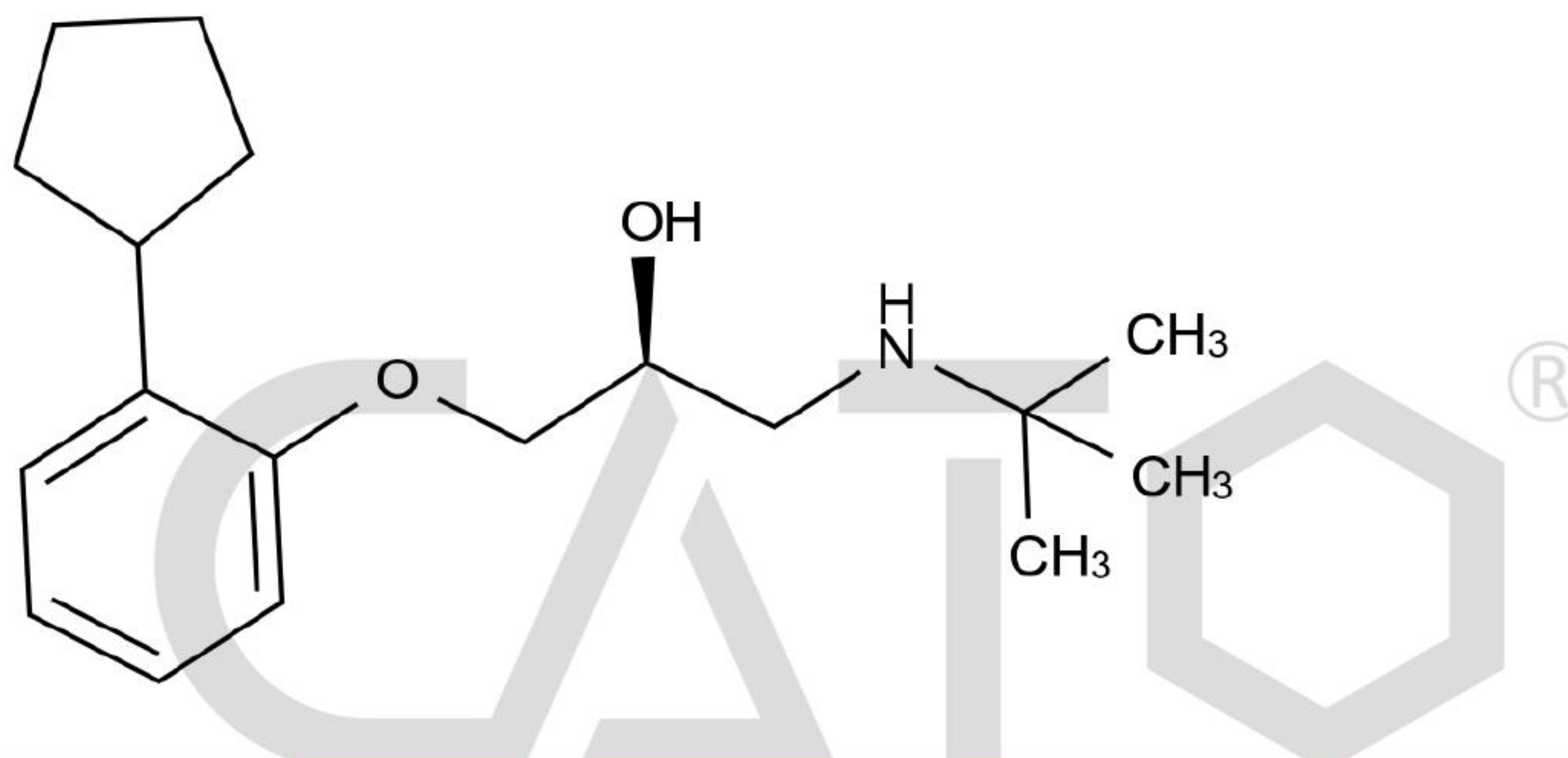


Certificate of Analysis

Reference Material & Standard

Product Name:	(S)-Penbutolol	Catalogue Number:	CCAD301557
Synonyms:	N/A	Lot Number:	0730-RH-0124
CAS Number:	38363-40-5	Expiry Date:	Jul 29, 2030
Molecular Formula:	C ₁₈ H ₂₉ NO ₂	Storage:	2°C ~ 8°C Protected from light and Sealed
Molecular Weight:	291.43	Shipping Condition:	Shipping at Room Temperature

Chemical Structure:



Test Items	Method	Results
Appearance	Visual inspection	White Solid
Identification	LCMS&HNMR	Confirmed
Purity	HPLC	92.430%
Loss on Drying	TGA	2.1265%
Assay		90.5%
Uncertainty		±1.4%

Comment:

1. The calculation of the mass balance method follows the formula (calculated on the non-dried basis):

$\text{Assay (\%)} = (100\% - \text{Loss on Drying}) * \text{Purity HPLC (\%)} / 100\%$

Loss on Drying is considered as absolute effect, HPLC purity is considered as relative effect.

2. The uncertainty values are the expanded uncertainty and represent an estimated standard deviation equal to the positive square root of the total variation of the uncertainty of components. A normal distribution is assumed and a coverage factor of K=2 is chosen using approximately a 95% confidence level.

Signature:

Prepared by:

Lisa

Reviewed by:

Hin Lam

Approved by General Manager:

David

Date: Jul 30, 2026

Date: Jul 31, 2026

Date: Jul 31, 2026



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