

Determination of Enantiomeric Purity of Luliconazole by Normal Phase HPLC

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Abstract: The enantiomeric purity of luliconazole, this method was developed to perform with comparative study. This method was based on luliconazole and its isomers can be derivatised with Isomer-II i.e. (-)- (Z)-2-[4(R)-2,4-Dichlorophenyl]-1,3 -dithiolan-2-ylidene]-2 -(1 H-imidazole- 1 -yl) acetonitrile or Z Isomer. The derivatised compounds can be separated by a chromatography column Phenomenex ceollose – 1, 250 × 4.6, 5µm, n-Hexane: Ethanol (90:10) used as mobile phase and 1.0 ml/min flow rate at room temperature. Injection volume is 10 µl and run time is 60 min. The detective wavelength is fixed at 215nm. The result indicates the limit of Z isomer complying the quality. [Limit: Z isomer NMT 0.15%], the purity of luliconazole was found to be 99.83%. Repeatability and accuracy are satisfied. This article is generated with aim and review of check analytical chiral purity of luliconazole by HPLC.

Keywords: Luliconazole, Enantiomeric purity, Derivatised, Normal phase, Chiral

INTRODUCTION

High performance liquid chromatography is an important technique of quantitative and qualitative technique of analysis. It is used to separate Identify and quantify each component in mixture in biochemistry and analytical chemistry it is based on the distribution of the analyte (sample) between mobile phase and stationary phase. The analysis of HPLC is precise, specific, and accurate

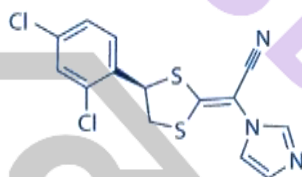


Fig. Structure of Luliconazole

In pharmaceutical industries HPLC is intrinsic and crucial tool for drug analysis. HPLC is a type of liquid chromatography where the pump passes the liquid which is pressurised, the solvent containing mixture of sample forced through column that is packed with a stationary phase and mobile phase. The aim of high-performance liquid chromatography (HPLC) is any drug analysis to confirm the identity of drug and deliver qualitative and quantitative result.

Luliconazole is antifungal drug. It belongs to azole class. Luliconazole kills the organisms Epidermophyton floccosum and Trichophyton rubrum. The exact mechanism is the luliconazole is inhibit the enzyme lanosterol demethylase. Lanosterol demethylase is needed because major component of synthesis of ergosterol. LUZU (Luliconazole) Cream, 1% is an azole antifungal indicated for the topical treatment of inter digitaltineapedis, tineacurris, and tineacorporis caused by the organisms Trichophyton rubrum and Epidermophyton floccosum, in patients 18 years of age and older. When treating inter digitaltineapedis, a thin layer of LUZU Cream, 1% should be applied to the affected area and approximately 1 inch of the immediate surrounding area(s) once daily for two (2) weeks. When treating tineacurris or tineacorporis, LUZU Cream, 1% should be applied to the affected area and approximately 1 inch of the immediate surrounding area(s) once daily for one (1) week.

Enantiomers are a pair of molecules that exist in two forms that are mirror images of another but cannot be superimposed one upon other. Enantiomers are in every other respect chemically identical. A pair of enantiomers is distinguished by the direction in which when dissolved in solution they rotate polarized light, either dextro (d or +) or Levo (l or -) rotatory, hence the term optical isomers. When two enantiomers are present in equal properties they are collectively referred as racemic mixture, a mixture does not rotate polarized light because the optical activity of each enantiomer is cancelled by other. Each enantiomer has different pharmacological action hence enantiomeric purity is important in pharmacy.

