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Tranylcypromine Sulfate

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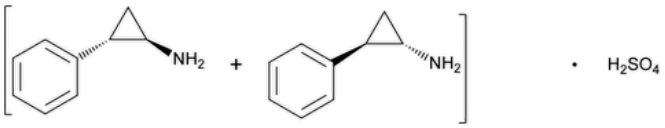

▲ (ERR 1-Jun-2020)

$(C_9H_{11}N)_2 \cdot H_2SO_4$ 364.46

Cyclopropanamine, 2-phenyl-, *trans*-(±)-, sulfate (2:1);

(±)-*trans*-2-Phenylcyclopropylamine sulfate (2:1) CAS RN®: 13492-01-8; UNII: 7ZAT6ES870.

DEFINITION

Tranylcypromine Sulfate contains NLT 98.0% and NMT 102.0% of $(C_9H_{11}N)_2 \cdot H_2SO_4$, calculated on the dried basis.

IDENTIFICATION

- **A.** **Spectroscopic Identification Tests ⟨197⟩, *Infrared Spectroscopy*: 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*.
- **C.** **Identification Tests—General, *Sulfate*⟨191⟩:** Meets the requirements

ASSAY

- **Procedure**

Buffer: Dissolve 3.4 g of monobasic ammonium phosphate in about 900 mL of water in a 1-L volumetric flask. Adjust with phosphoric acid to a pH of 2.2 ± 0.1, and dilute with water to volume.

Mobile phase: Methanol and *Buffer* (3:7)

0.05 N sulfuric acid: Cautiously add 1.3 mL of sulfuric acid to 100 mL of water, cool to room temperature, and dilute to 1000 mL.

Diluent: Methanol, water, and *0.05 N sulfuric acid* (1:3:1)

Standard stock solution: Using a sonicator, dissolve USP Tranylcypromine Sulfate RS in *0.05 N sulfuric acid* and methanol (about 30% of the final volume of each solvent). Dilute with *Diluent* to obtain a 400 µg/mL solution.

Standard solution: 40 µg/mL of USP Tranylcypromine Sulfate RS in *Diluent*, prepared from the *Standard stock solution*

Sample stock solution: Using a sonicator, dissolve Tranylcypromine Sulfate in methanol and *0.05 N sulfuric acid* (about 30% of the final volume of each solvent). Dilute with *Diluent* to obtain a 400 µg/mL solution.

Sample solution: 40 µg/mL tranylcypromine sulfate in *Diluent*, prepared from the *Sample stock solution*

Chromatographic system

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

Mode: LC

Detector: UV 220 nm

Column: 4.6-mm × 25-cm; 4-µm packing L11

Column temperature: 30°

Flow rate: 1 mL/min

Injection size: 20 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 $(C_9H_{11}N)_2 \cdot H_2SO_4$ in the portion taken:

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

r_U = peak response from the *Sample solution*

r_S = peak response from the *Standard solution*

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

C_U = concentration of tranylcypromine sulfate in the *Sample solution* (µg/mL)

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

IMPURITIES

Inorganic Impurities

- **Residue on Ignition ⟨281⟩:** NMT 0.1%

Organic Impurities

- **Procedure**

Buffer, 0.05 N sulfuric acid, and **Diluent:** Proceed as directed in the *Assay*.

Solution A: Methanol and *Buffer* (3:17)

Solution B: Methanol and *Buffer* (3:7)

Mobile phase: See the gradient table below.

Time (min)	Solution A (%)	Solution B (%)
0	100	0
20	100	0
25	0	100
37	0	100
39	100	0
45	100	0

Standard stock solution: 14 µg/mL of USP Tranylcypromine Sulfate RS, and 60 µg/mL each of USP Tranylcypromine Related Compound A RS and USP Tranylcypromine Related Compound B RS in *Diluent*. [Note—Sonicate as needed.]

Standard solution: Transfer a portion of the *Standard stock solution* to a suitable volumetric flask containing methanol and *0.05 N sulfuric acid* (30% of the final volume of each solvent). Dilute with *Diluent* to volume to obtain a solution containing 0.7 µg/mL of USP Tranylcypromine Sulfate RS and 3.0 µg/mL each of USP Tranylcypromine Related Compound A RS and USP Tranylcypromine Related Compound B RS.

Sample solution: Using a sonicator, dissolve Tranylcypromine Sulfate in methanol and *0.05 N sulfuric acid* (about 30% of the final volume of each solvent). Dilute with *Diluent* to obtain a solution containing 680 µg/mL of tranylcypromine sulfate.

