

TN-1300

USP Paliperidone Assay and Organic Impurities on Luna® Omega 3 µm Polar C18

Krishna Chaitanya Routhu¹, Swetha Kotikalapudi¹, and Dr. Bryan Tackett²

¹India Phenologix Lab, Phenomenex India, Hitech Defence and Aerospace Park Industrial Area, Mahadeva Kodigehalli, Hobli, Jala Taluka, Bengaluru 562149, India.

²Phenomenex Inc., 411 Madrid Avenue, Torrance, CA 90501, USA

Introduction

Paliperidone is an atypical antipsychotic drug used in the treatment of schizophrenia. It is a benzisoxazole derivative and is an active metabolite of Risperidone. This technical note for the LC-UV assay and organic impurities for Paliperidone drug substance is based on the USP monograph where a L1 (C18) column with 100 x 4.6 mm, 3 µm dimensions was used under gradient conditions for both assay and organic impurity analysis. The standard solution, sensitivity solution, and system suitability solution were prepared in accordance with the USP monograph, using Paliperidone reference standard (USP Catalog number 1491809) and Paliperidone resolution mixture (USP Catalog number 1491795). All solutions were protected from light. Luna Omega Polar C18 column was used for the separation, which has a novel stationary phase capable of providing a unique selectivity within a wide elution window and increased retention for both polar and non-polar analytes. The C18 ligand in the column provides the hydrophobic interactions while a polar modified particle surface provides enhanced polar retention and increased aqueous stability. This makes the Luna Omega Polar C18 an excellent choice for balanced retention and separation of Paliperidone from its organic impurities, while meeting the USP definition for an L1 column.

Experimental Conditions

The Paliperidone reference standard and the Paliperidone resolution mixture reference standard were obtained from USP (Rockville, Maryland, USA) and the solutions were prepared as indicated in the USP monograph. The Paliperidone assay standard and sensitivity solutions were prepared using the USP Paliperidone RS and the organic impurities system suitability solution was prepared using the USP Paliperidone Resolution Mixture RS. All solutions were prepared in amber volumetric glassware under amber lighting to protect the solutions from light.

LC-UV Conditions

Column: Luna Omega 3 µm Polar C18
Dimension: 100 x 4.6 mm
Part No.: [OOD-4760-E0](#)
Mobile Phase: A: Methanol:28 mM Tetrabutylammonium hydrogen sulfate (10:90 v/v)
 B: Methanol
Gradient:

Time (min)	%B
0	0
5	0
35	15
37	0
45	0

Flow Rate: 0.9 mL/min
Injection Volume: 10 µL
Temperature: 40 °C
Detector: UV @ 275 nm
System: Waters® Arc™ HPLC

Table 1.

Peak	Analyte
1	Paliperidone RC-C
2	Paliperidone RC-B
3	Paliperidone
4	Paliperidone Hydroxybenzoyl
5	Paliperidone Ketone



Krishna Chaitanya Routhu

Outside lab, Krishna enjoys travelling and finding good places to eat. Krishna loves to go on long walks on the beach with his friends.



Results and Discussion

The resolution mixture, sensitivity solution, and standard solutions were run on a Luna Omega 3 μ m Polar C18 100 x 4.6 mm column and the results demonstrated that the system suitability requirements were satisfied. **Table 2** shows the summary of results for the Assay using the standard solution. The column and mobile phase are the same for both assay and organic impurities. The standard and system suitability solutions were used for both assay and organic impurities.

Table 2. Summary of Results: Assay and Organic Impurities (Standard Solution)

Analyte	Retention Time (min)	Tailing Factor (NMT 2.0)	%RSD (n=5) (NMT 0.73 %)
Paliperidone	11.68	0.9	0.51

Table 3. Summary of Resolution Results: Organic Impurities, and Assay (System Suitability Solution)

Analyte	Retention Time (min)	Resolution (NLT 2.0)
Paliperidone Related Compound B	8.99	-
Paliperidone	11.67	8.38
Paliperidone hydroxybenzoyl analog	12.81	3.14

Table 4. Summary of Results: Organic Impurities (Sensitivity Solution)

Analyte	Retention Time (min)	Signal to Noise Ratio (NLT 10)	%RSD (n=6) (NMT 5 %)
Paliperidone	11.75	272.41	1.76

Figure 1. Standard Solution for Assay and Organic Impurities on Luna Omega 3 μ m Polar C18

