YMC
EUROPE GMBH
The Selectivity Company

# YMC Chiral Columns

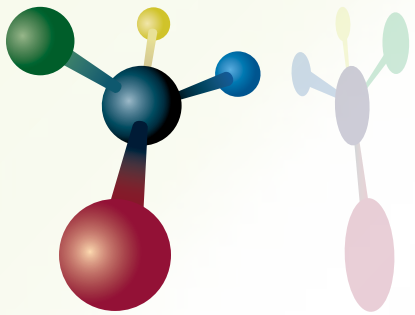
CHIRAL ART
Polysaccharides

YMC CHIRAL
NEA & CD BR

NP/RP/SFC

Coated/
Immobilised

(Semi-)prep



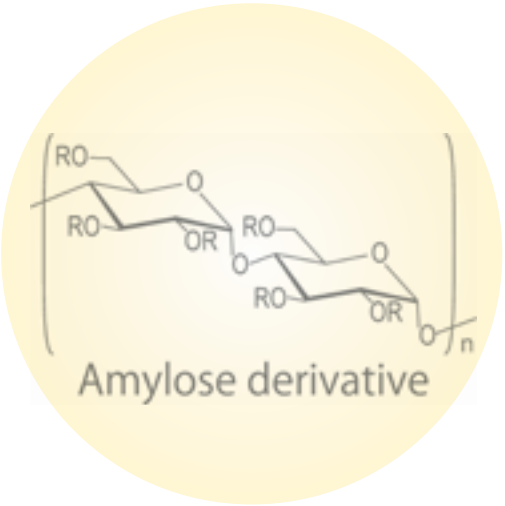
www.ymc.de

# 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

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# 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 with particle sizes of 3, 5, 10 or 20 µm available*
- *extremely attractive pricing*

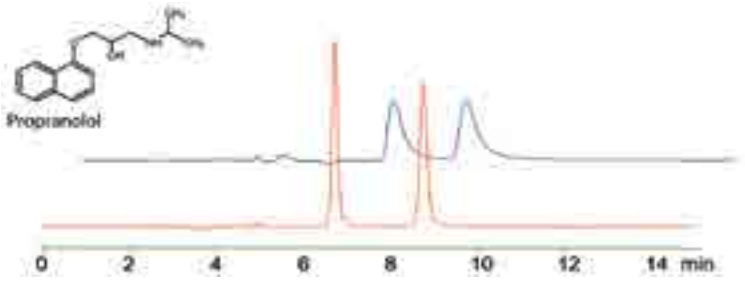
## Introduction

CHIRAL ART polysaccharide derivatives are a series 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 or in reversed phase modes. They are available in HPLC columns and in preparative grades, in large (multi kg) quantities.

### Excellent peak shape




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

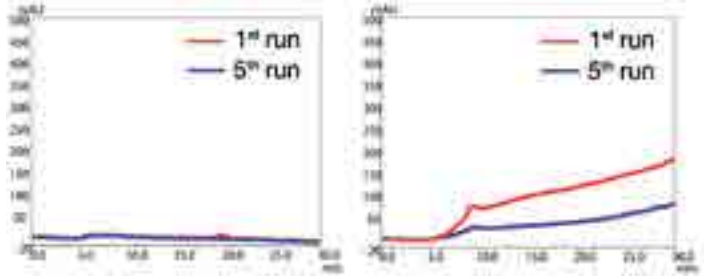
| | |
|---|---|
| Column: | 5 µm, 250 x 4.6 mm ID |
| Eluent: | *n*-hexane / IPA / DEA (80/20/0.1) |
| Flow rate: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | 230 nm |
| Injection: | 10 µL (0.1 mg/mL) |

**CHIRALPAK IB**

**CHIRAL ART Cellulose-SB**

### Low Column Bleeding

**CHIRAL ART Cellulose-SB** **CHIRALPAK IB**




| | |
|---|---|
| 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

UNIQUE

| | CHIRAL ART Amylose-SA | CHIRAL ART Cellulose-SB | CHIRAL ART Cellulose-SC | CHIRAL ART Cellulose-SJ |
|---|---|---|---|---|
| **Particle size** | 3, 5, 10, 20 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) |
| **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) | | | |
| **Recommended flow rate** | 4.6 mm ID: 0.5 - 1.0 mL/min (Max. flow rate: 3.0 mL/min)<br>10 mm ID: 2.5 - 5.0 mL/min (Max. flow rate: 15 mL/min) | | | |

## Product Line-up

| Product name | Particle size | CHIRAL selector | Type | Competitive product |
|---|---|---|---|---|
| **CHIRAL ART Amylose-SA** | 3 µm<br>5 µm<br>10 µm<br>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)** | | same chiral selector as CHIRALPAK® OJ (coated) |

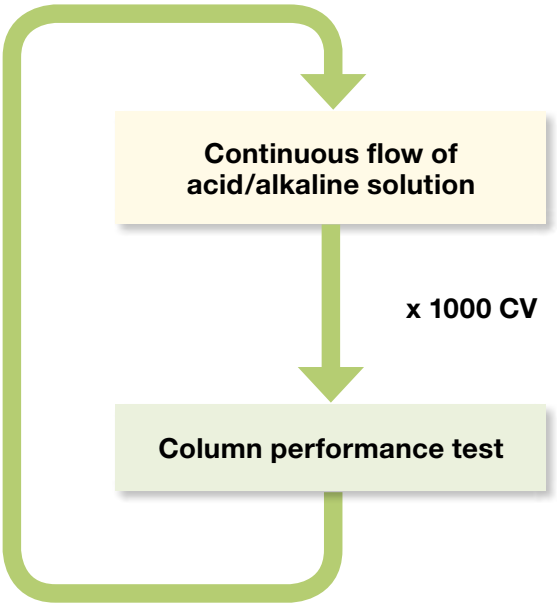
## Column Care

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.de/support-documentation.html.

