

Analysis of Six Aromatic Amines Using a Core Enhanced Technology Accucore HPLC Column

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Key Words

- Aromatic amines
- Accucore PFP
- Fused core
- Superficially porous
- Core Enhanced Technology

Abstract

This application note demonstrates the selectivity of the Thermo Scientific Accucore PFP HPLC column for the fast analysis of six aromatic amines.

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. Introduction of fluorine groups into the Accucore PFP (pentafluorophenyl) stationary phase causes significant changes in solute-stationary phase interactions. This can lead to extra retention and selectivity for positional isomers of halogenated compounds.

PFP Columns are also well suited to the selective analysis of non-halogenated compounds, in particular polar compounds containing hydroxyl, carboxyl, nitro, or other polar groups. High selectivity is often most apparent when the functional groups are located on an aromatic or other rigid ring system. The tightly controlled 2.6 µm diameter of Accucore particles provides much lower backpressures than typically seen with sub-2 µm materials.

2,4-Diaminotoluene, 4,4-oxydianiline, o-toluidine, 2-methoxy-5-methylaniline, 2,4,5-trimethylaniline and 4,4-methylene-bis (2-chloroaniline) are all aromatic amines, used in industry to produce a variety of products such as polymer resins, textile dyes, spandex fibers, wood stains and rubber.

These compounds are of interest in the clinical sector as they are suspected human carcinogens. The suitability of this perfluorinated phase for the separation of positional isomers is demonstrated here with the separation of six aromatic amines.



Sample Preparation

Primary standards of each amine were prepared in acetonitrile at a concentration of 1 mg/mL, with the exception of 2,4,5 trimethylaniline which was supplied at a concentration of 200 ng/mL.

Working standard contained the following:

80 ng/mL of 2,4,5 trimethylaniline

200 µg/mL of 2,4-diaminotoluene, o-toluidine and 2-methoxy-5-methylaniline

60 µg/mL of 4,4-oxydianiline and 4,4-methylene-bis (2-chloroaniline)

Thermo Scientific Column	Part Number
Accucore PFP 2.6 µm 100 x 2.1mm	17426-102130
Measured pressure: 300 bar	

Thermo Scientific Accela

Column temperature 45 °C

Injection volume 1 µL

Flow rate 0.6 mL/min

UV detection 254 nm

Mobile Phase

Mobile phase A: 25 mM Ammonium acetate pH 5.0

Mobile phase B: Acetonitrile

Gradient: 20-100%B in 1.5 minutes

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

Results

The analysis was carried out on an Accucore PFP 2.6 μm 100 x 2.1 mm column. The separation of 2,4-diaminotoluene, 4,4-oxydianiline, o-toluidine, 2-methoxy-5-methylaniline, 2,4,5-trimethylaniline and 4,4-methylene-bis (2-chloroaniline) can be achieved in approximately 1.5 minutes (Figure 1.)

Accucore PFP provides the optimum retention and separation of these basic, polar compounds.

Peak	Analyte	t_r (min)
1	2,4-Diaminotoluene	0.62
2	4,4-Oxydianiline	1.05
3	O-Toluidine	1.11
4	2-Methoxy-5-methylaniline	1.21
5	2,4,5-Trimethylaniline	1.36
6	4,4-Methylene-bis (2-chloroaniline)	1.51

Table 1: Peak identity and position of the aromatic amines obtained from Accucore PFP

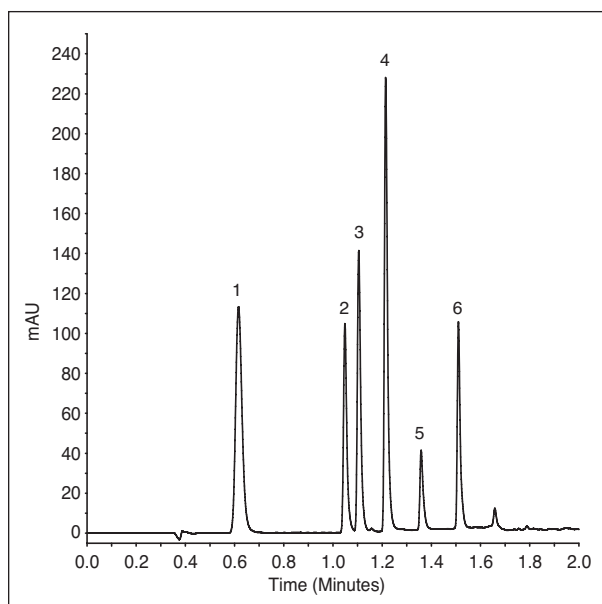


Figure 1: Chromatogram for 2,4-diaminotoluene (1), 4,4-oxydianiline (2), o-toluidine (3), 2-methoxy-5-methylaniline (4), 2,4,5-trimethylaniline (5) and 4,4-methylene-bis (2-chloroaniline) (6) separated on an Accucore PFP 2.6 μm 100 x 2.1 mm column

Conclusions

The use of Accucore PFP column allowed to successfully separate 6 aromatic amines in approximately 1.5 minutes. Accucore PFP columns are therefore an excellent choice for the analysis of basic, polar compounds, allowing greater selectivity and high sample throughput.

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