

***DAICEL 3 μm CHIRALPAK[®]
and CHIRALCEL[®] Analytical
Columns***

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OUTLINE

- ***Challenges in Chiral Chromatography***
- ***Solution***
- ***Applications***
- ***Summary***

Current Challenges in Chiral Chromatography: “Throughput”

Combinatorial discovery efforts in chiroscience:

Catalyst development

Biotransformations

Directed evolution

Real-time reaction monitoring

Clinical studies

Quality control of pharmaceutical products

***Serial sample processing in chiral chromatography
high quality analytical information, but limited throughput.***

Current Challenges in Chiral Chromatography: “Difficult Separations”

Diastereomeric mixtures

Samples with challenging impurity profiles

Low enantioselectivity

The current generation of CSPs suffers from relatively low efficiency, forcing researchers to seek more complex analytical solutions.

Current Challenges in Chiral Chromatography



***We can conquer them all.
Just give us a call...***



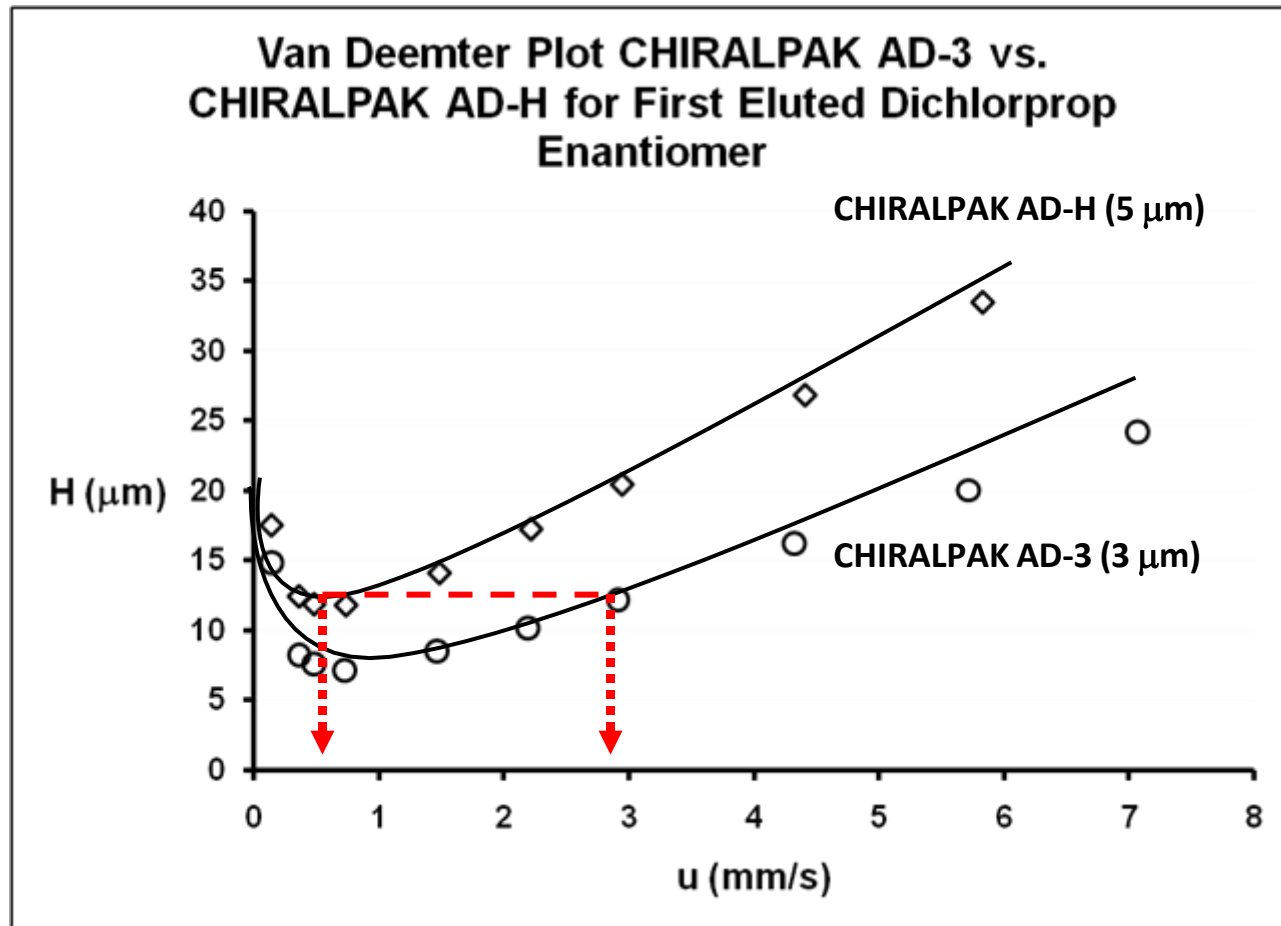
Solution Columns Packed with Smaller Particles