# Immobilised Polysaccharides

## Wide usable pH range

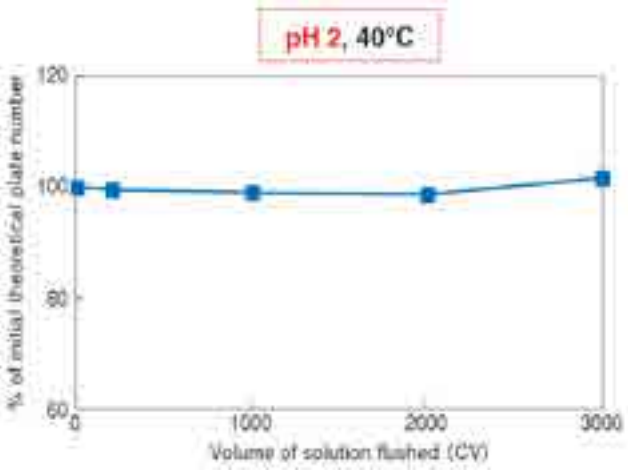


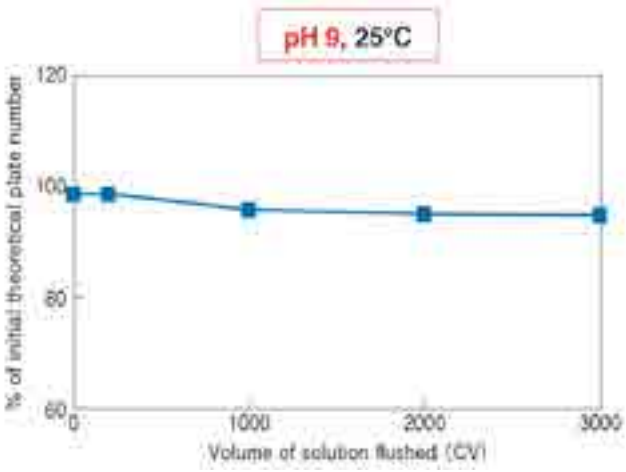

**Continuous flow of acid/alkaline solution**

| | |
|---|---|
| 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**

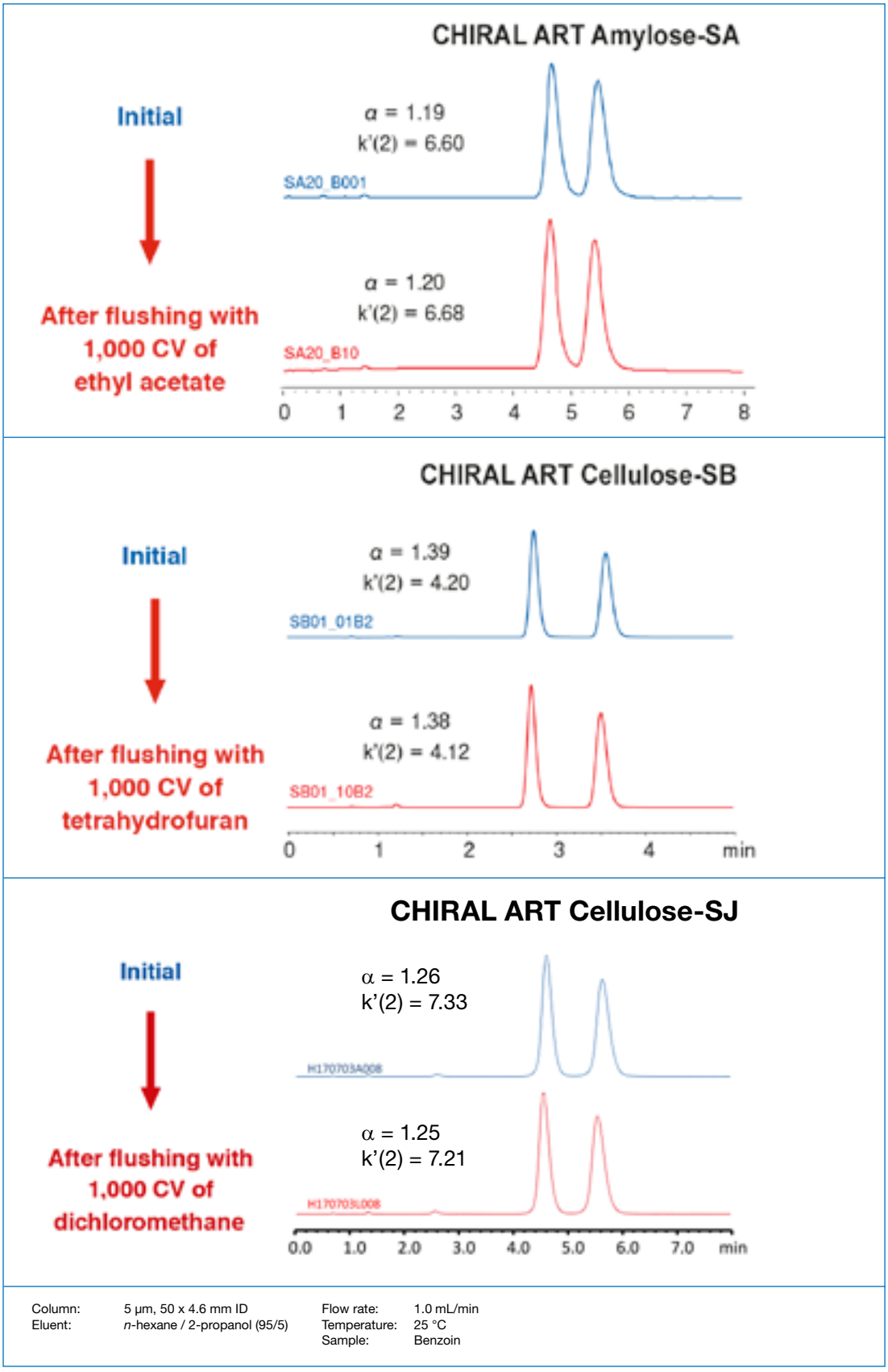
| | |
|---|---|
| Column: | CHIRAL ART Cellulose-SB 5 µm, 50 x 4.6 mm ID |
| Eluent: | acetonitrile/water (30/70) |
| Flow rate: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 254 nm |
| Sample: | Benzoin |



# Immobilised Polysaccharides

## High stability against various solvents

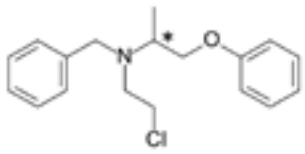



| | | | |
|---|---|---|---|
| Column: | 5 µm, 50 x 4.6 mm ID | Flow rate: | 1.0 mL/min |
| Eluent: | *n*-hexane / 2-propanol (95/5) | Temperature: | 25 °C |
| | | Sample: | Benzoin |

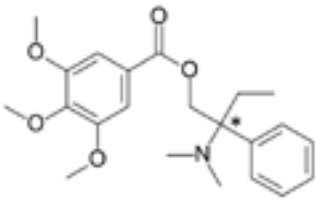
# Immobilised Polysaccharides

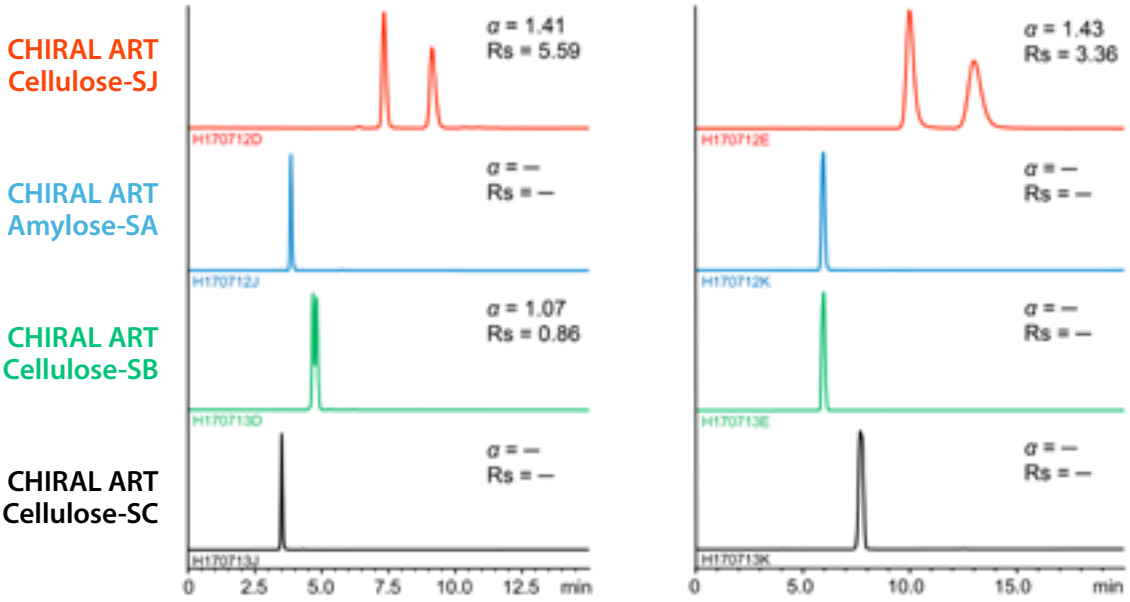
## Unique stereoselectivity complements other CHIRAL ART phases

**Phenoxybenzamin**




**Trimebutine**




**Phenoxybenzamine**

| | |
|---|---|
| Column: | (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) |

**Trimebutine**

| | |
|---|---|
| Column: | (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 265 nm |
| Injection: | 5 µL (1 mg/mL) |

# 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 with particle sizes of 3, 5, 10 or 20 µm available*
- *extremely attractive pricing*

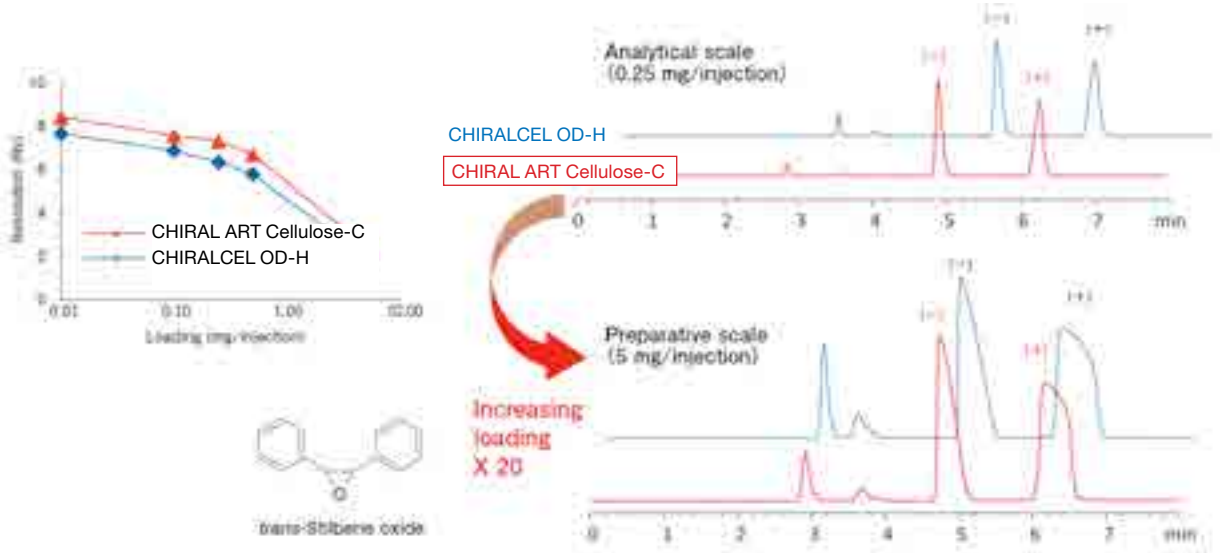
## Introduction

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




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) | |
| Recommended flow rate | 4.6 mm ID: 0.5 - 1.0 mL/min (Max. flow rate: 3.0 mL/min)<br>10 mm ID: 2.5 - 5.0 mL/min (Max. flow rate: 15 mL/min) | |

## Product Line-up

| Product name | Particle size | Chiral selector | Type | Competitive product |
|---|---|---|---|---|
| CHIRAL ART Amylose-C/Amylose-C Neo | 3 µm<br>5 µm<br>10 µm<br>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 |

