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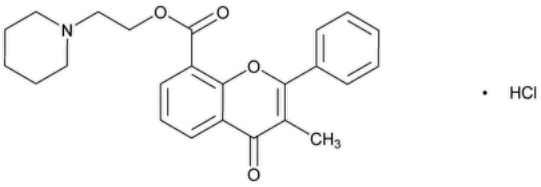
Flavoxate Hydrochloride

Change to read:



$C_{24}H_{25}NO_4 \cdot HCl$ ▲427.93▲ (USP 1-May-2021)

4*H*-1-Benzopyran-8-carboxylic acid, 3-methyl-4-oxo-2- phenyl-, 2-(1-piperidinyl)ethyl ester, hydrochloride;

2-Piperidinoethyl▲-▲ (USP 1-May-2021) 3-methyl-4-oxo-2-phenyl-4*H*-1-benzopyran-8-carboxylate hydrochloride;

▲2-(Piperidin-1-yl)ethyl 3-methyl-4-oxo-2-phenyl-4*H*-chromene-8-carboxylate hydrochloride▲ (USP 1-May-2021) CAS RN®: 3717-88-2; UNII: 9C05J6089W.

Change to read:

DEFINITION

Flavoxate Hydrochloride contains NLT 98.0% and NMT 102.0% of ▲flavoxate hydrochloride▲ (USP 1-May-2021) ($C_{24}H_{25}NO_4 \cdot HCl$), 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*.

Change to read:

• **C.** **Identification Tests—General ⟨191⟩, *Chemical Identification Tests, Chloride***

▲Sample solution: 10 mg/mL of Flavoxate Hydrochloride in water

Acceptance criteria: Meets the requirements▲ (USP 1-May-2021)

ASSAY

Change to read:

• **Procedure**

Solution A: Mixture of 1.0 g of ▲sodium 1-hexanesulfonate▲ (USP 1-May-2021) in 650 mL of water, 1 mL of triethylamine, and 1.0 mL of phosphoric acid

Mobile phase: Add 350 mL of acetonitrile to *Solution A*.

Standard solution: 50 µg/mL of USP Flavoxate Hydrochloride RS in *Mobile phase*

Sample solution: 50 µg/mL of Flavoxate Hydrochloride in *Mobile phase*

Chromatographic system

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

Mode: LC

Detector: UV 293 nm

Column: 4.6-mm × 15-cm; 5-µm packing L1

Flow rate: 1 mL/min

Injection ▲volume:▲ (USP 1-May-2021) 20 µL

▲Run time: NLT 1.5 times the retention time of flavoxate▲ (USP 1-May-2021)

System suitability

Sample: *Standard solution*

▲▲ (USP 1-May-2021)

Suitability requirements

▲▲ (USP 1-May-2021)

Tailing factor: ▲NMT 1.5▲ (USP 1-May-2021)

Relative standard deviation: ▲NMT 0.73%▲ (USP 1-May-2021)

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of ▲flavoxate hydrochloride▲ (USP 1-May-2021) ($C_{24}H_{25}NO_4 \cdot HCl$) in the portion of Flavoxate Hydrochloride 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 Flavoxate Hydrochloride RS in the *Standard solution*▲(µg/mL)▲ (USP 1-May-2021)

C_U =▲▲ (USP 1-May-2021) concentration of Flavoxate Hydrochloride in the *Sample solution* ▲(µg/mL)▲ (USP 1-May-2021)

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

IMPURITIES

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

Change to read:

• **Organic Impurities**

Solution A: ▲Transfer 0.5 mL of trifluoroacetic acid to a 1-L volumetric flask containing about 50% of the flask volume of water. Dilute with water to volume.▲ (USP 1-May-2021)

Solution B: Acetonitrile

▲**Solution C:** Transfer 40 mL of *Solution A* to a 100-mL volumetric flask and dilute with water to the mark. Sonicate for about 5 min.▲ (USP 1-May-2021)

Mobile phase: See ▲*Table 1*.

Table 1▲ (USP 1-May-2021)

Time (min)	Solution A (%)	Solution B (%)
0	68	32
15	68	32
25	20	80
35	20	80
36	68	32
41	68	32

Diluent: Methanol and ▲*Solution C* (50:50)▲ (USP 1-May-2021)

Standard stock solution 1: 2 mg/mL of USP Flavoxate Hydrochloride RS in *Diluent*

Standard stock solution 2: 0.05 mg/mL of USP Flavoxate Related Compound A RS in *Diluent*

Standard stock solution 3: 0.05 mg/mL of USP Flavoxate Related Compound B RS in methanol

Standard stock solution 4: 0.05 mg/mL of USP Flavoxate Related Compound C RS prepared as follows. Dissolve USP Flavoxate Related Compound C RS first in ▲10% of the flask volume of methanol and then in 10% of the flask volume of *Solution C*.▲ (USP 1-May-2021) Dilute with *Diluent* to volume.

