YMC EUROPE GMBH
The Selectivity Company

YMC Chiral Columns

CHIRAL ART
Polysaccharides

NP/RP/SFC

Coated/
Immobilised

(Semi-)prep

www.ymc.eu

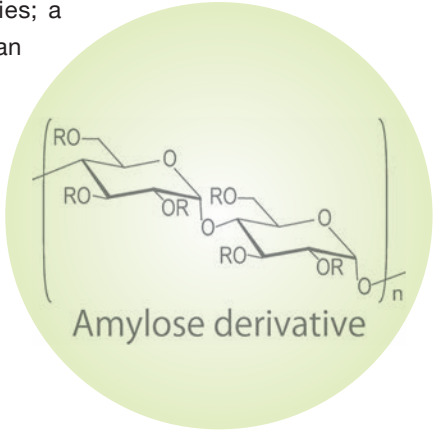
> *"YMC chiral columns gave better resolution and sharper peaks than the brand leader."*
>
> *"YMC will always be in our chiral screen for all new products"*
>
> *Alex Brien, Reach Separations (UK)*

HPLC Columns for Optical Isomer Separation

Chirality has become vitally important in the production of pharmaceuticals, agrochemicals, food and related products due to the different pharmacological or taste/odour effects which the different optical isomers can present. The pharmacological effects can range from no activity through undesirable effects to having potentially life threatening adverse effects. This has led to the development of highly efficient CHIRAL stationary phases (CSP) for analytical and preparative scale separations.

If the CSP is available in two enantiomeric configurations the elution order of enantiomeric pairs can be reversed.

This is particularly useful when the two isomers are not present in equal quantities; a later eluting minor component can often be hidden by the tail of a major peak but on reversal of elution order can be totally resolved from the major component.



Chiral Columns

Contents

page

Latest addition: Innovative CHIRAL ART Cellulose-SZ

CHIRAL ART Amylose-C Neo for Extended Resolution & Loadability

CHIRAL ART
Immobilised Polysaccharide Derivatives Series

- Applicable for normal and reversed phase modes
- Unique immobilised chiral selector
- More flexibility due to wide range of usable solvents
- Highly robust, also suitable for SFC/SMB
- HPLC columns and preparative grade bulk media available
- Extremely attractive pricing

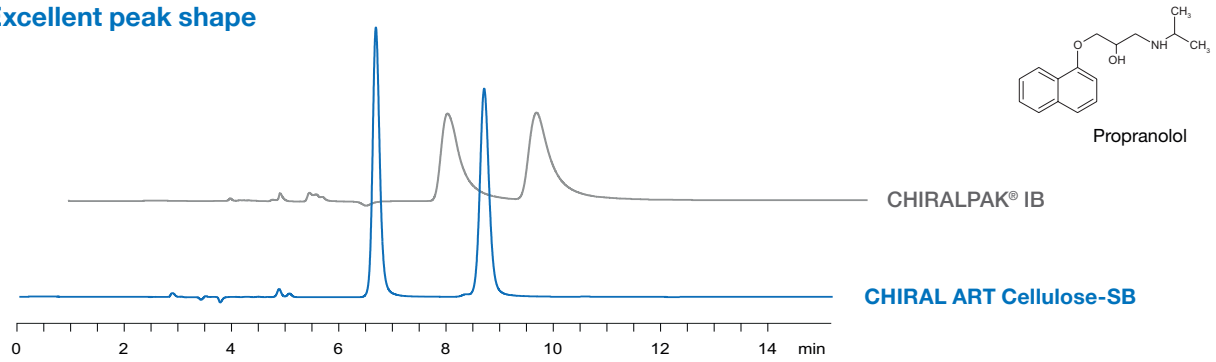
Introduction

CHIRAL ART polysaccharide derivatives are a family of chiral separation columns / packing materials with high stereo-selectivity. They are suitable for separations of a wide range of chiral compounds, cis-trans isomers and geometric isomers. The range of particle sizes and column dimensions available offer outstanding cost effectiveness for analytical to preparative separations.

Immobilised Type

CHIRAL ART immobilised polysaccharide derivatives can be used either in normal phase, reversed phase or SFC mode. They are available in HPLC columns and in preparative grades, in large (multi kg) quantities.

Excellent peak shape

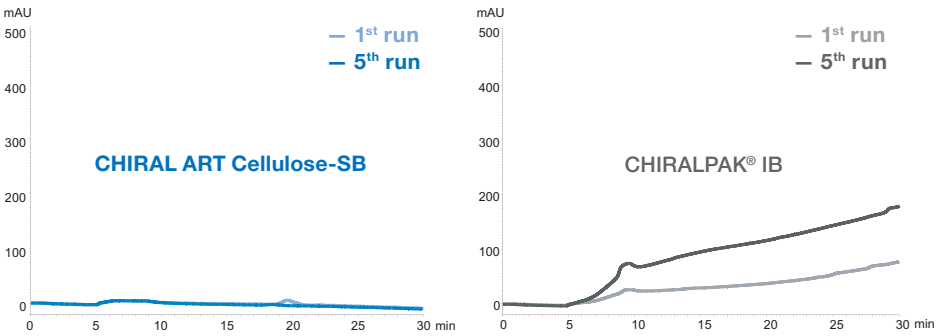


Propranolol

CHIRAL ART polysaccharide derivatives provide excellent peak shapes for ionic and metal coordinating compounds.

Column: 5 µm, 250 x 4.6 mm ID
Eluent: *n*-hexane / IPA / DEA (80/20/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: 230 nm
Injection: 10 µL (0.1 mg/mL)

Low Column Bleeding



Gradient test
Column: 5 µm, 250 x 4.6 mm ID
Eluent: A) *n*-hexane / B) ethanol
2–80% B (0–30 min),
80–2% B (30–30.1 min),
2% B (30.1–60 min)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 230 nm

CHIRAL ART
Immobilised Polysaccharide Derivatives Series

First to Market!

	CHIRAL ART Amylose-SA	CHIRAL ART Cellulose-SB	CHIRAL ART Cellulose-SC	CHIRAL ART Cellulose-SJ	CHIRAL ART Cellulose-SZ
Particle size	3, 5, 10, 20 µm				3, 5 µm
Chiral selector	Amylose tris (3,5-dimethylphenyl-carbamate)	Cellulose tris (3,5-dimethylphenyl-carbamate)	Cellulose tris (3,5-dichlorophenyl-carbamate)	Cellulose tris (4-methylbenzoat)	Cellulose tris (3-chloro-4-methyl-phenylcarbamate)
USP	L99	–	–	–	–
Type	Immobilised type				
Separation mode	Normal Phase / Reversed Phase / SFC				
Shipping solvent	*n*-hexane / 2-propanol (90/10)				
Usable pH-range	2.0–9.0				
Temperature	0–40°C				
Pressure limit	30 MPa (4,350 psi)				

Product Line-up

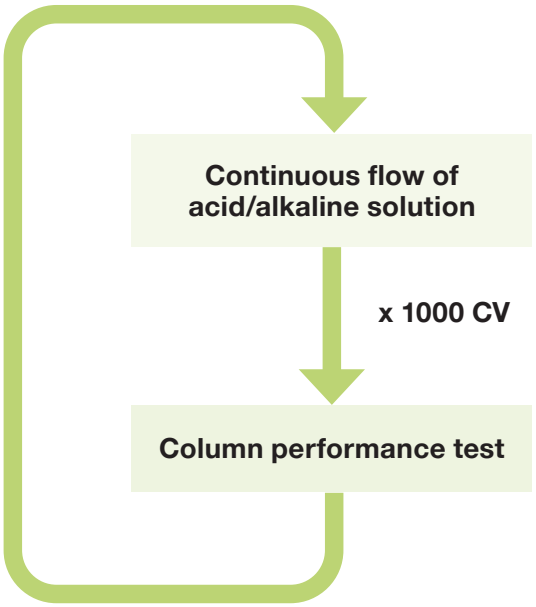
Product name	Particle size	CHIRAL selector	Type	Competitive product
CHIRAL ART Amylose-SA	3 µm 5 µm 10 µm 20 µm	Amylose tris (3,5-dimethylphenylcarbamate)	Immobilised	CHIRALPAK® IA, IA-3
CHIRAL ART Cellulose-SB		Cellulose tris (3,5-dimethylphenylcarbamate)		CHIRALPAK® IB, IB-3
CHIRAL ART Cellulose-SC		Cellulose tris (3,5-dichlorophenylcarbamate)		CHIRALPAK® IC, IC-3
CHIRAL ART Cellulose-SJ		Cellulose tris (4-methylbenzoat)		CHIRALPAK® IJ, IJ-3 [coated CHIRALCEL® OJ(-3/H)]
CHIRAL ART Cellulose-SZ	3, 5 µm	Cellulose tris (3-chloro-4-methylphenylcarbamate)		[coated CHIRALCEL® OZ-H, OZ-3]

Column Care

The recommended pH range for using CHIRAL ART immobilised polysaccharide columns is 2.0–9.0. Remove acid and buffer salts before storage. Store the column in *n*-hexane/2-propanol = 90/10 (NP) or methanol/water = 50/50 (RP).
If columns are affected by undesired contaminants or clogged inlet frits which cause back pressure increases, flush the column (in the reversed direction) with ethanol.
For detailed information please refer to the “Column Care and Use Instructions” which can be downloaded from **www.ymc.eu/support-documentation.html**.

Immobilised Polysaccharides

Wide usable pH range

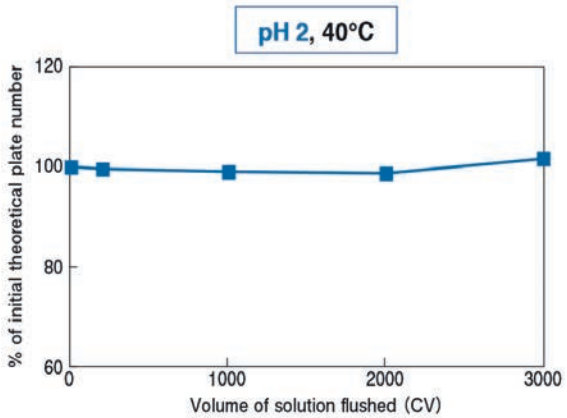


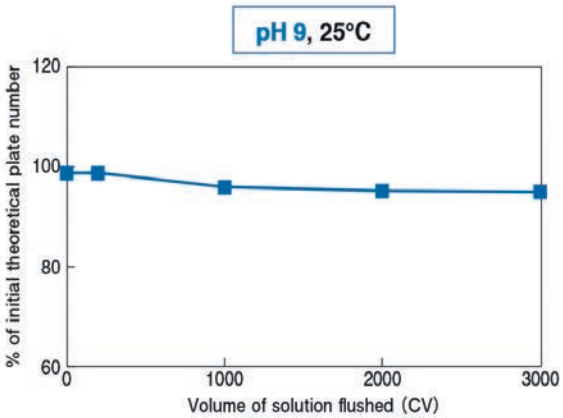
Continuous flow of acid/alkaline solution

Column:	CHIRAL ART Cellulose-SB 5 µm, 50 x 4.6 mm ID
Eluent:	buffer/methanol (90/10)
Flow rate:	1.0 mL/min
Acidic condition	
Buffer:	0.1% H_3PO_4 (**pH 2**)
Temperature:	40 °C
Basic condition	
Buffer:	20 mM NH_4HCO_3-DEA (**pH 9**)
Temperature:	25 °C

Column performance test

Column:	CHIRAL ART Cellulose-SB 5 µm, 50 x 4.6 mm ID
Eluent:	acetonitrile/water (30/70)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 254 nm
Sample:	Benzoin

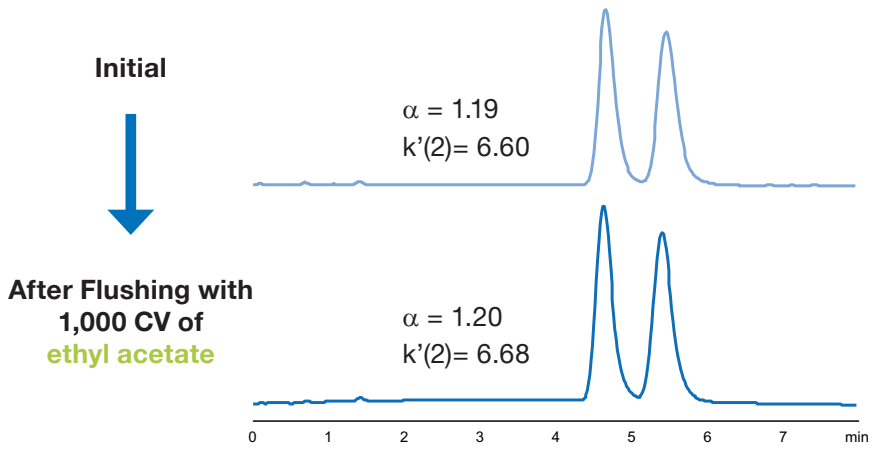




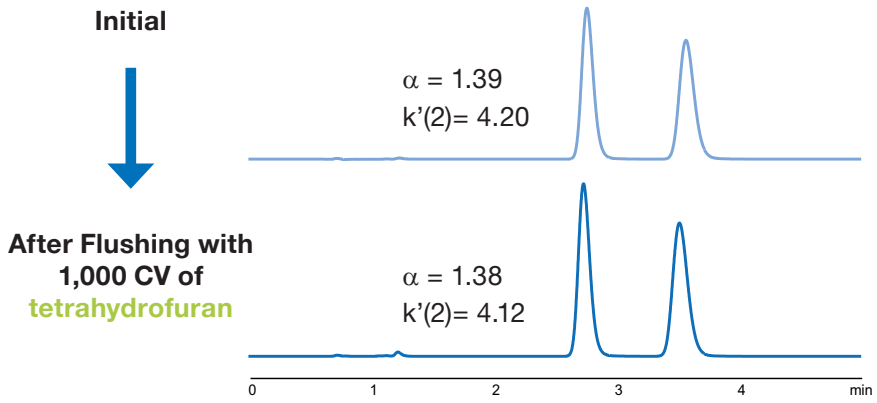
Immobilised Polysaccharides

High stability against various solvents

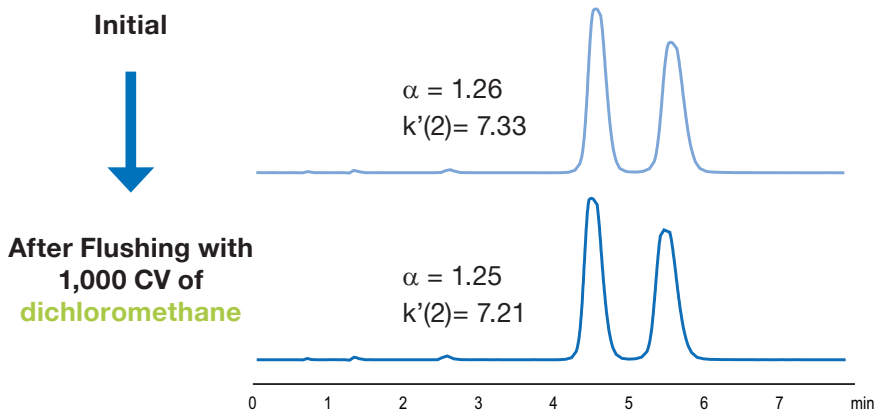
CHIRAL ART Amylose-SA



CHIRAL ART Cellulose-SB



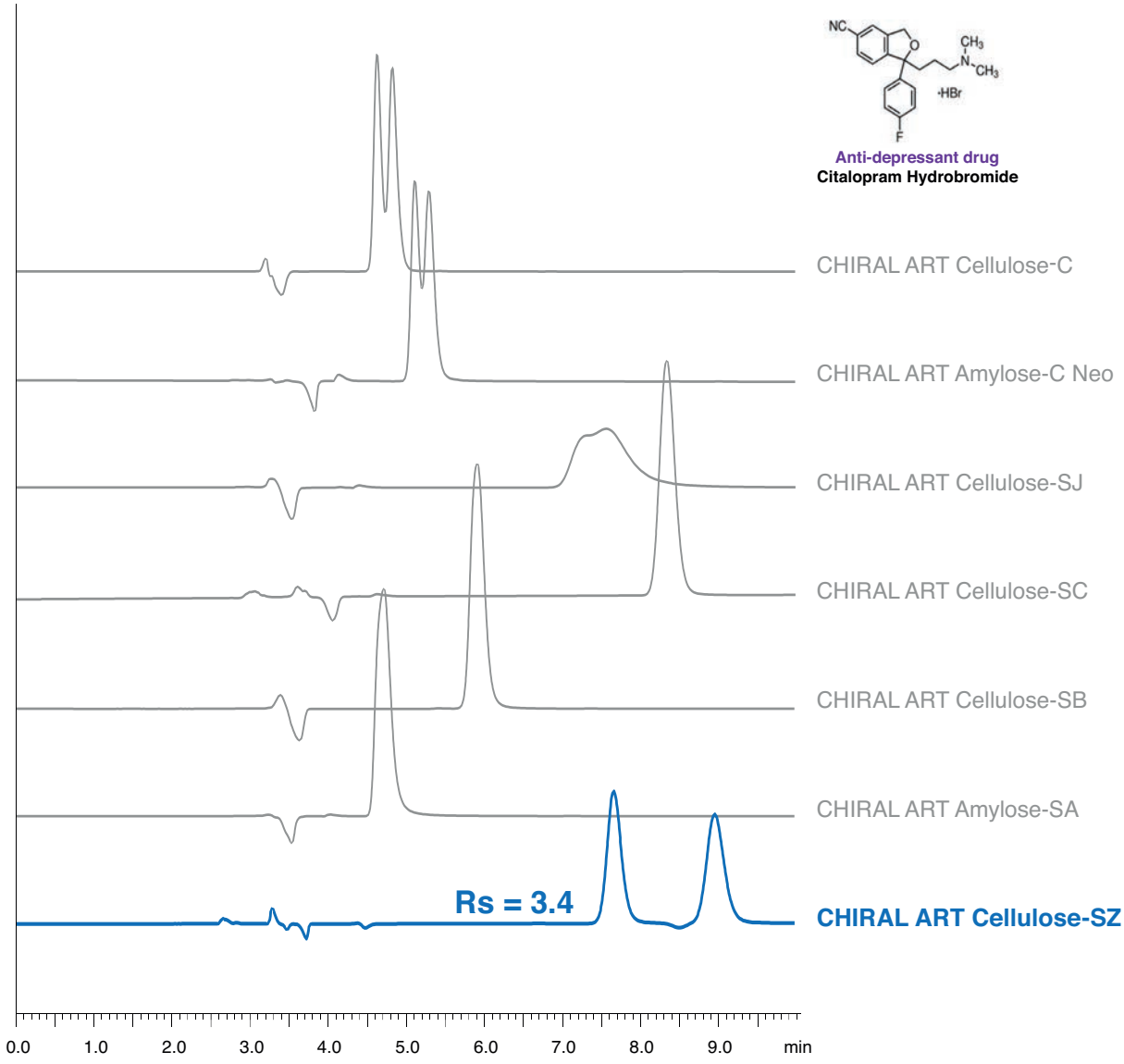
CHIRAL ART Cellulose-SJ



Column:	5 µm, 50 x 4.6 mm ID
Eluent:	*n*-hexane / 2-propanol (95/5)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Sample:	Benzoin

Immobilised Polysaccharides

Unique selectivity of CHIRAL ART Cellulose-SZ complements other phases



Column:	(5 µm) 250 x 4.6 mm ID	Flow rate:	1.0 mL/min
Eluent:	A) *n*-hexane/diethylamine (100/0.1)	Temperature:	25 °C
	B) 2-propanol/diethylamine (100/0.1)	Detection:	UV at 230 nm
Gradient:	30 % B (10 min)	Injection:	5 µL

CHIRAL ART
Coated Polysaccharide Derivatives Series

- Polysaccharide chiral selectors
- Wide application range
- With high stability, also for SFC/SMB
- HPLC columns and preparative grade bulk media available
- Extremely attractive pricing

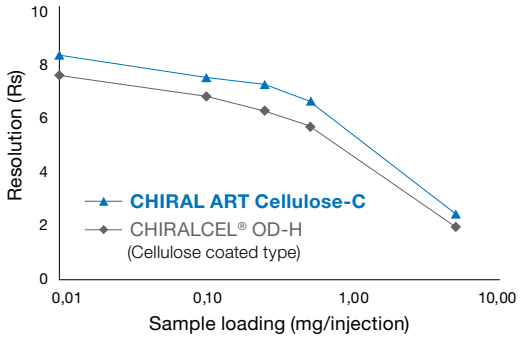
Introduction

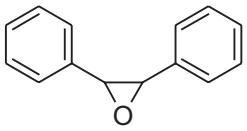
A family of coated chiral polysaccharide phases has been developed by YMC, designed to supply superior products which are competitively priced compared to established vendors. In addition – and typical of YMC – fully scalable preparative grades are available in large quantities.

Mobile phase and sample solvent

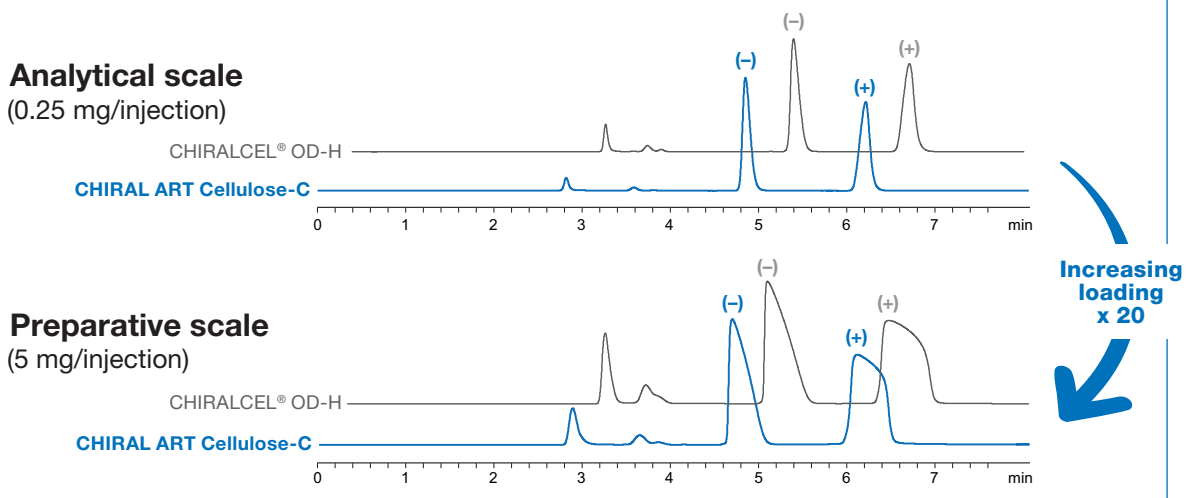
The silica packing material is coated with the polysaccharide derivative. Therefore trace quantities of a solvent which might potentially dissolve the polysaccharide derivative (e.g. THF, acetone, ethyl acetate, chloroform, dichloromethane, DMSO, DMF, etc.) should be eliminated. These solvents must be avoided in the mobile phase and the sample solvent.

Effective for Preparative Separation of Enantiomers





trans-Stilbene oxide



Column: (5 µm) 250 x 4.6 mm ID
Eluent: *n*-hexane/ethanol (90/10)
Flow rate: 1.0 mL/min

CHIRAL ART
Coated Polysaccharide Derivatives Series

CHIRAL ART Amylose-C Neo for Extended Resolution & Loadability

	CHIRAL ART Amylose-C*/Amylose-C Neo	CHIRAL ART Cellulose-C
Particle size	3, 5, 10, 20 µm	
Chiral selector	Amylose tris (3,5-dimethyl-phenylcarbamate)	Cellulose tris (3,5-dimethyl-phenylcarbamate)
USP	L51	L40
Type	Coated type	
Separation mode	Normal Phase / SFC	
Shipping solvent	*n*-hexane / 2-propanol (90/10)	
Temp. range	0–40°C	
Pressure limit	30 MPa (4,350 psi)	

Product Line-up

Product name	Particle size	Chiral selector	Type	Competitive product
CHIRAL ART Amylose-C*/Amylose-C Neo	3 µm 5 µm 10 µm 20 µm	Amylose tris (3,5-dimethylphenylcarbamate)	Coated	CHIRALPAK® AD, AD-H, AD-3
CHIRAL ART Cellulose-C		Cellulose tris (3,5-dimethylphenylcarbamate)		CHIRALCEL® OD, OD-H, OD-3

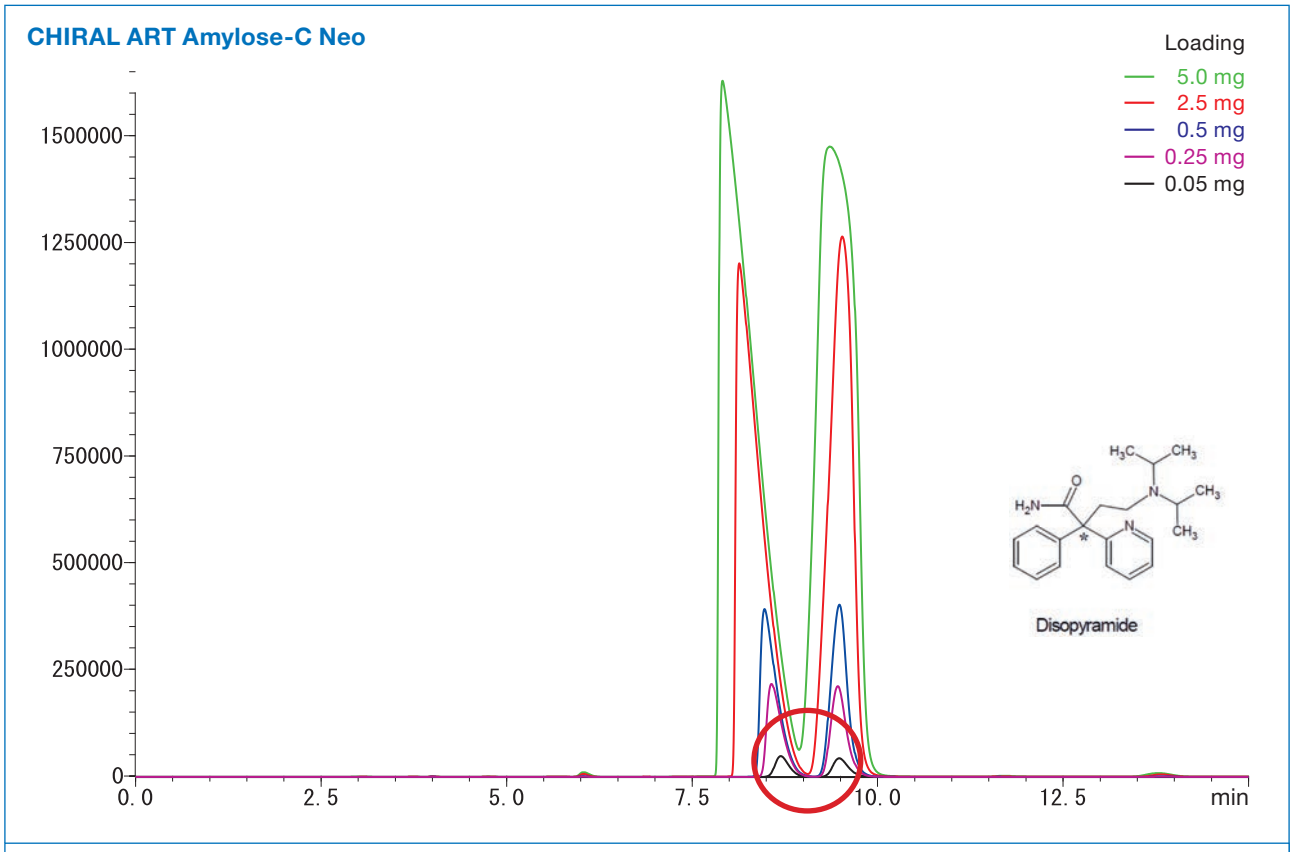
* CHIRAL ART Amylose-C available with 3 and 5 µm only.

Upgrade: CHIRAL ART Amylose-C Neo

CHIRAL ART Amylose-C Neo is an upgraded phase and offers increased resolution, compared to that of CHIRAL ART Amylose-C, for both HPLC and SFC separations.
This chiral phase also offers increased performance when it comes to purification under high loading as well as overall purification efficiency and productivity.