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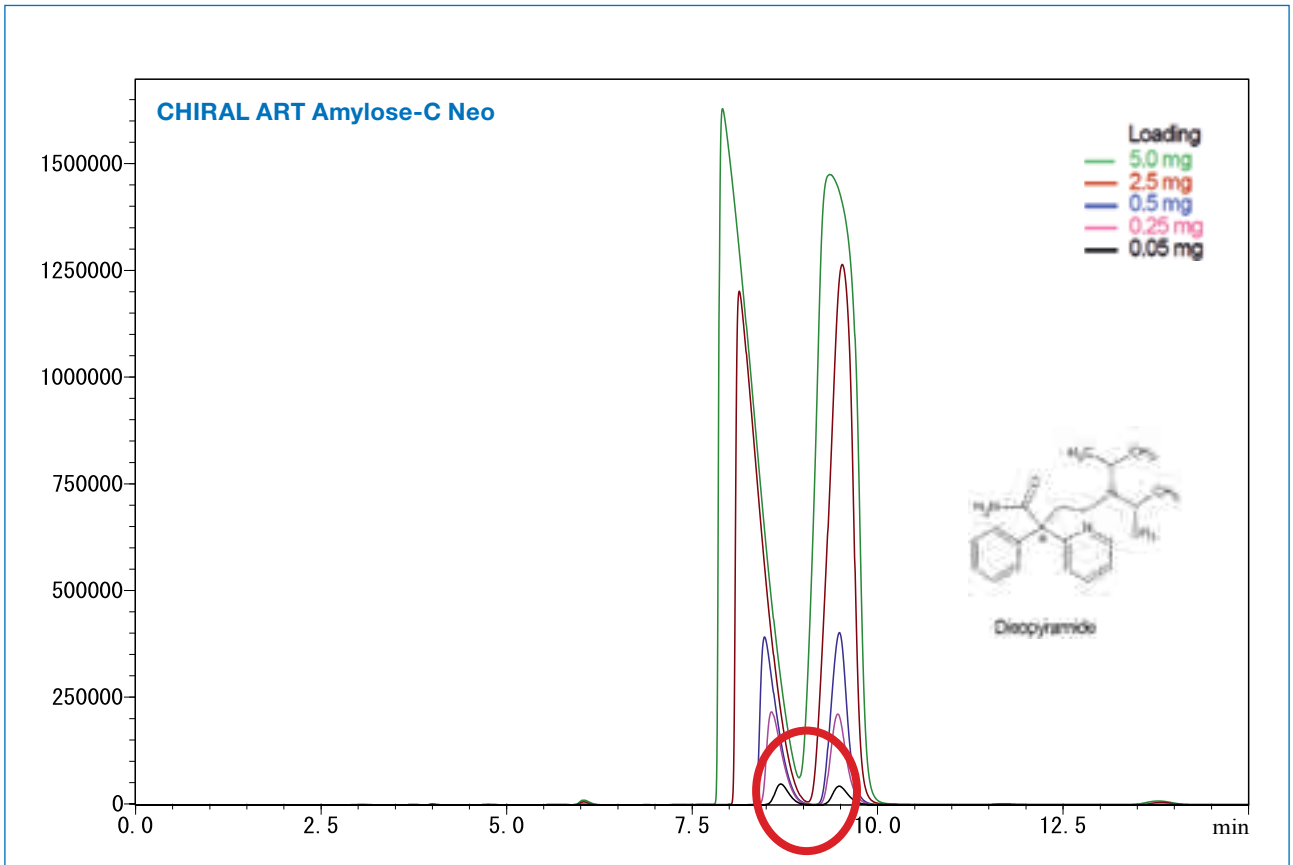
## CHIRAL ART Amylose-C Neo

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
Part No.: KBN99S05-2546WT
Eluent: n-Hexane/2-Propanol/Diethylamine (90/10/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV 290 nm
Sample: Disopyramide (50 mg/mL)

### Column Care

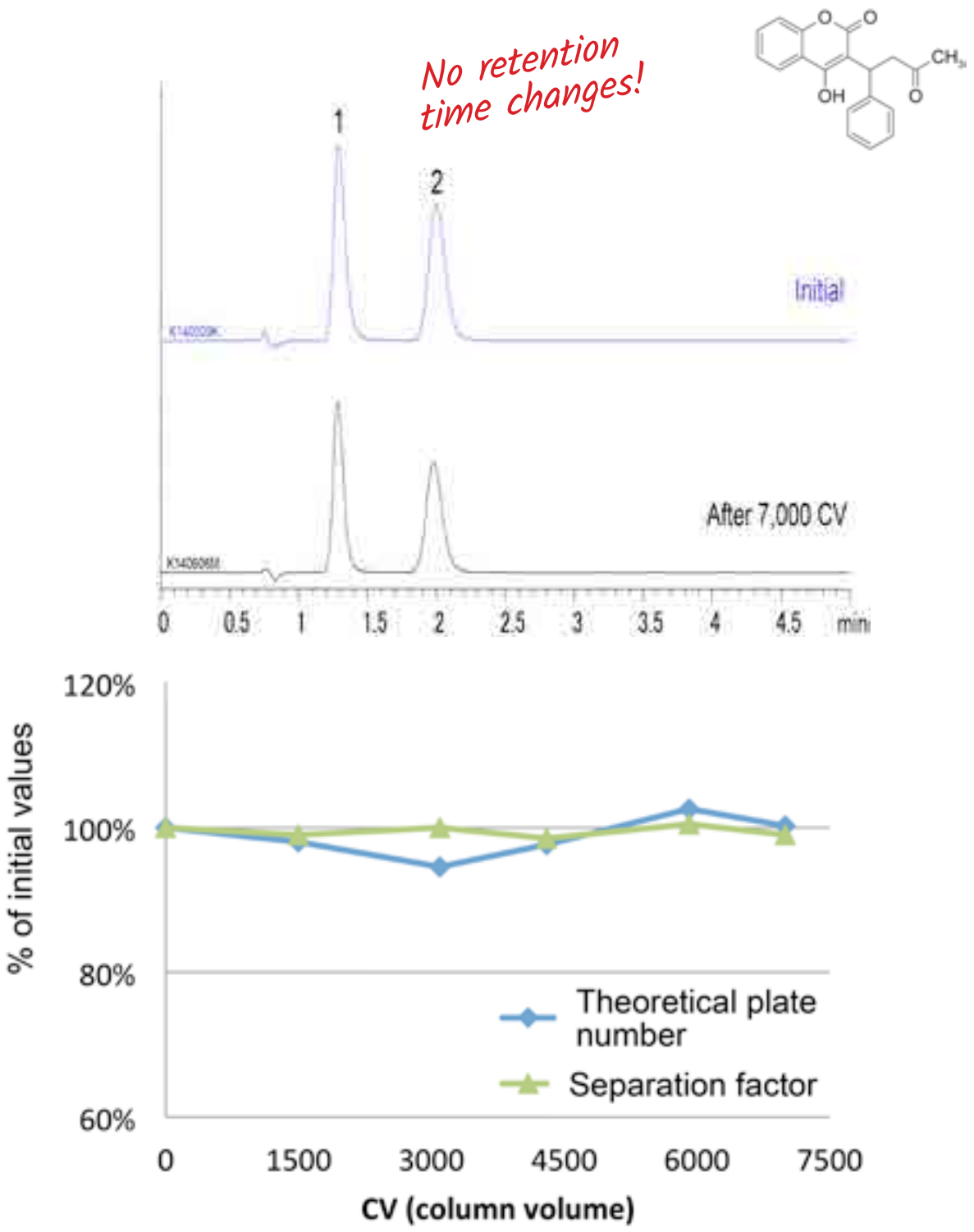
The recommended pH range for using CHIRAL ART coated polysaccharide columns is 3.5-6.5. Store the column in *n*-hexane/2-propanol = 90/10. If columns are affected by undesired contaminants or clogged inlet frits which cause back pressure increases, flush the column with ethanol.

