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# Propranolol Tablets

General Notices

*Details for the public consultation of this monograph are as follows:*

| EAG/Panel/Working Party | Medicinal Chemicals 2 |
|---|---|
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| **Deadline for Comment** | 31st March 2025 |
| **Target Publication Date (subject to change)** | BP 2026 |
| **Notes** | Revised monograph<br>**Identification** Extraction solvent changed.<br>**Dissolution** Test has been added, aligned with the USP.<br>**Related substances** Solution concentrations & injection volume aligned with revised Injection monograph and the USP. Quantitative limits introduced.<br>**Assay** Harmonised with the existing Related substances test and the USP monograph sample prep. |

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**Action and use**

Beta-adrenoceptor antagonist.

## DEFINITION

Propranolol Tablets contain Propranolol Hydrochloride.

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

**Content of propranolol hydrochloride, $C_{16}H_{21}NO_2$,HCl**

95.0 to 105.0% of the stated amount.

## IDENTIFICATION

Suspend a quantity of the powdered tablets containing 100 mg of Propranolol Hydrochloride in 20 mL of *water*, filter, make the filtrate alkaline with 1M *sodium hydroxide* and extract with three 10 mL quantities of *light petroleum R1*. Wash the combined extracts with water until the washings are free from alkali, dry with *anhydrous sodium sulfate*, filter, evaporate the filtrate to dryness and dry the residue at 50° at a pressure of 2 kPa for 1 hour. The *infrared absorption spectrum* of the residue, Appendix II A, is concordant with the *reference spectrum* of propranolol *RS 298*.

## TESTS

### Dissolution

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

TEST CONDITIONS

(a) Use Apparatus 1, rotating the basket at 100 revolutions per minute.
(b) Use 900 mL of 0.1M *hydrochloric acid*, at a temperature of 37°, as the medium.

PROCEDURE

(1) After 30 minutes withdraw a sample of the medium and measure the *absorbance* of the filtered sample, suitably diluted with the dissolution medium, if necessary, to produce a solution expected to contain 0.0011% w/v of Propranolol Hydrochloride at the maximum at 289 nm, Appendix II B, using dissolution medium in the reference cell.
(2) Measure the *absorbance* of a 0.0011% w/v solution of *propranolol hydrochloride BPCRS* in the dissolution medium using dissolution medium in the reference cell.

DETERMINATION OF CONTENT

Calculate the total content of propranolol hydrochloride, $C_{16}H_{21}NO_2$,HCl, in the medium from the absorbances obtained and using the declared content of $C_{16}H_{21}NO_2$,HCl in *propranolol hydrochloride BPCRS*.

LIMITS

The amount of propranolol hydrochloride 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 prepared in mobile phase.

(1) Add 25 mL of *methanol* to a quantity of the powdered tablets containing 50 mg of Propranolol Hydrochloride and dilute to 100 mL. Filter through glass-microfibre paper (Whatman GF/C is suitable) and use the filtrate.
(2) Dilute 1 volume of solution (1) to 50. Further dilute 1 volume to 10 volumes.
(3) 0.05% w/v of *propranolol for system suitability EPCRS*.

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CHROMATOGRAPHIC CONDITIONS

(a) Use a stainless steel column (25 cm × 4.6 mm) packed with *end-capped octadecylsilyl silica gel for chromatography* (5 µm) (Hypersil ODS 5 µm is suitable).
(b) Use isocratic elution and the mobile phase described below.
(c) Use a flow rate of 1.8 mL per minute.
(d) Use an ambient column temperature.
(e) Use a detection wavelength of 292 nm.
(f) Inject 50 µL of each solution.
(g) For solution (1), allow the chromatography to proceed for 8 times the retention time of the principal peak.

MOBILE PHASE

Add 1.6 g of *sodium laurilsulfate* and 0.31 g of *tetrabutylammonium dihydrogen orthophosphate* to a mixture of 1 mL of *sulfuric acid*, 450 mL of *water* and 550 mL of *acetonitrile*, adjusted to pH 3.3 with 2 M *sodium hydroxide*.

SYSTEM SUITABILITY

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

CALCULATION OF IMPURITIES

For each impurity, use the concentration of propranolol hydrochloride in solution (2).

For the reporting threshold, use the concentration of propranolol hydrochloride in solution (2).

For peak identification, use solution (3).

Propranolol retention time: about 3 minutes.

Relative retention: impurity A, about 0.6; impurity B, about 4.5 and impurity C, about 6.2.

LIMITS

— unspecified impurities: for each impurity, not more than 0.2%;

— total impurities: not more than 0.8%;

— reporting threshold: 0.1%.

## ASSAY

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

(1) Shake a quantity of powdered containing 50 mg of Propranolol Hydrochloride with 60 mL and mix with the aid of ultrasound. Dilute to produce 100 mL and filter. Dilute 1 volume of the filtrate to

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10 volumes.
(2) 0.002% w/v of *propranolol hydrochloride BPCRS*.
(3) 0.05% w/v of *propranolol for system suitability EPCRS*.

CHROMATOGRAPHIC CONDITIONS

The chromatographic procedure described under Related substances may be used, with the exception of the run time.

SYSTEM SUITABILITY

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

DETERMINATION OF CONTENT

Calculate the content of propranolol hydrochloride, $C_{16}H_{21}NO_2,HCl$, in the tablets from the chromatograms obtained and using the declared content of $C_{16}H_{21}NO_2,HCl$ in *propranolol hydrochloride BPCRS*.

## IMPURITIES

The impurities limited by the requirements of this monograph include those listed under Propranolol Hydrochloride.

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