CHIRAL ART
Coated Polysaccharide Derivatives Series

Excellent peak shapes at high loading: CHIRAL ART Amylose-C Neo



Column:	(5 µm) 250 x 4.6 mm ID	Temperature:	25 °C
Part No.:	KBN99S05-2546WT	Detection:	UV 290 nm
Eluent:	*n*-hexane / 2-propanol / diethylamine (90/10/0.1)	Sample:	Disopyramide (50 mg/mL)
Flow rate:	1.0 mL/min		

Column Care

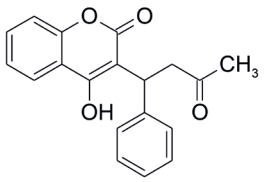
The recommended pH range for using CHIRAL ART coated polysaccharide columns is 3.5–6.5. Store the column in *n*-hexane/2-propanol = 90/10. If columns are affected by undesired contaminants or clogged inlet frits which cause back pressure increases, flush the column with ethanol.

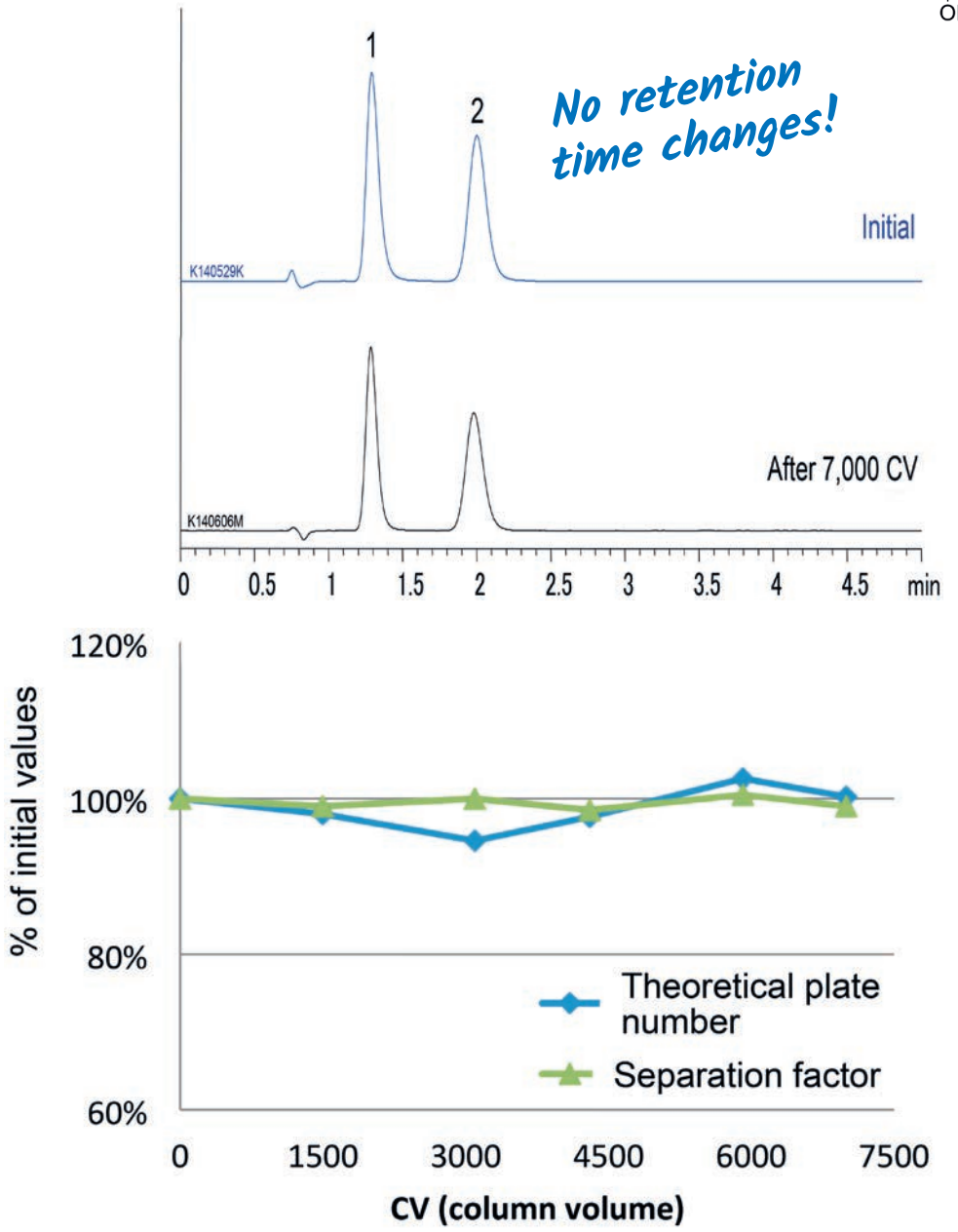
For detailed information please refer to the “Column Care and Use Instructions” which can be downloaded from **www.ymc.eu/support-documentation.html.**

Coated Polysaccharides

Enhanced stability using TFA

Stability evaluation with Warfarin



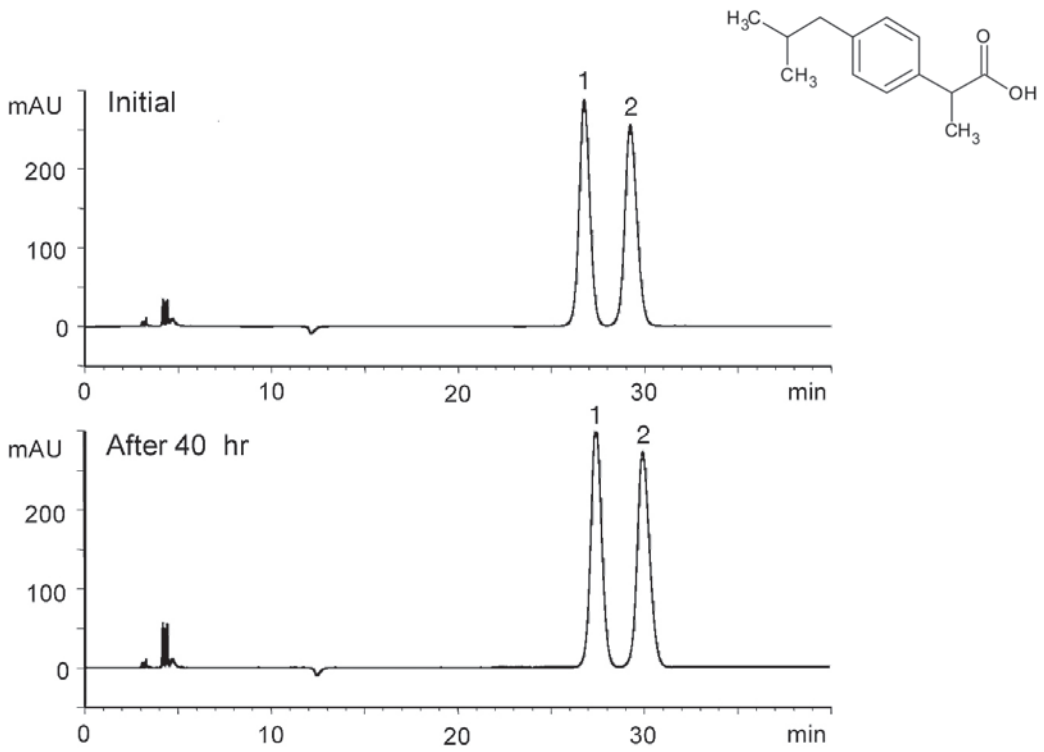


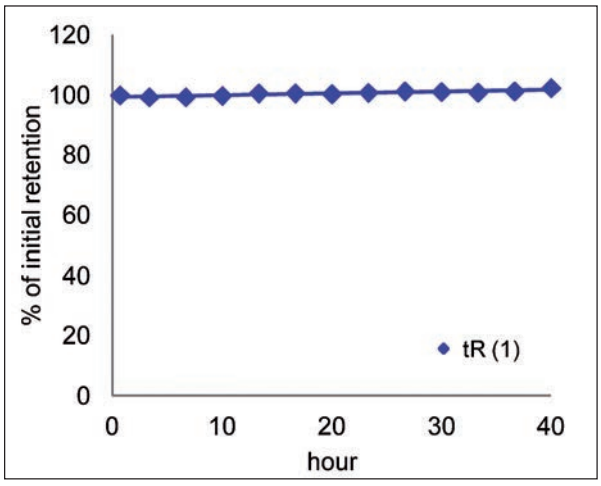
Column: CHIRAL ART Amylose-C (5 µm) 50 x 3.0 mm ID
Part No.: KAN99S05-0503WT
Eluent: *n*-hexane / ethanol / TFA (70/30/0.1)
Flow rate: 0.425 mL/min
Temperature: 25 °C
Detection: UV at 254 nm

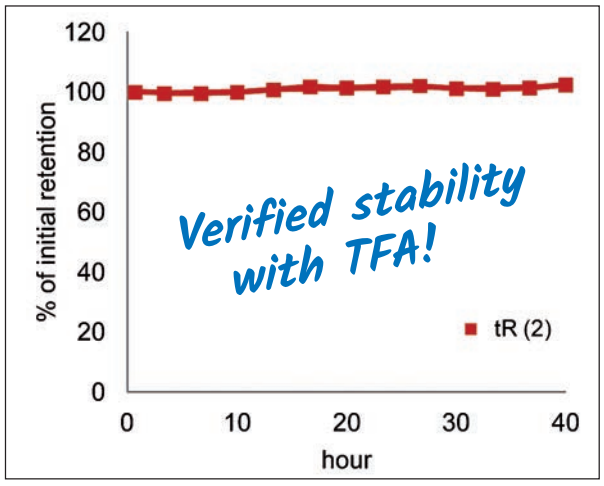
Coated Polysaccharides

Enhanced stability using TFA

Repeated analysis of Ibuprofen





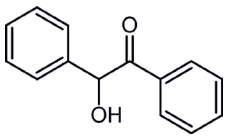


Column:	CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KAN99S05-2546WT
Eluent:	*n*-hexane / 2-propanol / TFA (99/1/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 220 nm
Injection:	10 µL (1 mg/mL)

TFA can be challenging for coated amylose phases with regards to stability and lifetime. CHIRAL ART Amylose-C however shows long-term stability using mobile phases containing TFA. The retention behaviour and column efficiency remain completely unaffected.

Coated Polysaccharides

Full scalability from 3 to 20 µm



Benzoin

3 µm

150 x 4.6 mm ID
at 1.0 mL/min

5 µm

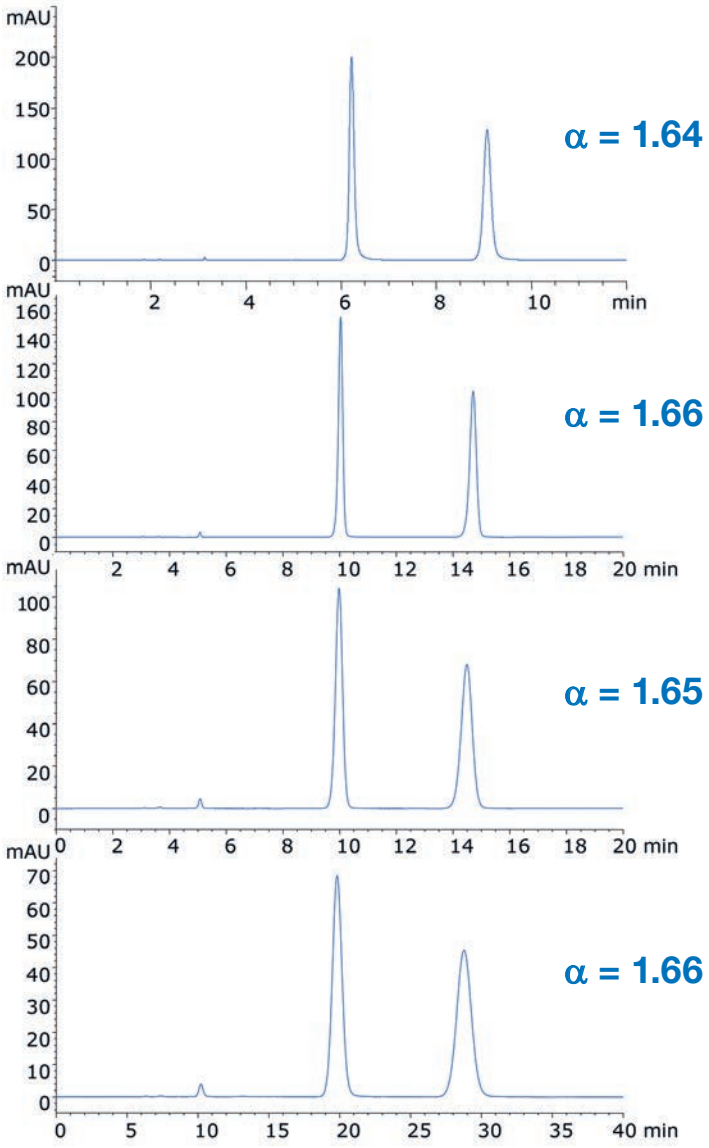
250 x 4.6 mm ID
at 1.0 mL/min

10 µm

250 x 4.6 mm ID
at 1.0 mL/min

20 µm

250 x 4.6 mm ID
at 0.5 mL/min

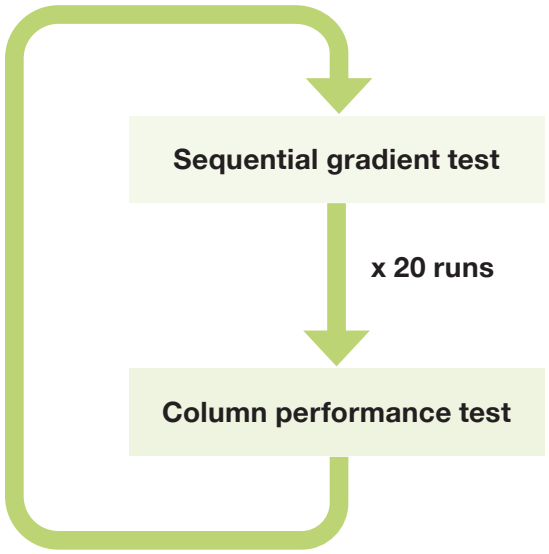


Column:	CHIRAL ART Cellulose-C
Eluent:	*n*-hexane / 2-propanol (90/10)
Flow rate:	1.0 mL/min (for 3, 5, 10 µm) 0.5 mL/min (for 20 µm)
Temperature:	25 °C
Detection:	UV at 254 nm
Sample:	Benzoin
Injection:	10 µl (0.1 mg/mL)

CHIRAL ART shows identical selectivity and excellent peak shapes for materials with particle sizes from 3 µm to 20 µm. It allows predictable scale up from analytical LC to semi-preparative or preparative LC, and vice versa. Screening and method development can be done on small particle sizes and the results can easily be transferred to larger particle sizes.

Coated Polysaccharides

Extended packing stability



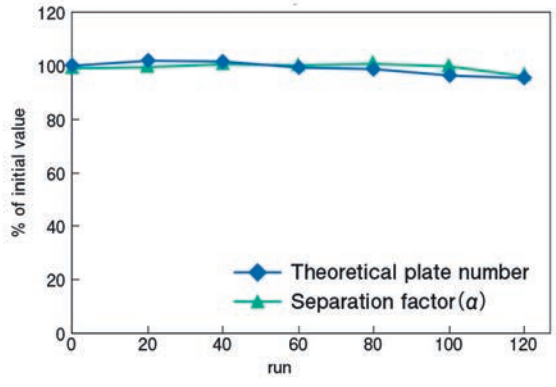
Sequential gradient test

Column:	5 µm, 250 x 4.6 mm ID
Eluent:	A) *n*-hexane, B) ethanol
	0-100% B (0-15 min)
Flow rate:	**3.0 mL/min**
Pressure:	**10–30 MPa/run**
Temperature:	37 °C

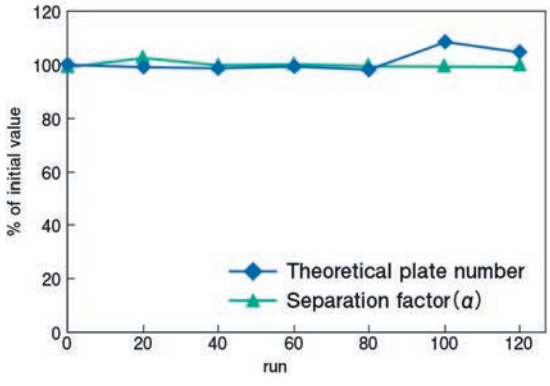
Column performance test

Column:	5 µm, 250 x 4.6 mm ID
Eluent:	*n*-hexane/ethanol (90/10)
Flow rate:	1.0 mL/min
Temperature:	37 °C
Detection:	UV at 230 nm
Sample:	*trans*-Stilbene oxide

CHIRAL ART *Amylose-C (Neo)*

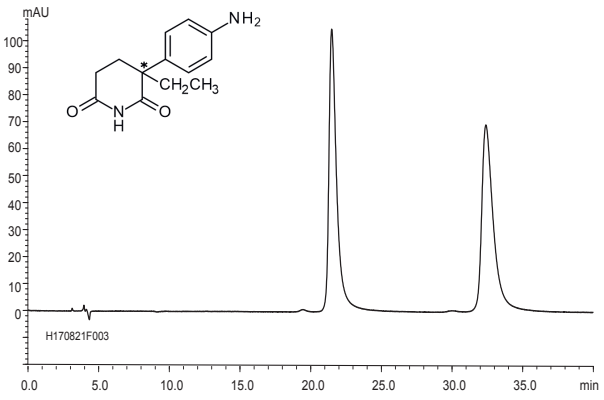


CHIRAL ART *Cellulose-C*



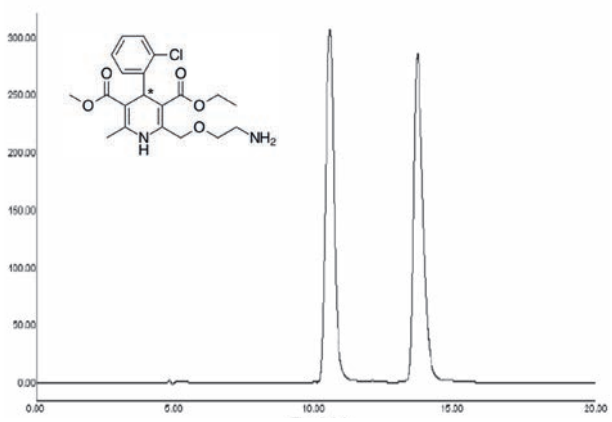
Applications
Pharmaceuticals (APIs)

Aminoglutethimide



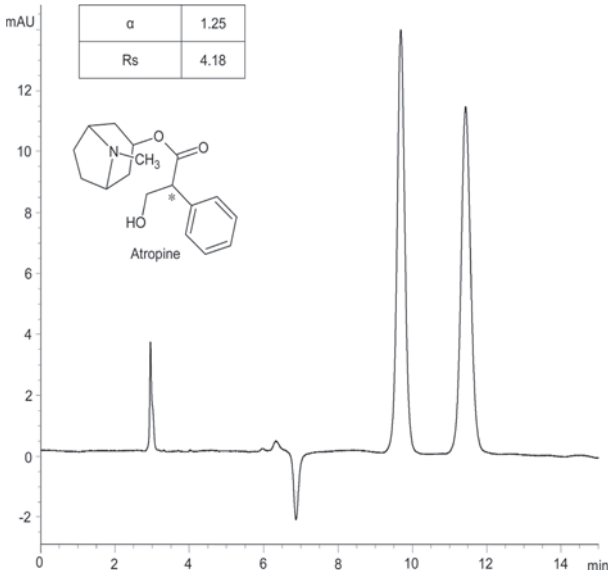
Column:	CHIRAL ART Cellulose-SJ (5 µm) 250 x 4.6 mm ID
Part No.:	KSJ99S05-2546WT
Eluent:	*n*-hexane / ethyl acetate / diethylamine (70/30/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C

Amlodipine



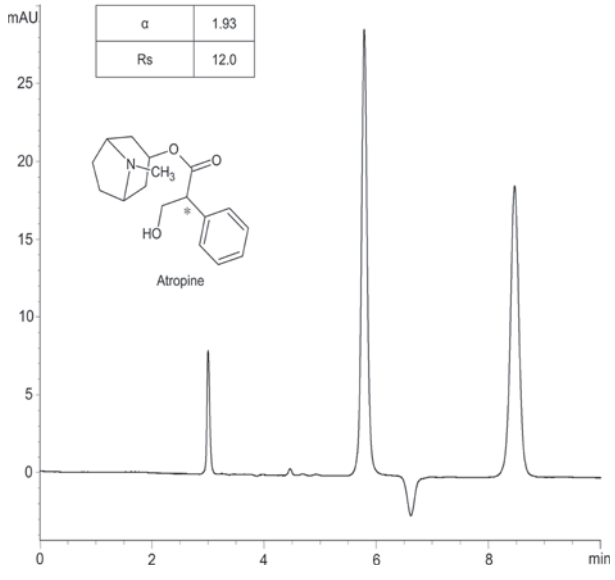
Column:	CHIRAL ART Cellulose-SC (5 µm) 250 x 4.6 mm ID
Part No.:	KSC99S05-2546WT
Eluent:	dichloromethane / acetonitrile / *n*-butylamine (90/10/0.1)
Flow rate:	0.7 mL/min
Temperature:	25 °C
Detection:	UV at 360 nm
Injection:	20 µL (0.5 mg/mL)

Atropine



Column:	CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KAN99S05-2546WT
Eluent:	*n*-hexane / ethanol / ethanolamine (87/13/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 230 nm
Injection:	2 µL (1 mg/mL)

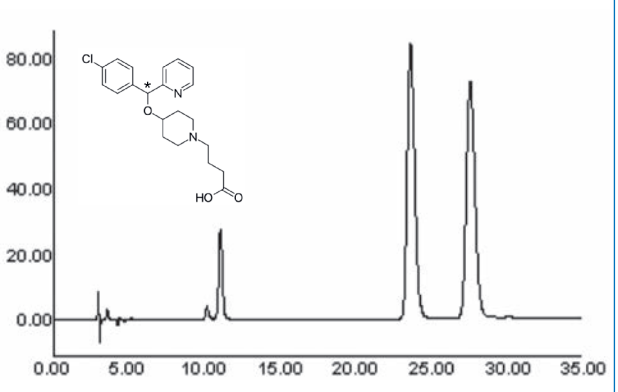
Atropine



Column:	CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KCN99S05-2546WT
Eluent:	*n*-hexane / ethanol / ethanolamine (90/10/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 230 nm
Injection:	2 µL (1 mg/mL)

Applications
Pharmaceuticals (APIs)

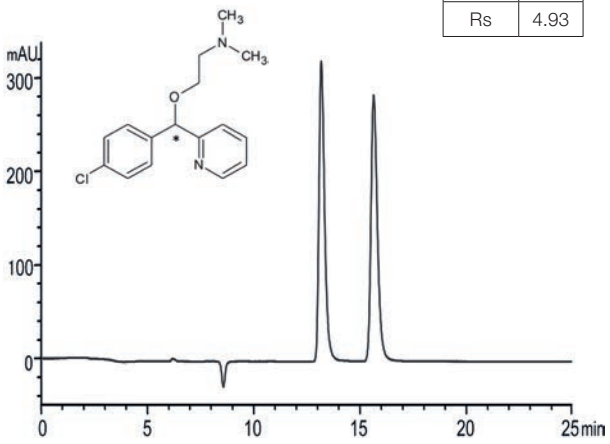
Bepotastine



Column: CHIRAL ART Amylose-SA (5 µm) 250 x 4.6 mm ID
Part No.: KSA99S05-2546WT
Eluent: *n*-hexane / ethanol / 1,4-dioxane / trifluoroacetic acid / diethylamine (90/5/5/0.1/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 260 nm
Injection: 20 µL (0.5 mg/mL)

Carbinoxamine

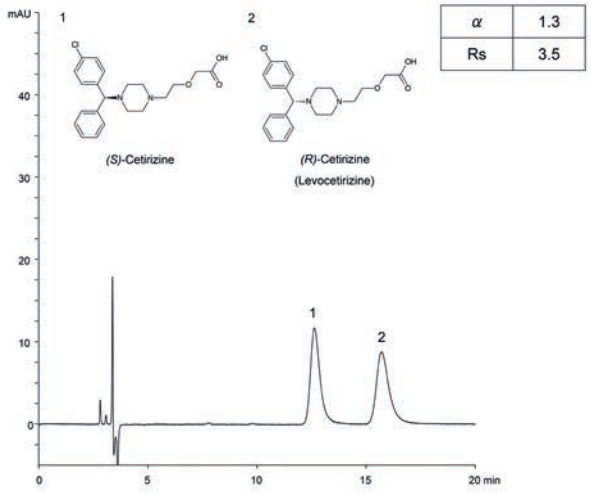
α	1.34
Rs	4.93



Column: CHIRAL ART Amylose-SA (5 µm) 250 x 4.6 mm ID
Part No.: KSA99S05-2546WT
Eluent: *n*-hexane / 2-propanol / diethylamine (90/10/0.1)
Flow rate: 0.5 mL/min
Temperature: 25 °C
Detection: UV at 230 nm
Injection: 5 µL (1 mg/mL)

Cetirizine

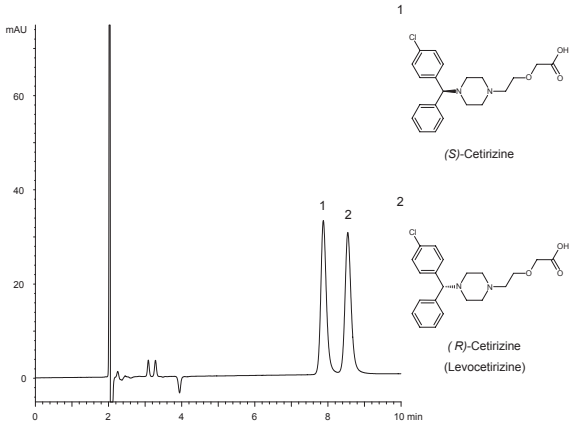
α	1.3
Rs	3.5



Column: CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.: KCN99S05-2546WT
Eluent: *n*-hexane / 2-propanol / formic acid / diethylamine (70/30/0.1/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 230 nm
Injection: 2 µL (200 µg/mL)

Cetirizine

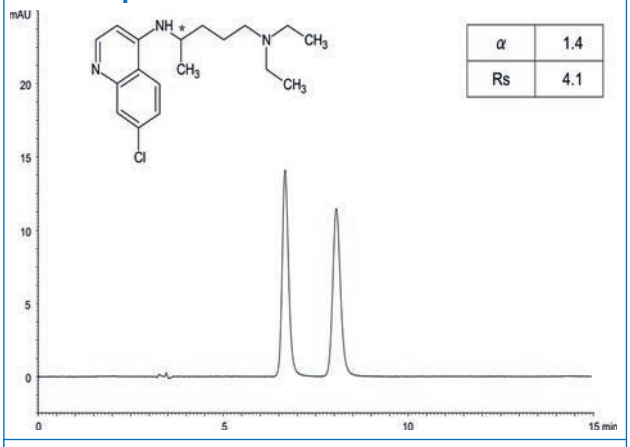
α	1.1
Rs	2.4



Column: CHIRAL ART Cellulose-SB (3 µm) 150 x 4.6 mm ID
Part No.: KSB99S03-1546WT
Eluent: acetonitrile / formic acid / diethylamine (100/0.1/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 230 nm
Injection: 2 µL (200 µg/mL)

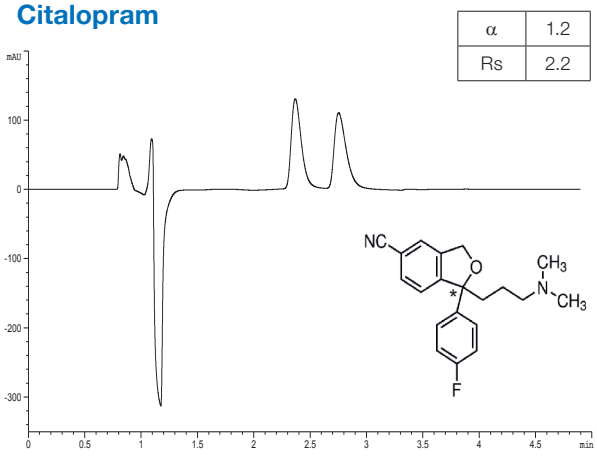
Applications
Pharmaceuticals (APIs)

Chloroquine



Column: CHIRAL ART Amylose-SA (5 µm) 250 x 4.6 mm ID
Part No.: KSA99S05-2546WT
Eluent: methyl *tert*-butyl ether / ethanol / diethylamine (95/5/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 344 nm
Injection: 5 µL (100 µg/mL)