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

# Coated Polysaccharides

## Enhanced stability using TFA

### Stability evaluation with Warfarin

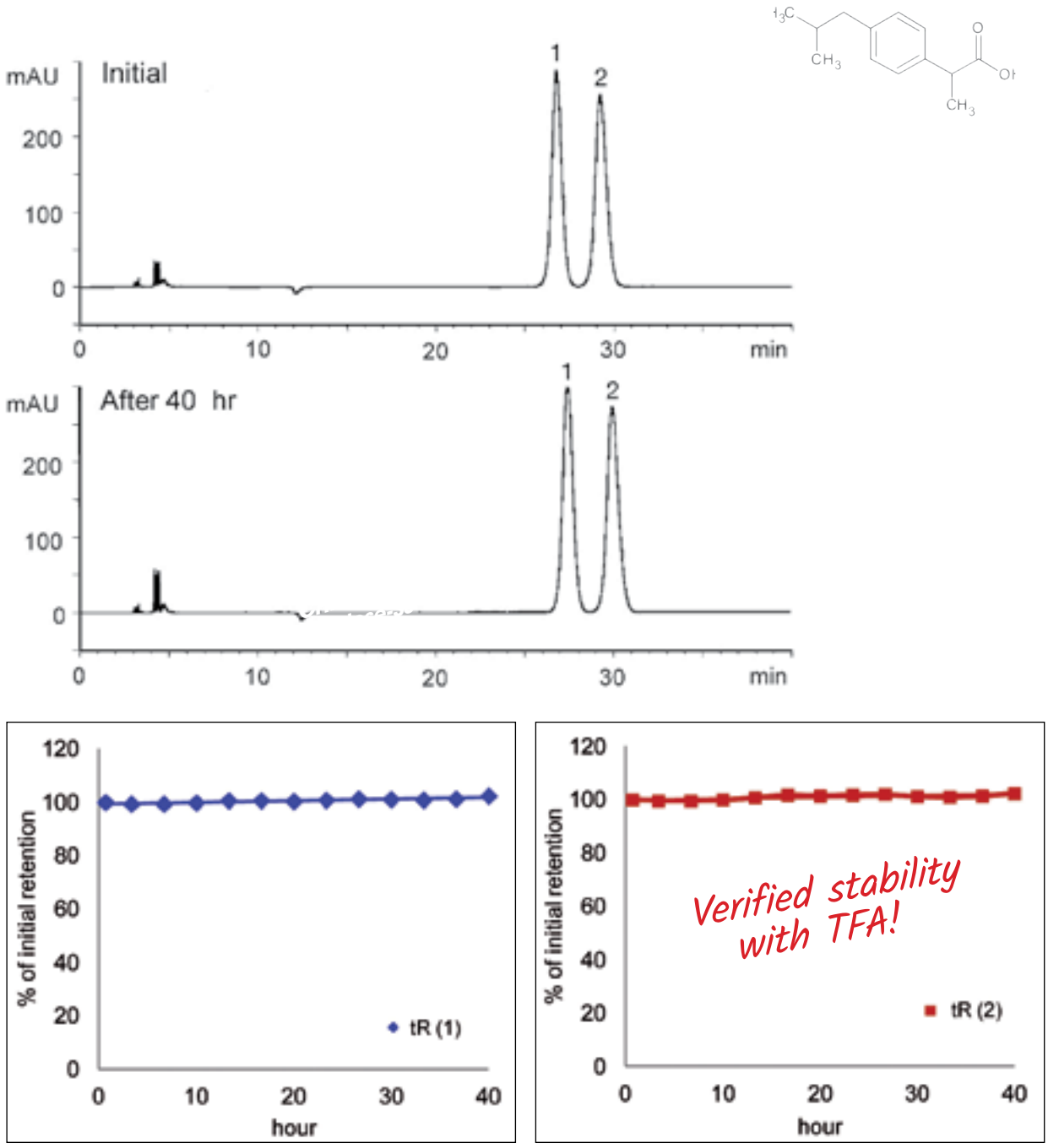



Column: CHIRAL ART Amylose-C (5 µm) 50 x 3.0 mm ID
Part No.: KAN99S05-0503WT
Eluent: *n*-hexane / ethanol / TFA (70/30/0.1)
Flow rate: 0.425 mL/min
Temperature: 25 °C
Detection: UV at 254 nm

# Coated Polysaccharides

## Enhanced stability using TFA

### Repeated analysis of Ibuprofen

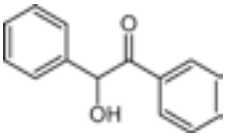



| | |
|---|---|
| Column: | CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID |
| Part No.: | KAN99S05-2546WT |
| Eluent: | *n*-hexane / 2-propanol / TFA (99/1/0.1) |
| Flow rate: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 220 nm |
| Injection: | 10 µL (1 mg/mL) |

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

α = 1.64

**5 µm**

250 x 4.6 mm ID
at 1.0 mL/min

α = 1.66

**10 µm**

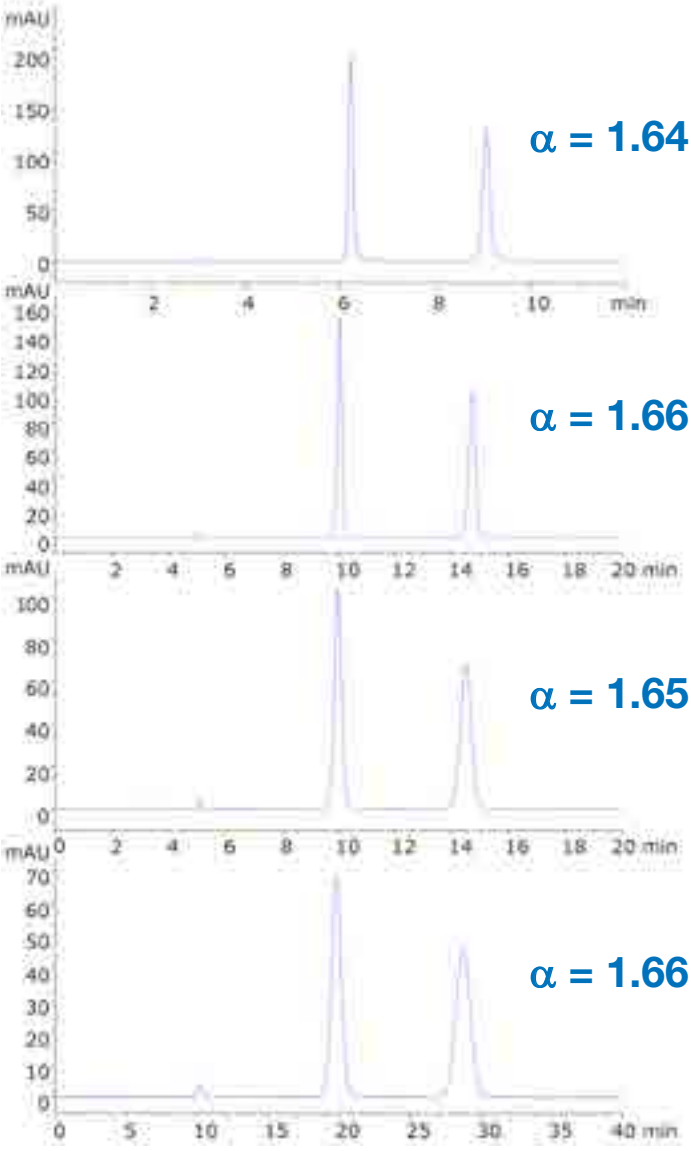
250 x 4.6 mm ID
at 1.0 mL/min

α = 1.65

**20 µm**

250 x 4.6 mm ID
at 0.5 mL/min

α = 1.66

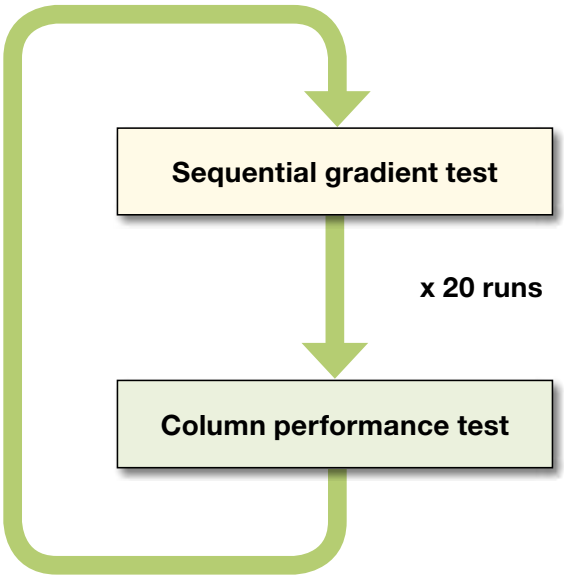



| | |
|---|---|
| Column: | CHIRAL ART Cellulose-C |
| Eluent: | *n*-hexane / 2-propanol (90/10) |
| Flow rate: | 1.0 mL/min (for 3, 5, 10 µm)<br>0.5 mL/min (for 20 µm) |
| Temperature: | 25 °C |
| Detection: | UV at 254 nm |
| Sample: | Benzoin |
| Injection: | 10 µl (0.1 mg/mL) |