Chromatographic system

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

Mode: LC

Detector: UV 249 nm for tranylcypromine related compound B; 220 nm for all other specified and unspecified impurities

Column: 4.6-mm × 15-cm; 3-µm packing L1

Column temperature: 35°

Flow rate: 1.2 mL/min

Injection size: 25 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Resolution: NLT 2.0 between tranylcypromine and tranylcypromine related compound A, determined at 220 nm

Tailing factor: NMT 2.0 for tranylcypromine, determined at 220 nm

Relative standard deviation: NMT 6.0% for tranylcypromine and tranylcypromine related compound A, determined at 220 nm; NMT 6.0% for tranylcypromine related compound B, determined at 249 nm.

Analysis

Samples: *Standard solution* and *Sample solution*

[NOTE—Disregard the signal for tranylcypromine related compound B observed at 220 nm.]

Identify tranylcypromine related compound A, *cis*-hydrazide, *trans*-hydrazide, and any unspecified impurity using the data in *Impurity Table 1*. Calculate the percentage of each impurity in the portion of sample taken:

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

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

r_S = peak response of the *Standard solution*

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

C_U = concentration of Tranylcypromine Sulfate in the *Sample solution* (µg/mL)

F = response factor relative to tranylcypromine sulfate

Calculate the percentage of tranylcypromine related compound B in the portion of sample taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times (M_{r1}/M_{r2}) \times 100$$

r_U = peak response at 249 nm of tranylcypromine related compound B from the *Sample solution*

r_S = peak response at 249 nm of tranylcypromine related compound B from the *Standard solution*

C_S = concentration of USP Tranylcypromine Related Compound B RS in the *Standard solution* (µg/mL)

C_U = concentration of Tranylcypromine Sulfate in the *Sample solution* (µg/mL)

M_{r1} = molecular weight of 3-phenylallylamine free base, 133.19

M_{r2} = molecular weight of 3-phenylallylamine hydrochloride (USP Tranylcypromine Related Compound B RS), 169.66

Acceptance criteria

Individual impurities: See *Impurity Table 1*. [NOTE—Tranylcypromine related compound B is determined at 249 nm. All other specified and unspecified impurities are determined at 220 nm.]

Total impurities: NMT 1.0% for sum of tranylcypromine related compound A, tranylcypromine related compound B, *cis*-hydrazide, *trans*-hydrazide, and any unspecified impurity.

Impurity Table 1

Name	Relative Retention Time	Relative Response Factor	Acceptance Criteria, NMT (%)
Tranylcypromine related compound A[a]	0.82	0.74	0.50
Tranylcypromine sulfate	1.0	1.0	—
Tranylcypromine related compound B[b]	1.2	—	0.50
cis-Hydrazide[c]	1.4	0.86	0.50

Name	Relative Retention Time	Relative Response Factor	Acceptance Criteria, NMT (%)
trans-Hydrazide[d]	2.5	1.1	0.50
Any unspecified impurity	—	1.0	0.10

[a] (±)-*cis*-2-Phenylcyclopropanamine (*cis*-Cypromine).

[b] 3-Phenylallylamine (Cinnamylamine), monitored at 249 nm.

[c] (±)-*cis*-2-Phenylcyclopropanecarbohydrazide.

[d] (±)-*trans*-2-Phenylcyclopropanecarbohydrazide.

SPECIFIC TESTS

• **Loss on Drying ⟨731⟩:** Dry a sample in vacuum at 60° for 2 h: it loses NMT 0.5% of its weight.

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in well-closed containers.

• **USP Reference Standards ⟨11⟩**

USP Tranylcypromine Sulfate RS

USP Tranylcypromine Related Compound A RS

(±)-*cis*-2-Phenylcyclopropanamine hydrochloride; *cis*-tranylcypromine hydrochloride.

$C_9H_{11}N \cdot HCl$ 169.65

USP Tranylcypromine Related Compound B RS

3-Phenylallylamine hydrochloride; cinnamylamine hydrochloride.

$C_9H_{11}N \cdot HCl$ 169.65

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

Topic/Question	Contact	Expert Committee
TRANYLCYPROMINE SULFATE	Documentary Standards Support	SM42020 Small Molecules 4
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM42020 Small Molecules 4

Chromatographic Database Information: Chromatographic Database

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