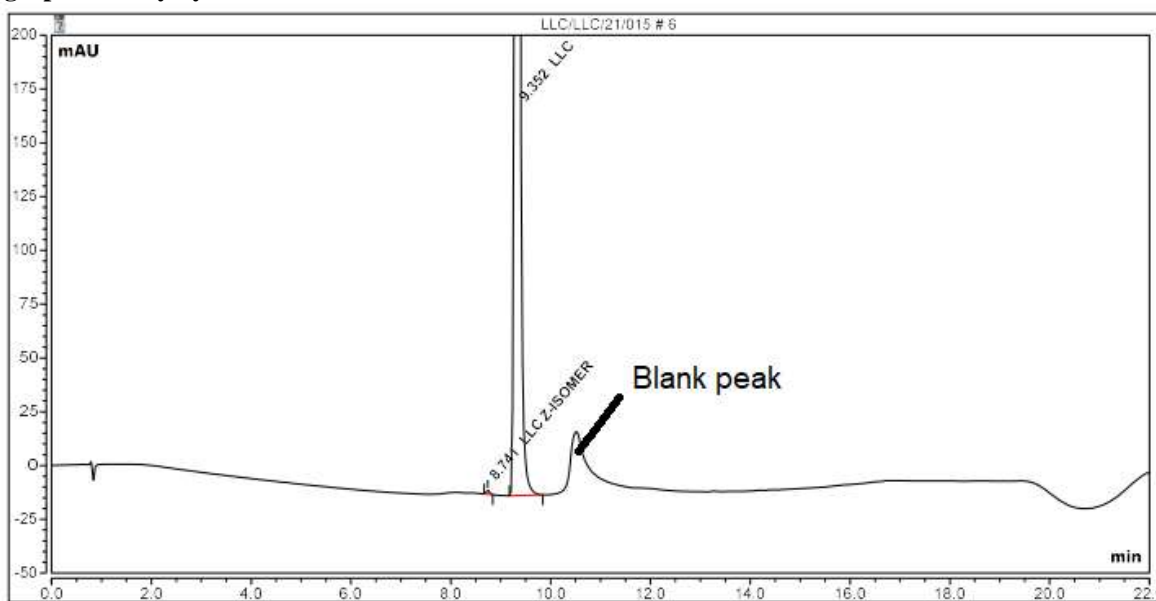
EXPERIMENT DETAILS

To determine Enantiomeric Purity / Chiral Purity by Normal Phase HPLC as per following details:

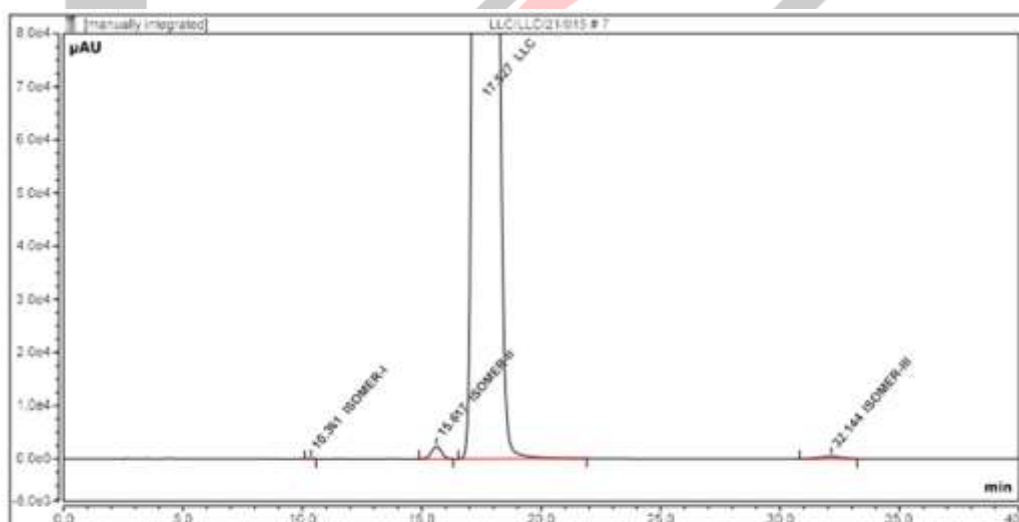
Chromatographic Conditions:

Column	Phenomenex ceollose – 1 ,250 × 4.6, 5µm
Wavelength	215nm
Flow rate	1.0 ml/min
Injection volume	10 µm
Isocratic / Gradient	Isocratic
Diluent	n-Hexane: Ethanol (90:10)
Run time	60 min
Mobile Phase	n-Hexane: Ethanol (90:10)

Chromatographic Purity by HPLC:



Peak No.	Ret.Time (min)	Peak Name	Type	Area mAU*sec	Area %	Rel. Ret.Time. %
1	8.741	LLC Z-ISOMER	BMB	7.741	0.10	0.93
2	9.352	LLC	BMB	7516.066	99.90	1.00
Total				7523.807	100.00	



Peak No.	Ret.Time (min)	Peak Name	Type	Area µAU*sec	Area %	Rel. Ret.Time. %
1	10.361	ISOMER-I	BMB	787.652	0.00	0.99
2	15.617	ISOMER-II	BMB	69662.893	0.12	0.99
3	17.527	LLC	BMB*	59724860.173	99.83	1.00
4	32.144	ISOMER-III	BMB*	30316.025	0.05	1.83
Total				59825426.743	100.00	

Result:

Peak RT (Min)	Description	Limit
10.361	Isomer-I i.e. (-) -(Z)-2-[4(S)-2,4-Dichlorophenyl]- 1,3 -dithiolan-2-ylidene]-2-(1 H-imidazole- I -yl) acetonitrile	NMT 0.2%
15.617	Isomer-II i.e. (-) -(Z)-2-[4(R)-2,4-Dichlorophenyl]- 1,3 -dithiolan-2-ylidene]-2-(1 H-imidazole- 1 -yl) acetonitrile or Z Isomer	NMT 0.2%
17.527	Luliconazole	NLT 99.50%
32.144	Isomer-III i.e. (-) -(E)-2 - [4(S)-2,4-Dichlorophenyl]- 1,3 -dithiolan-2-ylidene]-2- (I H-imidazole- I -yl) acetonitrile	NMT 1.0%

Conclusion: Purity of Luliconazole was found to be 99.83% by area percent and Z isomer was found to be 0.12%, thus this work complying the limits as per quality specification.

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