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



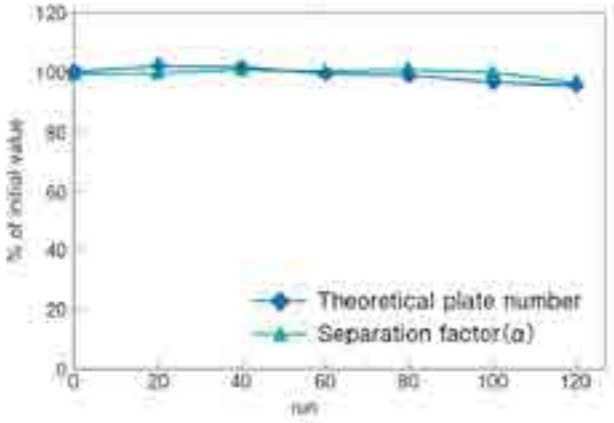

**Sequential gradient test**

| | |
|---|---|
| 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 |

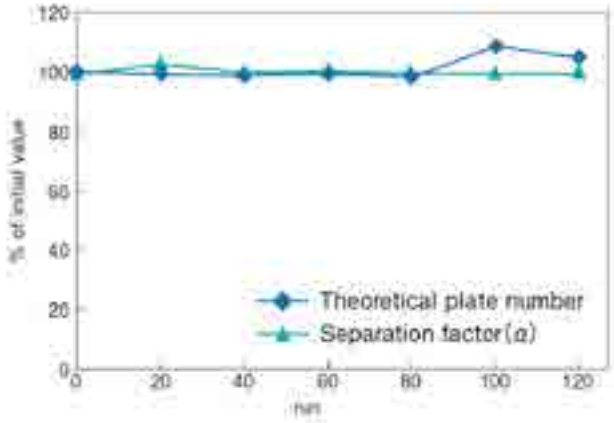
**Column performance test**

| | |
|---|---|
| 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)*



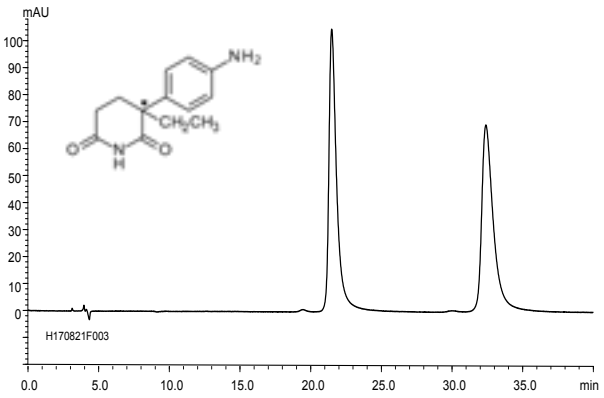

### CHIRAL ART *Cellulose-C*



# Applications
## Pharmaceuticals (APIs)

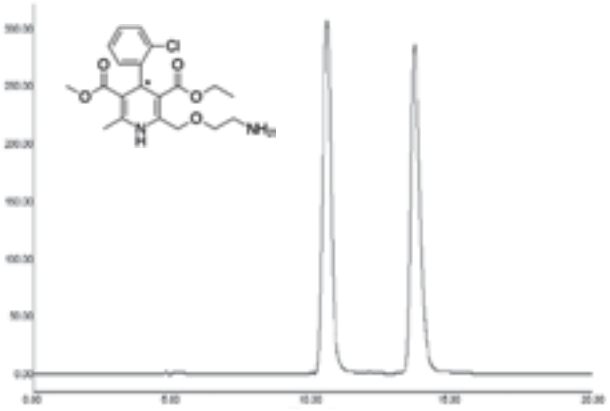
### Aminoglutethimide

Using CHIRAL ART Cellulose-SJ



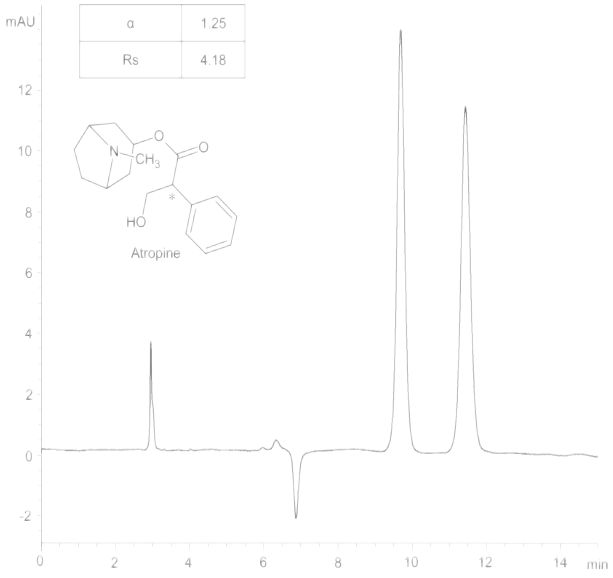

| | |
|---|---|
| Column: | CHIRAL ART Cellulose-SJ (5 µm) 250 X 4.6 mm ID |
| Part No.: | KSJ99S05-2546WT |
| Eluent: | *n*-hexane / ethyl acetate / diethylamine (70/30/0.1) |
| Flow rate | 1.0 mL/min |
| Temperature: | 25 °C |

### Amlodipine



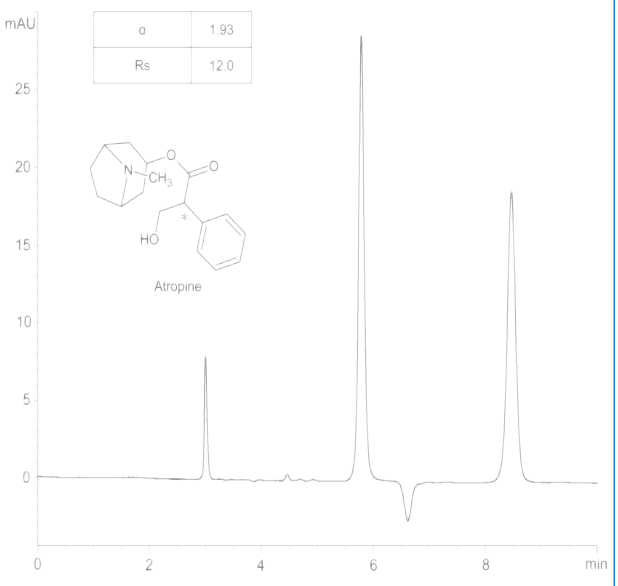

| | |
|---|---|
| Column: | CHIRAL ART Cellulose-SC (5 µm) 250 x 4.6 mm ID |
| Part No.: | KSC99S05-2546WT |
| Eluent: | dichloromethane / acetonitrile / *n*-butylamine (90/10/0.1) |
| Flow rate: | 0.7 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 360 nm |
| Injection: | 20 µL (0.5 mg/mL) |

### 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: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 230 nm |
| Injection: | 2 µL (1 mg/mL) |

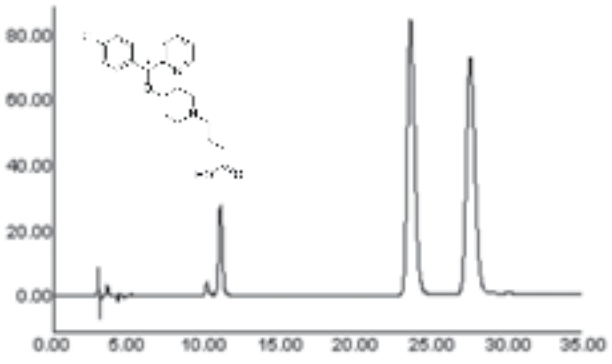
### Atropine




| | |
|---|---|
| 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: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 230 nm |
| Injection: | 2 µL (1 mg/mL) |

# Applications
## Pharmaceuticals (APIs)

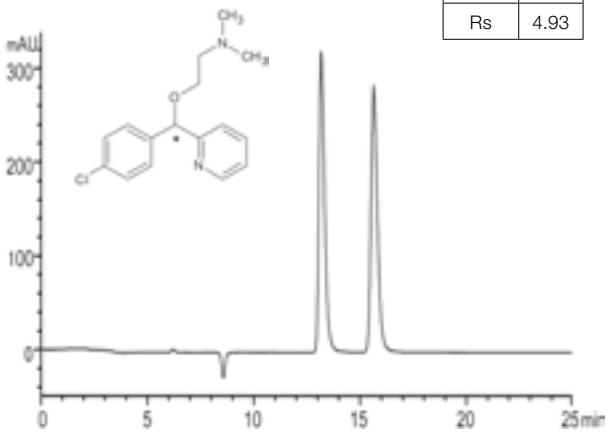
### Bepotastine




| | |
|---|---|
| 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

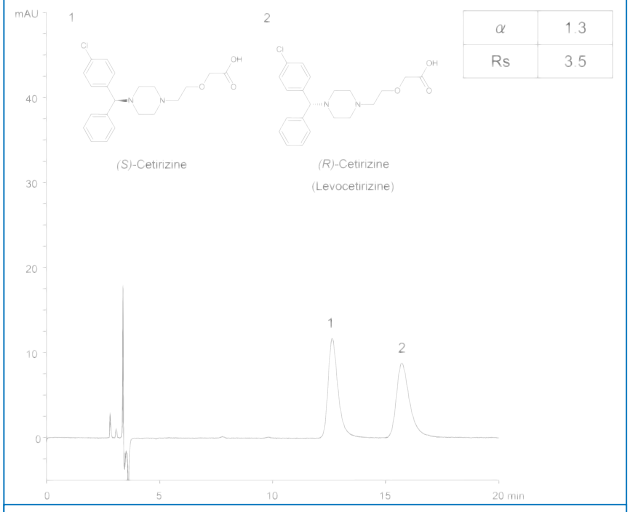
| | |
|---|---|
| α | 1.34 |
| Rs | 4.93 |




| | |
|---|---|
| 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 (1.0 mg/mL) |

### Cetirizine

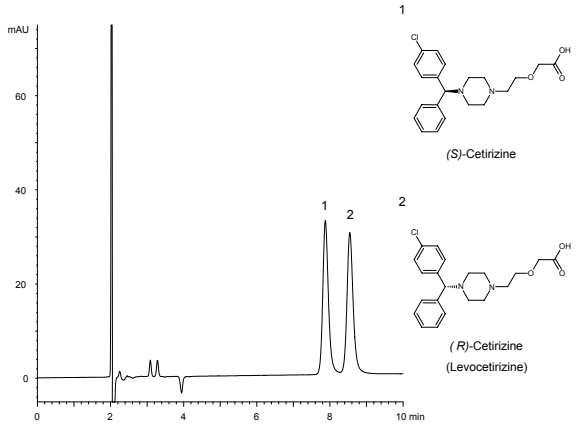
| | |
|---|---|
| α | 1.3 |
| Rs | 3.5 |




| | |
|---|---|
| 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: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 230 nm |
| Injection: | 2 µL (200 µg/mL) |

### Cetirizine

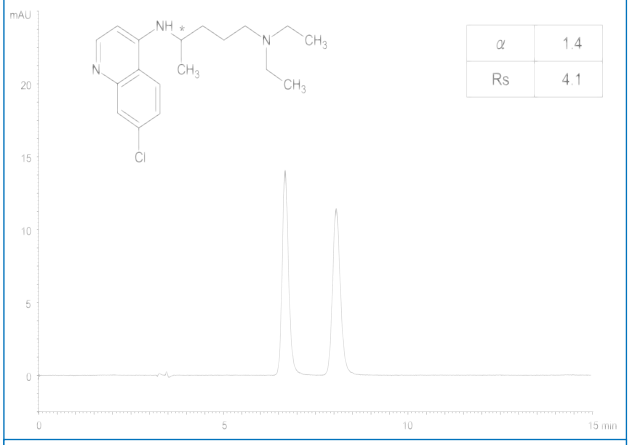
| | |
|---|---|
| α | 1.1 |
| Rs | 2.4 |




| | |
|---|---|
| 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) |

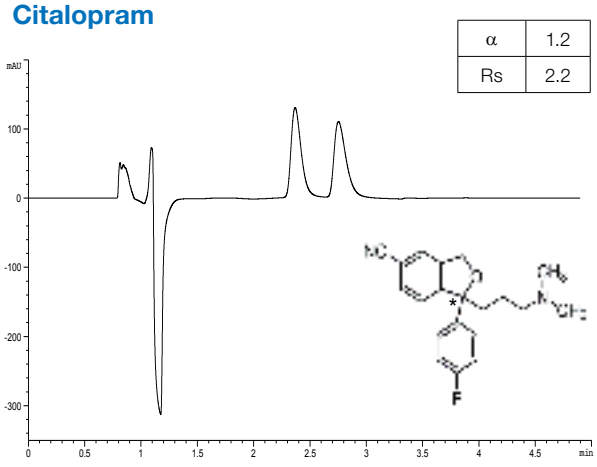
# Applications
## Pharmaceuticals (APIs)

