Application Note: ANCCSCETIBUVAL

Analysis of Ibuprofen and Valerophenone by LC/UV Using a Core Enhanced Technology Accucore HPLC Column

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Key Words

- Accucore C18
- Fused core
- Superficially porous
- USP
- Ibuprofen
- Antibiotics

Abstract

This application note demonstrates the use of the Thermo Scientific Accucore C18 HPLC column for the analysis of ibuprofen and valerophenone. The method of analysis is based on the USP monograph [1].

Introduction

Accucore™ HPLC columns use Core Enhanced Technology to facilitate fast and high efficiency separations. The 2.6 µm diameter particles are not totally porous, but rather have a solid core and a porous outer layer. The optimised phase bonding creates a series of high coverage, robust phases. The carbon loading of Accucore C18 provides high retention of non-polar analytes via a predominantly hydrophobic interaction mechanism. The highly retentive nature of Accucore C18 means that it can be used to separate a broad range of analytes.

The tightly controlled 2.6 µm diameter of Accucore particles results in much lower backpressures than typically seen with sub-2 µm materials.

The USP method for ibuprofen specifies a minimum resolution between the valerophenone and ibuprofen peaks of not less than 2.

Experimental details

The ibuprofen assay was run on a Thermo Scientific HPLC system. The UV detector was fitted with a 15 µL, 10 mm flow cell. The column used for the analysis was a core enhanced technology Accucore C18. The data was acquired and processed using Thermo Scientific ChromQuest 5.0 Software.

Sample Preparation

A sample of USP grade ibuprofen and valerophenone was weighed and diluted in mobile phase at 500 µg/mL concentration.

Thermo Scientific Column	Part Number
Accucore C18 2.6 µm 100 x 4.6 mm	17126-104630
Measured pressure: 276 bar	

Thermo Scientific HPLC system	
Column temperature	30 °C
Injection volume	5 µL (partial loop)
Flow rate	2.0 mL/min
UV detection	214 nm (data rate 10Hz, rise time 0.5 s)

Mobile Phase

66.3:33.7 water adjusted to pH 2.5 with phosphoric acid / acetonitrile

Consumables	Part Number
Fisher Scientific HPLC grade water	W/0106/17
Fisher Scientific HPLC grade acetonitrile	A/0626/17
NSC Mass Spec Certified 2 mL clear vial with blue bonded PTFE silicone cap	MSCERT4000-34W

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Results

The original USP method is based on a L1 150 x 4.0 mm, 5 µm column. The column used to generate this application note is a 100mm length column, packed with Accucore C18 2.6 µm particles. As shown on Figure 1, ibuprofen elutes at 18.4 min and valerophenone elutes at 14.1 min. The USP acceptance criteria (resolution not less than 2) was met, as demonstrated in Table 1. The statistical assessment is based on data from 6 replicate injections.

Conclusions

The Accucore C18 column demonstrated excellent performance for the analysis of ibuprofen with minimal peak tailing. The analytical results exceeded the specifications stated in the USP monograph and there was excellent reproducibility between runs. Accucore C18 columns are therefore an excellent choice for the analysis of ibuprofen and valerophenone.

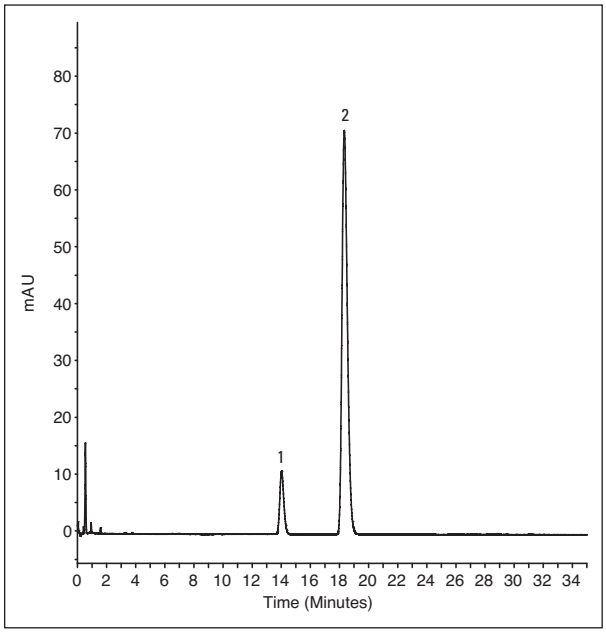

Figure 1: Chromatogram of 500 µg/mL of 1. valerophenone and 2. ibuprofen analyzed on the Accucore C18 100 x 4.6 mm, 2.6 µm column

	Valerophenone		Ibuprofen		
	t_r (min)	T_f	t_r (min)	T_f	Resolution
Mean	14.09	1.18	18.42	1.30	7.12
%RSD	0.29	0.80	0.29	0.73	0.64

Table 1: Method precision (%RSD) for valerophenone and ibuprofen (data calculated from six replicate injections).

References

[1] USP-32, Ibuprofen, Chromatographic purity.

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