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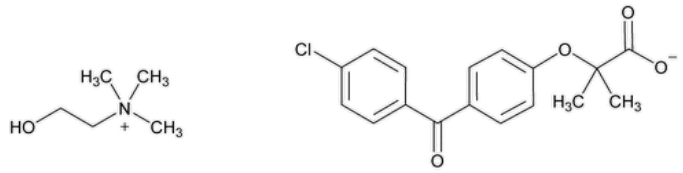
Add the following:

▲Choline Fenofibrate



$C_{17}H_{14}ClO_4^- \cdot C_5H_{14}NO^+$ 421.91

Ethanaminium, 2-hydroxy-*N*,*N*,*N*-trimethyl-, salt with 2-[4-(4-chlorobenzoyl)phenoxy]-2-methylpropanoic acid (1:1);
2-Hydroxy-*N*,*N*,*N*-trimethylethanaminium 2-[4-(4-chlorobenzoyl)phenoxy]-2-methylpropanoate CAS RN®: 856676-23-8; UNII: 4BMH7IZT98.

DEFINITION

Choline Fenofibrate contains NLT 97.0% and NMT 103.0% of choline fenofibrate ($C_{17}H_{14}ClO_4^- \cdot C_5H_{14}NO^+$), calculated on the anhydrous basis.

IDENTIFICATION

• **A.** **Spectroscopic Identification Tests ⟨197⟩, *Infrared Spectroscopy*:** 197A

• **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.**

Mobile phase: 18 mM methanesulfonic acid in water

Standard stock solution: Equivalent to 500 µg/mL of choline in water from USP Choline Chloride RS

Standard solution: Equivalent to 100 µg/mL of choline in *Mobile phase* from *Standard stock solution*

Sample stock solution: 2 mg/mL of Choline Fenofibrate in water

Sample solution: 0.4 mg/mL of Choline Fenofibrate in *Mobile phase* from *Sample stock solution*. [Note—This solution has an approximate concentration of 100 µg/mL of choline.]

Chromatographic system

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

Mode: Ion chromatography

Detector: Conductivity with a suitable suppressor

Column: 4.0-mm × 25-cm; 8-µm packing L106

Flow rate: 1 mL/min

Injection volume: 20 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Relative standard deviation: NMT 3.0%

Analysis

Samples: *Standard solution* and *Sample solution*

Acceptance criteria: The retention time of the choline peak of the *Sample solution* corresponds to the retention time of the choline peak of the *Standard solution*.

ASSAY

• **Procedure**

Protect solutions containing fenofibric acid or choline fenofibrate from light.

Solution A: Water adjusted with phosphoric acid to a pH of 2.5

Solution B: Acetonitrile

Mobile phase: See *Table 1*.

Table 1

Time (min)	Solution A (%)	Solution B (%)
0	50	50
5	50	50
25	20	80
35	20	80
36	50	50
50	50	50

Diluent: *Solution A* and *Solution B* (50:50)

Standard stock solution: 0.5 mg/mL of USP Fenofibric Acid RS in acetonitrile

Standard solution: 100 µg/mL of USP Fenofibric Acid RS in *Diluent* from the *Standard stock solution*

Sample solution: 130 µg/mL of Choline Fenofibrate in *Diluent*

Chromatographic system

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

Mode: LC

Detector: UV 286 nm

Column: 4.6-mm × 25-cm; 5-µm packing L1

Column temperature: 35°

Flow rate: 1 mL/min

Injection volume: 40 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 1.5

Relative standard deviation: NMT 1.10%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of choline fenofibrate ($C_{17}H_{14}ClO_4^- \cdot C_5H_{14}NO^+$) in the portion of Choline Fenofibrate taken:

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

r_U = peak response of fenofibric acid from the *Sample solution*

r_S = peak response of fenofibric acid from the *Standard solution*

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

C_U = concentration of Choline Fenofibrate in the *Sample solution* (µg/mL)

M_{r1} = molecular weight of choline fenofibrate, 421.91

M_{r2} = molecular weight of fenofibric acid, 318.75

Acceptance criteria: 97.0%–103.0% on the anhydrous basis

IMPURITIES

- **Residue on Ignition ⟨281⟩:** NMT 0.15%
- **Organic Impurities**

Protect solutions containing fenofibric acid or choline fenofibrate from light.

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

System suitability stock solution: 500 µg/mL of USP Fenofibric Acid RS, and 200 µg/mL each of USP Fenofibrate RS and USP Fenofibrate Related Compound C RS in acetonitrile

System suitability solution: 5 µg/mL of USP Fenofibric Acid RS, and 2 µg/mL each of USP Fenofibrate RS and USP Fenofibrate Related Compound C RS in *Diluent* from *System suitability stock solution*. Expose the solution to high intensity UV light with an intensity of NLT 650 foot-candles for approximately 2 min. Fenofibric acid will degrade to generate an unknown light degradation product having a relative retention time of 0.93.

Standard solution: 1 µg/mL of USP Fenofibric Acid RS in *Diluent*

Sensitivity solution: 0.05 µg/mL of USP Fenofibric Acid RS in *Diluent* from the *Standard solution*

System suitability

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

Suitability requirements

Resolution: NLT 2.0 between unknown light degradation product (RRT 0.93) and fenofibric acid (1.0), *System suitability solution*

Relative standard deviation: NMT 3.0%, *Standard solution*

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

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of each specified impurity and any unspecified impurity in the portion of Choline Fenofibrate taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times (1/F) \times (M_{r1}/M_{r2}) \times 100$$

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

r_S = peak response of fenofibric acid from the *Standard solution*

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

C_U = concentration of Choline Fenofibrate in the *Sample solution* (µg/mL)

F = relative response factor (see *Table 2*)

M_{r1} = molecular weight of choline fenofibrate, 421.91

M_{r2} = molecular weight of fenofibric acid, 318.75

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

Table 2

Name	Relative Retention Time	Relative Response Factor	Acceptance Criteria, NMT (%)
Fenofibric acid	1.00	—	—
Fenofibrate	1.77	0.88	0.20
Fenofibrate related compound C	1.94	0.73	0.20
Any unspecified impurity	—	1.00	0.10
Total impurities	—	—	0.5

SPECIFIC TESTS

• **Water Determination** ⟨921⟩, *Method I, Method Ia*: NMT 1.0%

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in tight containers and store below 30°.

• **USP Reference Standards** ⟨11⟩

USP Choline Chloride RS

USP Choline Fenofibrate RS

USP Fenofibrate RS

USP Fenofibric Acid RS

2-[4-(4-Chlorobenzoyl)phenoxy]-2-methylpropanoic acid.

$C_{17}H_{15}ClO_4$ 318.75

USP Fenofibrate Related Compound C RS

1-Isopropoxy-2-methyl-1-oxopropan-2-yl 2-[4-(4-chlorobenzoyl)phenoxy]-2-methylpropanoate.

$C_{24}H_{27}ClO_6$ 446.92▲ (USP 1-Dec-2024)

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

Topic/Question	Contact	Expert Committee
CHOLINE FENOFIBRATE	Documentary Standards Support	SM22020 Small Molecules 2

Chromatographic Database Information: Chromatographic Database

Most Recently Appeared In:
Pharmacopeial Forum: Volume No. 47(6)

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