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Antipyrine and Benzocaine Otic Solution

DEFINITION

Antipyrine and Benzocaine Otic Solution is a solution of Antipyrine and Benzocaine in Glycerin. It contains NLT 90.0% and NMT 110.0% of the labeled amount of antipyrine (C₁₁H₁₂N₂O) and benzocaine (C₉H₁₁NO₂).

[NOTE—In the preparation of this Otic Solution, use Glycerin that has a low water content, in order that the Otic Solution may comply with the limit for *Water Determination*. This may be ensured by using Glycerin having a specific gravity of NLT 1.2607, corresponding to a concentration of 99.5%.]

IDENTIFICATION

- **A.** The UV spectrum of the antipyrine and benzocaine peaks of the *Sample solution* exhibit maxima and minima at the same wavelengths as those of the *Standard solution*, as obtained in the *Assay*.
- **B.** The retention times of the major peaks of the *Sample solution* correspond to those of the *Standard solution*, as obtained in the *Assay*.

ASSAY

• **PROCEDURE**

Solution A: 50 mM [monobasic potassium phosphate](#) and 0.2% [triethylamine](#). Adjust with [10 N sodium hydroxide](#) to a pH of 7.0.

Solution B: Acetonitrile

Mobile phase: See [Table 1](#).

Table 1

Time (min)	Solution A (%)	Solution B (%)
0	85	15
20	50	50
23	50	50
23.1	85	15
25	85	15

Diluent: [Acetonitrile](#) and [water](#) (1:1)

Standard solution: 0.014 mg/mL of [USP Benzocaine RS](#) and 0.054 mg/mL of [USP Antipyrine RS](#) in *Diluent*

Sample solution: Nominally 0.014 mg/mL of benzocaine and 0.054 mg/mL of antipyrine prepared as follows. Transfer a suitable quantity of Otic Solution to a suitable volumetric flask. Dilute with *Diluent* to volume.

Chromatographic system

(See [Chromatography \(621\), System Suitability](#).)

Mode: LC

Detector: UV 270 nm. For *Identification A*, use a diode array detector in the range of 200–400 nm.

Column: 4.6-mm × 15-cm; 5-µm packing [L7](#)

Flow rate: 1 mL/min

Injection volume: 20 µL

System suitability

Sample: *Standard solution*

[NOTE—See [Table 2](#) for the relative retention times for antipyrine and benzocaine.]

Suitability requirements

Tailing factor: NMT 2.0

Relative standard deviation: NMT 2.0%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of antipyrine ($C_{11}H_{12}N_2O$) and benzocaine ($C_9H_{11}NO_2$) in the portion of Otic Solution taken:

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

r_U = peak response of antipyrine or benzocaine from the *Sample solution*

r_S = peak response of antipyrine or benzocaine from the *Standard solution*

C_S = concentration of [USP Antipyrine RS](#) or [USP Benzocaine RS](#) in the *Standard solution* (mg/mL)

C_U = nominal concentration of antipyrine or benzocaine in the *Sample solution* (mg/mL)

Acceptance criteria: 90.0%–110.0%

IMPURITIES

• ORGANIC IMPURITIES

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

System suitability solution: 0.1 mg/mL of [USP Antipyrine RS](#) and 0.01 mg/mL of [USP Antipyrine Related Compound A RS](#) in *Diluent*

Standard solution: 0.001 mg/mL each of [USP Benzocaine RS](#) and [USP Ethyl 4-Nitrobenzoate RS](#), and 0.004 mg/mL of [USP Antipyrine RS](#) in *Diluent*

Sample solution: Nominally 3.2 mg/mL of antipyrine and 0.8 mg/mL of benzocaine prepared as follows. Transfer a suitable quantity of Otic Solution to a suitable volumetric flask. Dilute with *Diluent* to volume.

System suitability

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

[NOTE—See [Table 2](#) for the relative retention times.]

Suitability requirements

Resolution: NLT 2.0 between antipyrine related compound A and antipyrine, *System suitability solution*

Relative standard deviation: NMT 5%, *Standard solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of ethyl 4-nitrobenzoate in the portion of Otic Solution taken:

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

r_U = peak response of ethyl 4-nitrobenzoate from the *Sample solution*

r_S = peak response of ethyl 4-nitrobenzoate from the *Standard solution*

C_S = concentration of [USP Ethyl 4-Nitrobenzoate RS](#) in the *Standard solution* (mg/mL)

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

Calculate the percentage of any individual, unspecified degradation product in the portion of Otic Solution taken:

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

r_U = peak response of each individual, unspecified degradation product from the *Sample solution*

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

C_S = concentration of [USP Benzocaine RS](#) in the *Standard solution* (mg/mL)

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

Acceptance criteria: See [Table 2](#). Disregard any impurity peaks less than 0.1%.

Table 2

Name	Relative Retention Time	Acceptance Criteria, NMT (%)
Antipyrine related compound A ^a	0.46	—
Antipyrine	0.53	



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