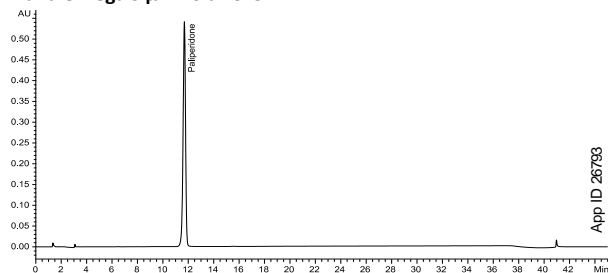


Figure 2. System Suitability Solution for Assay and Organic Impurities on Luna Omega 3 μ m Polar C18

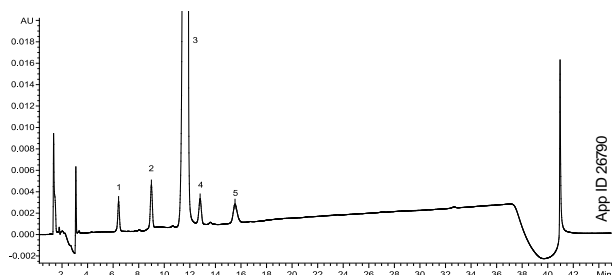


Figure 3. Overlay Chromatogram of Six Injections of System Suitability for Assay and Organic Impurities on Luna Omega 3 μ m Polar C18

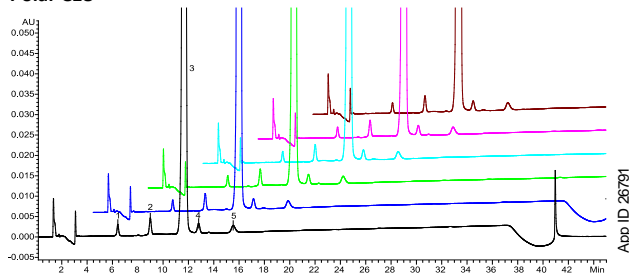
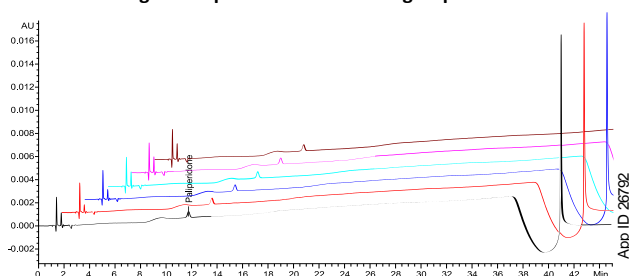


Figure 4. Overlay Chromatogram of Six Injections of Sensitivity Solution for Organic Impurities on Luna Omega 3 μ m Polar C18



Conclusions

The results above clearly show that the resolution achieved between Paliperidone Related Compound B and Paliperidone, and between Paliperidone and Paliperidone hydroxybenzoyl analog met the minimum requirement of no less than 2.0 per the USP Paliperidone monograph. The %RSD limits of no more than 2 % and 5 % for standard solution and sensitivity solution, respectively, were also met with the Luna Omega 3 μ m Polar C18 column. This illustrates that the Luna Omega 3 μ m Polar C18 meets all the requirements for system suitability as set forth in the USP monograph for Paliperidone and is therefore appropriate for determination of assay and organic impurities in Paliperidone drug substance.



Luna® Ordering Information

3 µm Analytical Columns (mm)						SecurityGuard™ Cartridges (mm)
Phases	30 x 4.6	50 x 4.6	75 x 4.6	100 x 4.6	150 x 4.6	4 x 3.0* /10pk
Silica(2)	00A-4162-E0	00B-4162-E0	—	00D-4162-E0	00F-4162-E0	AJ0-4348
C8(2)	00A-4248-E0	00B-4248-E0	00C-4248-E0	00D-4248-E0	00F-4248-E0	AJ0-4290
C18(2)	00A-4251-E0	00B-4251-E0	00C-4251-E0	00D-4251-E0	00F-4251-E0	AJ0-4287
CN	00A-4254-E0	00B-4254-E0	00C-4254-E0	00D-4254-E0	00F-4254-E0	AJ0-4305
Phenyl-Hexyl	—	00B-4256-E0	00C-4256-E0	00D-4256-E0	00F-4256-E0	AJ0-4351
NH ₂	—	00B-4377-E0	—	00D-4377-E0	00F-4377-E0	AJ0-4302
HILIC	—	—	—	00D-4449-E0	00F-4449-E0	AJ0-8329
PFP(2)	—	00B-4447-E0	—	00D-4447-E0	00F-4447-E0	AJ0-8327

3.2-8.0 mm

*SecurityGuard™ Analytical Cartridges require holder, Part No.: [KJ0-4282](#)

Need a different column size or sample preparation format?