3 μm particles provide lower plate height numbers than 5 μm particles, with the minimum plate height shifted to higher linear flow velocities.

Columns packed with 3 μm particles can be operated at higher flow velocities, with no significant loss in efficiency .

Applications

High Throughput Chiral Analysis



DAICEL 3 μm Chiral Analytical Columns

5 μm DAICEL Packings

Coated Phases

***CHIRALPAK[®] AD-H
CHIRALCEL[®] OD-H***

***CHIRALPAK[®] AD-RH
CHIRALCEL[®] OD-RH***

Immobilized Phases

***CHIRALPAK[®] IA
CHIRALPAK[®] IC***

3 μm DAICEL Packings

Coated Phases

***CHIRALPAK[®] AD-3
CHIRALCEL[®] OD-3***

***CHIRALPAK[®] AD-3R
CHIRALCEL[®] OD-3R***

Immobilized Phases

***CHIRALPAK[®] IA-3
CHIRALPAK[®] IC-3***

3 μm DAICEL Chiral Columns

Identical enantioselectivity and retention behavior as the corresponding 5 μm materials

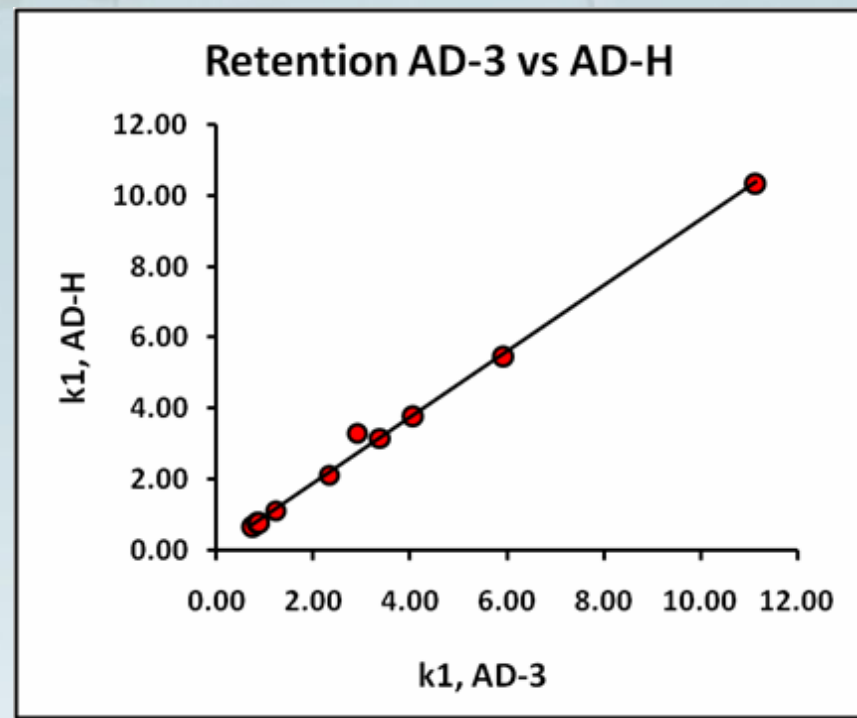
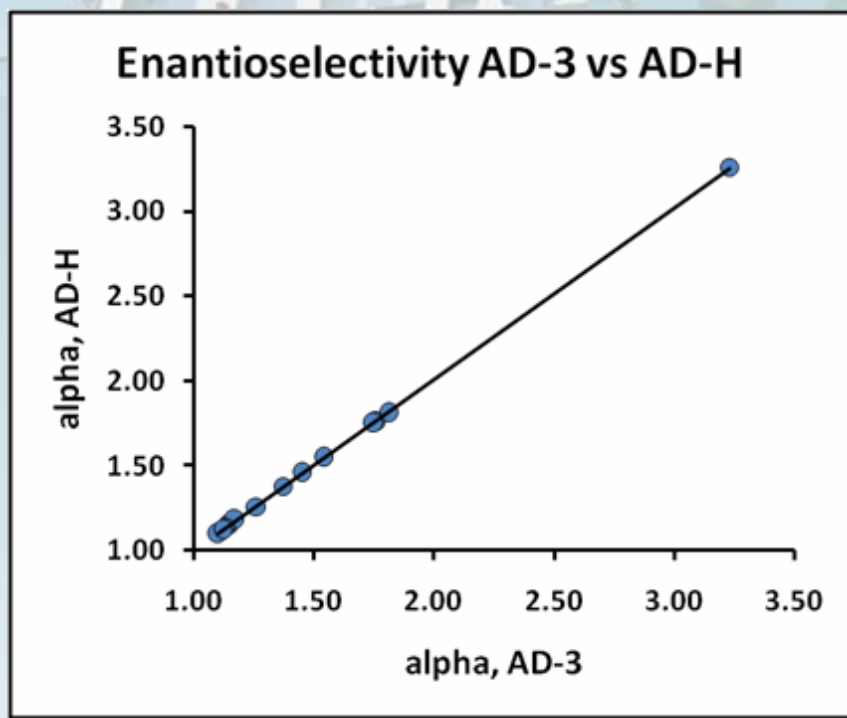
Increased efficiency (up to 60%)