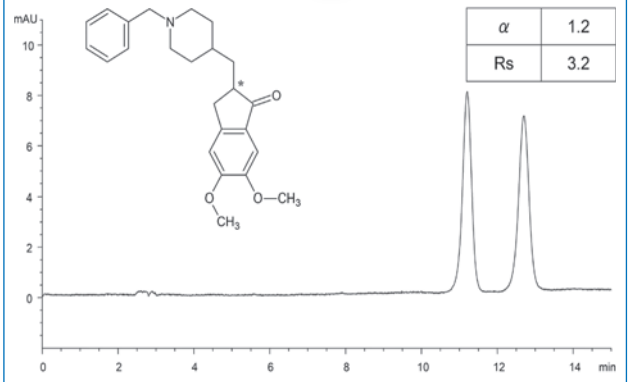
Citalopram



Column: CHIRAL ART Cellulose-C (3µm) 150 x 3.0 mm ID
Part No: KCN99S03-1503WT
Eluent: *n*-hexane / 2-propanol / diethylamine (90/10/0.1)
Flow rate: 1.0 mL/min
Temperature: 10 °C
Detection: UV at 220 nm
Injection: 5 µL (0.5 mg/mL)

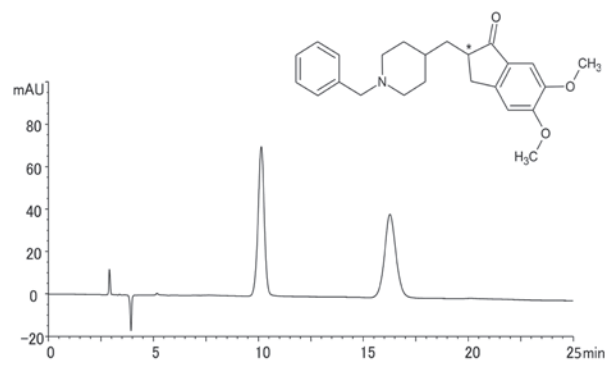
RP-Mode

Donepezil



Column: CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.: KSB99S05-2546WT
Eluent: 20 mM NH_4HCO_3-diethylamine (pH 9.0) / acetonitrile (40/60)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 254 nm
Injection: 2 µL (200 µg/mL)

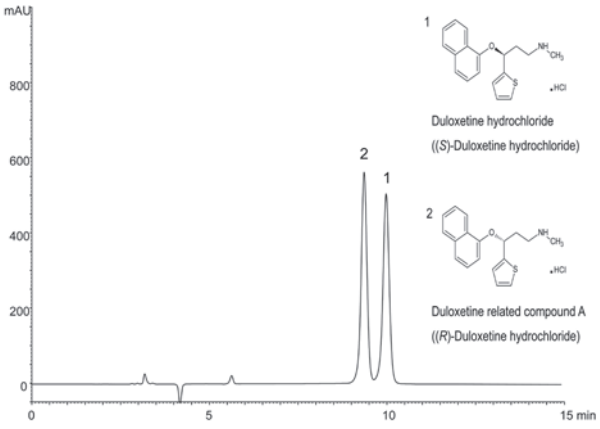
Donepezil



Column: CHIRAL ART Amylose-SA (5 µm) 250 x 4.6 mm ID
Part No.: KSA99S05-2546WT
Eluent: *n*-hexane / 2-propanol / diethylamine (80/20/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 230 nm
Injection: 2 µL (200 µg/mL)

Applications
Pharmaceuticals (APIs)

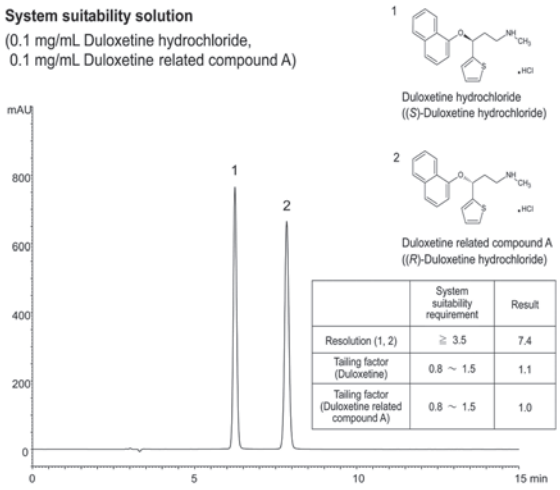
Duloxetine hydrochloride



Column: CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.: KAN99S05-2546WT
Eluent: *n*-hexane / ethanol / diethylamine (95/5/0.2)
Flow rate: 1.0 mL/min
Temperature: 30 °C
Detection: UV at 230 nm
Injection: 10 µL (0.1 mg/mL)

Duloxetine hydrochloride

System suitability solution
(0.1 mg/mL Duloxetine hydrochloride,
0.1 mg/mL Duloxetine related compound A)

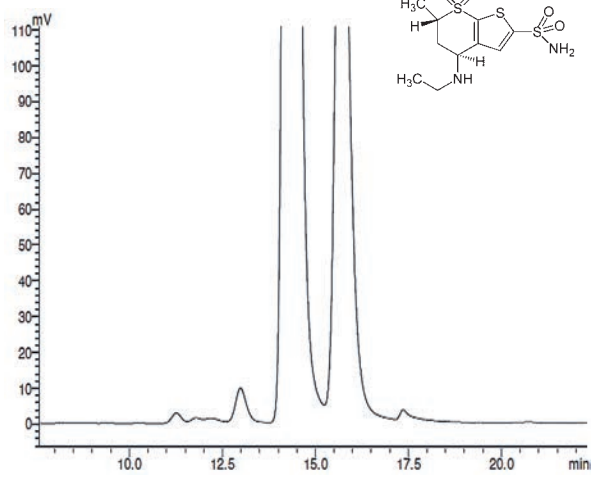


	System suitability requirement	Result
Resolution (1, 2)	≧ 3.5	7.4
Tailing factor (Duloxetine)	0.8 ~ 1.5	1.1
Tailing factor (Duloxetine related compound A)	0.8 ~ 1.5	1.0

Column: CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.: KCN99S05-2546WT
Eluent: *n*-hexane / ethanol / diethylamine (83/17/0.2)
Flow rate: 1.0 mL/min
Temperature: 40 °C
Detection: UV at 230 nm
Injection: 10 µL

(The United States Pharmacopeia 37th; Limit of Duloxetine related compound A)

Dorzolamide

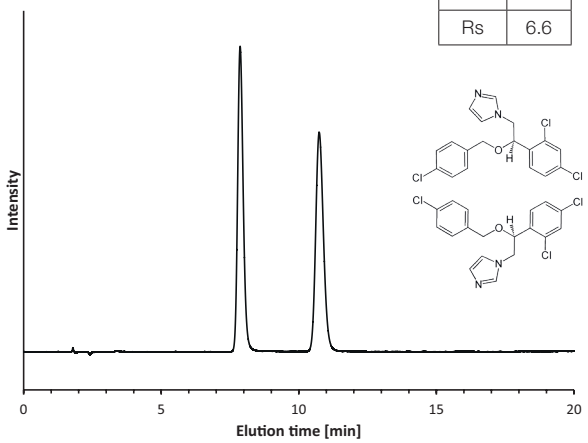


Column: CHIRAL ART Cellulose-SC (5 µm) 250 x 4.6 mm ID
Part No.: KSC99S05-2546WT
Eluent: *n*-hexane / ethanol / diethylamine (80/20/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 254 nm
Injection: 20 µL (0.25 mg/mL)

Econazole

Using CHIRAL ART Cellulose-SZ

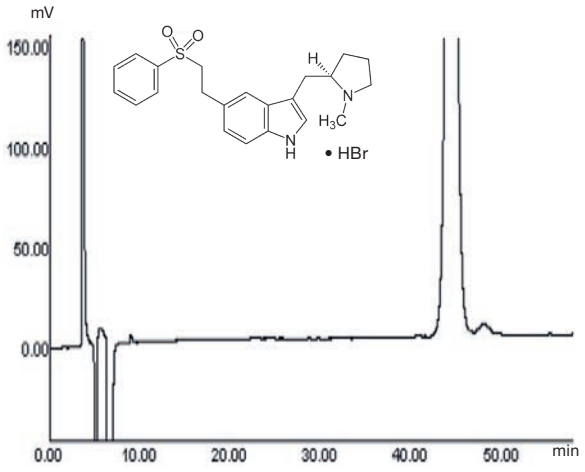
α	1.47
Rs	6.6



Column: CHIRAL ART Cellulose-SZ (5 µm) 150 x 4.6 mm ID
Part No.: KSZ99S05-1546WT
Eluent: *n*-hexane / 2-propanol / diethylamine (80/20/0.1)
Flow rate: 1 mL/min
Temperature: 25 °C
Detection: UV at 230 nm
Injection: 5 µL (1 mg/mL in eluent)

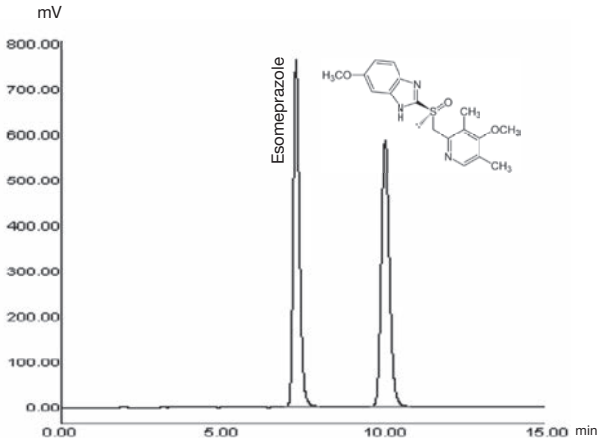
Applications
Pharmaceuticals (APIs)

Eletriptan hydrobromide



Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	*n*-hexane / ethanol / trifluoroacetic acid / diethylamine (85/15/0.5/0.5)
Flow rate:	0.8 mL/min
Temperature:	10 °C
Detection:	UV at 223 nm
Injection:	20 µL (0.2 mg/mL)

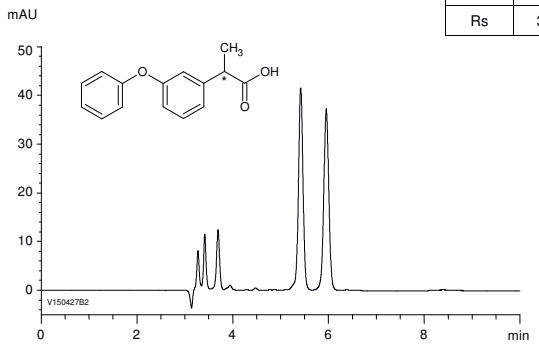
Esomeprazole



Column:	CHIRAL ART Cellulose-SC (5 µm) 250 x 4.6 mm ID
Part No.:	KSC99S05-2546WT
Eluent:	*n*-hexane / ethanol / diethylamine (60/40/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 302 nm
Injection:	20 µL (0.3 mg/mL)

Fenoprofen

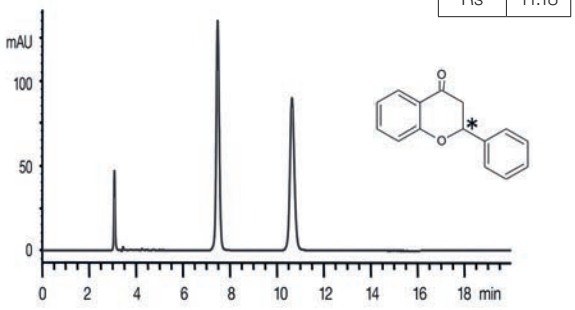
α	1.2
Rs	3.0



Column:	CHIRAL ART Cellulose-SC (5 µm) 250 x 4.6 mm ID
Part No.:	KSC99S05-2546WT
Eluent:	*n*-hexane / 2-propanol / TFA (90/10/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 254 nm
Injection:	10 µL (0.1 mg/mL)

Flavanone

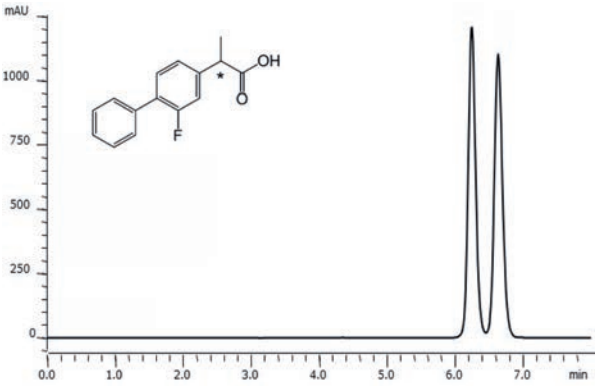
α	1.36
Rs	11.18



Column:	CHIRAL ART Amylose-SA (5 µm) 250 x 4.6 mm ID
Part No.:	KSA99S05-2546WT
Eluent:	*n*-hexane / 2-propanol / diethylamine (90/10/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 254 nm
Injection:	10 µL (0.1 mg/mL)

Applications
Pharmaceuticals (APIs)

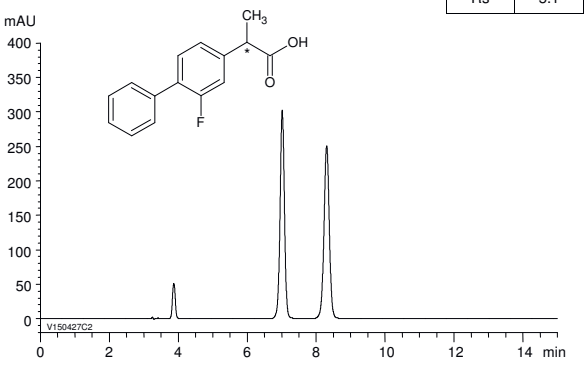
Flurbiprofen



Column:	CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KCN99S05-2546WT
Eluent:	*n*-hexane / 2-propanol / TFA (95/5/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 254 nm
Injection:	5 µL (1 mg/mL)

Flurbiprofen

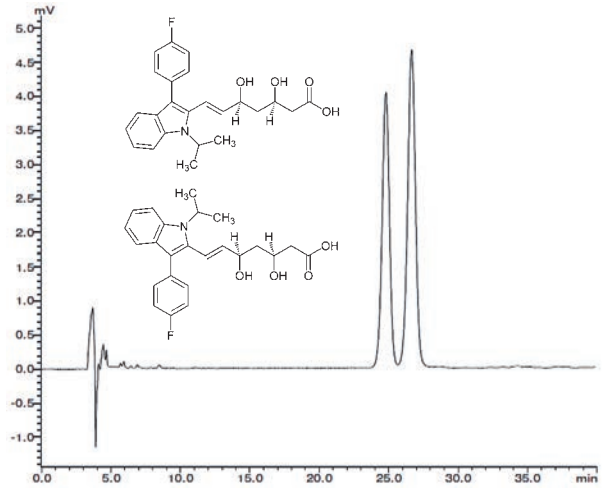
α	1.3
Rs	5.1



Column:	CHIRAL ART Amylose-SA (5 µm) 250 x 4.6 mm ID
Part No.:	KCA99S05-2546WT
Eluent:	*n*-hexane / 2-propanol / TFA (95/5/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 254 nm
Injection:	10 µL (0.1 mg/mL)

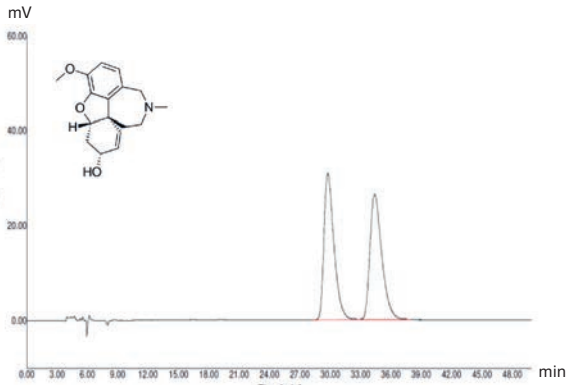
RP-Mode

Fluvastatin



Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	water / acetonitrile / formic acid (65/35/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 300 nm
Injection:	20 µL (5 mg/mL)

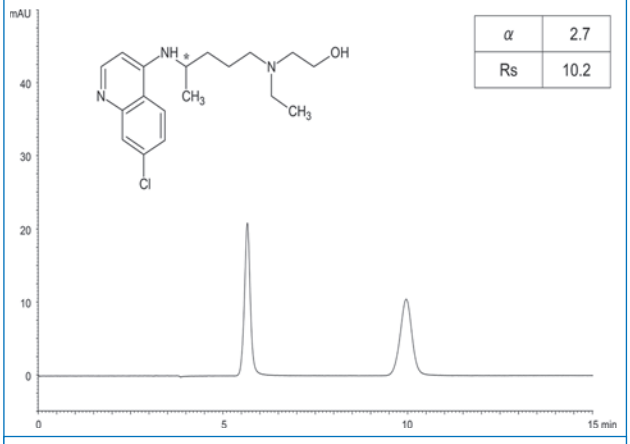
Galantamine



Column:	CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KAN99S05-2546WT
Eluent:	*n*-hexane / 2-propanol / propionic acid / diethylamine (90/9/1/0.2)
Flow rate:	0.8 mL/min
Temperature:	15 °C
Detection:	UV at 289 nm
Injection:	20 µL (0.5 mg/mL in ethanol)

Applications
Pharmaceuticals (APIs)

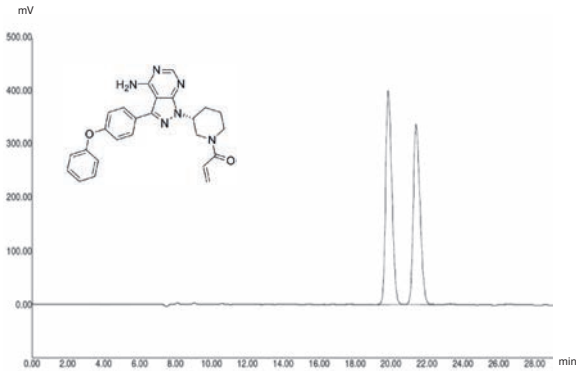
Hydroxychloroquine



α	2.7
Rs	10.2

Column: CHIRAL ART Amylose-SA (5 µm) 250 x 4.6 mm ID
Part No.: KSA99S05-2546WT
Eluent: methyl *tert*-butyl ether / ethanol / diethylamine (90/10/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 344 nm
Injection: 5 µL (100 µg/mL)

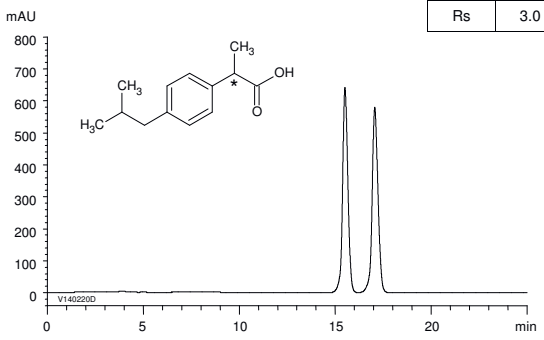
Ibrutinib



Column: CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.: KCN99S05-2546WT
Eluent: *n*-hexane / 2-propanol (98/2)
Flow rate: 0.5 mL/min
Temperature: 15 °C
Detection: UV at 210 nm
Injection: 20 µL (0.5 mg/mL)

Ibuprofen

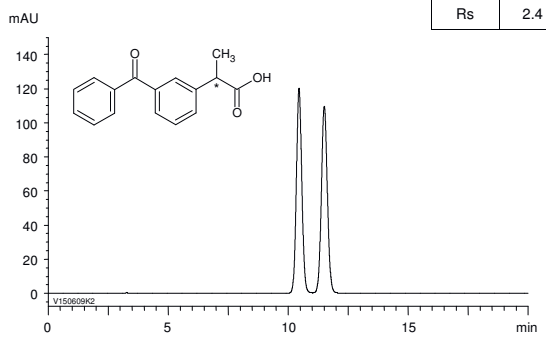
α	1.1
Rs	3.0



Column: CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.: KSB99S05-2546WT
Eluent: *n*-hexane / 2-propanol / TFA (99/1/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 10 µL (1 mg/mL)

Ketoprofen

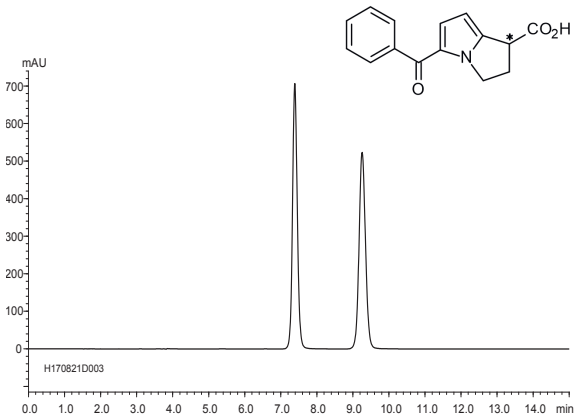
α	1.1
Rs	2.4



Column: CHIRAL ART Cellulose-SC (5 µm) 250 x 4.6 mm ID
Part No.: KSC99S05-2546WT
Eluent: *n*-hexane / 2-propanol / TFA (90/10/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 254 nm
Injection: 10 µL (0.1 mg/mL)

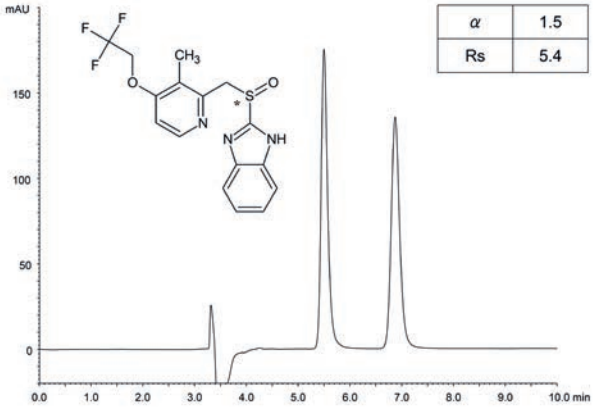
Applications
Pharmaceuticals (APIs)

Ketorolac



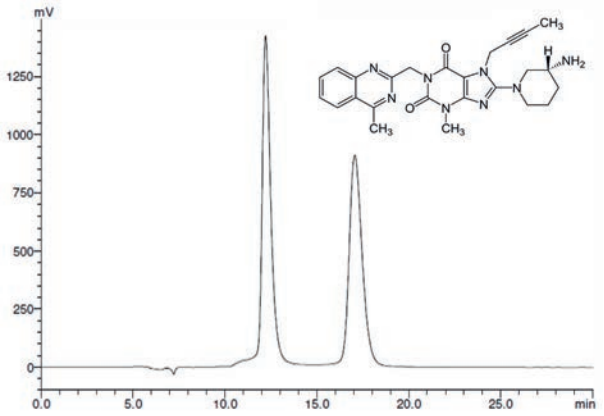
Column: CHIRAL ART Cellulose-SJ (5 µm) 250 x 4.6 mm ID
Part No.: KSJ99S05-2546WT
Eluent: *n*-hexane / tetrahydrofuran / TFA (70/30/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C

Lansoprazole



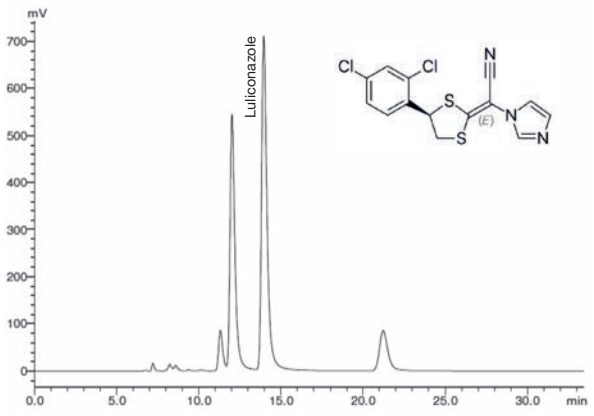
Column: CHIRAL ART Amylose-SA (5 µm) 250 x 4.6 mm ID
Part No.: KSA99S05-2546WT
Eluent: ethyl acetate / ethanol / diethylamine (95/5/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 290 nm
Injection: 10 µL (100 µg/mL)

Linagliptin



Column: CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.: KAN99S05-2546WT
Eluent: ethanol / methanol / diethylamine (90/10/0.1)
Flow rate: 0.5 mL/min
Temperature: 30 °C
Detection: UV at 225 nm
Injection: 20 µL (0.2 mg/mL)

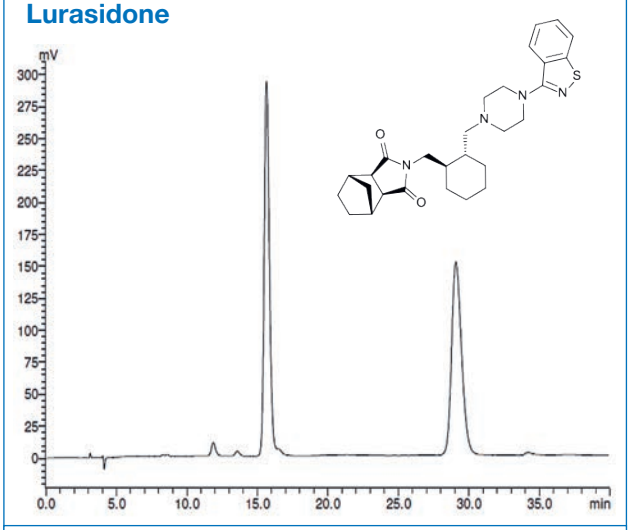
Luliconazole



Column: CHIRAL ART Amylose-SA (5 µm) 250 x 4.6 mm ID
Part No.: KSA99S05-2546WT
Eluent: methyl *tert*-butyl ether/2-propanol/diethylamine (80/20/0.1)
Flow rate: 0.5 mL/min
Temperature: 25 °C
Detection: UV at 295 nm
Injection: 20 µL (0.1 mg/mL)

Applications
Pharmaceuticals (APIs)

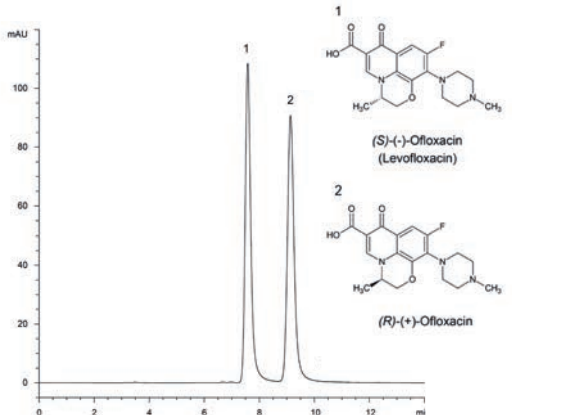
Lurasidone



Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	*n*-hexane / 2-propanol / diethylamine (90/10/0.2)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 230 nm
Injection:	20 µL (0.5 mg/mL)

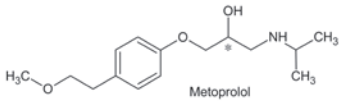
Ofloxacin (Levofloxacin)

α	1.3
Rs	4.0

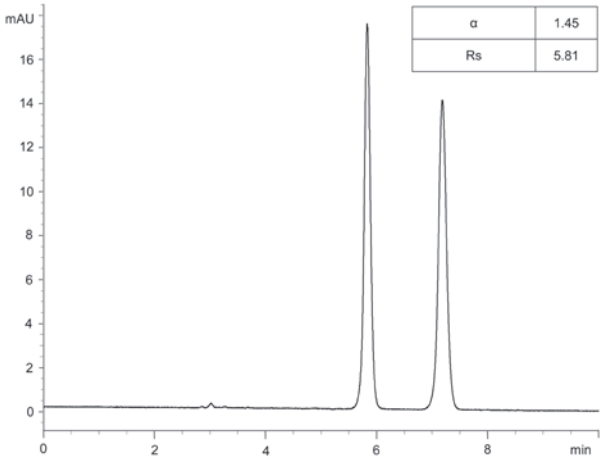


Column:	CHIRAL ART Cellulose-SC (5 µm) 250 x 4.6 mm ID
Part No.:	KSC99S05-2546WT
Eluent:	*tert*-butyl methyl ether / ethanol / acetic acid / ethylenediamine (50/50/0.1/0.1)
Flow rate:	1.0 mL/min
Temperature:	40 °C
Detection:	UV at 300 nm

