Oxcarbazepine Oral Suspension

DEFINITION
Oxcarbazepine Oral Suspension contains NLT 95.0% and NMT 105.0% of the labeled amount of oxcarbazepine (C₁₅H₁₂N₂O₂).

IDENTIFICATION

A. The retention time of the major peak from the Sample solution corresponds to that from the Standard solution, as obtained in the Assay.

ASSAY

• PROCEDURE
Protect all solutions from light.

Buffer: Dissolve 1.36 g of sodium acetate trihydrate and 0.6 g of glacial acetic acid in 1 L of water. Adjust with glacial acetic acid to a pH of 4.4.

Solution A: Acetonitrile, tetrahydrofuran, tert-butyl methyl ether, and Buffer (130:30:9:830)

Solution B: Acetonitrile, tetrahydrofuran, tert-butyl methyl ether, and Buffer (670:30:9:290)

Mobile phase: See Table 1.

Table 1

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>Solution A (%)</th>
<th>Solution B (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>93</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>25</td>
<td>10</td>
<td>90</td>
</tr>
<tr>
<td>26</td>
<td>93</td>
<td>7</td>
</tr>
<tr>
<td>35</td>
<td>93</td>
<td>7</td>
</tr>
</tbody>
</table>

Diluent: Dissolve 0.1 g of ascorbic acid and 1 mL acetoneitrile in 1 L of water.

Standard stock solution: 1 mg/mL of USP Oxcarbazepine RS in acetonitrile. Sonicate to aid in dissolution.

Standard solution: 0.25 mg/mL of USP Oxcarbazepine RS from the Standard stock solution, prepared as follows. Dilute a suitable volume of the Standard stock solution first in Diluent, using 70% final volume. Allow the solution to equilibrate to room temperature, and dilute with acetonitrile to volume.

Sample solution: 0.25 mg/mL of oxcarbazepine from a portion of Oral Suspension, prepared as follows. Dissolve first in Diluent using 8% of final volume, fill 30% of final volume with acetonitrile. Sonicate for 15 min. Add Diluent to fill 36% of final volume. Shake the flask vigorously. Allow the solution to equilibrate to room temperature, and dilute with Diluent to volume.

System suitability stock solution: 0.01 mg/mL of USP Oxcarbazepine Related Compound A RS and 0.02 mg/mL of USP Oxcarbazepine Related Compound C RS in acetonitrile

System suitability solution: 0.5 μg/mL of USP Oxcarbazepine Related Compound A RS and 1 μg/mL of USP Oxcarbazepine Related Compound C RS from the System suitability stock solution, in Standard solution

Chromatographic system
(See Chromatography (621), System Suitability.)

Mode: LC

Detector: UV 254 nm

Column: 3.0-mm × 25-cm; 3-μm packing L1

Column temperature: 50°C

Flow rate: 0.6 mL/min

Injection volume: 5 μL

System suitability

Samples: Standard solution and System suitability solution

NOTE—Refer to Table 2 for the relative retention times.

Suitability requirements

Resolution: NLT 1.3 between oxcarbazepine related compound C and oxcarbazepine related compound A, System suitability solution

Relative standard deviation: NMT 2.0%, Standard solution

Analysis

Samples: Standard solution and Sample solution

Calculate the percentage of the labeled amount of oxcarbazepine (C₁₅H₁₂N₂O₂) in the portion of Oral Suspension taken:

Result = \( \left( \frac{r_U}{r_S} \right) \times \left( \frac{C_S}{C_U} \right) \times 100 \)

\( r_U \) = peak response of oxcarbazepine from the Sample solution

\( r_S \) = peak response of oxcarbazepine from the Standard solution

\( C_S \) = concentration of USP Oxcarbazepine RS in the Standard solution (mg/mL)

\( C_U \) = nominal concentration of oxcarbazepine in the Sample solution (mg/mL)

Acceptance criteria: 95.0%–105.0%

PERFORMANCE TESTS

• DISSOLUTION (711)

Medium: 1% sodium dodecyl sulfate in water; 890 mL

Apparatus 2: 75 rpm

Time: 30 min

Analysis: Shake manually a bottle of Oral Suspension for about 20 s. Using a 10-mL syringe, draw 10.0 mL of the Oral Suspension through the needle to the bottom of the vessel containing preheated Medium. Take about 10 mL of the Medium from the vessel to clean the syringe, and transfer it back to the vessel. Start the paddle rotation immediately after introduction of each sample.