Moderately higher pressure drop

Increased resolution for challenging chiral separations

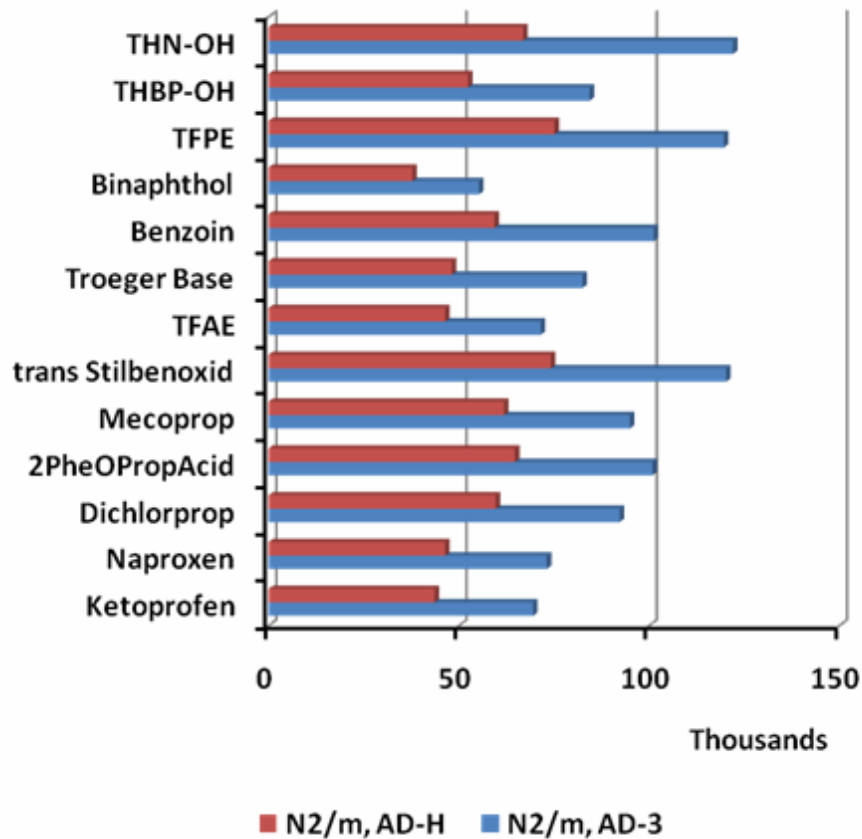
Minimal loss in resolving power

CHIRALPAK® AD-3 vs. CHIRALPAK® AD-H



CHIRALPAK® AD-3 provides identical chiral recognition characteristics as compared to CHIRALPAK® AD-H, facilitating the direct transfer of method development efforts.

CHIRALPAK[®] AD-3 vs. CHIRALPAK[®] AD-H



CHIRALPAK[®] AD-3 provides enhanced efficiency (40 - 60%) as compared to CHIRALPAK[®] AD-H

Compatibility with Standard Chromatographic Equipment

Benefits of columns packed with small particles may be compromised by extra column volume (ECV) effects of HPLC instruments.

