Edition: BP 2025 (Ph. Eur. 11.6 update)

Gabapentin Tablets

General Notices

Action and use

Antiepileptic.

DEFINITION

Gabapentin Tablets contain Gabapentin.

The tablets comply with the requirements stated under Tablets and with the following requirements.

Content of gabapentin, $C_9H_{17}NO_2$

95.0 to 105.0% of the stated amount.

IDENTIFICATION

The *infrared absorption spectrum* of the powdered tablets collected in ATR mode, Appendix II A, is concordant with the *reference spectrum* obtained with *gabapentin EPCRS*.

TESTS

Dissolution

Comply with the *dissolution test for tablets and capsules*, Appendix XII B1.

TEST CONDITIONS

(a) Use Apparatus 2, rotating the paddle at 50 revolutions per minute.
(b) Use 900 mL of 0.1M *hydrochloric acid*, at a temperature of 37°, as the medium.

PROCEDURE

Carry out the method for *liquid chromatography*, Appendix III D, using the following solutions.

(1) After 45 minutes withdraw a sample of the medium and filter. Use the filtered medium, diluted with dissolution medium if necessary, to produce a solution expected to contain 0.011% w/v of Gabapentin.
(2) 0.011% w/v of *gabapentin EPCRS* in 0.1M *hydrochloric acid*.
(3) 0.033% w/v of *gabapentin EPCRS* and 0.0016% w/v of *gabapentin impurity A EPCRS* in the medium.

CHROMATOGRAPHIC CONDITIONS

(a) Use a stainless steel column (25 cm × 4.6 mm) packed with *octadecylsilyl silica gel* (5 µm) (Hypersil ODS is suitable).
(b) Use isocratic elution and the mobile phase described below.

(c) Use a flow rate of 1 mL per minute.
(d) Use an ambient column temperature.
(e) Use a detection wavelength of 210 nm.
(f) Inject 25 µL of each solution.

MOBILE PHASE

1 volume of *orthophosphoric acid*, 22 volumes of *acetonitrile R1*, 78 volumes of *methanol R1* and 115 volumes of a solution containing 1% w/v of *ammonium dihydrogen orthophosphate* and 0.17% w/v of *sodium decanesulfonate* in *water*. Adjust the pH to 4.4 with *triethylamine*.

When the chromatograms are recorded under the prescribed conditions, the retention times of gabapentin and impurity A is about 6 minutes and 8.5 minutes respectively.

SYSTEM SUITABILITY

The test is not valid unless, in the chromatogram obtained with solution (3), the *resolution* between the peaks due to gabapentin impurity A and gabapentin is at least 5.0.

DETERMINATION OF CONTENT

Calculate the total content of $C_9H_{17}NO_2$ in the medium from the chromatograms obtained and using the declared content of $C_9H_{17}NO_2$ in *gabapentin EPCRS*.

LIMITS

The amount of gabapentin released is not less than 75% (Q) of the stated amount.

Related substances

Carry out the method for *liquid chromatography*, Appendix III D, using the following solutions in a mixture of 1 volume of *acetonitrile R1* and 9 volumes of *water* (solvent A).

(1) Disperse a quantity of powdered tablets containing 0.5 g of Gabapentin in 20 mL of solvent A. Add a sufficient volume of the solvent A to produce 25 mL and filter.
(2) Dilute 1 volume of solution (1) to 100 volumes, dilute 1 volume of the resulting solution to 10 volumes.
(3) 0.02% w/v each of *gabapentin EPCRS*, *gabapentin impurity A EPCRS* and *gabapentin impurity B EPCRS*.

CHROMATOGRAPHIC CONDITIONS

(a) Use a stainless steel column (25 cm × 4.6 mm) packed with *dimethyloctylsilane* (5 µm) (Hypersil MOS is suitable).
(b) Use gradient elution and the mobile phase described below.
(c) Use a flow rate of 1.5 mL per minute.
(d) Use an ambient column temperature.
(e) Use a detection wavelength of 210 nm.
(f) Inject 50 µL of each solution.

MOBILE PHASE

Mobile phase A 0.01M *potassium dihydrogen orthophosphate* previously adjusted to pH 6.9 with a 10% w/v solution of *potassium hydroxide*.

Mobile phase B *acetonitrile R1*.

Time (Minutes)	Mobile phase A (% v/v)	Mobile phase B (% v/v)	Comment
0→5	100	0	isocratic
5→15	100→90	0→10	linear gradient
15→45	90→70	10→30	linear gradient
45→55	70→25	30→75	linear gradient
55→60	25	75	isocratic
60→61	25→100	75→0	linear gradient
61→70	100	0	re-equilibration

When the chromatograms are recorded under the prescribed conditions, the retention times relative to gabapentin (retention time about 14 minutes) are: impurity B, about 1.1; impurity A, about 2.6.

SYSTEM SUITABILITY

The test is not valid unless, in the chromatogram obtained with solution (3), the *resolution* between the peaks due to and gabapentin and gabapentin impurity B is at least 1.5.

LIMITS

In the chromatogram obtained with solution (1):

the area of any peak corresponding to gabapentin impurity A is not greater than 0.4 times the area of the corresponding peak in the chromatogram obtained with solution (3) (0.4%);

the area of any other *secondary peak* is not greater than the area of the principal peak in the chromatogram obtained with solution (2) (0.1%);

the sum of the areas of all the *secondary peak* is not greater than 10 times the area of the principal peak in the chromatogram obtained with solution (2) (1.0%);

Disregard any peak with an area less than half the area of the principal peak in the chromatogram obtained with solution (2) (0.05%).

ASSAY

Weigh and powder 20 tablets. Carry out the method for *liquid chromatography*, Appendix III D, using the following solutions.

(1) Shake a quantity of powdered tablets containing 1.25 g of Gabapentin in 150 mL of mobile phase, add sufficient mobile phase to produce 200 mL and filter.
(2) 0.625% w/v of *gabapentin EPCRS* in mobile phase.
(3) 0.032% w/v each of *gabapentin EPCRS* and *gabapentin impurity A EPCRS*.

CHROMATOGRAPHIC CONDITIONS

(a) Use a stainless steel column (25 cm × 4.6 mm) packed with *octadecylsilylsilica gel* (10 µm) (µBondapak C-18 is suitable).
(b) Use isocratic elution and the mobile phase described below.
(c) Use a flow rate of 1 mL per minute.
(d) Use an ambient column temperature.
(e) Use a detection wavelength of 210 nm.
(f) Inject 50 µL of each solution.

MOBILE PHASE

10 volumes of *acetonitrile R1*, 35 volumes of *methanol R1*, 55 volumes of *water* and 0.1 volumes of a mixture containing 0.35% w/v of *potassium dihydrogen orthophosphate* and 0.73% w/v of *disodium hydrogen orthophosphate* previously adjusted to pH 7.0 with either *orthophosphoric acid* or a 10% w/v solution of *potassium hydroxide*.

When the chromatograms are recorded under the prescribed conditions, the retention times of gabapentin and impurity A are about 3 minutes and 10 minutes respectively.

SYSTEM SUITABILITY

The test is not valid unless, in the chromatogram obtained with solution (3), the *resolution* between the peaks due to gabapentin and impurity A is at least 10.0.

DETERMINATION OF CONTENT

Calculate the content of $C_9H_{17}NO_2$ in the tablets using the declared content of gabapentin in *gabapentin EPCRS*.

IMPURITIES

The impurities limited by the requirements of this monograph include impurities A, B and E listed under Gabapentin.