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

Nifedipine Capsules

General Notices

Action and use

Calcium channel blocker.

DEFINITION

Nifedipine Capsules contain Nifedipine.

The capsules comply with the requirements stated under Capsules and with the following requirements.

Content of nifedipine, $C_{17}H_{18}N_2O_6$

95.0 to 105.0% of the stated amount.

Carry out all the following procedures in the dark or under long-wavelength light (greater than 420 nm). Prepare solutions immediately before use and protect them from light.

IDENTIFICATION

A. Add a quantity of the contents of the capsules containing 50 mg of Nifedipine to 10 mL of *water* and mix with the aid of ultrasound for 5 minutes, filter (Whatman GF/C paper is suitable), wash the residue with *water* and dry at 110°. The *infrared absorption spectrum* of the residue, Appendix II A, is concordant with the *reference spectrum* of nifedipine *(RS 248)*.

B. Carry out the method for *thin-layer chromatography*, Appendix III A, using *silica gel* GF_{254} as the coating substance and a mixture of 40 volumes of *ethyl acetate* and 60 volumes of *cyclohexane* as the mobile phase in an unsaturated tank. Apply separately to the plate 5 µL of each of the following solutions in a mixture of equal volumes of *dichloromethane* and *methanol*. For solution (1) shake a quantity of the contents of the capsules containing 20 mg of Nifedipine with 10 mL of the solvent mixture and filter. Solution (2) contains 0.2% w/v of *nifedipine BPCRS* in the solvent mixture. After removal of the plate, allow it to dry in air and examine under *ultraviolet light (254 nm)*. The principal spot in the chromatogram obtained with solution (1) is similar in position, appearance under ultraviolet light and size to that in the chromatogram obtained with solution (2).

TESTS

Dissolution

Comply with the requirements for Monographs of the British Pharmacopoeia in the *dissolution test for tablets and capsules*, Appendix XII B1, using Apparatus 2. Use as the medium 900 mL of *0.1M hydrochloric acid* and rotate the paddle at 50 revolutions per minute. Withdraw a sample of 10 mL of the medium and measure the *absorbance* of a 2-cm layer of the solution, suitably diluted if necessary, at the maximum at 340 nm, Appendix II B. Measure the *absorbance* of a 2-cm layer of a solution prepared by diluting a 0.025% w/v solution of *nifedipine BPCRS* in *methanol* to a suitable volume with the dissolution medium and using the dissolution medium in the reference cell. Calculate the total content of nifedipine,

$C_{17}H_{18}N_2O_6$, in the medium from the absorbances obtained and from the declared content of $C_{17}H_{18}N_2O_6$ in *nifedipine BPCRS*.

Nitro- and nitroso-phenylpyridine analogues

Carry out the method for *liquid chromatography*, Appendix III D, using the following solutions. For solution (1) dissolve a quantity of the contents of the capsules containing 20 mg of Nifedipine in 8 mL of *methanol* and dilute to 20 mL with a mixture of 9 volumes of *acetonitrile*, 36 volumes of *methanol* and 55 volumes of *water*. Solution (2) contains 0.0010% w/v of *dimethyl-2,6-dimethyl-4-(2-nitrophenyl)pyridine-3,5-dicarboxylate BPCRS* (nitrophenylpyridine analogue) in a mixture of 5 volumes of *acetonitrile*, 33 volumes of *water* and 62 volumes of *methanol*. Solution (3) contains 0.00050% w/v of *dimethyl-2,6-dimethyl-4-(2-nitrosophenyl)pyridine-3,5-dicarboxylate BPCRS* (nitrosophenylpyridine analogue) in a mixture of 5 volumes of *acetonitrile*, 33 volumes of *water* and 62 volumes of *methanol*. For solution (4) dilute 2 volumes of a solution in *methanol* containing 0.25% w/v of *nifedipine BPCRS*, 0.0025% w/v each of the nitrophenylpyridine analogue and nitrosophenylpyridine analogue and 0.0050% w/v of *propyl hydroxybenzoate* to 5 volumes with a mixture of 9 volumes of *acetonitrile*, 36 volumes of *methanol* and 55 volumes of *water*.

The chromatographic procedure may be carried out using (a) a stainless steel column (25 cm × 4.6 mm) packed with *octadecylsilyl silica gel for chromatography* (5 µm) (Lichrosorb RP18 is suitable), (b) a mixture of 9 volumes of *acetonitrile*, 36 volumes of *methanol* and 55 volumes of *borate buffer pH 8.0* as the mobile phase with a flow rate of 2.0 mL per minute and (c) a detection wavelength of 220 nm.

The test is not valid unless the chromatogram obtained with solution (4) closely resembles the reference chromatogram supplied with *nifedipine BPCRS*.

In the chromatogram obtained with solution (1) the areas of any peaks corresponding to the nitrophenylpyridine analogue and the nitrosophenylpyridine analogue are not greater than the areas of the corresponding peaks in the chromatograms obtained with solution (2) (1%) and solution (3) (0.5%), respectively.

ASSAY

Carry out the method for *liquid chromatography*, Appendix III D, using the following solutions. For solution (1) take ten capsules and break them beneath the surface of 30 mL of *acetonitrile*. Stir to dissolve the capsule contents. Transfer the resulting solution to a 250 mL graduated flask. Wash the capsule shells with several portions of the mobile phase, transferring the washings to the flask, add sufficient of the mobile phase to produce 250 mL and mix. If necessary, further dilute a portion of the solution with the mobile phase to give a solution containing 0.02% w/v of nifedipine. For solution (2) dissolve 50 mg of *nifedipine BPCRS* in 30 mL of *acetonitrile* and dilute to 250 mL with the mobile phase.

The chromatographic procedure may be carried out using (a) a stainless steel column (10 cm × 4.6 mm) packed with *end-capped octadecylsilyl silica gel for chromatography* (5 µm) (Hypersil C18 is suitable), (b) a mixture of 40 volumes of *acetonitrile* and 60 volumes of a 0.03% v/v solution of *orthophosphoric acid* as the mobile phase with a flow rate of 1 mL per minute and (c) a detection wavelength of 235 nm.

Calculate the content of $C_{17}H_{18}N_2O_6$ in the capsules using the declared content of $C_{17}H_{18}N_2O_6$ in *nifedipine BPCRS*.