### 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) |

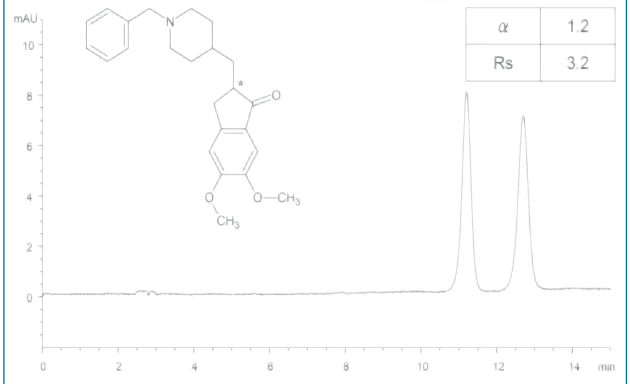
### Citalopram




| | |
|---|---|
| Column: | CHIRAL ART Cellulose-C (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) |

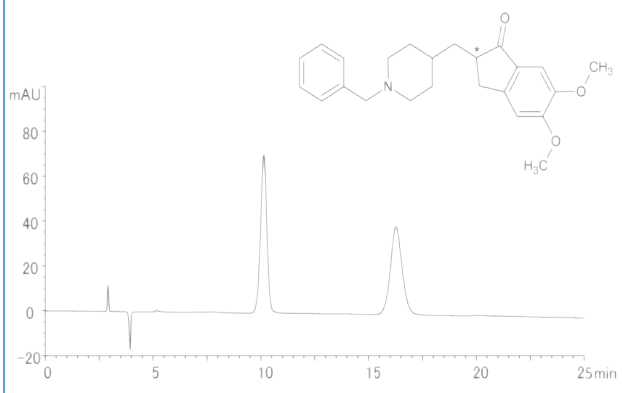
**RP-Mode**

### 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) |

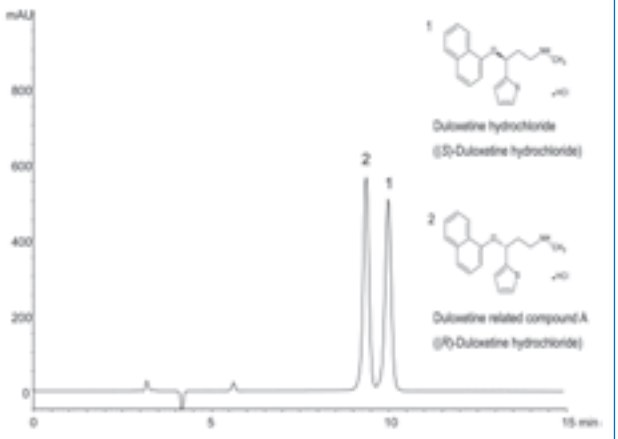
### Donepezil




| | |
|---|---|
| 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) |

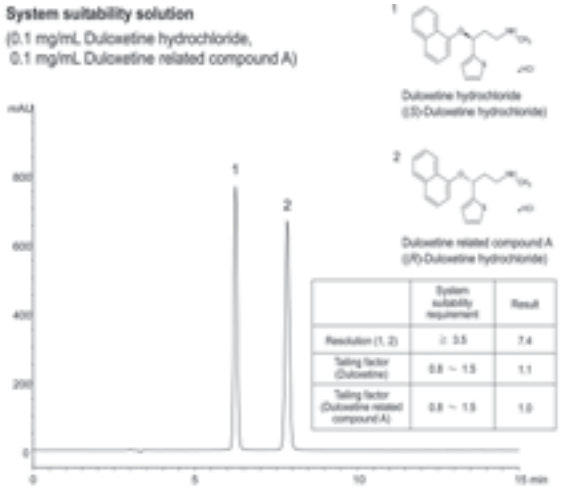
# Applications
## Pharmaceuticals (APIs)

### 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: 1.0 mL/min
Temperature: 30 °C
Detection: UV at 230 nm
Injection: 10 µL (0.1 mg/mL)

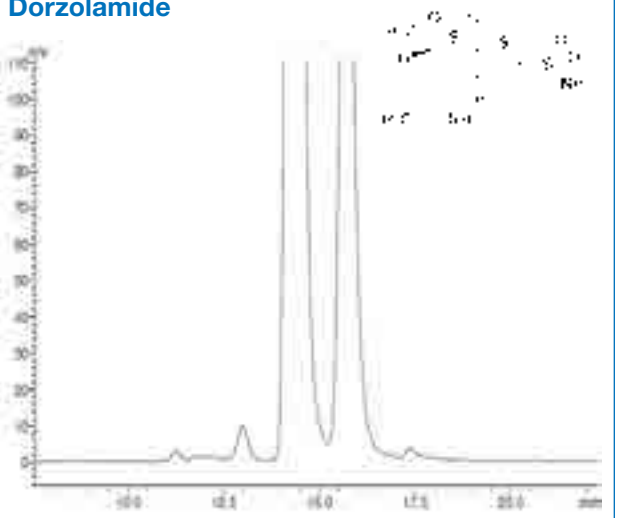
### Duloxetine hydrochloride




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: 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)

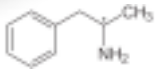
### Dorzolamide

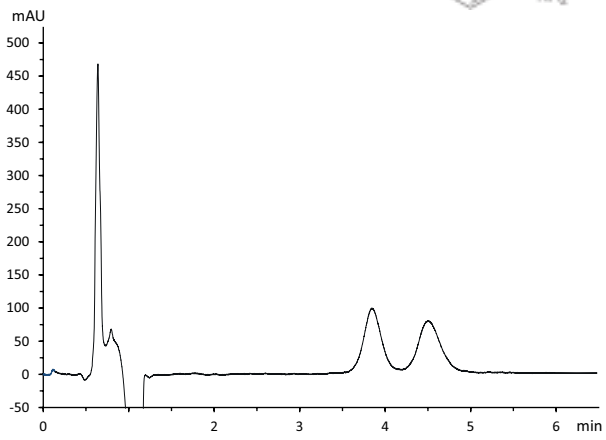


Column: CHIRAL ART Cellulose-SC (5 µm) 250 x 4.6 mm ID
Part No.: KSC99S05-2546WT
Eluent: *n*-hexane / ethanol / diethylamine (80/20/0.1))
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 254 nm
Injection: 20 µL (0.25 mg/mL)

**RP-Mode**

### Amphetamine

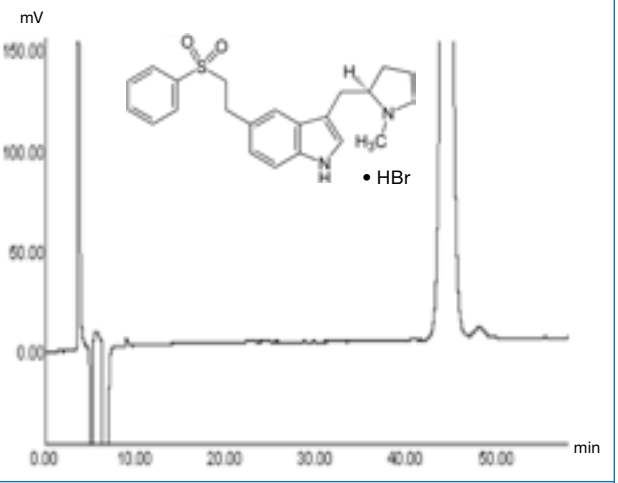



Column: CHIRAL ART Amylose-SA (3 µm) 50 x 4.6 mm ID
Part No.: KSA99S03-0546WT
Eluent: Water + 0.1 % diethylamine / Methanol + 0.1 % diethylamine (55/45)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 210 nm
Injection: 10 µL

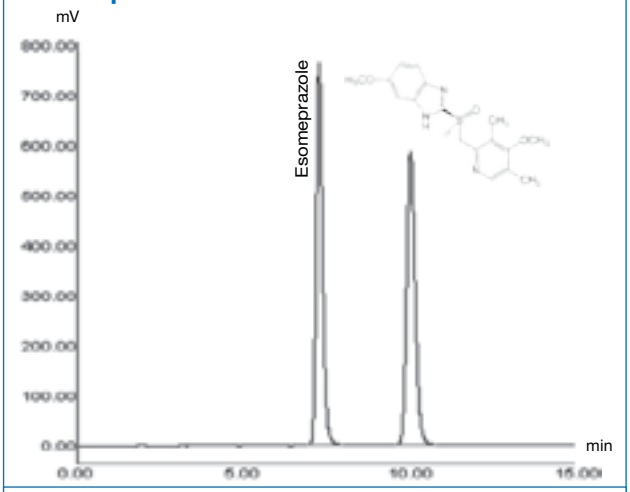
# Applications
## Pharmaceuticals (APIs)

