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Clotrimazole Topical Solution

DEFINITION

Clotrimazole Topical Solution is a solution of Clotrimazole in a suitable nonaqueous, hydrophilic solvent. It contains NLT 90.0% and NMT 115.0% of the labeled amount of clotrimazole ($C_{22}H_{17}ClN_2$).

IDENTIFICATION

- **A.** The retention time of the major peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the *Assay*.
- **B.** The UV spectrum of the clotrimazole peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the Assay.

ASSAY

- **Procedure**

Buffer: 0.3 g/L of monobasic sodium phosphate, anhydrous and 0.35 g/L of dibasic sodium phosphate, anhydrous in water. The resulting solution has a pH of 6.6–7.0.

Mobile phase: Acetonitrile and *Buffer* (50:50)

Diluent: Acetonitrile and water (50:50)

Standard solution: 0.2 mg/mL of USP Clotrimazole RS in *Diluent*

Sample solution: Nominally equivalent to 0.2 mg/mL of clotrimazole from Topical Solution in *Diluent*

Chromatographic system

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

Mode: LC

Detector: UV 206 nm. For *Identification* test *B*, use a diode array detector in the range of 200–300 nm.

Column: 4.6-mm × 15-cm; 5-µm packing L85

Flow rate: 1 mL/min

Injection volume: 8 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 1.5

Relative standard deviation: NMT 1.0%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of clotrimazole ($C_{22}H_{17}ClN_2$) in the portion of Topical Solution taken:

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

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

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

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

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

Acceptance criteria: 90.0%–115.0%

IMPURITIES

- **Organic Impurities**

Buffer, Mobile phase, Diluent, Sample solution, and **Chromatographic system:** Proceed as directed in the *Assay*.

Standard solution: 0.001 mg/mL each of USP Clotrimazole RS, USP Imidazole RS, and USP Clotrimazole Related Compound A RS in *Diluent*

System suitability

Sample: *Standard solution*

[Note—See *Table 1* for the relative retention times.]

Suitability requirements

Resolution: NLT 4 between imidazole and clotrimazole related compound A, and between clotrimazole and clotrimazole related compound A

Relative standard deviation: NMT 2.0%

Analysis

Samples: *Sample solution* and *Standard solution*

Calculate the percentage of the labeled amount of clotrimazole related compound A and imidazole in the portion of Topical Solution taken:

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

r_U = peak response of clotrimazole related compound A or imidazole from the *Sample solution*

r_S = peak response of clotrimazole related compound A or imidazole from the *Standard solution*

C_S = concentration of USP Clotrimazole Related Compound A RS or USP Imidazole RS in the *Standard solution* (mg/mL)

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

Calculate the percentage of any unspecified impurity in the portion of Topical Solution taken:

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

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

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

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

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

Acceptance criteria: See *Table 1*. Disregard any impurity peak less than 0.05%.

Table 1

Name	Relative Retention Time	Acceptance Criteria, NMT (%)
Imidazole	0.5	0.5
Clotrimazole related compound A	0.7	0.5
Clotrimazole	1	—
Any unspecified impurity	—	0.2
Total impurities	—	2.0

ADDITIONAL REQUIREMENTS

- **Packaging and Storage:** Preserve in tight containers at a temperature between 2° and 30°.
- **USP Reference Standards** ⟨11⟩

USP Clotrimazole RS

USP Clotrimazole Related Compound A RS
(o-Chlorophenyl)diphenylmethanol.
$C_{19}H_{15}ClO$ 294.78

USP Imidazole RS $C_3H_4N_2$ 68.08

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

Topic/Question	Contact	Expert Committee
CLOTRIMAZOLE TOPICAL SOLUTION	Documentary Standards Support	SM12020 Small Molecules 1
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM12020 Small Molecules 1

Chromatographic Database Information: Chromatographic Database

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