Metoprolol

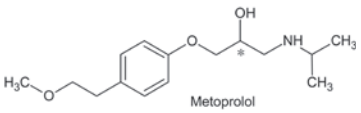


α	1.45
Rs	5.81

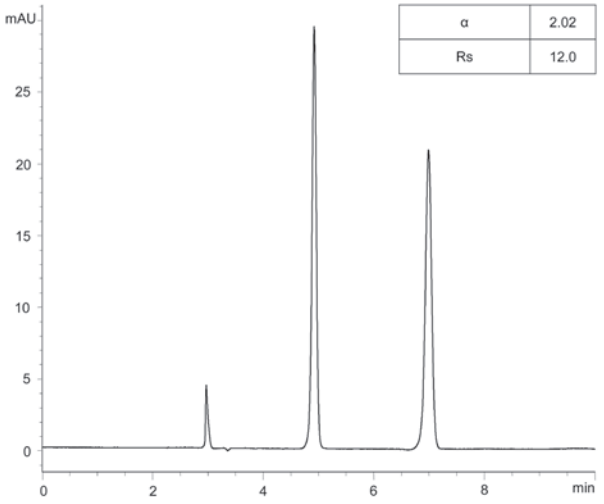


Column:	CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KAN99S05-2546WT
Eluent:	*n*-hexane / ethanol / ethanolamine (80/20/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 254 nm
Injection:	5 µL (1 mg/mL)

Metoprolol



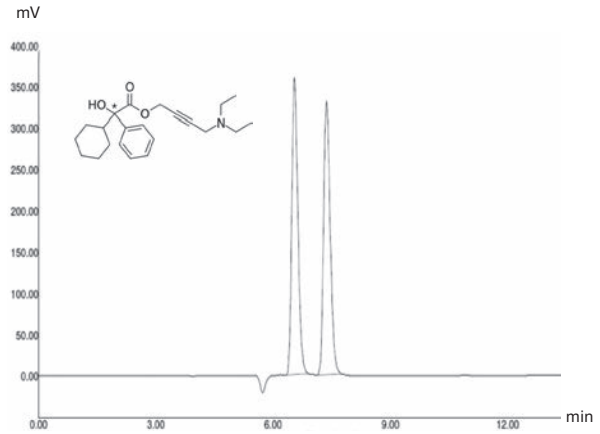
α	2.02
Rs	12.0



Column:	CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KCN99S05-2546WT
Eluent:	*n*-hexane / ethanol / ethanolamine (90/10/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 254 nm
Injection:	5 µL (1 mg/mL)

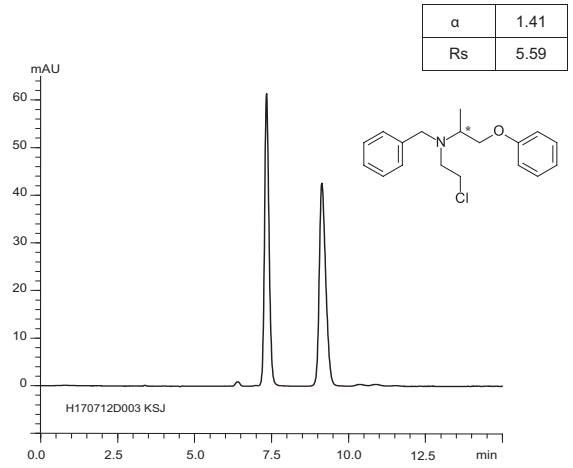
Applications
Pharmaceuticals (APIs)

Oxybutynin



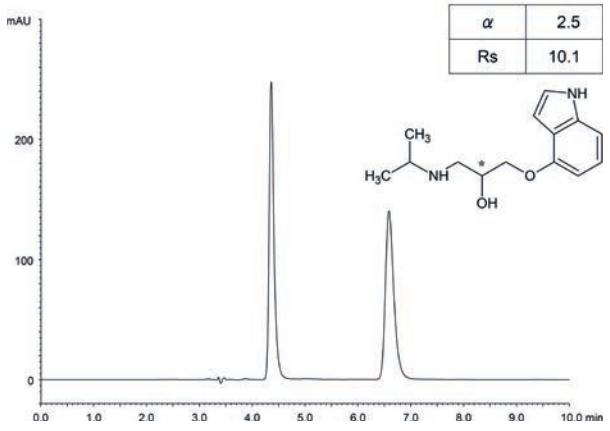
Column:	CHIRAL ART Amylose-SA (5 µm) 250 x 4.6 mm ID
Part No.:	KSA99S05-2546WT
Eluent:	*n*-hexane / 2-propanol / diethylamine (90/10/0.1)
Flow rate:	0.8 mL/min
Temperature:	25 °C
Detection:	UV at 220 nm
Injection:	20 µL (0.5 mg/mL)

Phenoxybenzamine



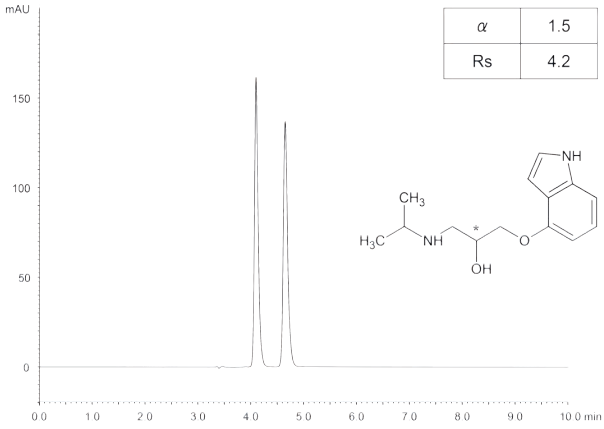
Column:	CHIRAL ART Cellulose-SJ (5 µm) 250 x 4.6 mm ID
Eluent:	*n*-hexane / ethanol / diethylamine (95/5/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 270 nm
Injection:	5 µL (1 mg/mL)

Pindolol



Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	*n*-hexane / ethanol / diethylamine (40/60/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 265 nm
Injection:	10 µL (100 µg/mL)

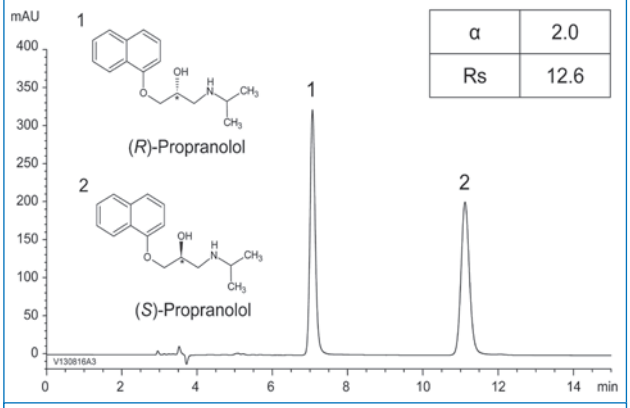
Pindolol



Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	methanol / diethylamine (100/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 265 nm
Injection:	10 µL (100 µg/mL)

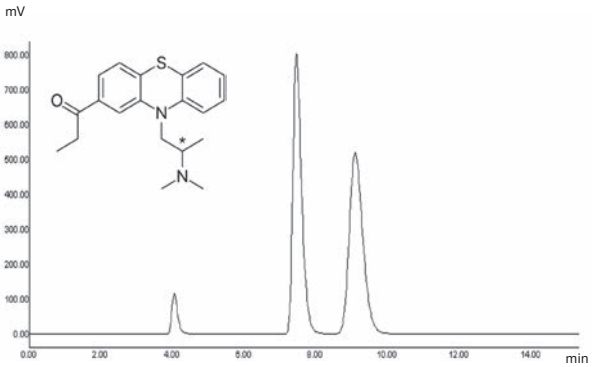
Applications
Pharmaceuticals (APIs)

Propranolol



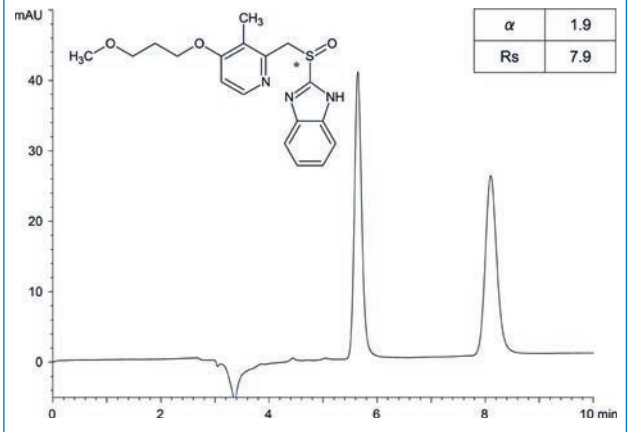
Column: CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.: KCN99S05-2546WT
Eluent: *n*-hexane / 2-propanol / diethylamine (80/20/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 230 nm
Injection: 10 µL (0.1 mg/mL)

Propiomazine



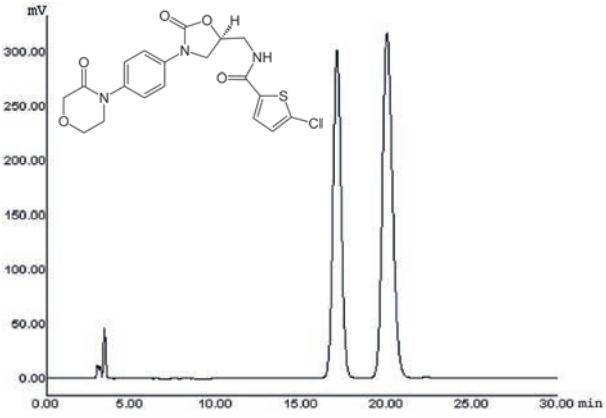
Column: CHIRAL ART Amylose-C 5 µm (250 x 4.6 mm ID)
Part No.: KAN99S05-2546WT
Eluent: methanol / diethylamine (100/0.1)
Flow rate: 0.7 mL/min
Temperature: 25 °C
Detection: UV at 254 nm
Injection: 20 µL (0.5 mg/mL)

Rabeprazole



Column: CHIRAL ART Cellulose-SC (5 µm) 250 x 4.6 mm ID
Part No.: KSC99S05-2546WT
Eluent: ethyl acetate / 2-propanol / diethylamine (95/5/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 290 nm
Injection: 5 µL (100 µg/mL)

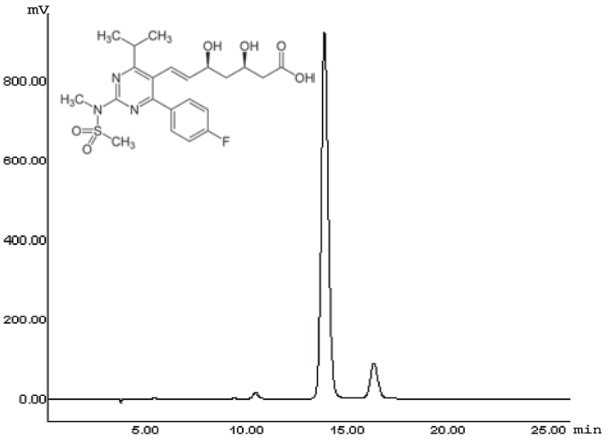
Rivaroxaban



Column: CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.: KSB99S05-2546WT
Eluent: *n*-hexane / ethanol / trifluoroacetic acid (50/50/0.1)
Flow rate: 1.0 mL/min
Temperature: 35 °C
Detection: UV at 250 nm
Injection: 20 µL (0.5 mg/mL)

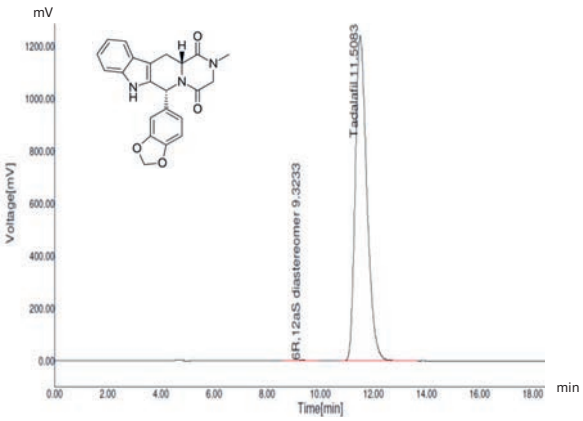
Applications
Pharmaceuticals (APIs)

Rosuvastatin



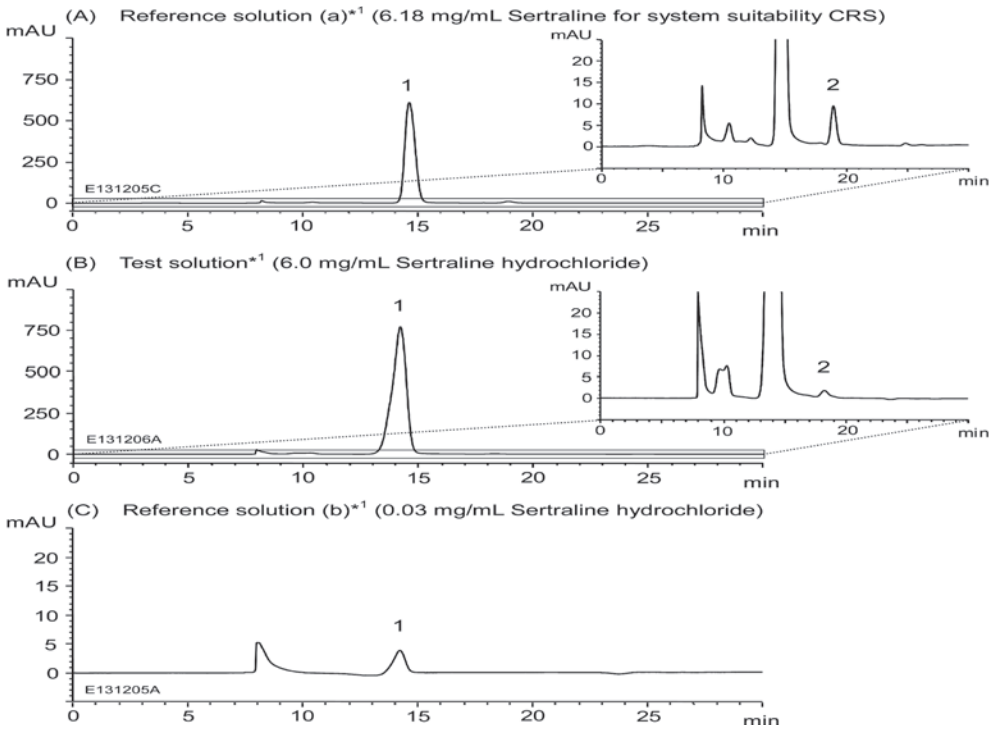
Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	*n*-hexane / ethanol / trifluoroacetic acid (85/15/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 242 nm
Injection:	20 µL (0.5 mg/mL)

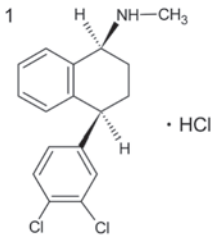
Tadalafil



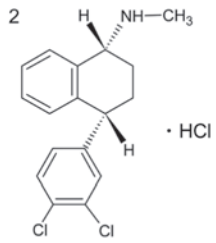
Column:	CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KAN99S05-2546WT
Eluent:	*n*-hexane / 2-propanol (50/50)
Flow rate:	0.75 mL/min
Temperature:	30 °C
Detection:	UV at 222 nm
Injection:	10 µL (0.5 mg/mL in *n*-hexane/2-propanol/acetonitrile (40/40/20))

Sertraline hydrochloride (The European Pharmacopeia)





Sertraline hydrochloride



Sertraline hydrochloride (enantiomer)

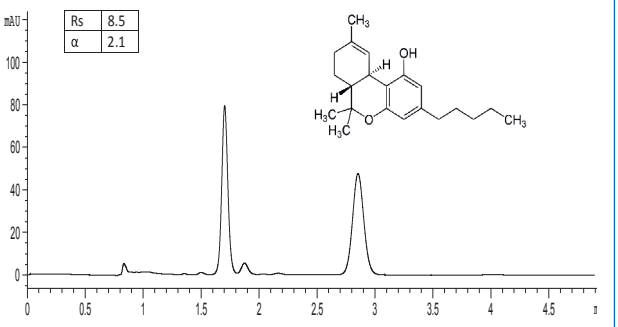
*1 Test solution and Reference solution were prepared from Sertraline hydrochloride supplied as a reagent for laboratory use.

Column:	CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KAN99S05-2546WT
Eluent:	mixture*2 / *n*-hexane (70/30)
	*2 *n*-hexane / 2-propanol / diethylamine (75/25/1)
Flow rate:	0.4 mL/min
Temperature:	25 °C
Detection:	UV at 275 nm
Injection:	20 µL

(The draft for The European Pharmacopeia, Enantiomeric purity)

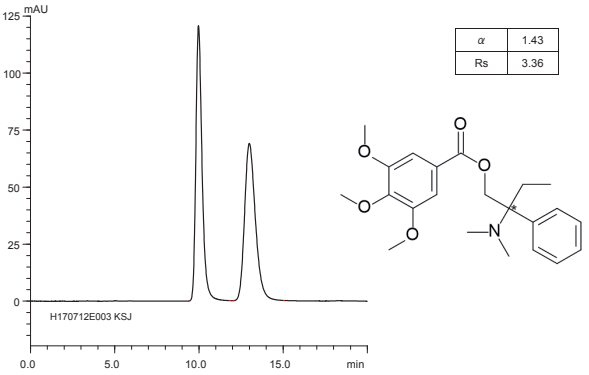
Applications
Pharmaceuticals (APIs)

Tetrahydrocannabinol



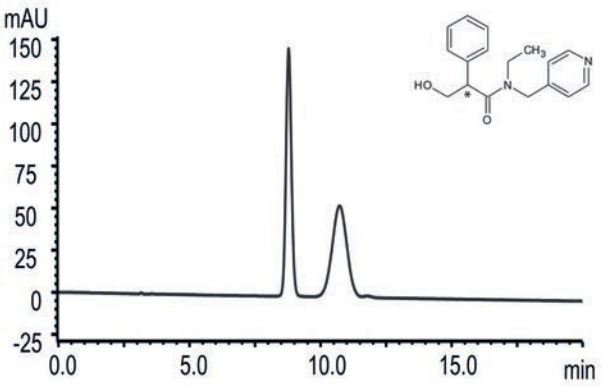
Column: CHIRAL ART Amylose-C (3 µm) 150 x 3.0 mm ID
Part No.: KAN99S03-1503WT
Eluent: *n*-heptane / 2-propanol (92/8)
Flow rate: 1.0 mL/min
Temperature: 40 °C
Detection: UV at 228 nm
Injection: 10 µL (50 µg/mL)

Trimebutine



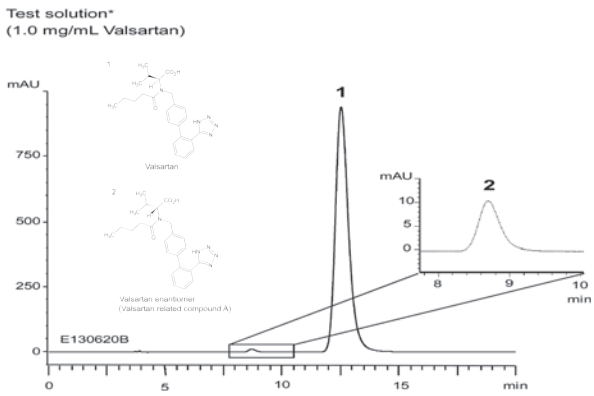
Column: CHIRAL ART Cellulose-SJ (5 µm) 250 x 4.6 mm ID
Part No.: KSJ99S05-2546WT
Eluent: *n*-hexane / ethanol / diethylamine (95/5/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 265 nm
Injection: 5 µL (1 mg/mL)

Tropicamide



Column: CHIRAL ART Cellulose-SC (5 µm) 250 x 4.6 mm ID
Part No.: KSC99S05-2546WT
Eluent: *n*-hexane / ethanol / diethylamine (55/45/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 254 nm
Injection: 10 µL (1 mg/mL)

Valsartan (The United States Pharmacopeia)

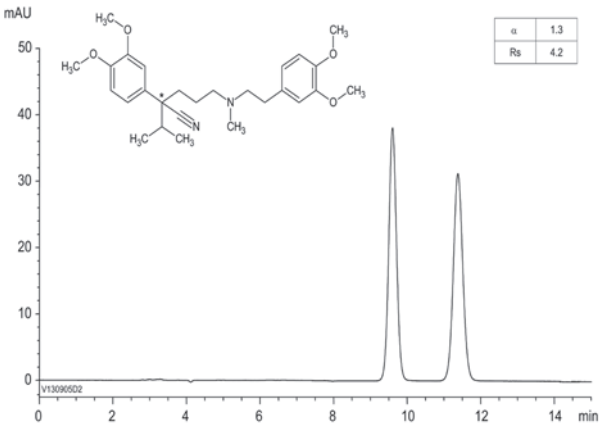


* Test solution was prepared from Valsartan supplied as a reagent for laboratory use.

Column: CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.: KCN99S05-2546WT
Eluent: *n*-hexane / 2-propanol / trifluoroacetic acid (85/15/0.1)
Flow rate: 0.8 mL/min
Temperature: 25 °C
Detection: UV at 230 nm
Injection: 10 µL
(The United States Pharmacopeia 34th, Related compounds)

Applications
Pharmaceuticals (APIs)

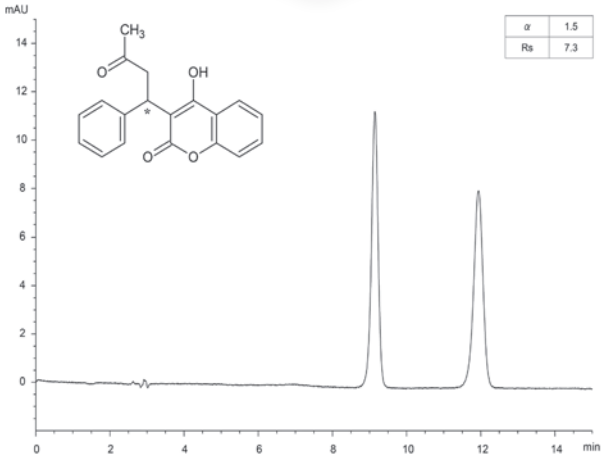
Verapamil



Column:	CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KAN99S05-2546WT
Eluent:	*n*-hexane / 2-propanol / diethylamine (90/10/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 254 nm
Injection:	10 µL (1 mg/mL)

RP-Mode

Warfarin

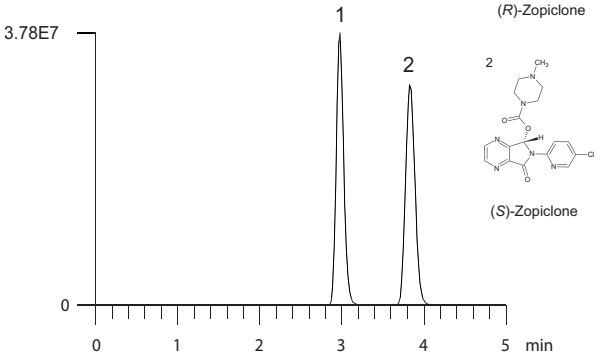


Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	20 mM phosphoric acid / acetonitrile (50/50)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 254 nm
Injection:	2 µL (200 µg/mL)

LC-MS

Zopiclone

Analysis of zopiclone in human hair by chiral LC/HRMS



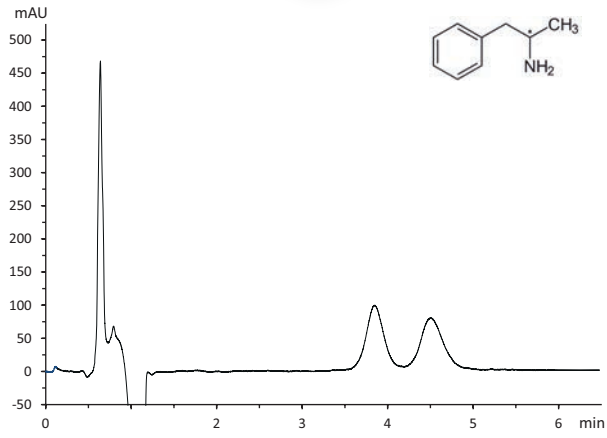
(*R*)-Zopiclone

(*S*)-Zopiclone

Column:	CHIRAL ART Cellulose-SC (3 µm) 150 x 2.0 mm ID
Part No.:	KSC99S03-1502WT
Eluent:	10 mM ammonium bicarbonate (pH 8.0 with aqueous ammonia) / acetonitrile (25/75)
Flow rate:	0.2 mL/min
Temperature:	25 °C
Detection:	ESI, positive
Injection:	10 µL (Hair sample extracted by micropulverized extraction)
Instrument:	LC - UltimateTM 3000 liquid chromatograph (Thermo Fisher Scientific) HRMS - Q ExactiveTM mass spectrometer (Thermo Fisher Scientific)

RP-Mode

Amphetamine

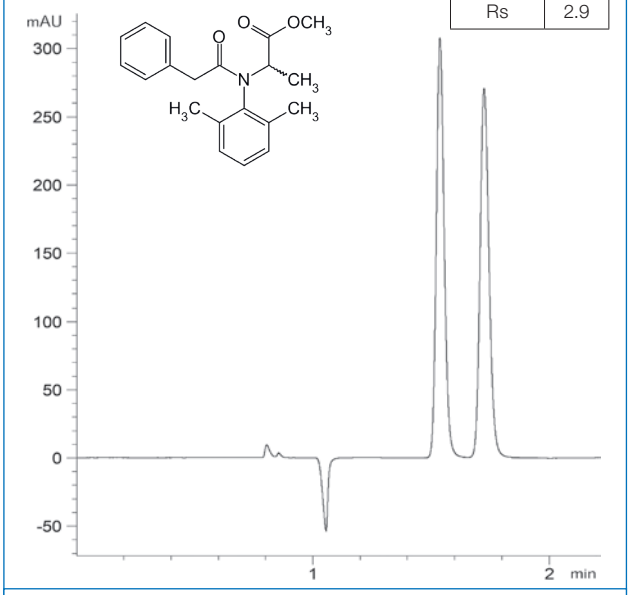


Column:	CHIRAL ART Amylose-SA (3 µm) 50 x 4.6 mm ID
Part No.:	KSA99S03-0546WT
Eluent:	Water + 0.1 % diethylamine / Methanol + 0.1 % diethylamine (55/45)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 210 nm
Injection:	10 µL

Applications
Pesticides

Benalaxyl

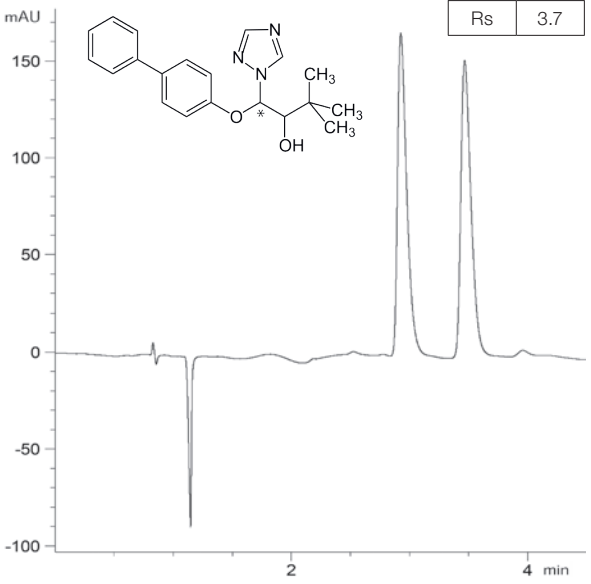
α	1.2
Rs	2.9



Column: CHIRAL ART Cellulose-C (3 µm) 150 x 3.0 mm ID
Part No.: KCN99S03-1503WT
Eluent: *n*-hexane / 2-propanol / diethylamine (80/20/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 2 µL (1 mg/mL)

Bitertanol

α	1.2
Rs	3.7

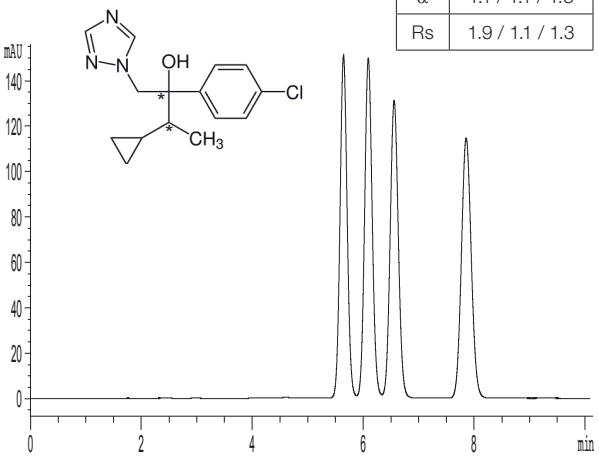


Column: CHIRAL ART Cellulose-C (3 µm) 150 x 3.0 mm ID
Part No.: KCN99S03-1503WT
Eluent: *n*-hexane / 2-propanol / diethylamine (95/5/0.1)
Flow rate: 1.0 mL/min
Temperature: 40 °C
Detection: UV at 220 nm
Injection: 5 µL (1.25 mg/mL)