### 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) |

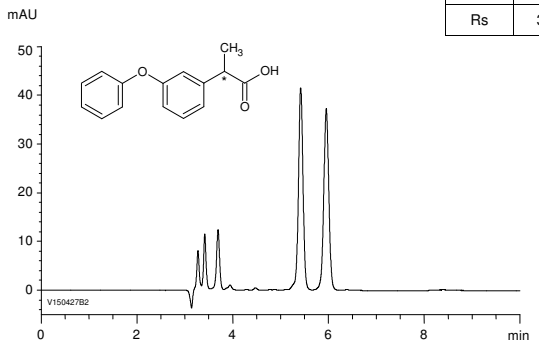
### Esomeprazole




| | |
|---|---|
| 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

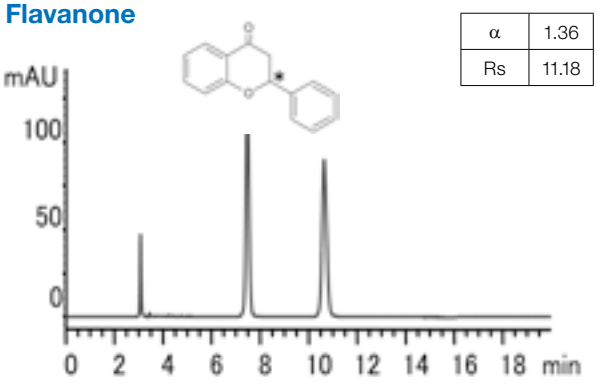
| α | 1.2 |
|---|---|
| Rs | 3.0 |




| | |
|---|---|
| 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

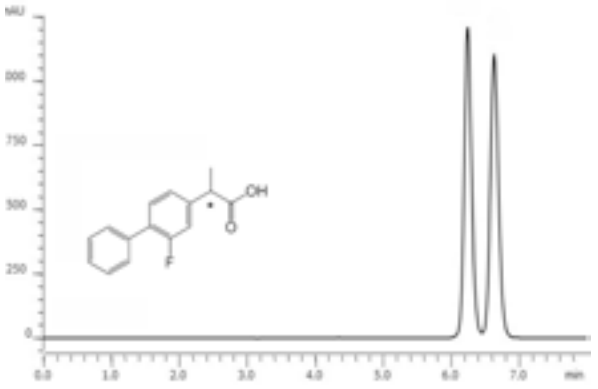
| α | 1.36 |
|---|---|
| Rs | 11.18 |




| | |
|---|---|
| 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)

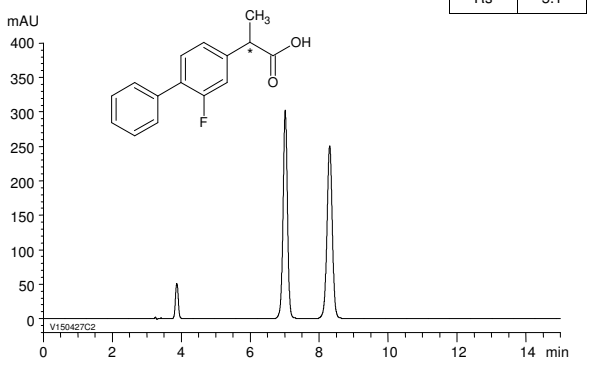
### Flurbiprofen




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 (1.0 mg/mL)

### Flurbiprofen

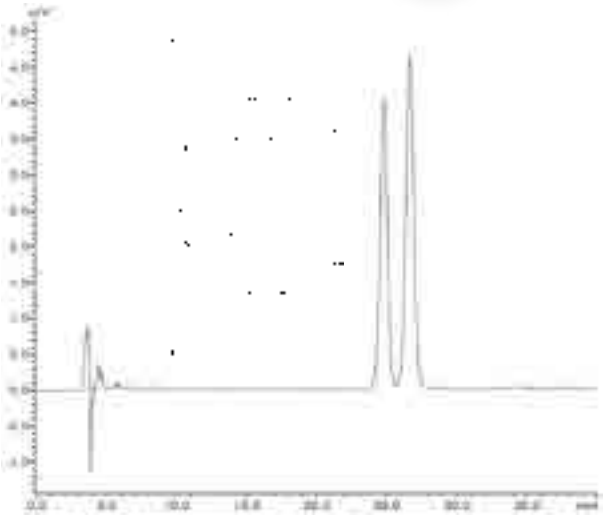
| | |
|---|---|
| α | 1.3 |
| Rs | 5.1 |




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)

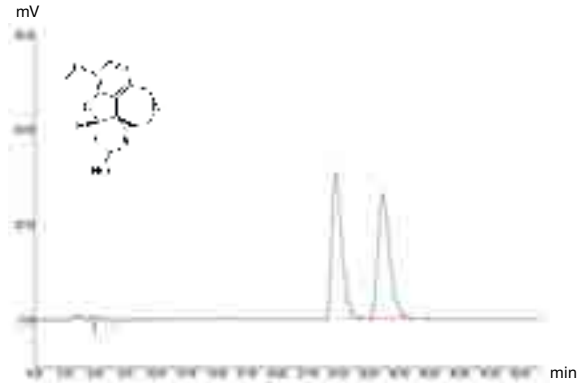
**RP-Mode**

### 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)

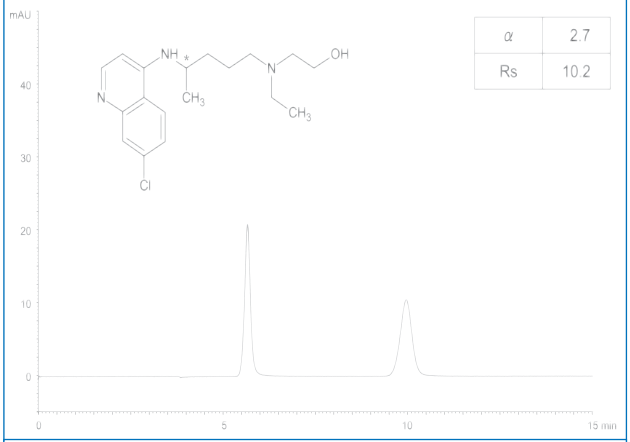
### Galantamine




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)

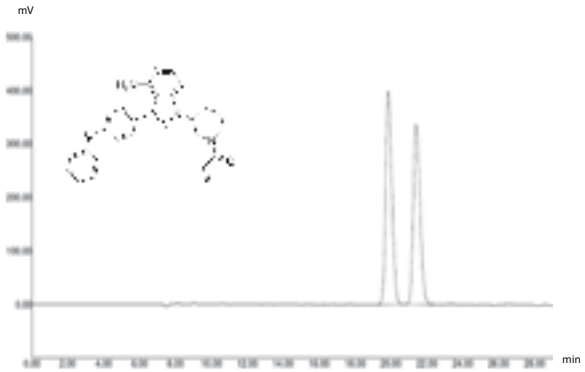
## Hydroxychloroquine




| | |
|---|---|
| α | 2.7 |
| Rs | 10.2 |

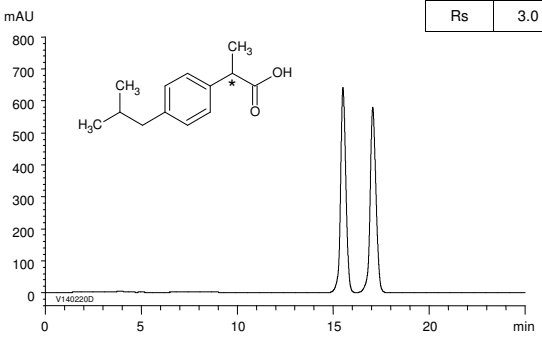
| | |
|---|---|
| Column: | CHIRAL ART Amylose-SA (5 µm) 250 x 4.6 mm ID |
| Part No.: | KSA99S05-2546WT |
| Eluent: | methyl *tert*-butyl ether / ethanol / diethylamine (90/10/0.1) |
| Flow rate: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 344 nm |
| Injection: | 5 µL (100 µg/mL) |

## 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) |

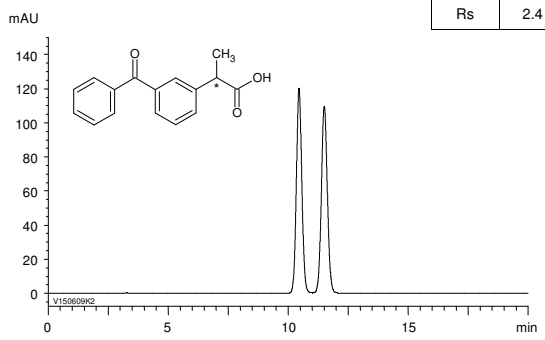
## Ibuprofen




| | |
|---|---|
| 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



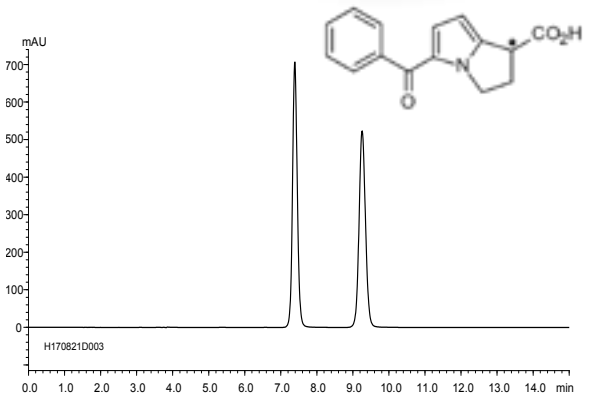

| | |
|---|---|
| α | 1.1 |
| Rs | 2.4 |

| | |
|---|---|
| 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)