Mobile phase: Methanol, acetic acid, and water (24:1:75)

Standard solution: 0.7 mg/mL of USP Oxcarbazepine RS in Medium

Sample solution: Pass a portion of the solution under test through a suitable filter of 1-μm pore size, discarding the first few mL

Chromatographic system
(See Chromatography (621), System Suitability.)

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Oxcarbazepine

Mode: LC
Detector: UV 310 nm
Column: 4.6-mm × 25-cm; 10-µm packing L10
Column temperature: 30°C
Flow rate: 1.5 mL/min
Injection volume: 10 µL

System suitability
Sample: Standard solution
Suitability requirements
Relative standard deviation: NMT 2.0%

Analysis
Samples: Standard solution and Sample solution
Calculate the percentage of any individual impurity in the portion of Oral Suspension taken:

$$\text{Result} = \left( \frac{r_i}{r_0} \right) \times \left( \frac{C_i}{C_0} \right) \times (1/F) \times 100$$

- $r_0$ = peak response of each individual impurity from the Sample solution
- $r_i$ = peak response of carbamazepine from the Standard solution
- $C_i$ = concentration of USP Carbamazepine RS in the Standard solution (mg/mL)
- $C_0$ = nominal concentration of oxcarbazepine in the Sample solution (mg/mL)

**Discussion**

**IMPURITIES**

- **Organic Impurities**
  Protect all solutions from light.

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

Standard stock solution: 0.5 mg/mL of USP Carbamazepine RS in acetonitrile. Sonicate to aid in dissolution.

Standard solution: 0.5 µg/mL of USP Carbamazepine RS from the Standard stock solution prepared as follows.

Dilute a volume of the Standard stock solution first in Diluent, using 70% of final volume. Cool to room temperature, and dilute with acetonitrile to volume.

System suitability
Samples: System suitability solution and Standard solution
Suitability requirements
Resolution: NLT 1.3 between oxcarbazepine related compound C and oxcarbazepine related compound A peaks, System suitability solution
Relative standard deviation: NMT 5.0%, Standard solution

Table 2

<table>
<thead>
<tr>
<th>Name</th>
<th>Relative Retention Time</th>
<th>Relative Response Factor</th>
<th>Acceptance Criteria, NMT (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acridine carboxylic acid</td>
<td>0.24</td>
<td>11.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Carbamazepinedione</td>
<td>0.65</td>
<td>0.68</td>
<td>0.2</td>
</tr>
<tr>
<td>Oxcarbazepine</td>
<td>1.0</td>
<td>1.0</td>
<td>—</td>
</tr>
<tr>
<td>Oxcarbazepine related</td>
<td>1.33</td>
<td>12.5</td>
<td>0.1</td>
</tr>
<tr>
<td>compound C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxcarbazepine related</td>
<td>1.38</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>compound A**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbamazepine</td>
<td>1.66</td>
<td>1.0</td>
<td>—</td>
</tr>
<tr>
<td>Dibenzazepinedione</td>
<td>1.97</td>
<td>1.1</td>
<td>0.2</td>
</tr>
<tr>
<td>Acridine</td>
<td>2.49</td>
<td>11.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Dibenzazepineone</td>
<td>2.62</td>
<td>2.9</td>
<td>0.1</td>
</tr>
<tr>
<td>Any unspecified individual degradation product</td>
<td>—</td>
<td>1.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Total impurities</td>
<td>—</td>
<td>—</td>
<td>0.8</td>
</tr>
</tbody>
</table>

*Acridine-9-carboxylic acid.
Acridin-9(10H)-one.
For system suitability purposes only.
5H-Dibenzo[b,f]azepine-10,11-dione.
Acridine.
10(11H)-Oxo-5H-dibenzo[b,f]azepine.

**SPECIFIC TESTS**

- **pH (791):** 2.5 ± (0.3-Mar-2013) ± 3.7
- **Microbial Enumeration Tests (61) and Test for Specified Microorganisms (62):** The total aerobic microbial count does not exceed 10^2 cfu/mL. The total yeasts and molds count does not exceed 10^1 cfu/mL. It meets the requirements of the test for absence of Escherichia coli.

**ADDITIONAL REQUIREMENTS**

- **Packaging and Storage:** Preserve in light-resistant containers. Store at controlled room temperature.
- **USP Reference Standards (11)**
  USP Carbamazepine RS
  USP Oxcarbazepine RS
  USP Oxcarbazepine Related Compound A RS
  C_{15}H_{12}N_2O_2 280.28
  USP Oxcarbazepine Related Compound C RS
  Acridin-9(10H)-one.
  C_{16}H_{12}NO 195.22

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