Application Note: ANCCSSYNCSTATIN

Analysis of Rosuvastatin on a Thermo Scientific Syncronis C18 by HPLC/UV

W. Faulkner, Thermo Fisher Scientific, Runcorn, Cheshire, UK

Key Words

- Rosuvastatin
- Syncronis C18
- Reversed-phase chromatography
- HPLC/UV

Abstract

A simple and rapid reversed-phase HPLC/UV procedure for the chromatographic analysis of rosuvastatin on a highly retentive Syncronis™ C18 stationary phase is described herein. Under typical isocratic conditions, elution of the analyte can be achieved within two minutes and chromatographic data exhibit exceptional precision.

Introduction

Rosuvastatin [(3R,5S,6E)-7-[4-(4-fluorophenyl)-2-(N-methylmethanesulphonamido)-6-(propan-2yl)pyrimidin-5-yl]-3,5-dihydroxyhept-6-enoic acid] is a synthetic, orally-administered member of the 'statin' class of cholesterol-lowering drugs. This particular drug is marketed by Astra Zeneca as 'Crestor'. Employed as an adjunct to dietary modification, the drug is used to treat primary hypercholesterolaemia, mixed dyslipidaemia and hypertriglyceridaemia in an attempt to reduce the risk of atherosclerosis and poor cardiovascular health.

In terms of the mechanism of its action, rosuvastatin is a selective and competitive inhibitor of the enzyme 3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) reductase. This particular enzyme catalyses the conversion of HMG-CoA to mevalonate, a precursor of cholesterol.

A number of researchers has reported the measurement of rosuvastatin in human plasma and pharmaceutical formulations [1,2]. Typical chromatographic approaches include separation upon C18 phases (via hydrophobic interactions), and, retention of the ionized molecule via an ion-exchange mechanism.

The purpose of this particular study is to demonstrate the suitability of a highly retentive Syncronis C18 stationary phase for the rapid analysis of rosuvastatin under typical reversed-phase, isocratic conditions. In addition, the tightly controlled specifications imposed during the manufacture of the stationary phase should permit the acquisition of chromatographic data that are highly consistent.

Experimental Details

Chemicals and Reagents	Part Number
Fisher Scientific water (HPLC gradient grade)	W/0106/17
Fisher Scientific acetonitrile (HPLC grade)	A/0626/17
Fisher Scientific ammonium acetate (AR grade)	A/3440/50
Rosuvastatin	

Sample Handling Equipment	Part Number
Fisher Scientific Finnpipette F2 pipettor kit 10 µL - 100 µL, 100 µL - 1000 µL, 1 mL – 10 mL	PMP-020-220F
Fisher Scientific Finntip pipette tips, 10 µL	PMP-107-110W
Fisher Scientific Finntip pipette tips, 200 µL	PMP-107-600F
Fisher Scientific Finntip pipette tips, 1000 µL	PMP-103-206K
Fisher Scientific Finntip pipette tips, 10 mL	PMP-107-040R
Thermo Scientific borosilicate glass vials (2 mL, 12 mm x 32 mm) with 8 mm black screw cap fitted with a silicone/PTFE seal	60180-600

Sample Preparation

Analytical Standards: A primary analytical standard of rosuvastatin was prepared by the dissolution of approximately 0.001 g (weighed accurately) of reference material in mobile phase (1.0 mL, 1:1 (v/v) mixture of ammonium acetate (20 mM, pH = 3.01) and acetonitrile). The concentration of rosuvastatin was approximately 1 mg/mL.
Thereafter, a working standard was prepared by combining 1 part of primary standard with 19 parts of mobile phase. The concentration of rosuvastatin in the working standard was approximately 50 µg/mL.

