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Ethosuximide Oral Solution

DEFINITION

Ethosuximide Oral Solution contains NLT 90.0% and NMT 105.0% of the labeled amount of ethosuximide ($C_7H_{11}NO_2$).

IDENTIFICATION

Change to read:

• **A.** ▲Spectroscopic Identification Tests ⟨197⟩, *Infrared Spectroscopy*: **197S** ▲ (CN 1-May-2020)

Standard solution: 30.0 mg/mL of USP Ethosuximide RS in chloroform

Sample solution: Nominally 30 mg/mL of ethosuximide in chloroform prepared as follows. Transfer the equivalent of about 150 mg of ethosuximide from Oral Solution to a 125-mL separatory funnel, add 50 mL of ether, and shake well. Allow the layers to separate, and retain the ether layer. Wash the ether layer with three 10-mL portions of water. Transfer the ether layer to a suitable beaker, add 5 g of anhydrous sodium sulfate, and swirl. Filter the mixture into a 50-mL volumetric flask through a small pledget of cotton that has been previously washed with ether. Evaporate to dryness. Dissolve the residue in 5 mL of chloroform.

Wavelength range: 3000–1650 cm^{-1}

Analysis

Samples: *Standard solution* and *Sample solution*

Acceptance criteria: Meets the requirements

• **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

Change to read:

• **Procedure**

Mobile phase: Acetonitrile and water (12.5:87.5). To each liter, add 1.0 mL of glacial acetic acid.

System suitability solution: 0.062 mg/mL of USP Ethosuximide RS and 0.064 mg/mL of 2-ethyl-2-methylsuccinic acid in *Mobile phase*

Standard solution: 0.062 mg/mL of USP Ethosuximide RS in *Mobile phase*

Sample solution: Nominally 0.062 mg/mL of ethosuximide from Oral Solution in *Mobile phase* prepared as follows. Transfer a volume of Oral Solution, equivalent to 250 mg of ethosuximide, to a 100-mL volumetric flask. Dilute with *Mobile phase* to volume. Transfer 5.0 mL of this solution to a 200-mL volumetric flask and dilute with *Mobile phase* to volume.

Chromatographic system

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

Mode: LC

Detector: UV 225 nm

Column: 3.9-mm × 15-cm; ▲4-µm▲ (USP 1-May-2019) packing L1

Flow rate: 1 mL/min

Injection volume: 10 µL

▲**Run time:** NLT 2 times the retention time of ethosuximide▲ (USP 1-May-2019)

System suitability

Sample: *System suitability solution*

▲[Note—The relative retention times for ethosuximide and 2-ethyl-2-methylsuccinic acid are 1.0 and 1.3, respectively.]▲ (USP 1-May-2019)

Suitability requirements

Resolution: NLT 3.5 between ethosuximide and 2-ethyl-2-methylsuccinic acid

Tailing factor: NMT 1.5

Relative standard deviation: NMT ▲1.0%▲ (USP 1-May-2019) for ethosuximide and NMT 5.0% for 2-ethyl-2-methylsuccinic acid

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of ethosuximide ($C_7H_{11}NO_2$) in the portion of Oral Solution 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 Ethosuximide RS in the *Standard solution* (mg/mL)

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

Acceptance criteria: 90.0%–105.0%

IMPURITIES

• **Limit of 2-Ethyl-2-Methylsuccinic Acid**

Mobile phase, System suitability solution, Chromatographic system, and **System suitability:** Proceed as directed in the *Assay*.

Standard solution: 0.05 mg/mL of 2-ethyl-2-methylsuccinic acid in *Mobile phase*

Sample solution: Nominally 2.5 mg/mL of ethosuximide from Oral Solution in *Mobile phase* prepared as follows. Using a "to contain" pipet, transfer a volume of Oral Solution, equivalent to 250 mg of ethosuximide, to a 100-mL volumetric flask. Rinse the pipet several times with *Mobile phase*, and dilute with *Mobile phase* to volume.

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of 2-ethyl-2-methylsuccinic acid in the portion of Oral Solution taken:

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

r_U = peak response of 2-ethyl-2-methylsuccinic acid from the *Sample solution*

r_S = peak response of 2-ethyl-2-methylsuccinic acid from the *Standard solution*

C_S = concentration of 2-ethyl-2-methylsuccinic acid in the *Standard solution* (mg/mL)

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

Acceptance criteria: NMT 2.0%

SPECIFIC TESTS

• **pH** ⟨791⟩**:** 4.5–5.8

ADDITIONAL REQUIREMENTS

Change to read:

• **Packaging and Storage:** Preserve in tight containers. ▲Store at controlled room temperature. Protect from freezing and light.▲ (USP 1-May-2019)

• **USP Reference Standards** ⟨11⟩

USP Ethosuximide RS

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

Topic/Question	Contact	Expert Committee
ETHOSUXIMIDE ORAL SOLUTION	Documentary Standards Support	SM42020 Small Molecules 4

Chromatographic Database Information: Chromatographic Database

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