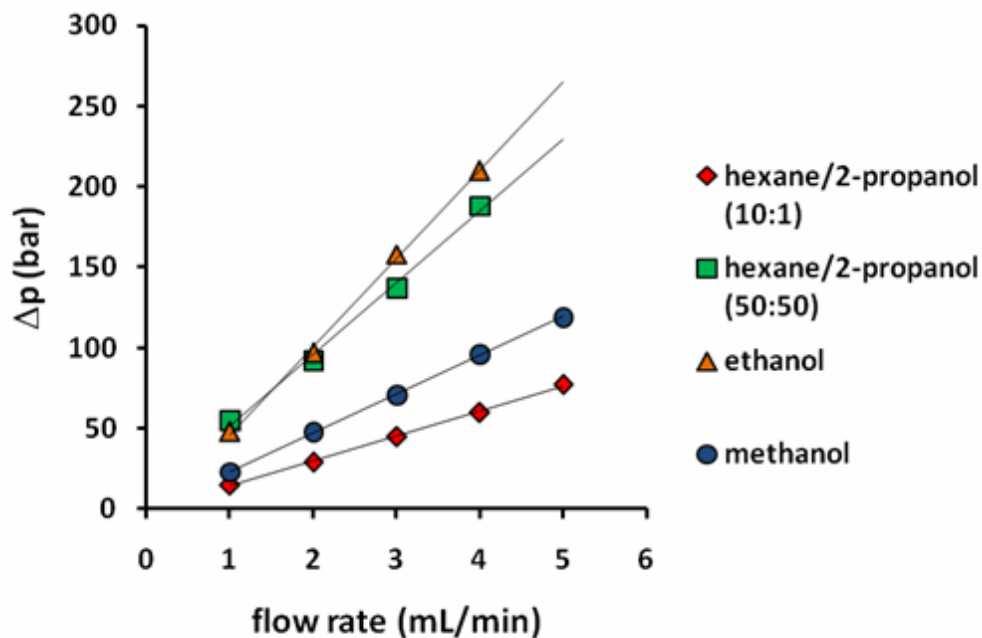
**Effects on CHIRALPAK® AD-3 columns tested using a dedicated ECV-optimized and an unmodified HPLC instrument with a weakly retained analyte (α -(trifluoromethyl)benzylalcohol, $k_1 = 0.89$).
n-hexanes/2-propanol 90:10 (v/v); 1 mL/min, 210 nm, 25°C)**

CHIRALPAK® AD-3	Agilent 1200 SL (ECV optimized)		Agilent 1100 (unmodified)		Relative Loss (%)	
	N1	N2	N1	N2	N1	N2
250 x 4.6 mm I.D.	32030	30969	31360	30900	2.1	0.2
150 x 4.6 mm I.D.	15800	15620	15200	15160	3.9	2.9
50 x 4.6 mm I.D.	6660	6500	6360	6410	4.5	1.4

DAICEL 3 μ m columns can be operated with conventional HPLC instruments without significant loss in efficiency.