▲**Sensitivity solution:** 0.5 µg/mL of USP Flavoxate Hydrochloride RS from *Standard stock solution 1* in *Diluent*▲ (USP 1-May-2021)

Standard solution: 1 mg/mL of USP Flavoxate Hydrochloride RS and 5 µg/mL each of USP Flavoxate Related Compound A RS, USP Flavoxate Related Compound B RS, and USP Flavoxate Related Compound C RS in *Diluent* from *Standard stock solutions 1*, *2*, *3*, and *4*, respectively

Sample solution: 1 mg/mL of Flavoxate Hydrochloride in *Diluent*

Chromatographic system

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

Mode: LC

Detector: UV 240 nm

Column: 4.6-mm × 15-cm; 5-µm packing L1

Column temperature: 30°

Flow rate: 0.8 mL/min

Injection ▲volume:▲ (USP 1-May-2021) 10 µL

System suitability

Samples: ▲*Sensitivity solution* and▲ (USP 1-May-2021) *Standard solution*

▲[NOTE—See *Table 2* for the relative retention times.]▲ (USP 1-MAY-2021)

Suitability requirements

Resolution: NLT 2.0 between ▲flavoxate related compound B and flavoxate related compound C, *Standard solution*▲ (USP 1-May-2021)

Tailing factor: NMT 1.5 for ▲flavoxate related compound A, flavoxate related compound B, and flavoxate related compound C, *Standard solution*▲ (USP 1-May-2021)

Relative standard deviation: NMT 2.0% for ▲flavoxate, *Standard solution*

Signal-to-noise ratio: NLT 10, *Sensitivity solution*▲ (USP 1-May-2021)

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of flavoxate related compounds A, B, and C in the portion of Flavoxate Hydrochloride taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times (1/F) \times 100$$

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

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

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

C_U = concentration of Flavoxate Hydrochloride in the *Sample solution* (mg/mL)

F = relative response factor (see ▲*Table 2*▲ (USP 1-May-2021))

Calculate the percentage of any other unspecified ▲impurity▲ (USP 1-May-2021) in the portion of Flavoxate Hydrochloride taken:

$$\text{Result} = (r_U/r_T) \times 100$$

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

r_T = sum of the responses of all peaks from the *Sample solution*

Acceptance criteria: See ▲*Table 2*. The reporting threshold is 0.05%.

Table 2▲ (USP 1-May-2021)

Name	Relative Retention Time	Relative Response Factor	Acceptance Criteria, NMT (%)
Flavoxate	1.0	—	—
Flavoxate related compound A▲▲ (USP 1-May-2021)	2.8	1.6	0.3
Flavoxate related compound B▲▲ (USP 1-May-2021)	3.5	1.5	0.1
Flavoxate related compound C▲▲ (USP 1-May-2021)	3.7	1.4	0.1
Any single unspecified ▲impurity▲ (USP 1-May-2021)	—	1.0	0.1

Name	Relative Retention Time	Relative Response Factor	Acceptance Criteria, NMT (%)
▲Total impurities▲ (USP 1-May-2021)	—	—	▲1.0▲ (USP 1-May-2021)

SPECIFIC TESTS

Change to read:

• **Loss on Drying** ⟨731⟩

▲**Analysis:** Dry at 105° to constant weight.

Acceptance criteria: NMT 0.5%▲ (USP 1-May-2021)

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in well-closed containers, protected from light; and store at room temperature.

Change to read:

• **USP Reference Standards** ⟨11⟩

USP Flavoxate Hydrochloride RS

USP Flavoxate Related Compound A RS

▲3-Methyl-4-oxo-2-phenyl-4*H*-chromene-8-carboxylic acid.▲ (USP 1-May-2021)

$C_{17}H_{12}O_4$ ▲280.28▲ (USP 1-May-2021)

USP Flavoxate Related Compound B RS

▲Methyl 3-methyl-4-oxo-2-phenyl-4*H*-chromene-8-carboxylate.▲ (USP 1-May-2021)

$C_{18}H_{14}O_4$ ▲294.31▲ (USP 1-May-2021)

USP Flavoxate Related Compound C RS

▲Ethyl 3-methyl-4-oxo-2-phenyl-4*H*-chromene-8-carboxylate.▲ (USP 1-May-2021)

$C_{19}H_{16}O_4$ 308.33

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

Topic/Question	Contact	Expert Committee
FLAVOXATE HYDROCHLORIDE	Documentary Standards Support	SM42020 Small Molecules 4

Chromatographic Database Information: Chromatographic Database

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