No problem! We have a majority of our available dimensions up on www.phenomenex.com, but if you can't find what you need right away, our super helpful Technical Specialists can guide you to the solution via our online chat portal www.phenomenex.com/Chat.

Australia

t: +61 (0)2-9428-6444
auinfo@phenomenex.com

Austria

t: +43 (0)1-319-1301
anfrage@phenomenex.com

Belgium

t: +32 (0)2 503 4015 (French)
t: +32 (0)2 511 8666 (Dutch)
beinfo@phenomenex.com

Canada

t: +1 (800) 543-3681
info@phenomenex.com

China

t: +86 400-606-8099
cninfo@phenomenex.com

Czech Republic

t: +420 272 017 077
cz-info@phenomenex.com

Denmark

t: +45 4824 8048
nordicinfo@phenomenex.com

Finland

t: +358 (0)9 4789 0063
nordicinfo@phenomenex.com

France

t: +33 (0)1 30 09 21 10
franceinfo@phenomenex.com

Germany

t: +49 (0)6021-58830-0
anfrage@phenomenex.com

Hong Kong

t: +852 6012 8162
hkinfo@phenomenex.com

India

t: +91 (0)40-3012 2400
indiainfo@phenomenex.com

Indonesia

t: +62 21 5010 9707
indoinfo@phenomenex.com

Ireland

t: +353 (0)1 247 5405
eireinfo@phenomenex.com

Italy

t: +39 051 6327511
italiainfo@phenomenex.com

Japan

t: 0120-149-262
jpinfo@phenomenex.com

Luxembourg

t: +31 (0)30-2418700
nlinfo@phenomenex.com

Mexico

t: 01-800-844-5226
tecnicomx@phenomenex.com

The Netherlands

t: +31 (0)30-2418700
nlinfo@phenomenex.com

New Zealand

t: +64 (0)9-4780951
nzinfo@phenomenex.com

Norway

t: +47 810 02 005
nordicinfo@phenomenex.com

Poland

t: +48 22 104 21 72
pl-info@phenomenex.com

Portugal

t: +351 221 450 488
ptinfo@phenomenex.com

Singapore

t: +65 800-852-3944
sginfo@phenomenex.com

Slovakia

t: +420 272 017 077
sk-info@phenomenex.com

Spain

t: +34 91-413-8613
espinfo@phenomenex.com

Sweden

t: +46 (0)8 611 6950
nordicinfo@phenomenex.com

Switzerland

t: +41 (0)61 692 20 20
swissinfo@phenomenex.com

Taiwan

t: +886 (0) 0801-49-1246
twinfo@phenomenex.com

Thailand

t: +66 (0) 2 566 0287
thaiinfo@phenomenex.com

United Kingdom

t: +44 (0)1625-501367
ukinfo@phenomenex.com

USA

t: +1 (310) 212-0555
info@phenomenex.com

🌐 All other countries/regions

Corporate Office USA
t: +1 (310) 212-0555
info@phenomenex.com

www.phenomenex.com

Phenomenex products are available worldwide. For the distributor in your country/region, contact Phenomenex USA, International Department at international@phenomenex.com

BE-HAPPY™
GUARANTEE

Your happiness is our mission. Take 45 days to try our products. If you are not happy, we'll make it right.

www.phenomenex.com/behappy

Terms and Conditions

Subject to Phenomenex Standard Terms and Conditions, which may be viewed at www.phenomenex.com/TermsAndConditions.

Trademarks

Luna is a registered trademark and SecurityGuard and BE-HAPPY are trademarks of Phenomenex. Waters is a registered trademark and Arc is a trademark of Waters Technologies Corporation.

Disclaimer

Phenomenex is in no way affiliated with Waters Technologies Corporation.

FOR RESEARCH USE ONLY. Not for use in clinical diagnostic procedures.

© 2021 Phenomenex, Inc. All rights reserved.