Pressure Drop of DAICEL 3 μm Chiral Columns

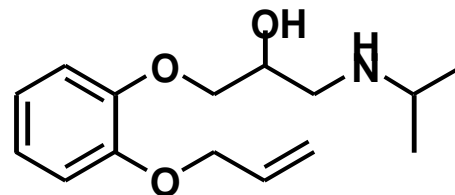
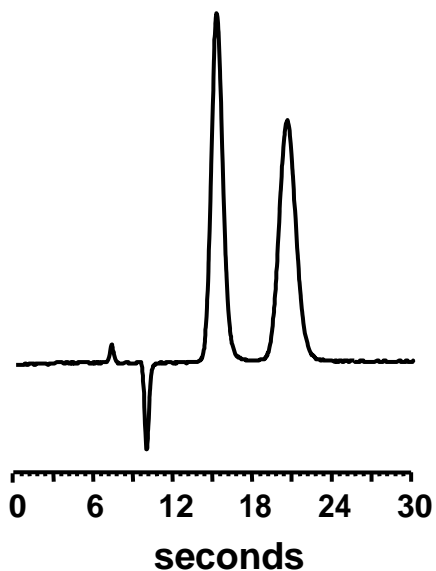
Pressure Drop on 50 x 4.6 mm I.D.
CHIRALPAK AD-3 Columns



DAICEL 3 μm columns in 50 x 4.6 mm I.D. format can be operated at high flow rates with all established mobile phase systems.

Applications: Fast Separation

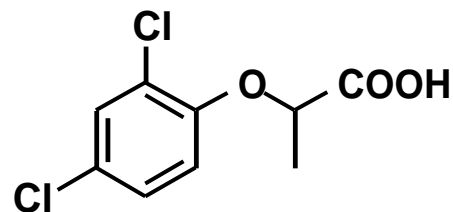
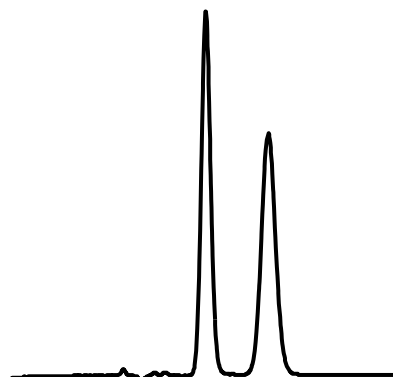
Oxprenolol.HCl



CHIRALPAK[®] AD-3 (50 x 4.6 mm I.D.)
n-Hexane/2-propanol/diethylamine 90/10/0.1 (v/v/v);
flow rate: 5.0 mL/min; UV-detection: 235 nm;
temperature: 25C.

Applications: Fast Separation

Dichlorprop

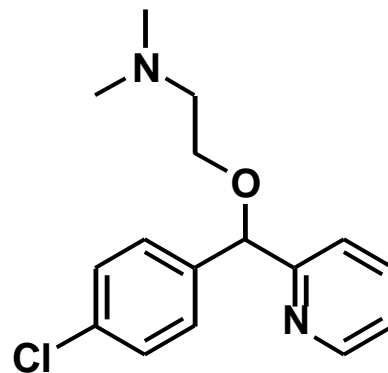
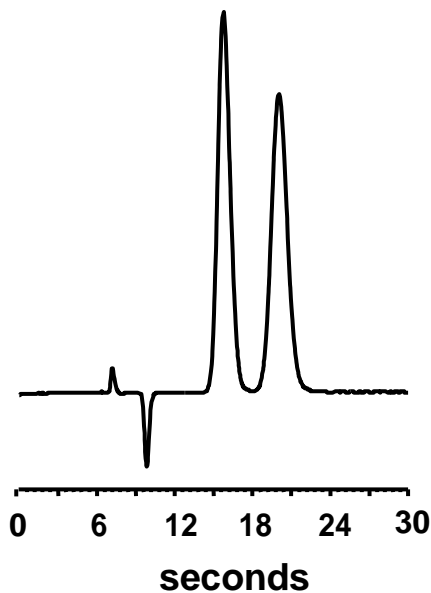


CHIRALPAK[®] AD-3 (50 x 4.6 mm I.D.)
n-hexane/2-propanol/trifluoroacetic acid 90/10/0.1
(v/v/v); flow rate: 5.0 mL/min; UV-detection: 235 nm;
temperature: 25°C.