Separation Conditions		Part Number
Instrument:	Thermo Scientific HPLC system equipped with a photodiode array (PDA) detector	
Column:	Syncronis C18 5 µm, 50 x 4.6 mm	97105-054630
Mobile phase:	ammonium acetate (20 mM, pH = 3.01) / acetonitrile (1:1 v/v)	
Flow rate:	1.0 mL/min	
Column temperature:	30 °C	
Autosampler temperature:	ambient	
Detection:	UV at 242 nm	
Injection volume:	5 µL	
Syringe flush:	mobile phase	
Run time:	2 minutes	

Data Processing	
Software:	Thermo Scientific Chromquest 5.0 Software

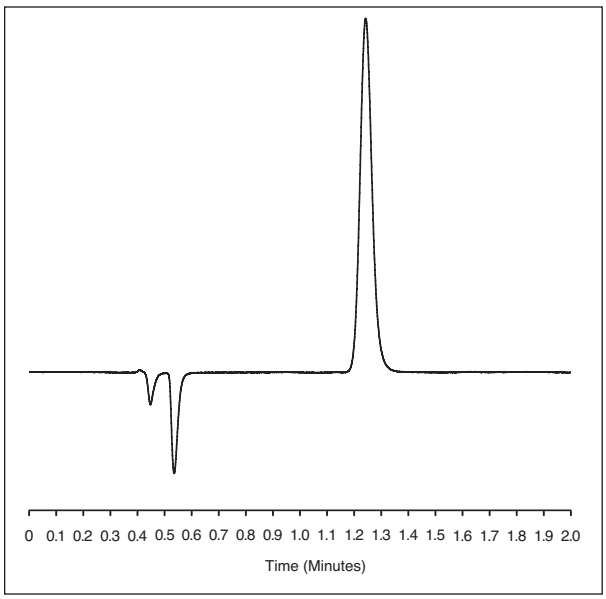

Figure 1: Analysis of rosuvastatin upon Syncronis C18 5 µm, 50 x 4.6 mm

	T_r (min)	Efficiency (USP plates/m)	T_f (USP)	Peak Area
Mean	1.24	73186	1.16	482779
% RSD	0.03	0.40	0.60	0.16

Table 1: Repeatability in performance of Syncronis C18 phase for the chromatographic analysis of rosuvastatin T_r - retention time, T_f - tailing factor. Statistical assessment is based upon data derived from 10 replicate injections

Results

Under the isocratic, reversed-phase conditions adopted for this analysis, adequate retention and elution of rosuvastatin was observed in less than two minutes.

The repeatability in performance of the Syncronis C18 phase for the chromatographic examination of rosuvastatin is summarised in Table 1. It is evident that the chromatographic data are matched with excellent precision.

A typical chromatogram derived from the inspection of a solution of rosuvastatin is shown in Figure 1.

Conclusions

The highly retentive Syncronis C18 bonded phase may be used for the rapid analysis of rosuvastatin. Adopting typical reversed-phase, isocratic conditions, the analyte can be successfully retained and eluted in less than two minutes in a highly reproducible manner.

References

1. Pelat, M.; Dessy, C.; Massion, P.; Desager, J.-P.; Feron, O.; Balligand, J.-L., J. Circ. 2003, 107, 2480
2. Trivedi, R.K.; Kallem, R.R.; Mullangi, R.; Srinivas, N.R., J. Of Pharm. Biomed. Anal. 2005, 39(3-4), 661-669

In addition to these offices, Thermo Fisher Scientific maintains a network of representative organizations throughout the world.

North America
USA and Canada
+1 800 332 3331

Europe
France
+33 (0)1 60 92 48 34

Germany
+49 (0) 2423 9431 -20 or -21

Switzerland
+41 56 618 41 11

United Kingdom
+44 1928 534110

Asia
Japan
+81 3 5826 1615

China
+86-21-68654588
or +86-10-84193588
800-810-5118

India
1800 22 8374 (toll-free)
+91 22 6716 2200

Thermo Fisher Scientific Australia Pty Ltd
1300 735 292 (free call domestic)

Thermo Fisher Scientific New Zealand Ltd
0800 933 966 (free call domestic)

All Other Enquiries
+44 (0) 1928 534 050

Technical Support

North America
800 332 3331

Outside North America
+44 (0) 1928 534 440

www.thermoscientific.com/chromatography

ANCCSSYNCSTATIN 1011