

The Fast Analysis of 6 Benzoic Acids Using a Core Enhanced Technology Accucore HPLC Column

Stephen Aspey, Thermo Fisher Scientific, Runcorn, Cheshire, UK

Key Words

- Fused core
- Superficially porous
- Intermediates
- Acids
- Core Enhanced Technology
- Accucore C18

Abstract

This application note demonstrates the use of the Thermo Scientific Accucore C18 columns for the fast analysis of benzoic acids.

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

Benzoic acids are used in a variety of industries, including the manufacturing of drugs, pesticides and dyes. These compounds lend themselves to analysis by reverse-phase at reduced pH.

Results

A good separation of the benzoic acids was achieved using the specified mobile phase. The low pH buffer helps to suppress the ionization of the acids, which have pKa values typically of 3 to 4.5.

The acid separation was achieved at 0.8 ml/min, which is four-times the linear velocity typically used with a conventional packed 2.1 mm column. This was achieved at less than 250 bar using a conventional low-pressure HPLC instrument.

Conclusions

The Accucore C18 HPLC columns provides good separation of a range of benzoic acids in less than 1 minute using a conventional low pressure HPLC instrument.



Sample Preparation

Uracil (1.0 mg), phthalic acid (1.0 mg), 2-fluorobenzoic acid (2.1 mg), 3-nitrobenzoic acid (1.0 mg) and 3-fluorobenzoic acid (1.0 mg) were each dissolved in 1.0 mL methanol/water (50:50). Each of these solutions (100 µl) were mixed and made up to 1000 µL with methanol/water (50:50).

Thermo Scientific Column	Part Number
Accucore C18 2.6 µm 100 x 2.1mm	17126-102130
Measured backpressure: 248 bar	

Thermo Scientific HPLC system

Column temperature	40 °C
Injection volume	1.0 µL
Flow rate	0.8 mL/min
UV detection	254 nm

Mobile Phase

Sodium hydrogen phosphate (Na₂HPO₄) 25mM pH 2.5/methanol (65:35)

Consumables	Part Number
Fisher Scientific HPLC grade water	W/0106/17
Fisher Scientific HPLC grade methanol	M/4056/17
NSC Mass Spec Certified 2 mL clear vial with blue bonded PTFE silicone cap	MSCERT4000-34W

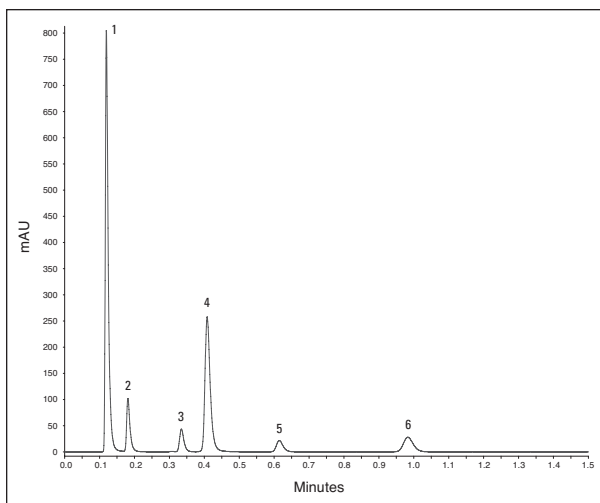


Figure 1: The separation of 5 benzoic acids on Accucore C18
 Compounds: (1) Uracil (2) Phthalic acid (3) 2-fluorobenzoic acid
 (4) 3-nitrobenzoic acid (5) 3-fluorobenzoic acid (6) m-toluic acid

Parameter	Mean	%CV
%T _f	1.20	1.3
N	5542	0.3

Table 1: Method precision - using retention time, asymmetry and the efficiency of peak 6 and derived from 6 replicate injections

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

©2011 Thermo Fisher Scientific Inc. All rights reserved. All trademarks are the property of Thermo Fisher Scientific Inc. and its subsidiaries. Specifications, terms and pricing are subject to change. Not all products are available in all countries. Please consult your local sales representative for details.

ANCCSCETBENZ 0611