RP-Mode

Cyproconazole

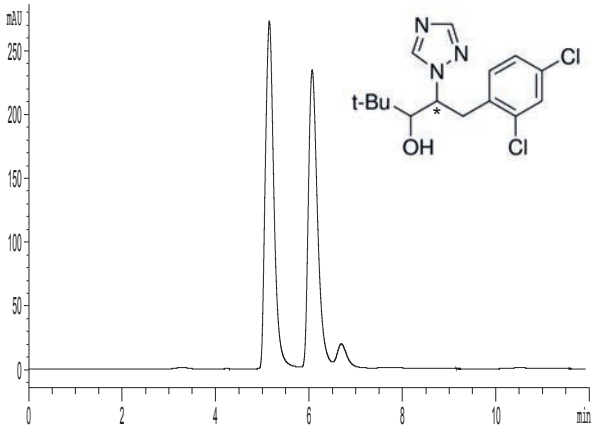
α	1.1 / 1.1 / 1.3
Rs	1.9 / 1.1 / 1.3



Column: CHIRAL ART Cellulose-SC (5 µm) 250 x 4.6 mm ID
Part No.: KSC99S05-2546WT
Eluent: water / acetonitrile (48/52)
Flow rate: 1.2 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 10 µL (1 mg/mL)

Diclobutrazole

α	1.3
Rs	2.7

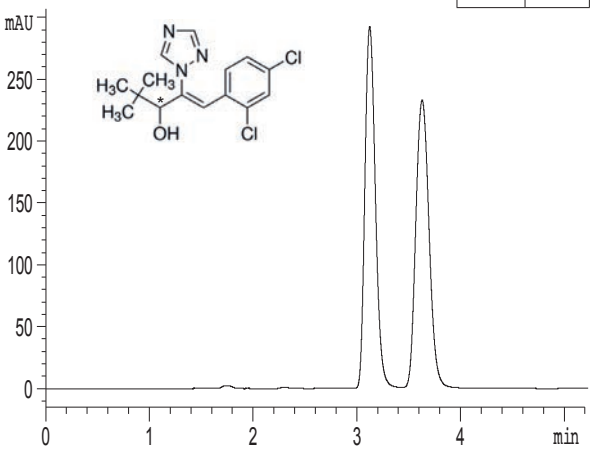


Column: CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.: KSB99S05-2546WT
Eluent: *n*-hexane / 2-propanol / diethylamine (95/5/0.1)
Flow rate: 0.7 mL/min
Temperature: 10 °C
Detection: UV at 220 nm
Injection: 10 µL (1 mg/mL)

Applications
Pesticides

Diniconazole

α	1.3
Rs	2.4

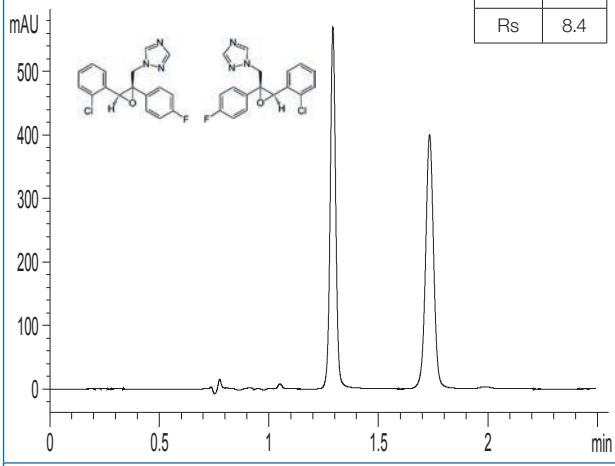


Column: CHIRAL ART Amylose-SA (3 µm) 150 x 3.0 mm ID
Part No.: KSA99S03-1503WT
Eluent: *n*-hexane / ethanol (90/10)
Flow rate: 0.5 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 2 µL (1 mg/mL)

RP-Mode

Epoxiconazole

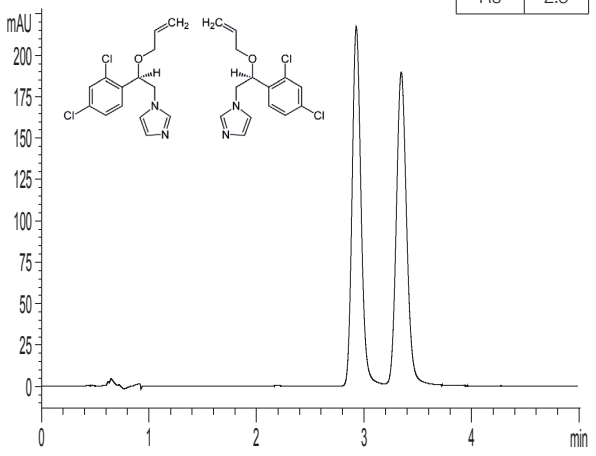
α	1.3
Rs	8.4



Column: CHIRAL ART Cellulose-SB (3 µm) 150 x 3.0 mm ID
Part No.: KSB99S03-1503WT
Eluent: 20mM NH_4HCO_3 / acetonitrile / diethylamine (30/70/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 1 µL (1 mg/mL)

Enilconazole

α	1.2
Rs	2.6

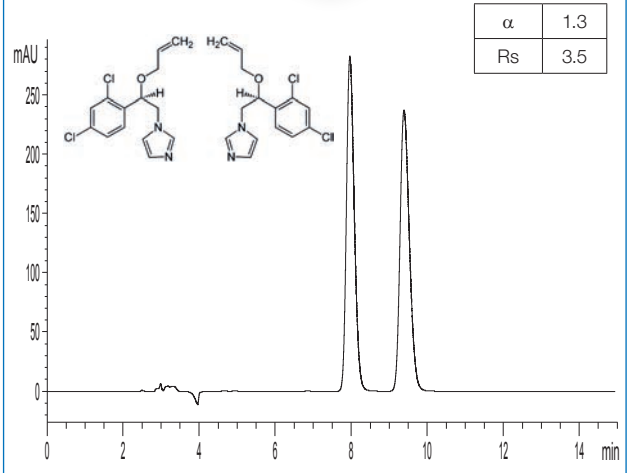


Column: CHIRAL ART Cellulose-SC (3 µm) 50 x 4.6 mm ID
Part No.: KSC99S03-0546WT
Eluent: *n*-hexane / ethanol (90 / 10)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 1 µL (1 mg/mL)

RP-Mode

Enilconazole

α	1.3
Rs	3.5



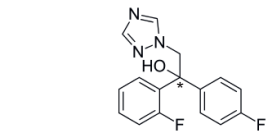
Column: CHIRAL ART Cellulose-SJ (5 µm) 250 x 4.6 mm ID
Part No.: KSJ99S05-2546WT
Eluent: water / methanol / diethylamine (25/75/0.1)
Flow rate: 1.0 mL/min
Temperature: 35 °C
Detection: UV at 220 nm
Injection: 10 µL (1 mg/mL)

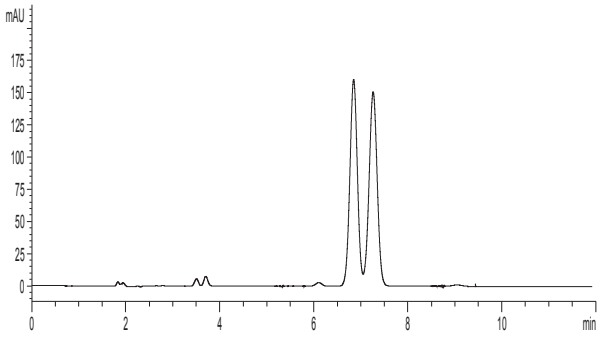
Applications
Pesticides

RP-Mode

Flutriafol

α	1.1
Rs	1.4





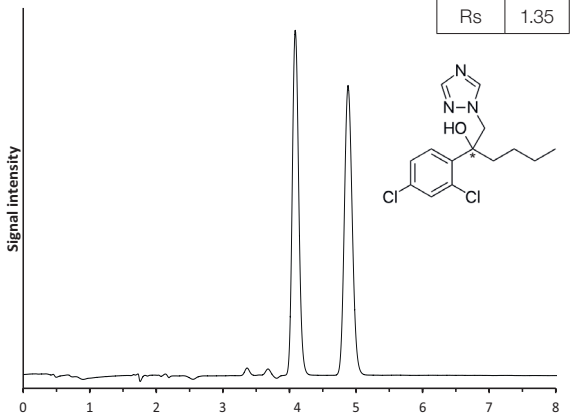
Column: CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.: KSB99S05-2546WT
Eluent: 20 mM NH_4HCO_3 / acetonitrile / diethylamine (60/40/0.1)
Flow rate: 1.5 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 5 µL (1mg/mL)

RP-Mode

Using CHIRAL ART Cellulose-SZ

Hexaconazole

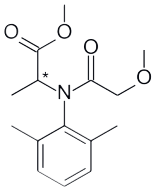
α	4.0
Rs	1.35



Column: CHIRAL ART Cellulose-SZ (5 µm) 150 x 4.6 mm ID
Part No.: KSZ99S05-1546WT
Eluent: 20 mM NH_4HCO_3 / acetonitrile / diethylamine (40/60/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 5 µL (1 mg/mL in 20 mM NH_4HCO_3 / acetonitrile / diethylamine (50/50/0.1))

Metalaxyl

α	1.64
Rs	12.4

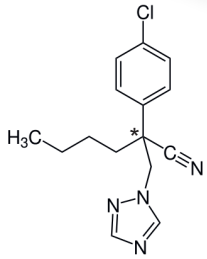


Column: CHIRAL ART Cellulose-SB (5 µm) 250 × 4.6 mm ID
Part No.: KSB99S05-2546WT
Mobile Phase: THF / *n*-hexane (30/70, premixed)
Flow Rate: 1.0 mL/min
Detection: 230 nm
Temperature: 25 °C
Injection: 20 µL (1 mg/mL dissolved in mobile phase)
Sample: Metalaxyl (PESTANAL®, Sigma-Aldrich)

RP-Mode

Myclobutanil

α	1.3
Rs	3.1



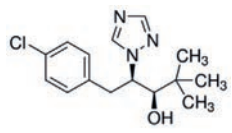
Column: CHIRAL ART Cellulose-SB (3 µm) 50 x 4.6 mm ID
Part No.: KSB99S03-0546WT
Eluent: water / acetonitrile (45 / 55)
Flow rate: 1.0 mL/min
Temperature: 30 °C
Detection: UV at 220 nm
Injection: 1 µL (1 mg/mL)

Applications
Pesticides

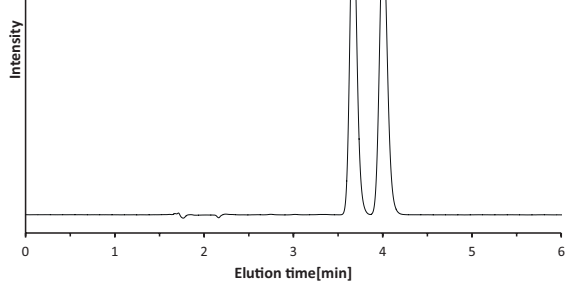
RP-Mode

Using CHIRAL ART Cellulose-SZ

Paclobutrazol

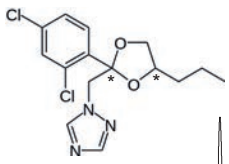


α	1.2
Rs	3.4

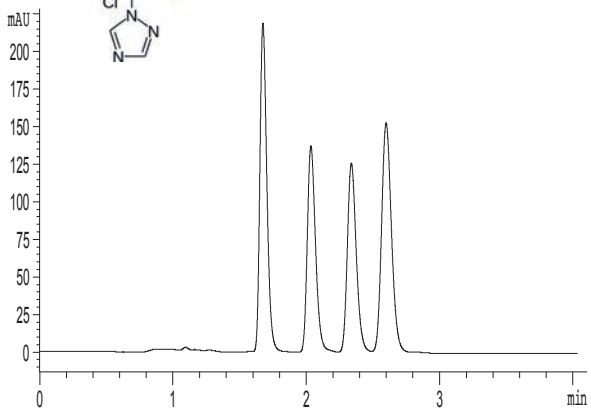


Column: CHIRAL ART Cellulose-SZ (5 µm) 150 x 4.6 mm ID
Part No.: KSZ99S05-1546WT
Eluent: 20 mM NH_4HCO_3 / acetonitrile / diethylamine (50/50/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 5 µl (1 mg/mL in eluent)

Propiconazole



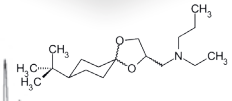
α	1.3 / 1.2 / 1.2
Rs	3.5 / 2.6 / 2.1



Column: CHIRAL ART Cellulose-C (3 µm) 150 x 3.0 mm ID
Part No.: KCN99S03-1503WT
Eluent: *n*-hexane / 2-propanol (75/25)
Flow rate: 1.0 mL/min
Temperature: 10 °C
Detection: UV at 220 nm
Injection: 5 µL (1 mg/mL)

RP-Mode

Spiroxamine

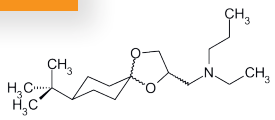


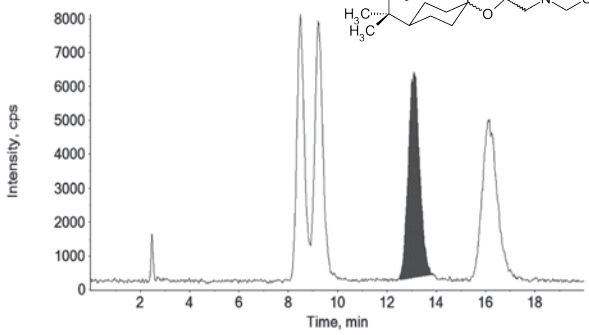
$\alpha_{1,2}$	1.12
$\alpha_{2,3}$	1.59
$\alpha_{3,4}$	1.26
$Rs_{1,2}$	1.1
$Rs_{2,3}$	4.5
$Rs_{3,4}$	2.0

Column: CHIRAL ART Amylose-SA (3 µm) 150 x 3.0 mm ID
Part No.: KSA99S03-1503WT
Eluent: water / ethanol / diethylamine (27.5/72.5/0.1)
Flow rate: 0.25 ml/min
Temperature: 30 °C
Detection: UV at 210 nm
Injection: 10 µL (10 mg/mL)

LC-MS

Spiroxamine





By courtesy of Sven Stuke, Bayer AG, Division Cropscience

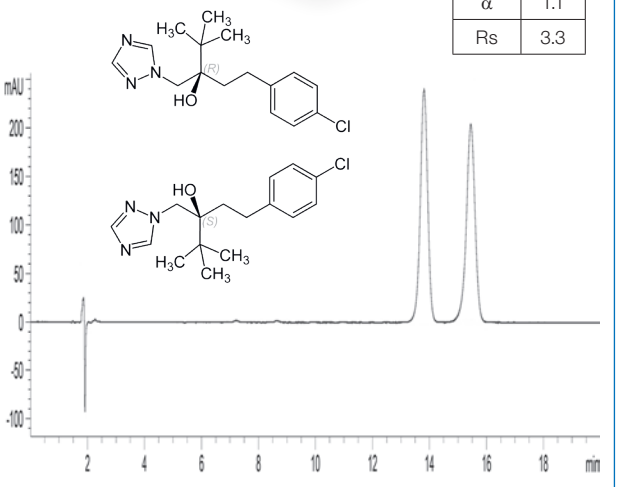
Column: CHIRAL ART Amylose-SA (3 µm) 150 x 3.0 mm ID
Part No.: KSA99S03-1503WT
Eluent: A/B (25/75)
A: water / ethanol +10 mM ammonium carbonate (90/10)
B: water / ethanol +10 mM ammonium carbonate (10/90)
Flow rate: 0.3 ml/min
Temperature: 30 °C
Detection: ESI-MS/MS
Injection: 1 µL (1 µg/L)
post-column make-up via T-peace with 0.3 mL/min 1 % formic acid in water/ methanol 50/50.

Applications
Pesticides

RP-Mode

Tebuconazole

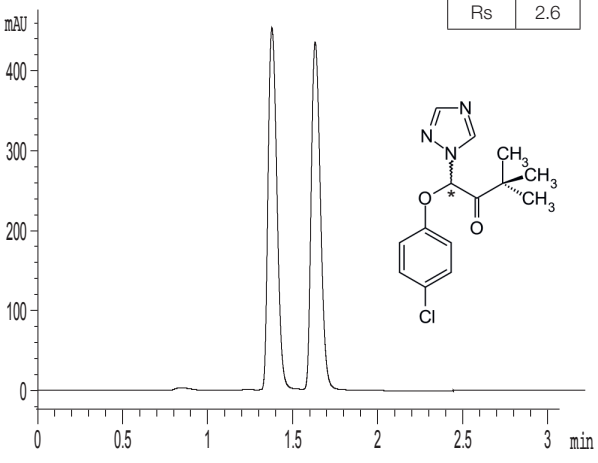
α	1.1
Rs	3.3



Column: CHIRAL ART Cellulose-SC (3 µm) 150 x 3.0 mm ID
Part No.: KSC99S03-1503WT
Eluent: water / acetonitrile / formic acid (60/40/0.1)
Flow rate: 0.43 ml/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 2 µL (1 mg/mL)

Triadimefon

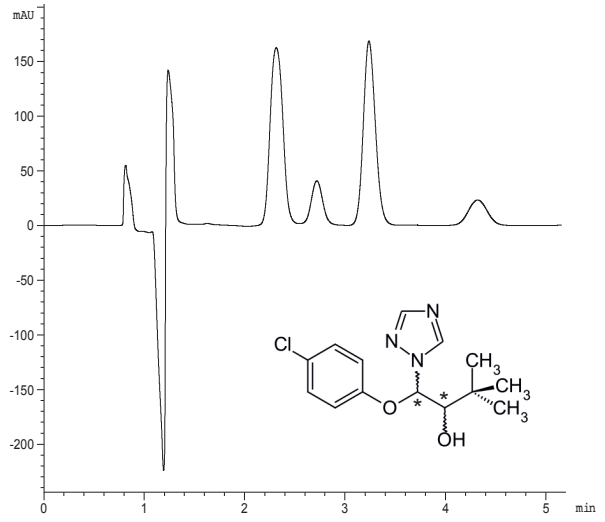
α	1.3
Rs	2.6



Column: CHIRAL ART Cellulose-C (3 µm) 150 x 3.0 mm ID
Part No.: KCN99S03-1503WT
Eluent: *n*-hexane / 2-propanol / diethylamine (95/5/0.1)
Flow rate: 1.0 mL/min
Temperature: 40 °C
Detection: UV at 220 nm
Injection: 5 µL (1.25 mg/mL)

Triadimenol

α	1.2 / 1.3 / 1.4
Rs	1.8 / 2.4 / 3.8

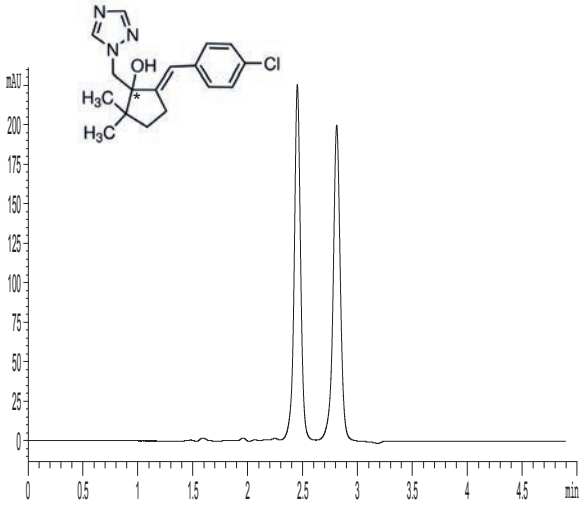


Column: CHIRAL ART Amylose-C (3 µm) 150 x 3.0 mm ID
Part No.: KAN99S03-1503WT
Eluent: *n*-heptane / ethanol / diethylamine (92/8/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 5 µL (1 mg/mL)

RP-Mode

Triticonazole

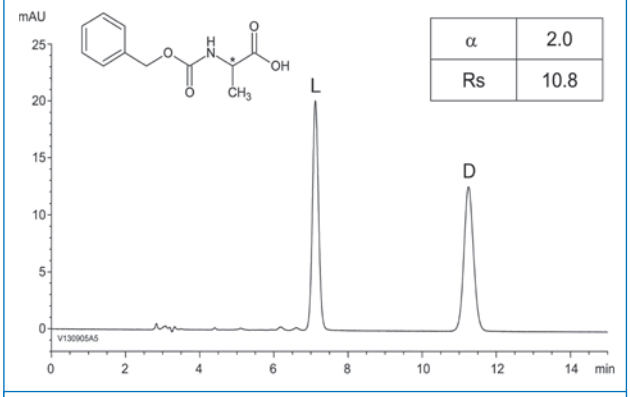
α	1.3
Rs	3.4



Column: CHIRAL ART Cellulose-SB (3 µm) 150 x 3.0 mm ID
Part No.: KSB99S03-1503WT
Eluent: 20 mM NH_4HCO_3 / acetonitrile / diethylamine (70/30/0.1)
Flow rate: 0.5 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 2 µL (1 mg/mL)

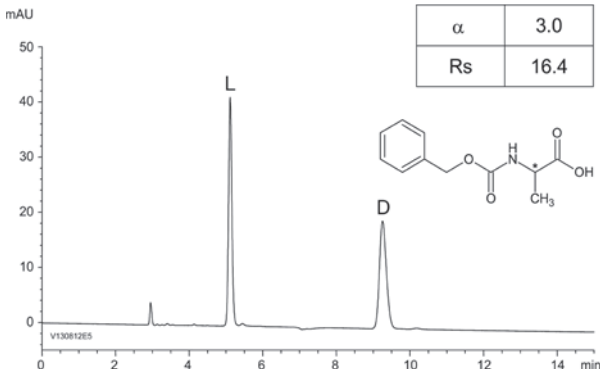
Applications
Amino Acids

N-CBZ-DL-Alanine



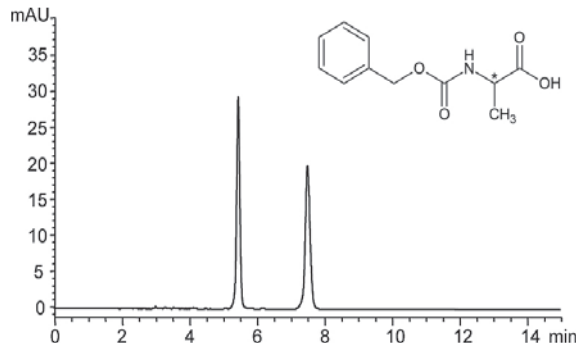
Column:	CHIRAL ART Cellulose-C (3 µm) 150 x 3.0 mm ID
Part No:	KCN99S03-1503WT
Eluent:	*n*-hexane / 2-propanol / diethylamine (90/10/0.1)
Flow rate:	1.0 mL/min
Temperature:	10 °C
Detection:	UV at 220 nm
Injection:	5 µL (0.5 mg/mL)

N-CBZ-DL-Alanine



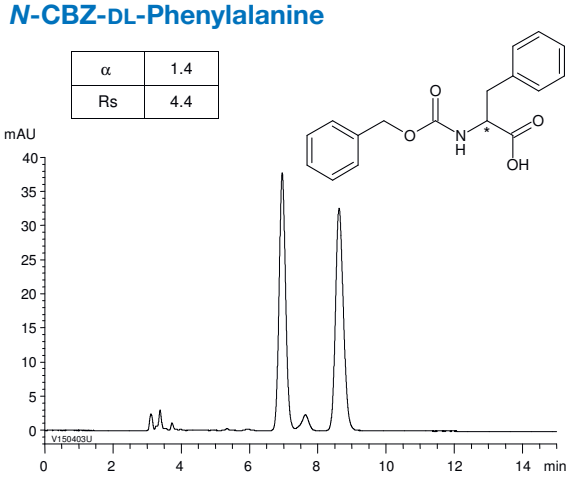
Column:	CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KCN99S05-2546WT
Eluent:	*n*-hexane / 2-propanol / TFA (80/20/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 254 nm
Injection:	10 µL (1 mg/mL)

N-CBZ-DL-Alanine



Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	*n*-hexane / 2-propanol / TFA (80/20/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 254 nm

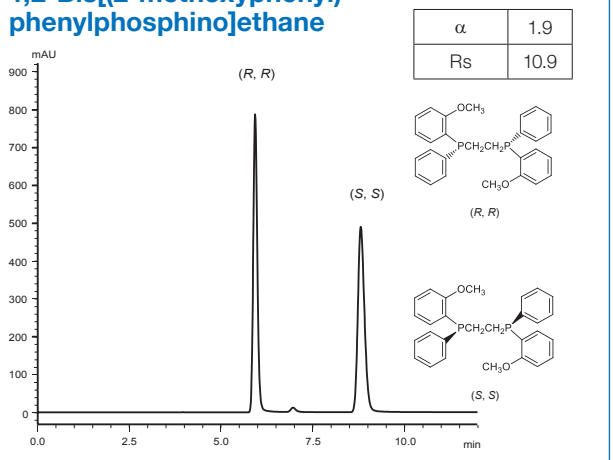
N-CBZ-DL-Phenylalanine



Column:	CHIRAL ART Cellulose-SC (5 µm) 250 x 4.6 mm ID
Part No.:	KSC99S05-2546WT
Eluent:	*n*-hexane / 2-propanol / TFA (80/20/0.1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 254 nm
Injection:	10 µL (1 mg/mL)

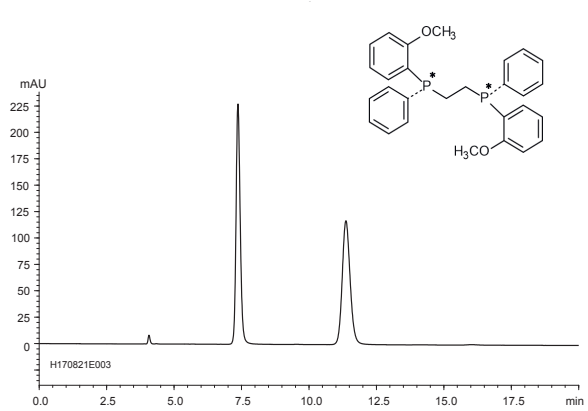
Applications
Specialties

1,2-Bis[(2-methoxyphenyl) phenylphosphino]ethane



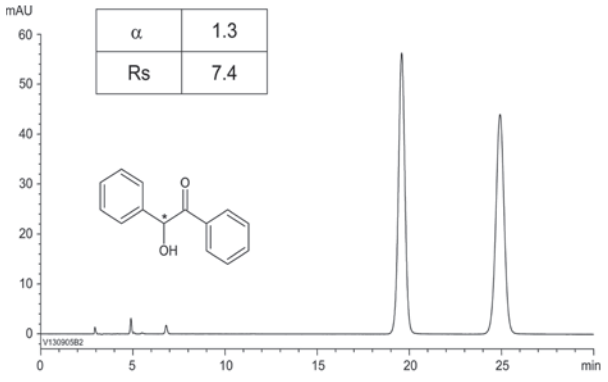
Column :	CHIRAL ART Amylose-C Neo (5 µm) 250 x 4.6 mm ID
Part No.:	KBN99S05-1546WT
Eluent:	*n*-hexane/2-propanol (90/10)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 285 nm
Injection:	10 µL (0.5 mg/mL)

1,2-Bis[(2-methoxyphenyl) phenylphosphino]ethane (DIPAMP)



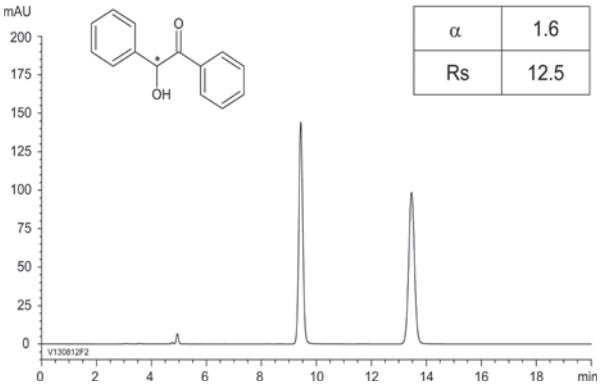
Column:	CHIRAL ART Cellulose-SJ (5 µm) 250 x 4.6 mm ID
Part No.:	KSJ99S05-2546WT
Eluent:	*n*-hexane / chloroform (80/20)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 290 nm
Injection:	5 µL (1 mg/mL)

Benzoin



Column:	CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KAN99S05-2546WT
Eluent:	*n*-hexane / 2-propanol (90/10)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 254 nm
Injection:	10 µL (0.1 mg/mL)