0 6 12 18 24
seconds

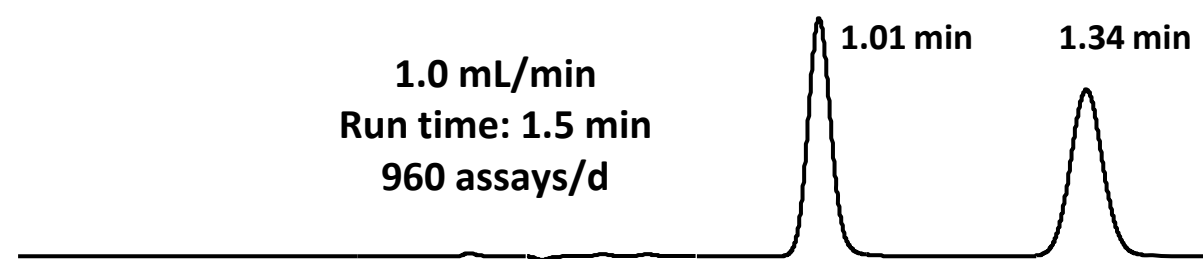
Applications: Fast Separation

Carbinoxamine

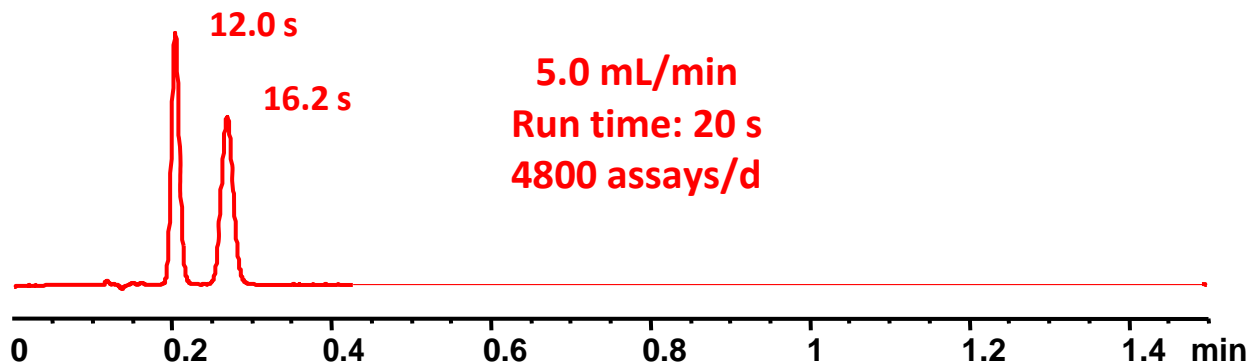


CHIRALPAK[®] AD-3 (50 x 4.6 mm I.D.)
n-Hexane/2-propanol/diethylamine 90/10/0.1 (v/v/v);
flow rate: 5.0 mL/min; UV-detection: 235 nm;
temperature: 25°C.

High Throughput Chiral Analysis of Dichlorprop



k1: 0.77
k2: 1.36
alpha: 1.77
N1: 6063
N2: 5112
Rs: 5.28



k1: 0.73
k2: 1.28
alpha: 1.76
N1: 2068
N2: 1554
Rs: 2.86

Column: CHIRALPAK[®] AD-3 (50 x 4.6 mm I.D.); Mobile phase: hexane/2-propanol/trifluoroacetic acid 90/10/0.1 (v/v/v); UV-detection: 235 nm; Temperature: 25°C.

Summary

DAICEL 3 μm Analytical Chiral Columns

- ***Packed with DAICEL Quality and Performance***
- ***High Speed Analysis***
- ***Superior Resolution***
- ***Fast Chiral Screening***
- ***Rapid HPLC and SFC method development***
- ***Both immobilized and coated phases available***