 min.

Acceptance criteria: The IR absorption spectrum of a potassium bromide dispersion of the residue obtained from the *Sample* exhibits maxima only at the same wavelengths as that of a similar preparation of USP Miconazole Nitrate RS.

• **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**

Buffer: 4.6 g/L of dibasic potassium phosphate trihydrate in *water*. Adjust with phosphoric acid to a pH of 7.5.

Solution A: *Acetonitrile* and *Buffer* (65:35)

Solution B: *Acetonitrile*

Solution C: *Acetonitrile*, *water*, and phosphoric acid (50:50:0.05)

Mobile phase: See *Table 1*.

Table 1

Time (min)	Solution A (%)	Solution B (%)	Solution C (%)	Flow rate (mL/min)
0	100	0	0	1.0
17.0	86	14	0	1.0
17.1	0	0	100	3.0
28.0	0	0	100	3.0
28.1	100	0	0	2.0
38.0	100	0	0	2.0
38.1	100	0	0	1.0
40	100	0	0	1.0

Diluent: *Acetonitrile* and *water* (50:50)

Standard stock solution: 2 mg/mL of USP Miconazole Nitrate RS in *Diluent*. Sonication may be needed to aid dissolution.

Standard solution: 0.2 mg/mL of USP Miconazole Nitrate RS in *Diluent* from the *Standard stock solution*

Sample solution: Nominally 0.2 mg/mL of miconazole nitrate in *Diluent* prepared as follows. Transfer an appropriate amount of miconazole nitrate from a portion of the Topical Powder to a suitable volumetric flask. Add *Diluent* equivalent to 50% of the flask volume, shake for 30 min, and sonicate for 10 min. Dilute with *Diluent* to volume. Pass a portion of the solution through a suitable filter of 0.45-µm pore size.

Chromatographic system

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

Mode: LC

Detector: UV 220 nm

Column: 4.6-mm × 25-cm; 5-µm packing L7

Column temperature: 32°

Flow rate: See *Table 1*.

Injection volume: 5 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 2.0

Relative standard deviation: NMT 2.0%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of miconazole nitrate ($C_{18}H_{14}Cl_4N_2O \cdot HNO_3$) in the portion of Topical Powder taken:

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

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

r_S = peak response of miconazole from the *Standard solution*

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

C_U = nominal concentration of miconazole nitrate in the *Sample solution* (mg/mL)

Acceptance criteria: 90.0%–110.0%

IMPURITIES

• **Organic Impurities**

Buffer, Solution B, Solution C, Diluent, Standard stock solution, and **Sample solution:** Prepare as directed in the *Assay*.

Solution A: *Acetonitrile* and *Buffer* (35:65)

Mobile phase: See *Table 2*.

Table 2

Time (min)	Solution A (%)	Solution B (%)	Solution C (%)	Flow rate (mL/min)
0	100	0	0	1.0
55.0	30.8	69.2	0	1.0
55.1	0	0	100	3.0
68.0	0	0	100	3.0
68.1	100	0	0	2.0
83.0	100	0	0	2.0
83.1	100	0	0	1.0
85.0	100	0	0	1.0

System suitability solution: 0.2 mg/mL of USP Miconazole Nitrate RS from the *Standard stock solution* and 0.2 µg/mL of USP Miconazole Related Compound C RS in *Diluent*

Standard solution: 2 µg/mL of USP Miconazole Nitrate RS in *Diluent* from the *Standard stock solution*

Sensitivity solution: 0.1 µg/mL of USP Miconazole Nitrate RS in *Diluent* from the *Standard solution*

Chromatographic system

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

Mode: LC

Detector: UV 220 nm

Column: 4.6-mm × 25-cm; 5-µm packing L7

Column temperature: 32°

Flow rate: See *Table 2*.

Injection volume: 15 µL

System suitability

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

Suitability requirements

Resolution: NLT 1.5 between miconazole related compound C and miconazole, *System suitability solution*

Relative standard deviation: NMT 10.0%, *Standard solution*

Signal-to-noise ratio: NLT 10, *Sensitivity solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of miconazole related compound C and any individual unspecified degradation product in the portion of Topical Powder taken:

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

r_U = peak response of miconazole related compound C or any individual unspecified degradation product from the *Sample solution*

r_S = peak response of miconazole from the *Standard solution*

C_S = concentration of USP Miconazole Nitrate RS in the *Standard solution* (µg/mL)

C_U = nominal concentration of miconazole nitrate in the *Sample solution* (µg/mL)

Acceptance criteria: See *Table 3*.

Table 3

Name	Relative Retention Time	Acceptance Criteria, NMT (%)
Miconazole	1.0	—
Miconazole related compound C	1.06	0.25
Any individual unspecified degradation product	—	0.10
Total impurities	—	1.0

PERFORMANCE TESTS

• **Minimum Fill ⟨755⟩:** Meets the requirements

SPECIFIC TESTS

• **Microbial Enumeration Tests ⟨61⟩** and **Tests for Specified Microorganisms ⟨62⟩:** The total count does not exceed 10^2 cfu/g. It meets the requirements of the tests for the absence of *Staphylococcus aureus* and *Pseudomonas aeruginosa*.

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in well-closed containers. Store at controlled room temperature.

Change to read:

• **USP Reference Standards ⟨11⟩**

USP Miconazole Nitrate RS

USP Miconazole Related Compound C RS

2-[(2,4-Dichlorobenzyl)oxy]-2-(2,4-dichlorophenyl)ethan-1-amine ▲hydrochloride.

$C_{15}H_{13}Cl_4NO \cdot HCl$ 401.53▲ (ERR 1-Jun-2018)

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

Topic/Question	Contact	Expert Committee
MICONAZOLE NITRATE TOPICAL POWDER	Documentary Standards Support	SM12020 Small Molecules 1

Chromatographic Database Information: Chromatographic Database

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