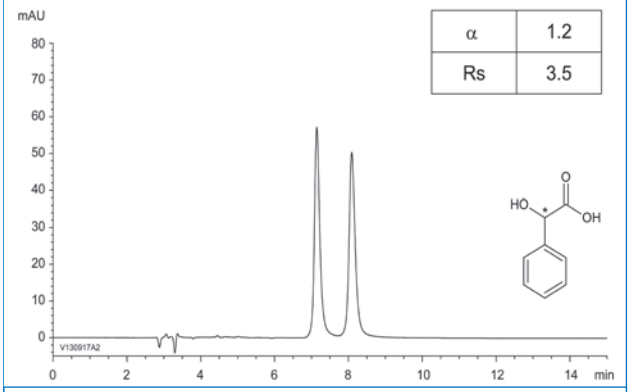
Benzoin



Column:	CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KCN99S05-2546WT
Eluent:	*n*-hexane / 2-propanol (90/10)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 254 nm
Injection:	10 µL (0.1 mg/mL)

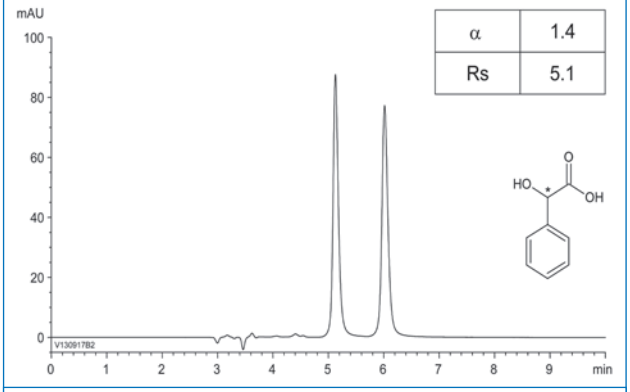
Applications
Specialties

DL-Mandelic acid



Column: CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.: KAN99S05-2546WT
Eluent: *n*-hexane / 2-propanol / TFA (80/20/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 254 nm
Injection: 20 µL (1 mg/mL)

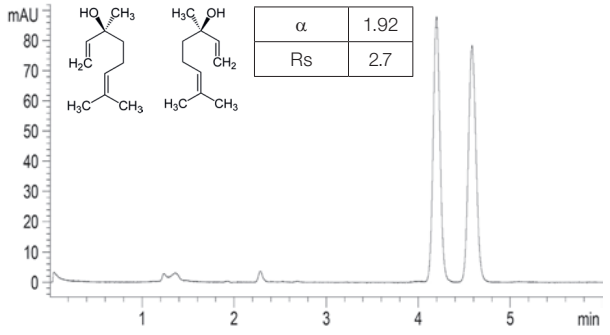
DL-Mandelic acid



Column: CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.: KCN99S05-2546WT
Eluent: *n*-hexane / 2-propanol / TFA (80/20/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 254 nm
Injection: 20 µL (1 mg/mL)

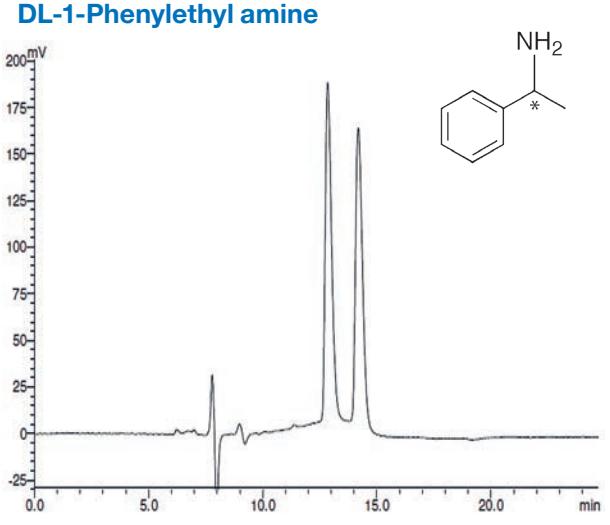
RP-Mode

Linalool



Column: CHIRAL ART Amylose-SA (3 µm) 150 x 3.0 mm ID
Part No.: KSA99S03-1503WT
Eluent: water / acetonitrile (42/58)
Flow rate: 0.4 mL/min
Temperature: 35 °C
Detection: UV at 210 nm
Injection: 1 µL (0.5 µL/mL)

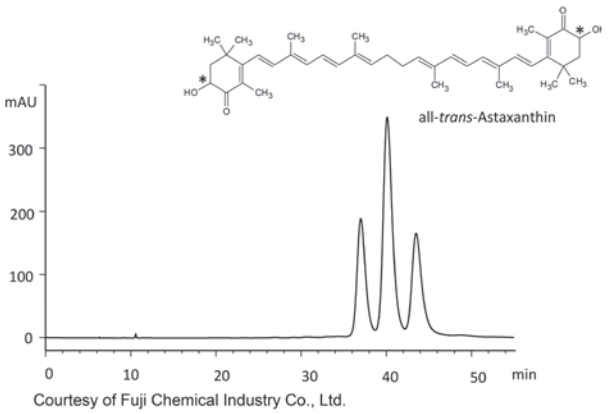
DL-1-Phenylethyl amine



Column: CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.: KSB99S05-2546WT
Eluent: *n*-hexane / 2-propanol / diethylamine (90/10/0.2)
Flow rate: 0.5 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 20 µL (2.5 mg/mL)

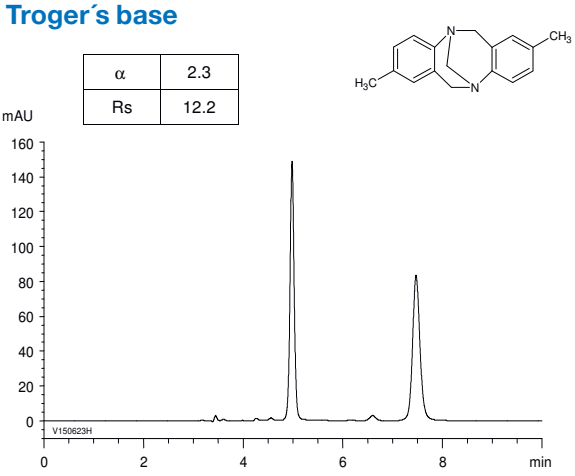
Applications
Specialties

Astaxanthin



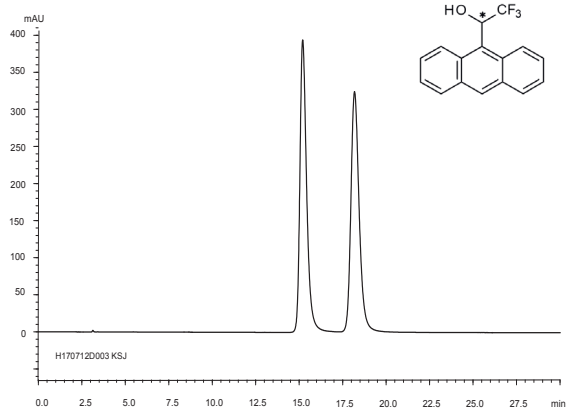
Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	*n*-hexane / THF (85/15)
Flow rate:	0.5 mL/min
Temperature:	25 °C
Detection:	UV at 476 nm

Troger´s base



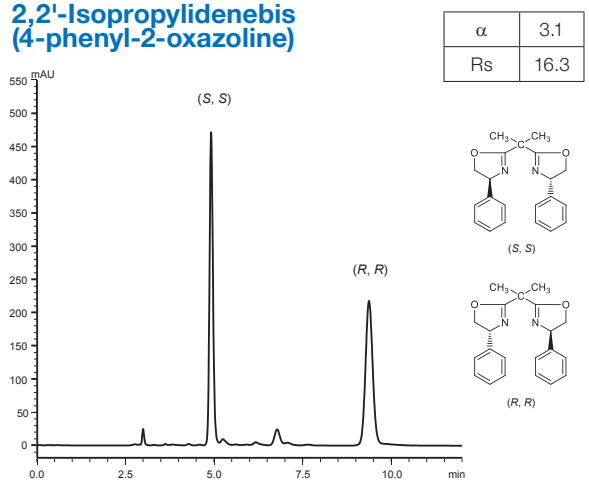
Column:	CHIRAL ART Amylose-SA (5 µm) 250 x 4.6 mm ID
Part No.:	KSJ99S05-2546WT
Eluent:	*n*-hexane / ethanol (90/10)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 254 nm
Injection:	10 µL (0.1 mg/mL)

2,2,2-Trifluoro-1-(9-anthryl) ethanol



Column:	CHIRAL ART Cellulose-SJ (5 µm) 250 x 4.6 mm ID
Part No.:	KSJ99S05-2546WT
Eluent:	*n*-hexane / tetrahydrofuran (90/10)
Flow rate:	1.0 mL/min
Temperature:	25 °C

2,2'-Isopropylidenebis (4-phenyl-2-oxazoline)

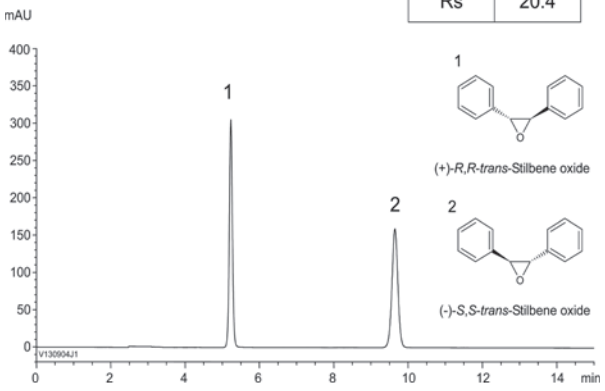


Column:	CHIRAL ART Amylose-C Neo (5 µm) 250 x 4.6 mm ID
Part No.:	KCBN99S05-1546WT
Eluent:	*n*-hexane/2-propanol (70/30)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 210 nm
Injection:	10 L (0.1 mg/mL)

Applications
Specialties

trans-Stilbene oxide

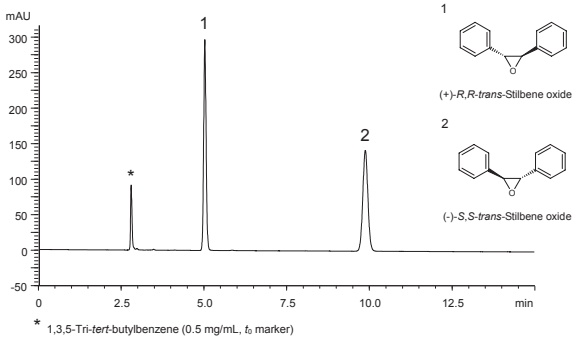
α	2.9
Rs	20.4



Column: CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.: KAN99S05-2546WT
Eluent: *n*-hexane / 2-propanol (90/10)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 230 nm
Injection: 5 µL (0.1 mg/mL)

trans-Stilbene oxide

α	3.2
Rs	23.4

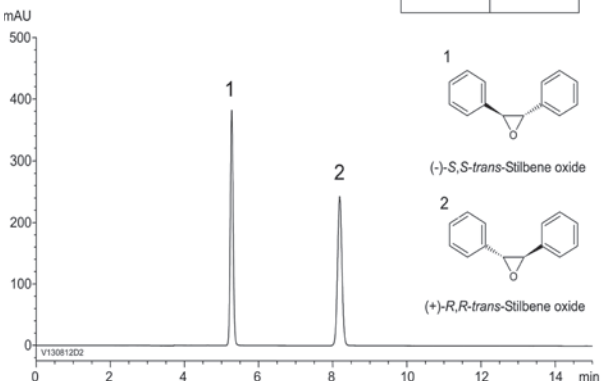


* 1,3,5-Tri-*tert*-butylbenzene (0.5 mg/mL, t_0 marker)

Column: CHIRAL ART Amylose-C Neo (5 µm) 250 x 4.6 mm ID
Part No.: KBN99S05-1546WT
Eluent: *n*-hexane/2-propanol (90/10)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 230 nm
Injection: 5 ML (0.1 mg/mL)

trans-Stilbene oxide

α	2.3
Rs	16.8



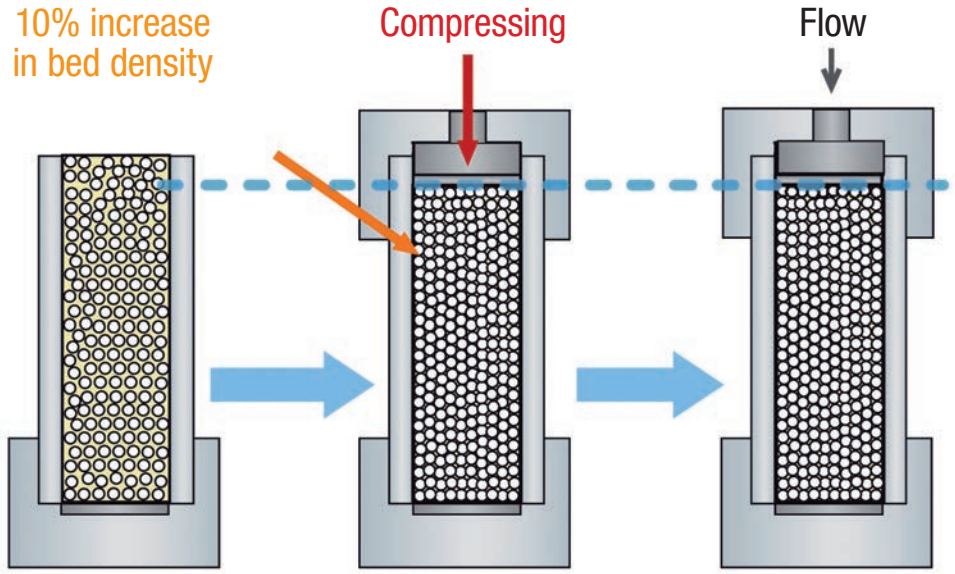
Column: CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.: KCN99S05-2546WT
Eluent: *n*-hexane / 2-propanol (90/10)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 230 nm
Injection: 5 µL (0.1 mg/mL)

High Performance Chiral Purifications with YMC- Actus CHIRAL ART (Semi-)Preparative Columns

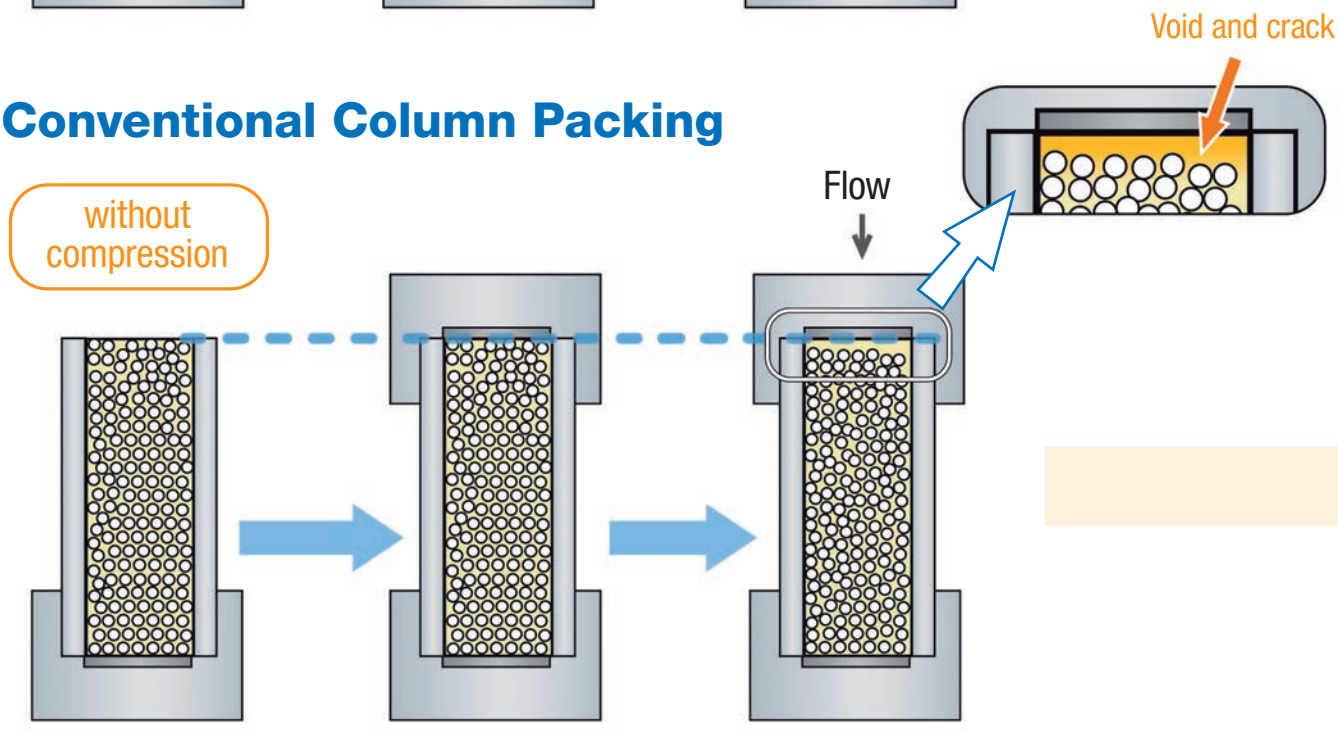
How to obtain long lasting columns?

YMC-Actus series columns are semi-preparative HPLC columns that have excellent column stability and efficiency as a result of applying axial compression technology.
YMC-Actus series columns show high stability under high flow rate or steep gradient conditions which are desirable for milligram scale preparative HPLC of various compounds.

YMC Actus Column Packing



Conventional Column Packing



High Performance Chiral Purifications with YMC- Actus CHIRAL ART (Semi-)Preparative Columns

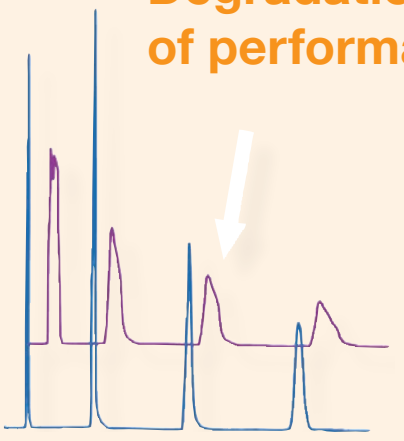
Uniformly high density packing is necessary for highly efficient and stable HPLC columns.DAC (Dynamic Axial Compression) columns are widely used for preparative separation in pilot or production scale. This allows uniformly high density packing and prevents formation of voids.
YMC-Actus series columns have been developed by applying this Axial Compression Technology to semi-prep column production. The column bed is compressed appropriately when attaching the inlet end assembly of the newly designed YMC-Actus hardware. It provides increased bed density (10% higher than conventional columns) and bed uniformity.

Long Lasting Columns!

Test conditions (standard RP)
(high-speed and high-pressure)

Column:	5 µm, 50 x 20 mm ID
Eluent:	A) water B) methanol
Gradient:	5%–95% B
Flow rate:	50 mL/min
Pressure:	~ 17 MPa

Degradation of performance



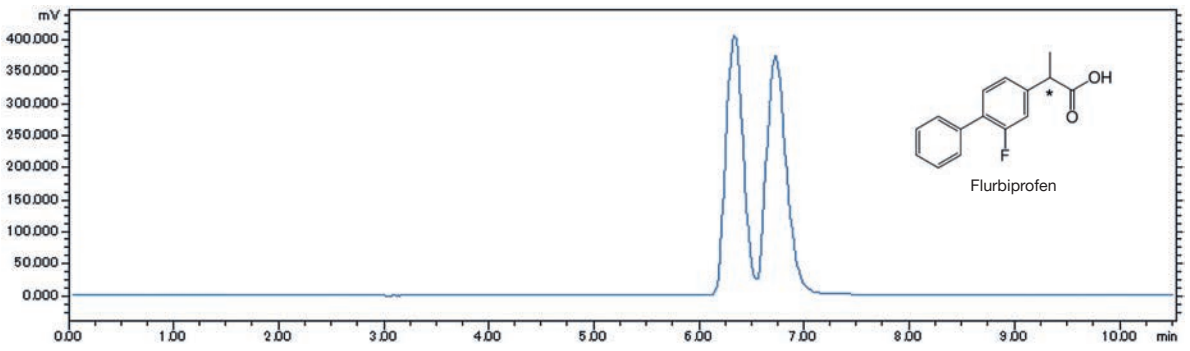
High Performance Chiral Purifications with YMC- Actus CHIRAL ART (Semi-)Preparative Columns

Cost efficiency

Rapid pressure changes under high-speed gradient conditions can lead to column degradation and loss of column performance. As with all YMC-Actus columns, a specific hardware and packing technology has been applied to these (semi-)preparative columns to provide a uniform packing density, which results in a longer lifetime than conventional semi-preparative columns.

(Semi-)preparative CHIRAL ART columns are available only in YMC-Actus hardware. YMC-Actus CHIRAL ART columns offer outstanding efficiency without compromising resolution. Furthermore, YMC-Actus CHIRAL ART columns provide reliable results, even after exposure to severe, rapid gradient conditions and multiple injections.

High Loadability with YMC-Actus CHIRAL ART



Column:	YMC-Actus CHIRAL ART Cellulose-C (5 µm) 250 x 30 mm ID
Part No.:	KSC99S05-2530WX
Eluent:	*n*-hexane / 2-propanol / TFA (95/5/0.1)
Flow rate:	45 mL/min
Detection:	UV 280 nm
Injection:	585 µL (20 mg/mL)

Secured Hardware Stability of YMC-Actus CHIRAL ART

A study has been performed using the 50 mm ID YMC-Actus columns for 80 hours at a constant maximum column pressure. An initial column performance test and after 40 hours was carried out. No significant changes in performance were observed after hours of continuous pressurisation.

Column performance test

↓

Continuous flow for 40 h

↓

Column performance test

↓

Opening the column

↓

Continuous flow for 40 h

↓

Opening the column

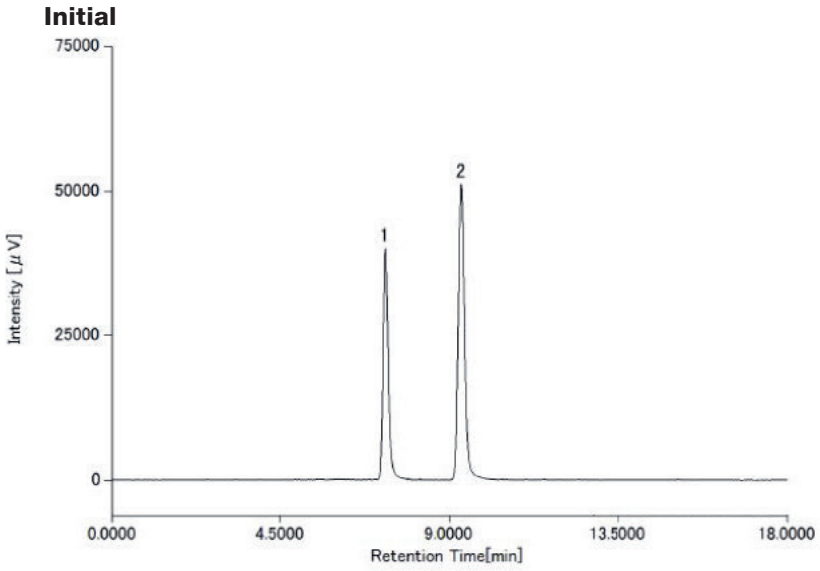
Column continuous flow

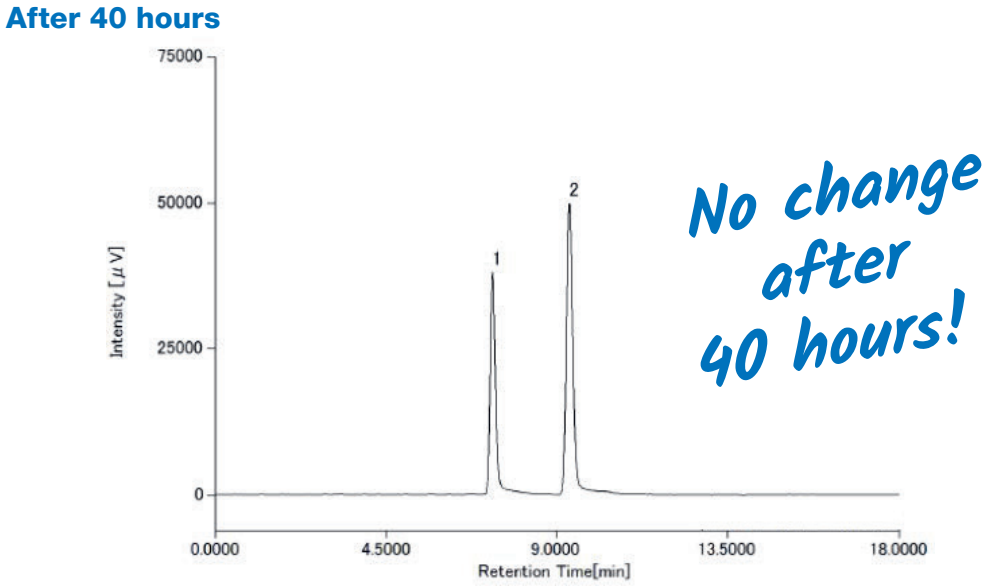
Column:	YMC-Actus SIL (12 nm, 5 µm) **250 x 50 mm ID**
Part.-No.:	SL12S05-2553DX
Eluent:	*n*-hexane / ethanol (90/10)
Flow rate:	240 mL/min
Pressure:	200 bar
Temperature:	ambient

Column performance test

Column:	YMC-Actus SIL (12 nm, 5 µm) **250 x 50 mm ID**
Eluent:	*n*-hexane / ethanol (90/10)
Flow rate:	50 mL/min
Temperature:	ambient
Detection:	UV at 254 nm
Sample:	1. Toluene (500 µL/mL) 2. Nitrobenzene (10 µL/mL)
Injection:	20 µL

Secured Hardware Stability of YMC-Actus CHIRAL ART





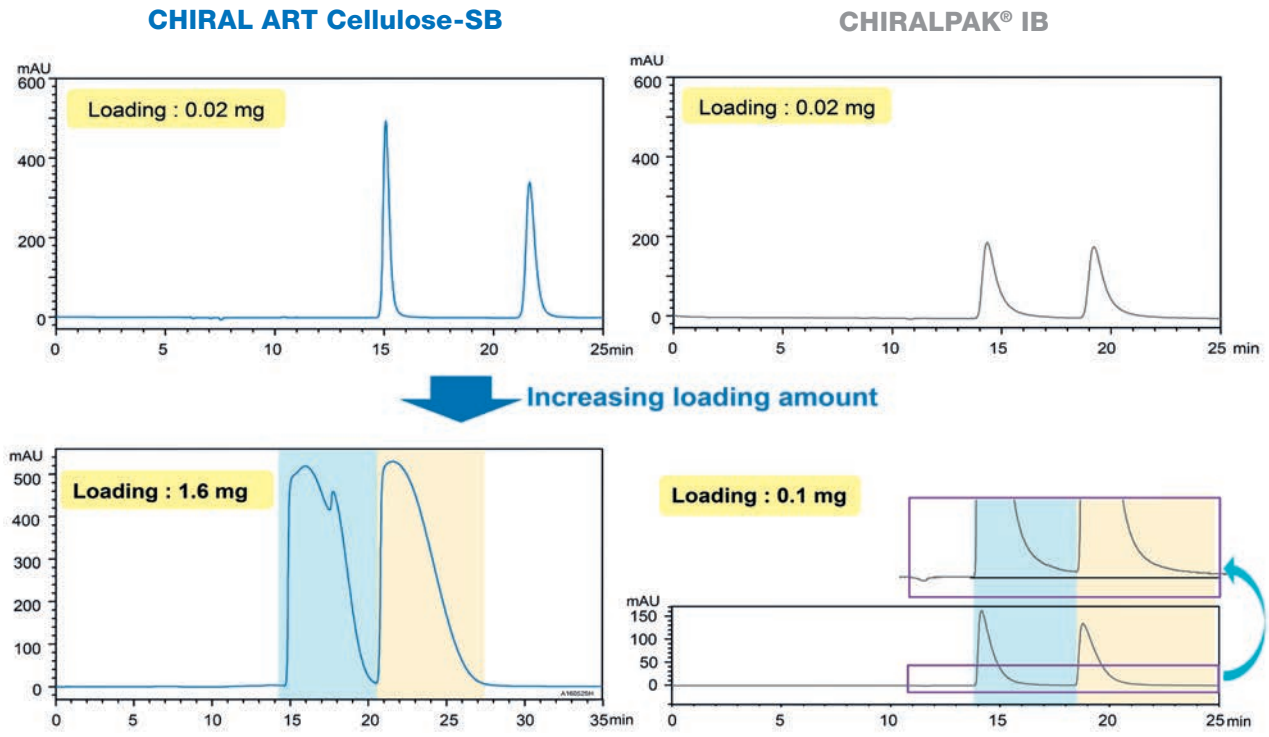
Step	Theoretical plate number N*	Tailing factor Tf*	Backpressure (bar)
Initial	16,093	1.18	20
After 40 h	15,693	1.16	22

*values for nitrobenzene (peak 2)

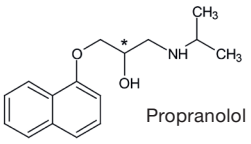
The inlet frit was inspected after 40 and 80 hours. On opening, neither frit distortion nor gel leakage was observed.

Efficient Purification Using YMC-Actus CHIRAL ART

Analytical scale loading studies



Column: 5 µm, 250 x 4.6 mm ID
Eluent: *n*-hexane / 2-propanol / diethylamine (80/20/0.1)
Flow rate: 0.5 ml/min
Detection: UV at 230 nm
Temperature: 25 °C



Propranolol

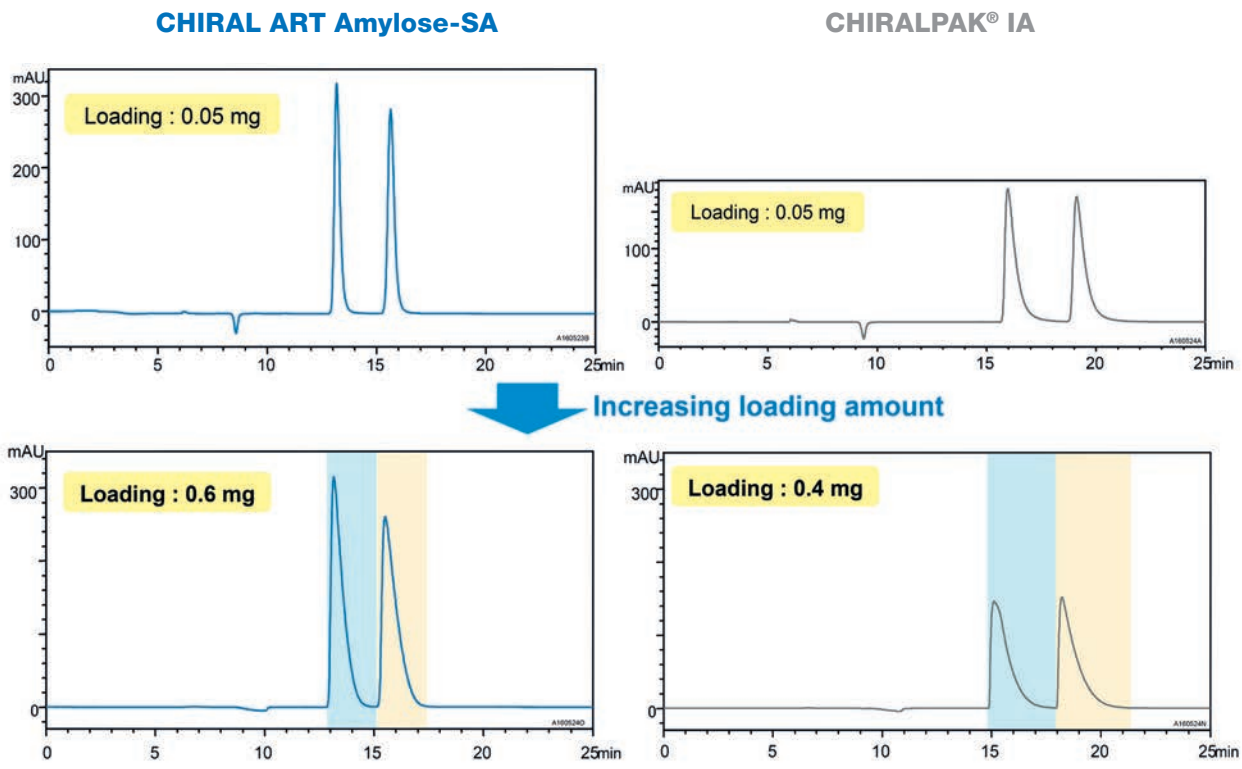
For the competitor's product, loading amount of more than 0.1 mg was not possible because the enantiomeric excess of the 2nd peak was already less than 98%ee with a loading amount of 0.1 mg.

	CHIRAL ART Cellulose-SB		CHIRALPAK® IB	
	1st peak	2nd peak	1st peak	2nd peak
Enantiomeric excess	>99.9%ee,	99.3%ee	>99.9%ee	97.9%ee
Recovery	99%	99%	99%	97%
Productivity (mg/h)*	3.1	3.3	0.3	0.3

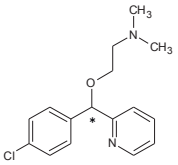
*Calculated for repeated injections every 15 minutes (CHIRAL ART Cellulose-SB) and every 10 minutes (CHIRALPAK® IB).

The calculated maximum loading amount on CHIRAL ART Cellulose-SB of 1.6 mg was 10 times larger than that obtained for the competitor's product due to the large differences in the peak shapes, even though the interval between repeat injections was higher!

Efficient Purification Using YMC-Actus CHIRAL ART



Column: 5 µm, 250 x 4.6 mm ID
Eluent: *n*-hexane / 2-propanol / diethylamine (90/10/0.1)
Flow rate: 0.5 ml/min
Detection: UV at 230 nm
Temperature: 25 °C



Carbinoxamine

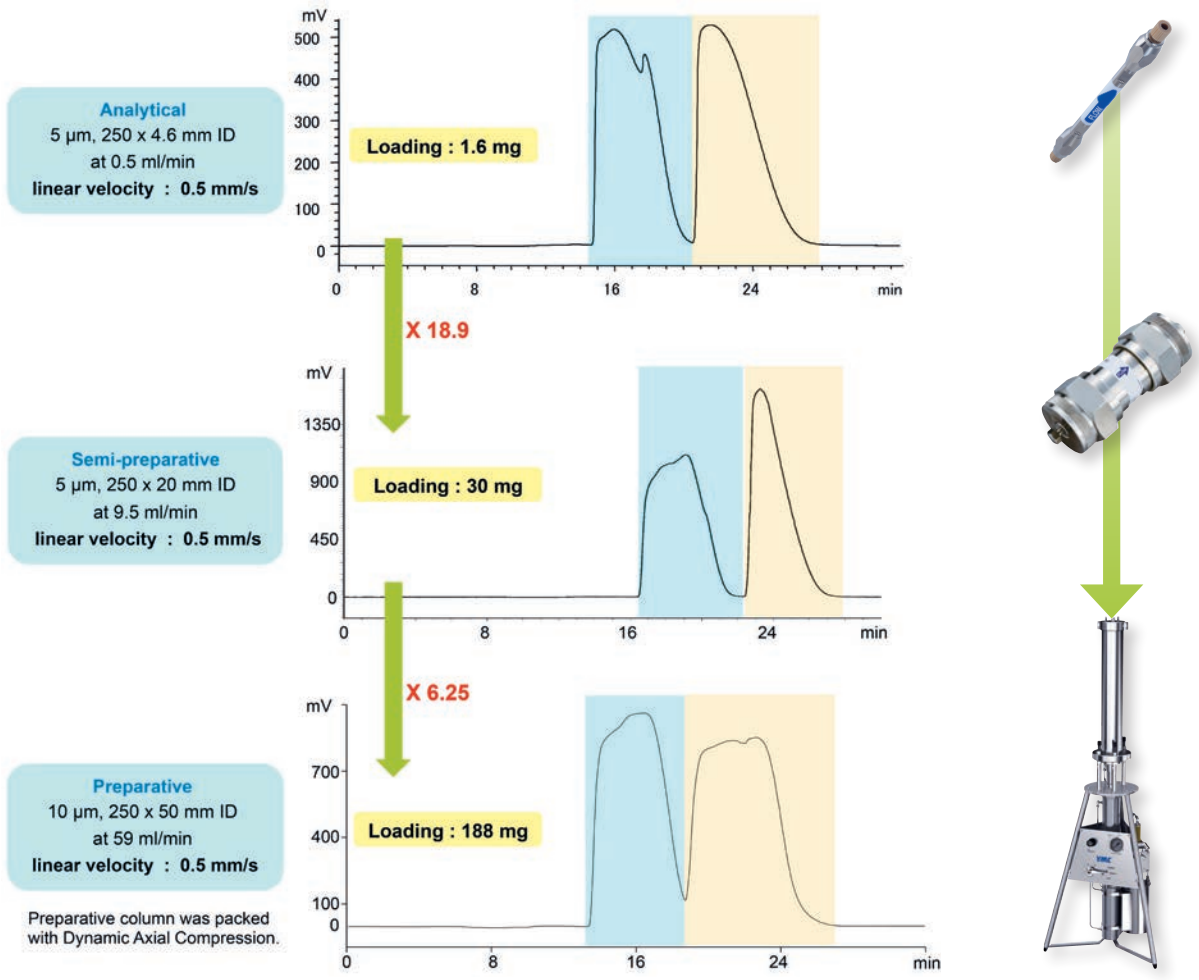
	CHIRAL ART Amylose-SA		CHIRALPAK® IA	
	1st peak	2nd peak	1st peak	2nd peak
Enantiomeric excess	>99.9%ee	99.4%ee	>99.9%ee	98.9%ee
Recovery	99%	99%	99%	98%
Productivity (mg/h)*	2.9	2.9	1.5	1.4

*Calculated for repeated injections every 6 minutes (CHIRAL ART Amylose-SA) and every 8 minutes (CHIRALPAK® IA).

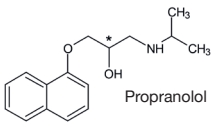
The calculated maximum loading amount on CHIRAL ART Amylose-SA was double that obtained for the competitor's product due to the good peak shape with no tailing, which also allowed increased productivity.

Efficient Purification Using YMC-Actus CHIRAL ART

Scale-up with YMC-Actus CHIRAL ART



Chiral
stationary phase: CHIRAL ART Cellulose-SB
Eluent: *n*-hexane / 2-propanol / diethylamine (80/20/0.1)
Detection: UV at 237 nm
Temperature: ambient



Propranolol

	Analytical 250 x 4.6 mm ID		YMC-Actus Semi-preparative 250 x 20 mm ID		Self-packed DAC Preparative 250 x 50 mm ID	
	1st peak	2nd peak	1st peak	2nd peak	1st peak	2nd peak
Enantiomeric excess	>99.9%ee	99.3%ee	99.9%ee	99.8%ee	99.1%ee	99.3%ee
Recovery	99%	99%	97%	99%	99%	94%
Productivity (mg/h)	3.1	3.3	58.6	62.4	366	390

Linear scale-up was performed using the appropriate scale-up factors. The Dynamic Axial Compression Column self-packed with CHIRAL ART Cellulose-SB 10 µm can be easily and linearly scaled-up for a greater purification scale. The final productivity is 366 and 390 mg/h respectively for peak 1 and 2.

Chiral Separations in SFC Mode

Chiral SFC columns by YMC

2 options are available:

- SFC compatible LC columns: CHIRAL ART*
- SFC dedicated columns: Alcyon SFC CSP

*A statement is available to confirm the usability in SFC mode.

Product Line-up

SFC compatible LC product	Particle size	SFC dedicated product	Type	Competitive product
CHIRAL ART Amylose-C (Neo)	3 µm 5 µm	Alcyon SFC CSP Amylose-C (Neo)	Coated	CHIRALPAK® AD-3/SFC, AD-H/SFC
CHIRAL ART Cellulose-C		Alcyon SFC CSP Cellulose-C		CHIRALCEL® OD-3/SFC, OD-H/SFC
CHIRAL ART Amylose-SA		Alcyon SFC CSP Amylose-SA	Immobilised	CHIRALPAK® IA-3/SFC, IA/SFC
CHIRAL ART Cellulose-SB		Alcyon SFC CSP Cellulose-SB		CHIRALPAK® IB-3/SFC, IB/SFC
CHIRAL ART Cellulose-SC		Alcyon SFC CSP Cellulose-SC		CHIRALPAK® IC-3/SFC, IC/SFC
CHIRAL ART Cellulose-SJ		Alcyon SFC CSP Cellulose-SJ		CHIRALPAK® IJ-3/SFC, IJ/SFC
CHIRAL ART Cellulose-SZ		Alcyon SFC CSP Cellulose-SZ		[coated: CHIRALCEL® OZ-3/SFC, OZ-H/SFC]

Properties of SFC compatible LC columns

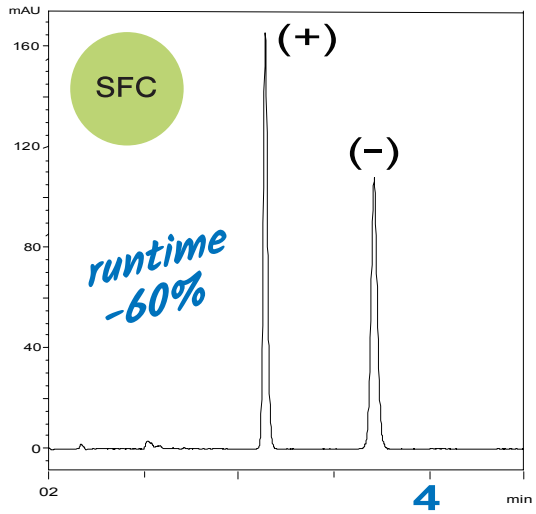
CHIRAL ART LC columns are interchangeable between NP/RP mode and SFC mode with a simple solvent switch. All you need to do is flush your column with 10 column volumes of 100% isopropanol before switching to final conditions in the new mode. This applies to switching from LC to SFC and vice versa.

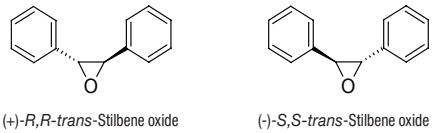
Properties of Alcyon SFC CSP columns

Alcyon SFC columns are specifically packed in SFC dedicated hardware, tested under SFC conditions and supplied with a test certificate under SFC conditions. The stationary phase used in Alcyon SFC columns is identical to that used in the corresponding CHIRAL ART columns.

Chiral Separations in SFC Mode

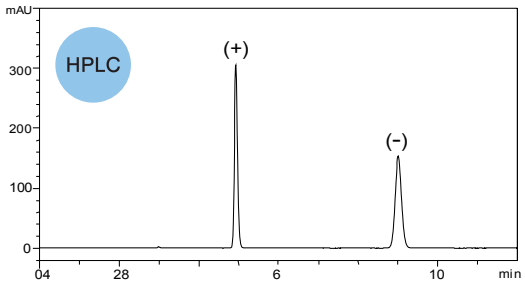
Fast separation with high resolution





(+)-*R,R-trans*-Stilbene oxide

(-)-*S,S-trans*-Stilbene oxide

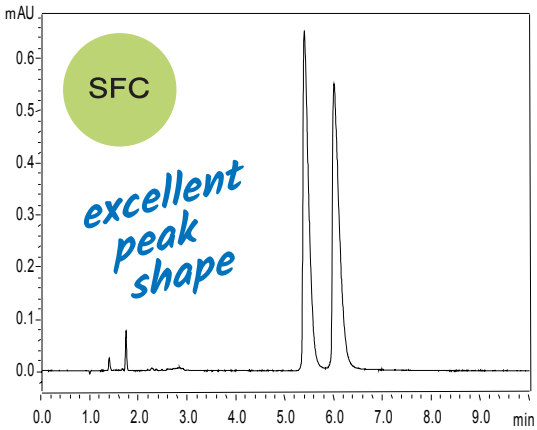


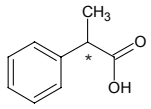
Column:	**CHIRAL ART Amylose-C** (5 µm) 250 x 4.6 mm ID
Part No.:	KAN99S05-2546WT
Eluent:	CO_2 / methanol (60/40)
Flow rate:	3.0 mL/min
Temperature:	40 °C
Detection:	UV at 220 nm
Back pressure:	17.2 MPa (2500 psi)

Column:	CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KAN99S05-2546WT
Eluent:	*n*-hexane / 2-propanol (90/10)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 220 nm

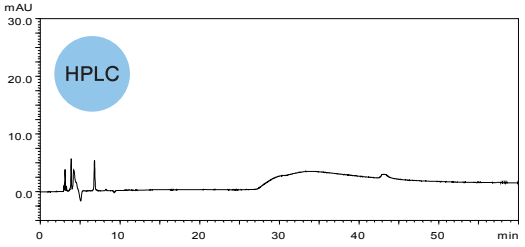
Faster chiral separation of trans-stilbene oxide is achieved using supercritical fluid chromatography compared to HPLC as the separation mode. Lower viscosity and larger diffusion coefficients for supercritical fluid provide rapid separations of both chiral and achiral compounds.

Excellent peak shape using mobile phase without the addition of an acid





2-Phenylpropionic acid



Column:	**CHIRAL ART Cellulose-C** (5 µm) 250 x 4.6 mm ID
Part No.:	KCN99S05-2546WT
Eluent:	CO_2 / methanol (98/2)
Flow rate:	3.0 mL/min
Temperature:	35 °C
Detection:	UV at 220 nm
Back pressure:	10.3 MPa (2000 psi)

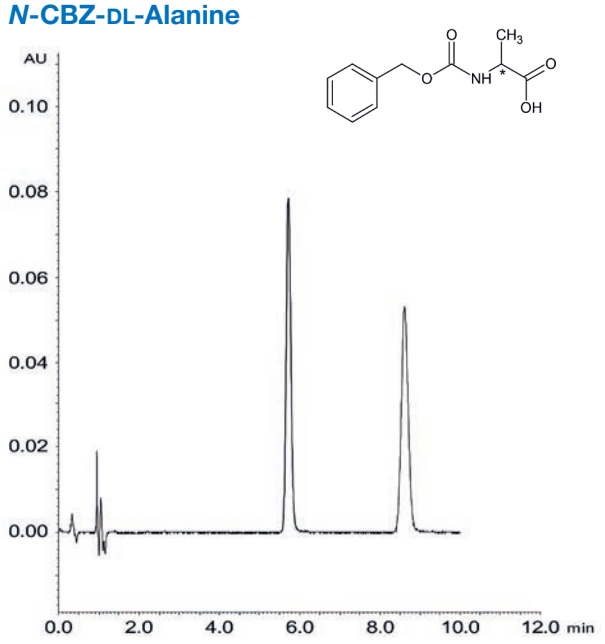
Column:	CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KCN99S05-2546WT
Eluent:	*n*-hexane / 2-propanol (99/1)
Flow rate:	1.0 mL/min
Temperature:	25 °C
Detection:	UV at 220 nm

Excellent peak shape of 2-phenylpropionic acid is obtained using SFC chiral separation. Under HPLC conditions, the peak shape is very broad with mobile phase containing no additives such as an acid. With SFC, on the other hand, peak shapes are very good just with a mixture of CO_2 and methanol. It is thought that supercritical carbon dioxide acts as a weak acid.

Chiral Separations in SFC Mode

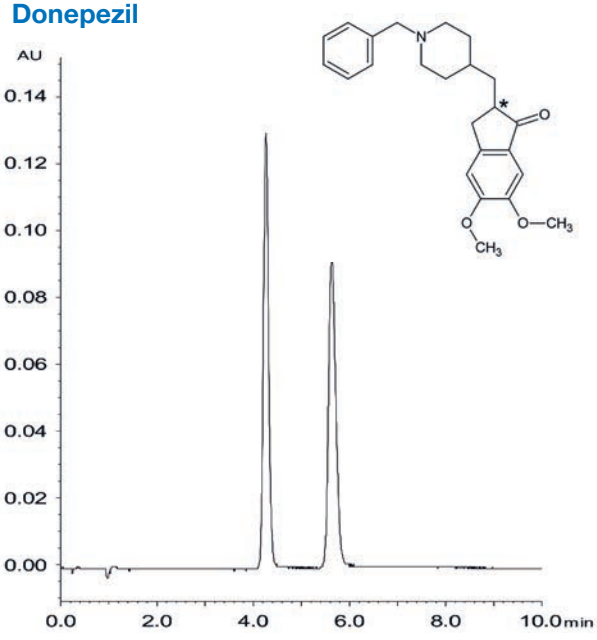
Applications

N-CBZ-DL-Alanine



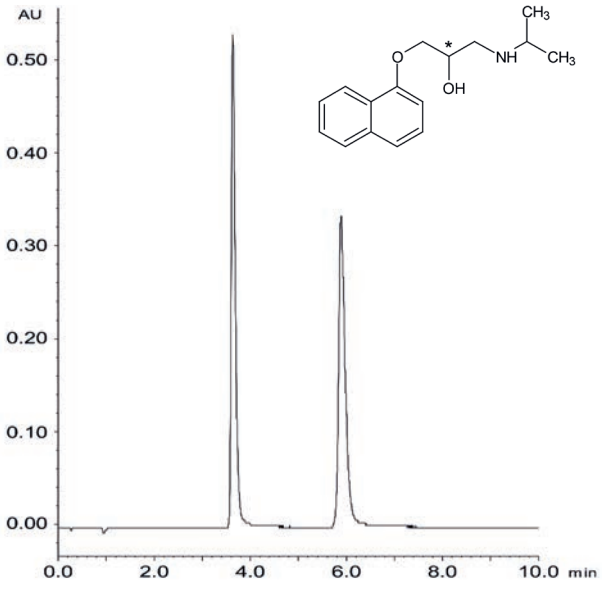
Column:	CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KAN99S05-2546WT
Eluent:	CO_2 / 2-propanol containing 0.1% TFA (90/10)
Flow rate:	3.0 mL/min
Temperature:	35 °C
Detection:	UV at 215 nm
Backpressure:	13.8 MPa (2000 psi)
Injection:	5 µL (1 mg/mL)

Donepezil



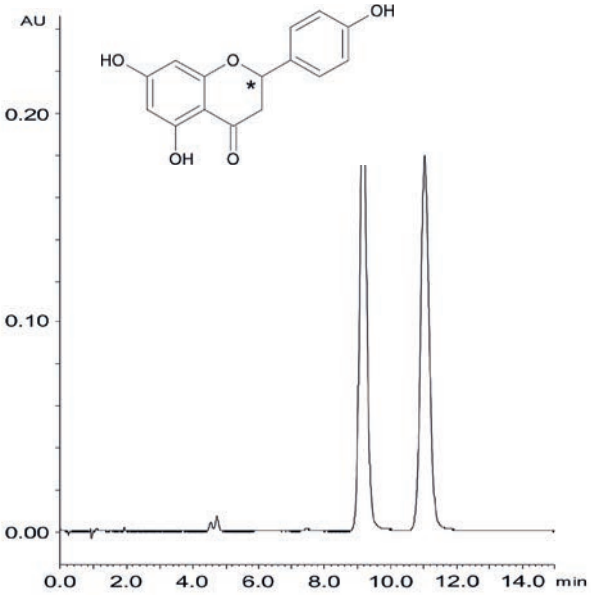
Column:	CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KCN99S05-2546WT
Eluent:	CO_2 / 2-propanol containing 0.1% DEA (70/30)
Flow rate:	3.0 mL/min
Temperature:	35 °C
Detection:	UV at 268 nm
Backpressure:	13.8 MPa (2000 psi)
Injection:	5 µL (1 mg/mL)

Propranolol



Column:	CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KCN99S05-2546WT
Eluent:	CO_2 / methanol containing 0.1% DEA (80/20)
Flow rate:	3.0 mL/min
Temperature:	35 °C
Detection:	UV at 230 nm
Backpressure:	13.8 MPa (2000 psi)
Injection:	5 µL (1 mg/mL)

Naringenin



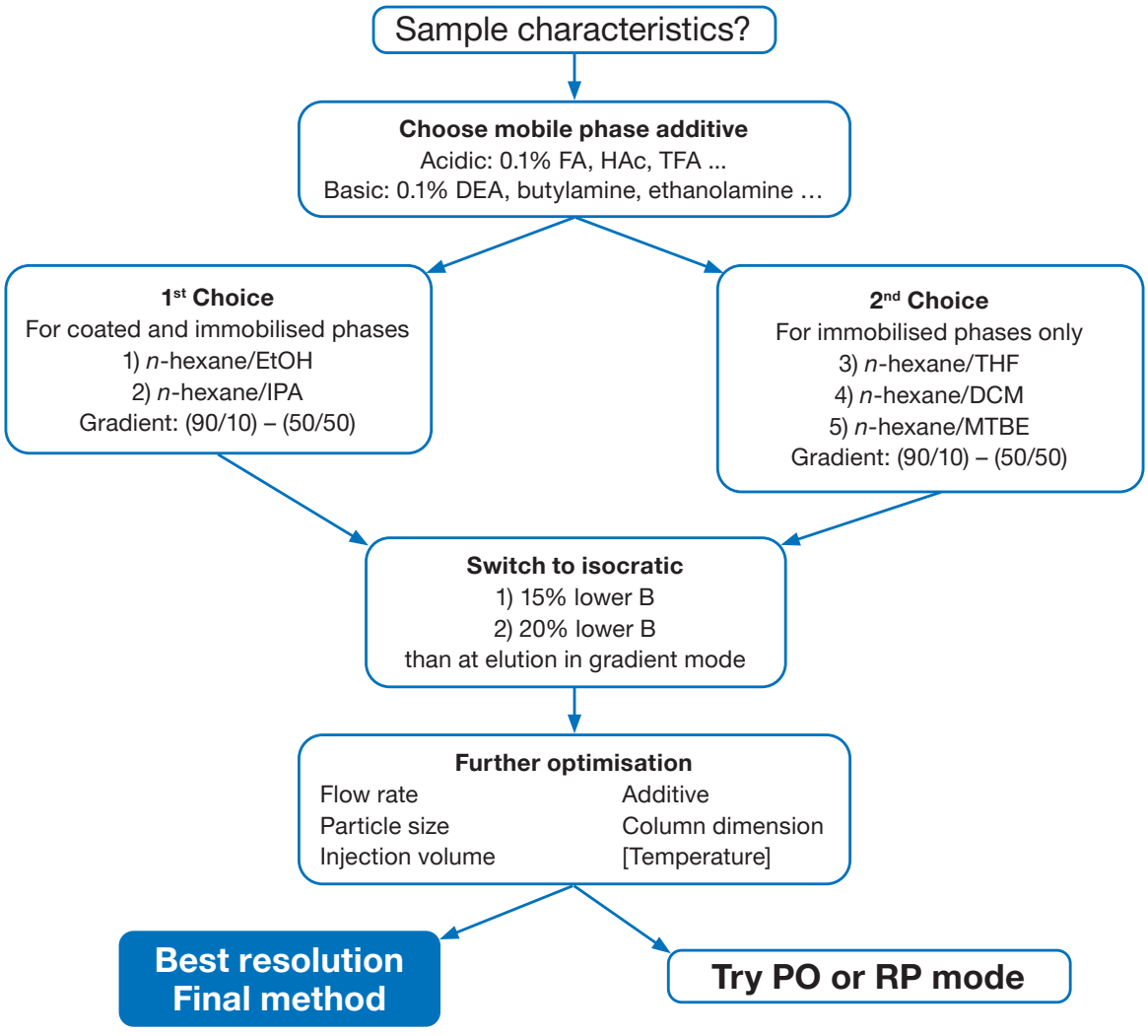
Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	CO_2 / 2-propanol (80/20)
Flow rate:	3.0 mL/min
Temperature:	35 °C
Detection:	UV at 220 nm
Backpressure:	13.8 MPa (2000 psi)
Injection:	5 µL (1 mg/mL)

Method Screening Strategy for Polysaccharide Phases

When NP mode, when RP mode?

CHIRAL ART columns can be used in NP and RP mode. Coated CHIRAL ART are dedicated for use in NP mode only, while immobilised CHIRAL ART columns can be operated in both modes. It is recommended to start screening in NP mode first as the success rates are usually much higher. YMC's screening success rate in NP mode is >95%, while it is <5% only in RP mode.
However, beside the success rate there can be specific reasons for RP mode, e.g. use of MS as detection mode.

NP Screening Strategy



For Polar Organic (PO) mode, methanol, ethanol or mixtures of both can be used as well as acetonitrile or mixtures of methanol and acetonitrile. RP mode can only be applied to immobilised polysaccharide phases.
It is essential to make sure of the miscibility of the organic solvents. When switching from alkane/alcohol solvents to polar organic solvents (methanol, acetonitrile etc), run an intermediate wash with at least ten column volumes of ethanol or 2-propanol.
It is important to remember that a column used with polar organic solvents (such as methanol/ethanol, methanol/acetonitrile) as a mobile phase should be dedicated to this specific mode of application.

Method Screening Strategy

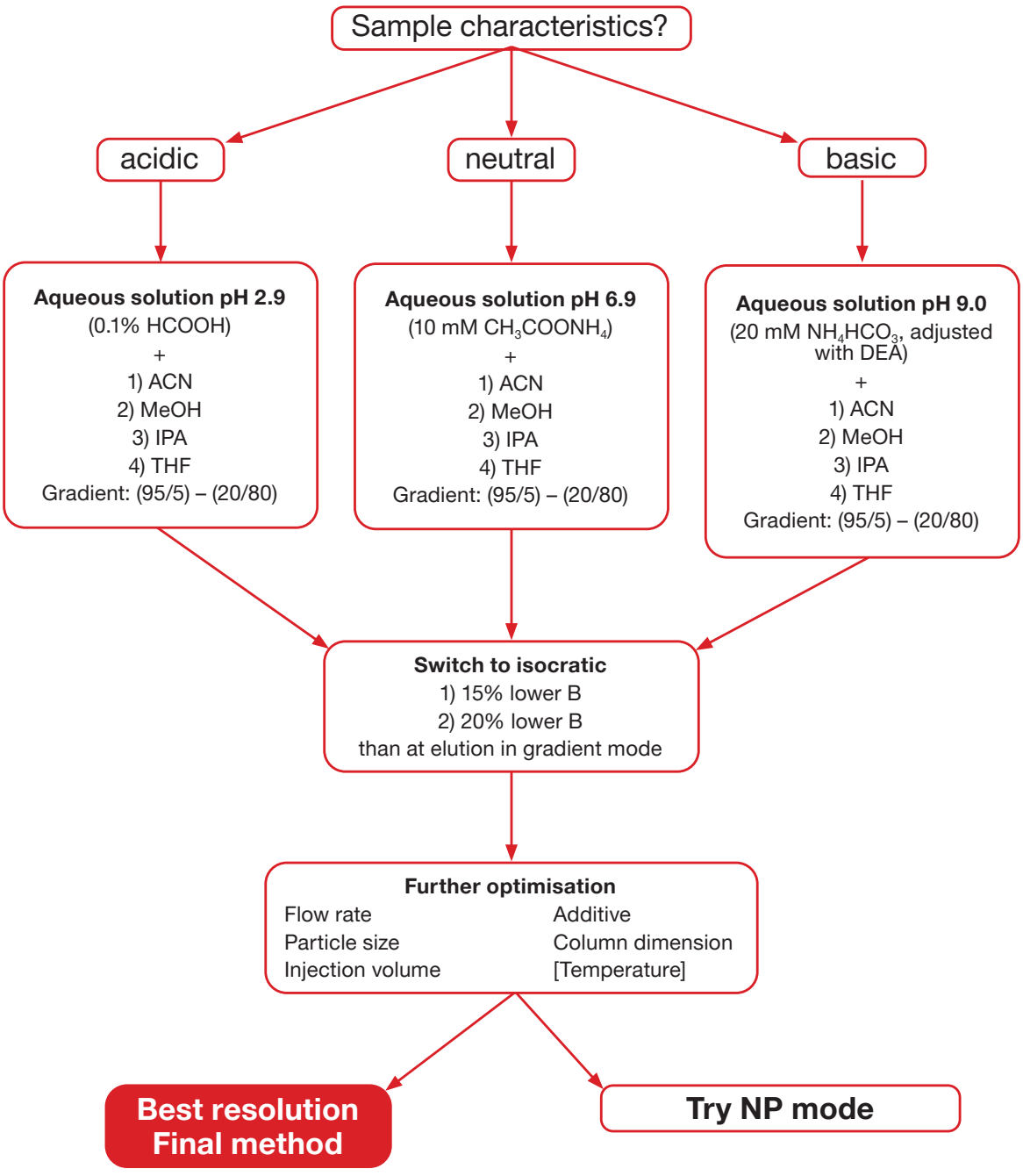
Use of Screening Gradients

YMC recommends using a gradient based screening strategy as it is much faster than isocratic screening when using different mobile phase compositions. Different strategies are recommended for each separation mode.

➔ For a more detailed overview on the different strategies, also refer to the whitepaper "*Chiral LC & SFC Method Development*" that can be downloaded from the YMC Europe homepage.

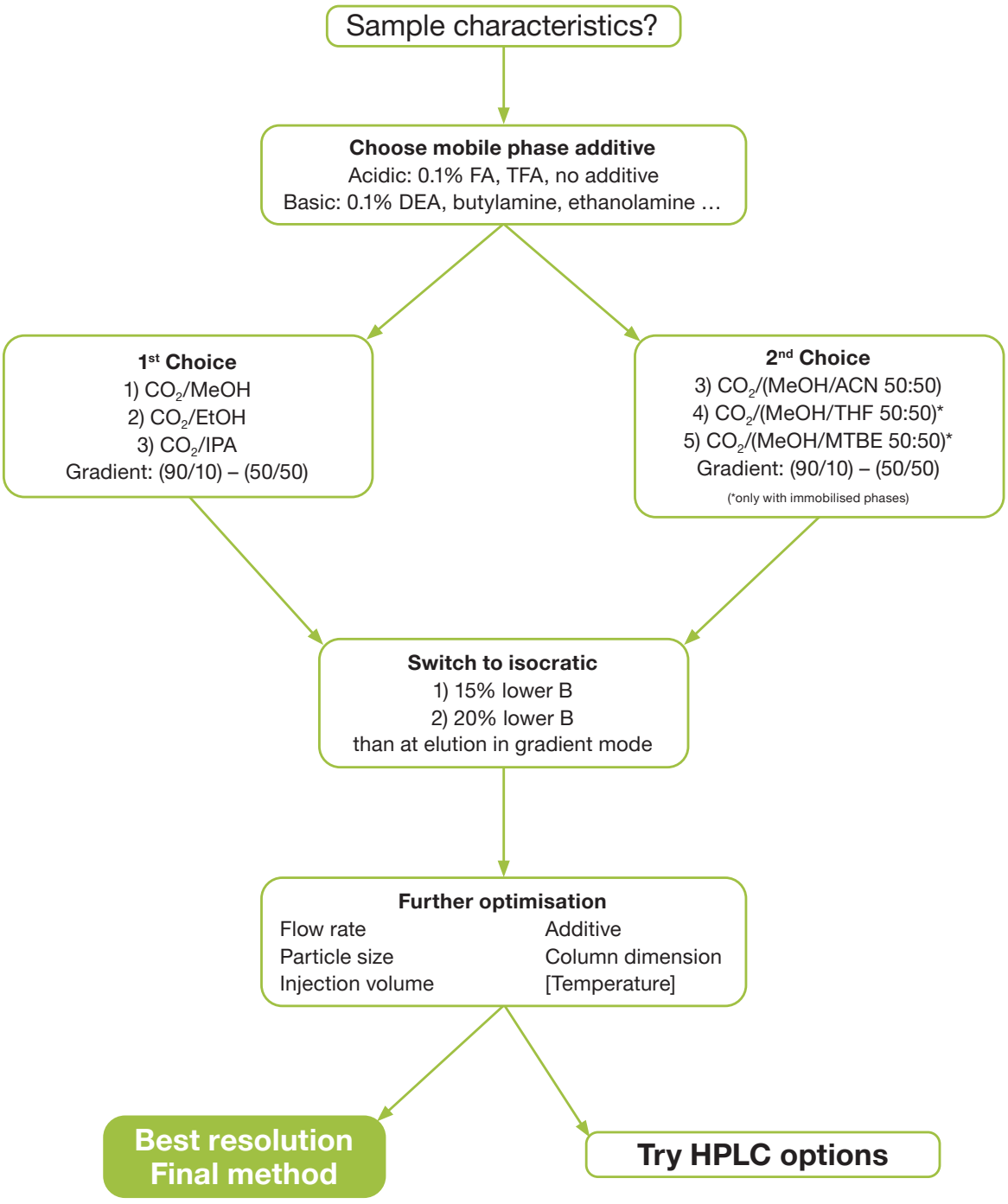
RP Screening Strategy

For immobilised stationary phases only



Method Screening Strategy

SFC Screening Strategy



Abbreviations used:

FA (formic acid); HAc (acetic acid); TFA (trifluoroacetic acid); DEA (diethylamine); EtOH (ethanol); IPA (2-propanol); THF (tetrahydrofuran); DCM (dichloromethane); MTBE (methyl *tert*-butyl ether); ACN (acetonitrile); MeOH (methanol)

How to Choose the Correct Chiral Column

YMC Database

A selection of chiral applications can be found at **https://www.ymc.eu/applications.html**

Here, you can search for chiral applications already known for your compounds.

Test Columns or Screening Kits

You can request a test column to initially test a chiral column before finally buy it if it works for your application. If the column is not suitable, simply return it without any further requirements.

Alternatively you can choose one of the YMC method development kits or request a customised screening kit with 3–7 different CHIRAL ART phases. You only need to contact your local YMC contact for details.

FREE Chiral Screening Service

- >90% success rate
- Rapid screening within a short period of time
- Screening according to your requirements: e.g. RP-mode, MS-compatibility etc.
- Screening on all available CHIRAL ART phases and further YMC CHIRAL phases if needed
- Results presented in a detailed report
- Confidentiality Agreements can be arranged as necessary

How to Choose the Correct Chiral Column

> *"Excellent products and service."*
>
> *"An excellent range of products. Chromatography gave excellent reproducibility, even for very complex environmental samples. Support received by YMC [...] was fantastic."*
>
> *Bruce Petrie, Robert Gordon University Aberdeen (UK)*

Your YMC Success Rate

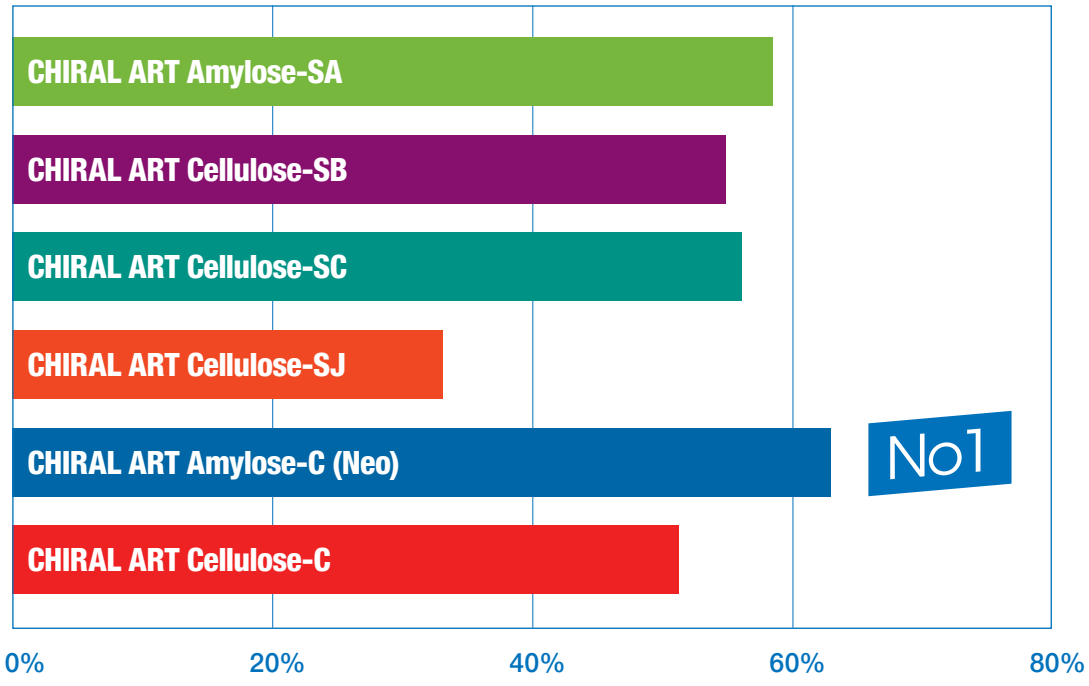
- Hit database: compiled from more than 500 samples supplied for HPLC/SFC contract service
- The 6 used CHIRAL ART phases can cover >90% of chiral separations
- About 95% of the LC applications are in NP/PO mode, while 5% are in RP mode

Method Development

- Method development based on phase screening
- According to your requirements

Preparative and Process Scale-Up

- Phase screening
- Preparative method development
- Small scale purification



Contract Purification of Chiral Compounds

In addition to chiral screening which can be carried out at our German or Japanese facilities, YMC now offer contract purification of chiral compounds at a range of scales and by different techniques.

Highly productive

Highly efficient preparative separation methods (recycling chromatography, SFC, SMB)

Highly reliable

Extensive expertise and excellent performance in scaling up of chromatographic purification

Cost competitive

Competitively priced YMC chiral packing materials used

Applicable to various scales

Equipped with dynamic axial compression columns with a maximum inner diameter of up to 1000 mm and HPLC systems with pumps up to a maximum flow rate of 25 L/min

GMP compliant purification service

Contract Purification of Chiral Compounds

	System	Column ID	Purpose
Equipment	Preparative HPLC	10–1000 mm ID	Purification of trace impurities to production in commercial scale
	Preparative SFC	20–30 mm ID	Purification of trace impurities to small scale purification
	SMB	10–80 mm ID	Preparative method development for SMB to continuous production
Scale	mg-tons		

YMC Locations

YMC Kyoto Research Laboratories, Japan

YMC Komatsu Works, Japan

YMC Kyoto Works, Japan

YMC Europe, Dinslaken, Germany

Ordering Information

CHIRAL ART Amylose-C Neo

Particle size	Column ID [mm]	Column length [mm]				Guard cartridges* with 10 mm length
		50	100	150	250	(pack of 5)
3 µm	2.0	KBN99S03-0502WT	KBN99S03-1002WT	KBN99S03-1502WT	KBN99S03-2502WT	KBN99S03-01Q1GC
	3.0	KBN99S03-0503WT	KBN99S03-1003WT	KBN99S03-1503WT	KBN99S03-2503WT	KBN99S03-0103GC
	4.6	KBN99S03-0546WT	KBN99S03-1046WT	KBN99S03-1546WT	KBN99S03-2546WT	KBN99S03-0104GC

Particle size	Column ID [mm]	Column length [mm]			Guard cartridges* with 10 mm length
		100	150	250	(pack of 5 or 2)
5 µm	2.0	KBN99S05-1002WT	KBN99S05-1502WT	KBN99S05-2502WT	KBN99S05-01Q1GC
	4.6	KBN99S05-1046WT	KBN99S05-1546WT	KBN99S05-2546WT	KBN99S05-0104GC
	10	KBN99S05-1010WT	KBN99S05-1510WT	KBN99S05-2510WT	KBN99S05-0110CC
	20	KBN99S05-1020WX	KBN99S05-1520WX	KBN99S05-2520WX	KBN99S05-0120CCN
	30	KBN99S05-1030WX	KBN99S05-1530WX	KBN99S05-2530WX	KBN99S05-0130CCN
	50	KBN99S05-1053DX	KBN99S05-1553DX	KBN99S05-2553DX	KBN99S05-0553DXG**

CHIRAL ART Amylose-C

Particle size	Column ID [mm]	Column length [mm]				Guard cartridges* with 10 mm length
		50	100	150	250	(pack of 5)
3 µm	2.0	KAN99S03-0502WT	KAN99S03-1002WT	KAN99S03-1502WT	KAN99S03-2502WT	KAN99S03-01Q1GC
	3.0	KAN99S03-0503WT	KAN99S03-1003WT	KAN99S03-1503WT	KAN99S03-2503WT	KAN99S03-0103GC
	4.6	KAN99S03-0546WT	KAN99S03-1046WT	KAN99S03-1546WT	KAN99S03-2546WT	KAN99S03-0104GC

Particle size	Column ID [mm]	Column length [mm]			Guard cartridges* with 10 mm length
		100	150	250	(pack of 5 or 2)
5 µm	2.0	KAN99S05-1002WT	KAN99S05-1502WT	KAN99S05-2502WT	KAN99S05-01Q1GC
	4.6	KAN99S05-1046WT	KAN99S05-1546WT	KAN99S05-2546WT	KAN99S05-0104GC

*Guard cartridge holder required, part no. XPGCH-Q1 (2.1, 3.0, 4.0 mm ID)
XPCHSPW1 (10 mm ID)
XPGHFSP20ID (20 mm ID)
XPGHFSP20ID (20 mm ID)
**no holder required for 50 x 50 ID guard columns (no cartridge)

Ordering Information

CHIRAL ART Cellulose-C

Particle size	Column ID [mm]	Column length [mm]				Guard cartridges* with 10 mm length
		50	100	150	250	(pack of 5)
3 µm	2.0	KCN99S03-0502WT	KCN99S03-1002WT	KCN99S03-1502WT	KCN99S03-2502WT	KCN99S03-01Q1GC
	3.0	KCN99S03-0503WT	KCN99S03-1003WT	KCN99S03-1503WT	KCN99S03-2503WT	KCN99S03-0103GC
	4.6	KCN99S03-0546WT	KCN99S03-1046WT	KCN99S03-1546WT	KCN99S03-2546WT	KCN99S03-0104GC

Particle size	Column ID [mm]	Column length [mm]			Guard cartridges* with 10 mm length
		100	150	250	(pack of 5 or 2)
5 µm	2.0	KCN99S05-1002WT	KCN99S05-1502WT	KCN99S05-2502WT	KCN99S05-01Q1GC
	4.6	KCN99S05-1046WT	KCN99S05-1546WT	KCN99S05-2546WT	KCN99S05-0104GC
	10	KCN99S05-1010WT	KCN99S05-1510WT	KCN99S05-2510WT	KCN99S05-0110CC
	20	KCN99S05-1020WX	KCN99S05-1520WX	KCN99S05-2520WX	KCN99S05-0120CCN
	30	KCN99S05-1030WX	KCN99S05-1530WX	KCN99S05-2530WX	KCN99S05-0130CCN
	50	KCN99S05-1053DX	KCN99S05-1553DX	KCN99S05-2553DX	KCN99S05-0553DXG**

CHIRAL ART Amylose-SA

Particle size	Column ID [mm]	Column length [mm]				Guard cartridges* with 10 mm length
		50	100	150	250	(pack of 5)
3 µm	2.0	KSA99S03-0502WT	KSA99S03-1002WT	KSA99S03-1502WT	KSA99S03-2502WT	KSA99S03-01Q1GC
	3.0	KSA99S03-0503WT	KSA99S03-1003WT	KSA99S03-1503WT	KSA99S03-2503WT	KSA99S03-0103GC
	4.6	KSA99S03-0546WT	KSA99S03-1046WT	KSA99S03-1546WT	KSA99S03-2546WT	KSA99S03-0104GC

Particle size	Column ID [mm]	Column length [mm]			Guard cartridges* with 10 mm length
		100	150	250	(pack of 5 or 2)
5 µm	2.0	KSA99S05-1002WT	KSA99S05-1502WT	KSA99S05-2502WT	KSA99S05-01Q1GC
	4.6	KSA99S05-1046WT	KSA99S05-1546WT	KSA99S05-2546WT	KSA99S05-0104GC
	10	KSA99S05-1010WT	KSA99S05-1510WT	KSA99S05-2510WT	KSA99S05-0110CC
	20	KSA99S05-1020WX	KSA99S05-1520WX	KSA99S05-2520WX	KSA99S05-0120CCN
	30	KSA99S05-1030WX	KSA99S05-1530WX	KSA99S05-2530WX	KSA99S05-0130CCN
	50	KSA99S05-1053DX	KSA99S05-1553DX	KSA99S05-2553DX	KSA99S05-0553DXG**

*Guard cartridge holder required, part no. XPGCH-Q1 (2.1, 3.0, 4.0 mm ID)
XPCHSPW1 (10 mm ID)
XPGHFSP20ID (20 mm ID)
XPGHFSP20ID (20 mm ID)
**no holder required for 50 x 50 ID guard columns (no cartridge)

Ordering Information

CHIRAL ART Cellulose-SB

Particle size	Column ID [mm]	Column length [mm]				Guard cartridges* with 10 mm length
		50	100	150	250	(pack of 5)
3 µm	2.0	KSB99S03-0502WT	KSB99S03-1002WT	KSB99S03-1502WT	KSB99S03-2502WT	KSB99S03-01Q1GC
	3.0	KSB99S03-0503WT	KSB99S03-1003WT	KSB99S03-1503WT	KSB99S03-2503WT	KSB99S03-0103GC
	4.6	KSB99S03-0546WT	KSB99S03-1046WT	KSB99S03-1546WT	KSB99S03-2546WT	KSB99S03-0104GC

Particle size	Column ID [mm]	Column length [mm]			Guard cartridges* with 10 mm length
		100	150	250	(pack of 5 or 2)
5 µm	2.0	KSB99S05-1002WT	KSB99S05-1502WT	KSB99S05-2502WT	KSB99S05-01Q1GC
	4.6	KSB99S05-1046WT	KSB99S05-1546WT	KSB99S05-2546WT	KSB99S05-0104GC
	10	KSB99S05-1010WT	KSB99S05-1510WT	KSB99S05-2510WT	KSB99S05-0110CC
	20	KSB99S05-1020WX	KSB99S05-1520WX	KSB99S05-2520WX	KSB99S05-0120CCN
	30	KSB99S05-1030WX	KSB99S05-1530WX	KSB99S05-2530WX	KSB99S05-0130CCN
	50	KSB99S05-1053DX	KSB99S05-1553DX	KSB99S05-2553DX	KSB99S05-0553DXG**

CHIRAL ART Cellulose-SC

Particle size	Column ID [mm]	Column length [mm]				Guard cartridges* with 10 mm length
		50	100	150	250	(pack of 5)
3 µm	2.0	KSC99S03-0502WT	KSC99S03-1002WT	KSC99S03-1502WT	KSC99S03-2502WT	KSC99S03-01Q1GC
	3.0	KSC99S03-0503WT	KSC99S03-1003WT	KSC99S03-1503WT	KSC99S03-2503WT	KSC99S03-0103GC
	4.6	KSC99S03-0546WT	KSC99S03-1046WT	KSC99S03-1546WT	KSC99S03-2546WT	KSC99S03-0104GC

Particle size	Column ID [mm]	Column length [mm]			Guard cartridges* with 10 mm length
		100	150	250	(pack of 5 or 2)
5 µm	2.0	KSC99S05-1002WT	KSC99S05-1502WT	KSC99S05-2502WT	KSC99S05-01Q1GC
	4.6	KSC99S05-1046WT	KSC99S05-1546WT	KSC99S05-2546WT	KSC99S05-0104GC
	10	KSC99S05-1010WT	KSC99S05-1510WT	KSC99S05-2510WT	KSC99S05-0110CC
	20	KSC99S05-1020WX	KSC99S05-1520WX	KSC99S05-2520WX	KSC99S05-0120CCN
	30	KSC99S05-1030WX	KSC99S05-1530WX	KSC99S05-2530WX	KSC99S05-0130CCN
	50	KSC99S05-1053DX	KSC99S05-1553DX	KSC99S05-2553DX	KSC99S05-0553DXG**

*Guard cartridge holder required, part no. XPGCH-Q1 (2.1, 3.0, 4.0 mm ID)
XPCHSPW1 (10 mm ID)
XPGHFSP20ID (20 mm ID)
XPGHFSP20ID (20 mm ID)
**no holder required for 50 x 50 ID guard columns (no cartridge)

Ordering Information

CHIRAL ART Cellulose-SJ

Particle size	Column ID [mm]	Column length [mm]				Guard cartridges* with 10 mm length
		50	100	150	250	(pack of 5)
3 µm	2.0	KSJ99S03-0502WT	KSJ99S03-1002WT	KSJ99S03-1502WT	KSJ99S03-2502WT	KSJ99S03-01Q1GC
	3.0	KSJ99S03-0503WT	KSJ99S03-1003WT	KSJ99S03-1503WT	KSJ99S03-2503WT	KSJ99S03-0103GC
	4.6	KSJ99S03-0546WT	KSJ99S03-1046WT	KSJ99S03-1546WT	KSJ99S03-2546WT	KSJ99S03-0104GC

Particle size	Column ID [mm]	Column length [mm]			Guard cartridges* with 10 mm length
		100	150	250	(pack of 5 or 2)
5 µm	2.0	KSJ99S05-1002WT	KSJ99S05-1502WT	KSJ99S05-2502WT	KSJ99S05-01Q1GC
	4.6	KSJ99S05-1046WT	KSJ99S05-1546WT	KSJ99S05-2546WT	KSJ99S05-0104GC
	10	KSJ99S05-1010WT	KSJ99S05-1510WT	KSJ99S05-2510WT	KSJ99S05-0110CC
	20	KSJ99S05-1020WX	KSJ99S05-1520WX	KSJ99S05-2520WX	KSJ99S05-0120CCN
	30	KSJ99S05-1030WX	KSJ99S05-1530WX	KSJ99S05-2530WX	KSJ99S05-0130CCN
	50	KSJ99S05-1053DX	KSJ99S05-1553DX	KSJ99S05-2553DX	KSJ99S05-0553DXG**

CHIRAL ART Cellulose-SZ

Particle size	Column ID [mm]	Column length [mm]				Guard cartridges* with 10 mm length
		50	100	150	250	(pack of 5)
3 µm	2.0	KSZ99S03-0502WT	KSZ99S03-1002WT	KSZ99S03-1502WT	KSZ99S03-2502WT	KSZ99S03-01Q1GC
	3.0	KSZ99S03-0503WT	KSZ99S03-1003WT	KSZ99S03-1503WT	KSZ99S03-2503WT	KSZ99S03-0103GC
	4.6	KSZ99S03-0546WT	KSZ99S03-1046WT	KSZ99S03-1546WT	KSZ99S03-2546WT	KSZ99S03-0104GC

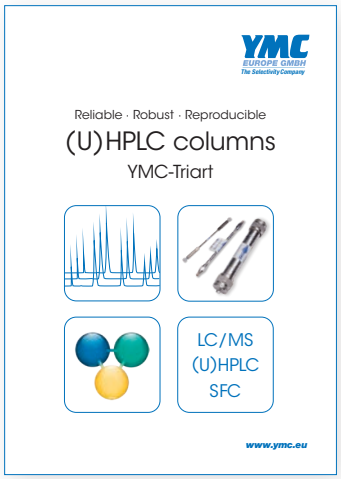
Particle size	Column ID [mm]	Column length [mm]			Guard cartridges* with 10 mm length
		100	150	250	(pack of 5 or 2)
5 µm	2.0	KSZ99S05-1002WT	KSZ99S05-1502WT	KSZ99S05-2502WT	KSZ99S05-01Q1GC
	4.6	KSZ99S05-1046WT	KSZ99S05-1546WT	KSZ99S05-2546WT	KSZ99S05-0104GC
	10	KSZ99S05-1010WT	KSZ99S05-1510WT	KSZ99S05-2510WT	KSZ99S05-0110CC
	20	KSZ99S05-1020WX	KSZ99S05-1520WX	KSZ99S05-2520WX	KSZ99S05-0120CCN
	30	KSZ99S05-1030WX	KSZ99S05-1530WX	KSZ99S05-2530WX	KSZ99S05-0130CCN
	50	KSZ99S05-1053DX	KSZ99S05-1553DX	KSZ99S05-2553DX	KSZ99S05-0553DXG**

*Guard cartridge holder required, part no. XPGCH-Q1 (2.1, 3.0, 4.0 mm ID)
XPCHSPW1 (10 mm ID)
XPGHFSP20ID (20 mm ID)
XPGHFSP20ID (20 mm ID)
**no holder required for 50 x 50 ID guard columns (no cartridge)

Further dimensions or 10/20µm columns available on request

Substance Index Substance Index

Other Brochures Available



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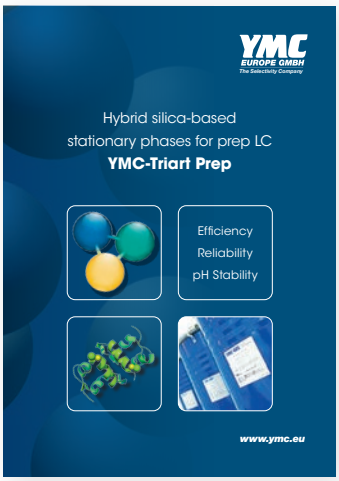
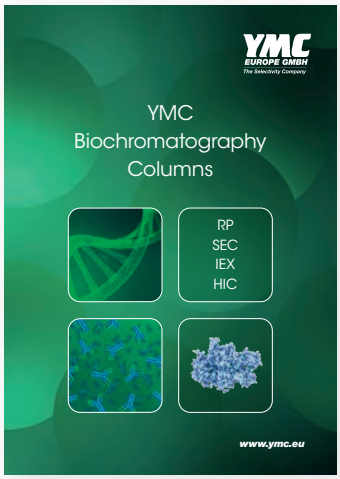


YMC-Triart Prep



YMC Biochromatography columns

"Our CHIRAL ART Cellulose-SC in 250 x 30 mm ID shows incredible performance!"

"The transfer from analytical to prep. scale is very smooth. Very symmetrical peaks, which only increase in height with higher loadings."

Christian Siegl, Merck KgaA (DE)

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