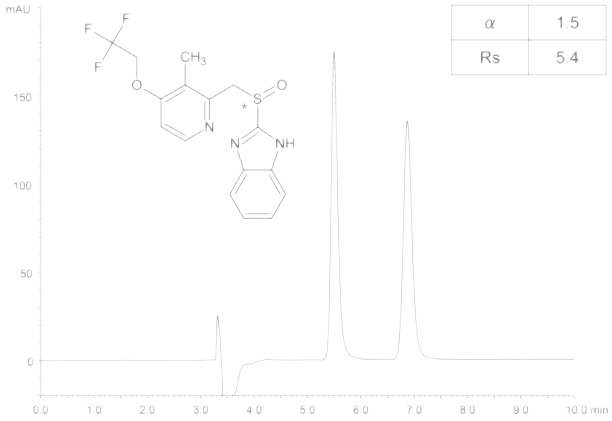
### Ketorolac

Using CHIRAL ART Cellulose-SJ




| | |
|---|---|
| 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

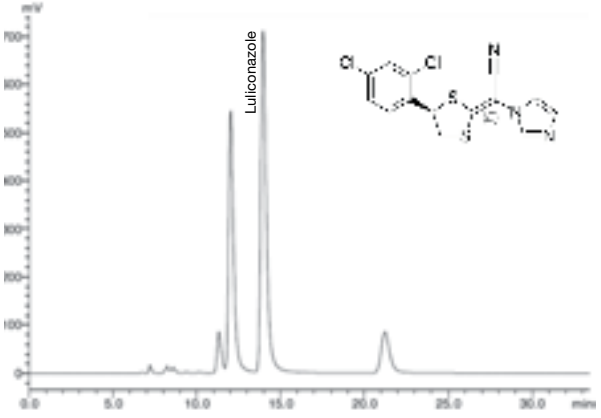



| | |
|---|---|
| Column: | CHIRAL ART Amylose-SA (5 µm) 250 x 4.6 mm ID |
| Part No.: | KSA99S05-2546WT |
| Eluent: | ethyl acetate / ethanol / diethylamine (95/5/0.1) |
| Flow rate: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 290 nm |
| Injection: | 10 µL (100 µg/mL) |

### 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) |

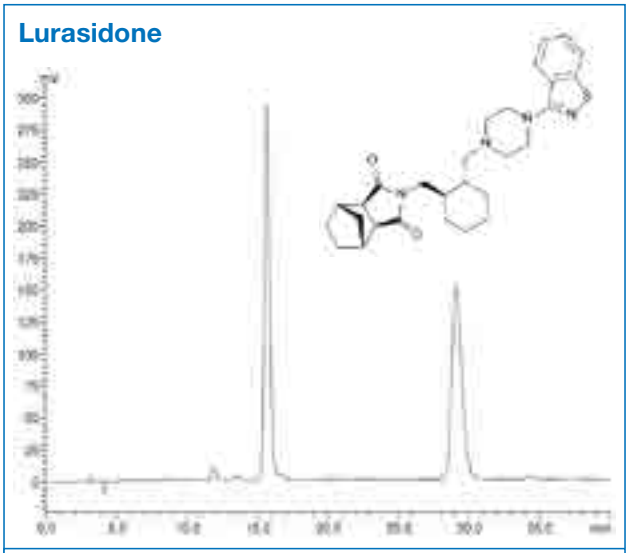
### Luliconazole




| | |
|---|---|
| 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) |

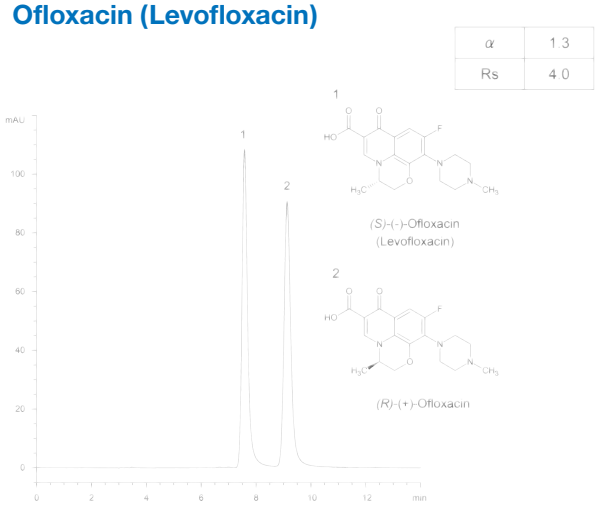
# Applications
## Pharmaceuticals (APIs)

### Lurasidone



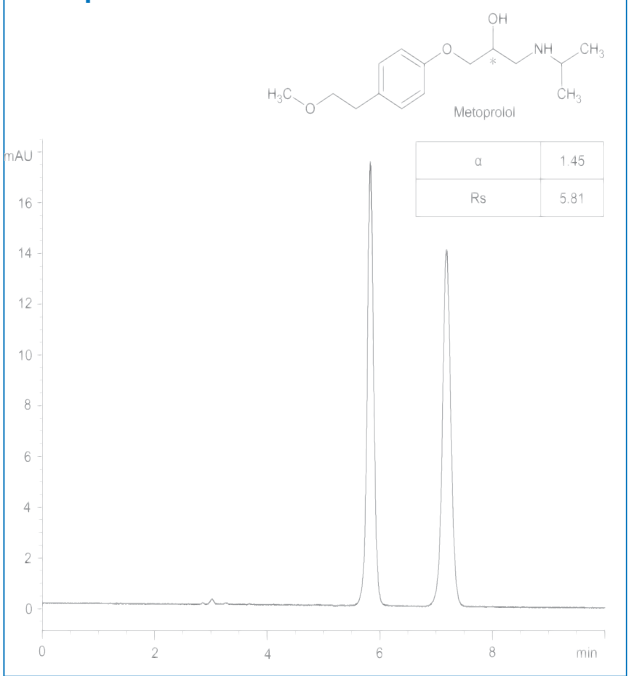
| | |
|---|---|
| Column: | CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID |
| Part No.: | KSB99S05-2546WT |
| Eluent: | *n*-hexane / 2-propanol / diethylamine (90/10/0.2) |
| Flow rate: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 230 nm |
| Injection: | 20 µL (0.5 mg/mL) |

### Ofloxacin (Levofloxacin)



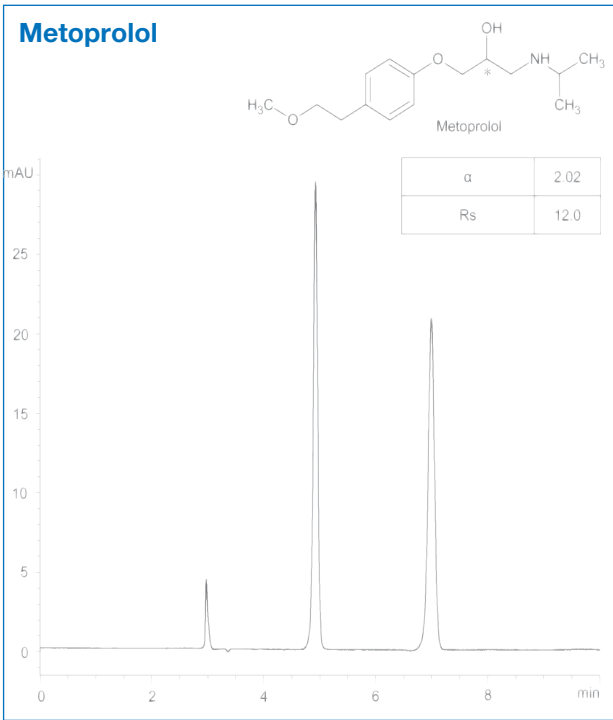

| | |
|---|---|
| Column: | CHIRAL ART Cellulose-SC (5 µm) 250 x 4.6 mm ID |
| Part No.: | KSC99S05-2546WT |
| Eluent: | *tert*-butyl methyl ether / ethanol / acetic acid / ethylenediamine (50/50/0.1/0.1) |
| Flow rate: | 1.0 mL/min |
| Temperature: | 40 °C |
| Detection: | UV at 300 nm |

### Metoprolol




| | |
|---|---|
| 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: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 254 nm |
| Injection: | 5 µL (1 mg/mL) |

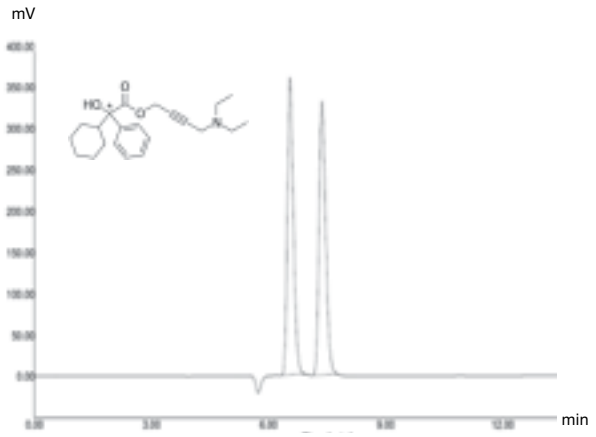
### Metoprolol




| | |
|---|---|
| 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: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 254 nm |
| Injection: | 5 µL (1 mg/mL) |

# Applications
## Pharmaceuticals (APIs)

### Oxybutynin

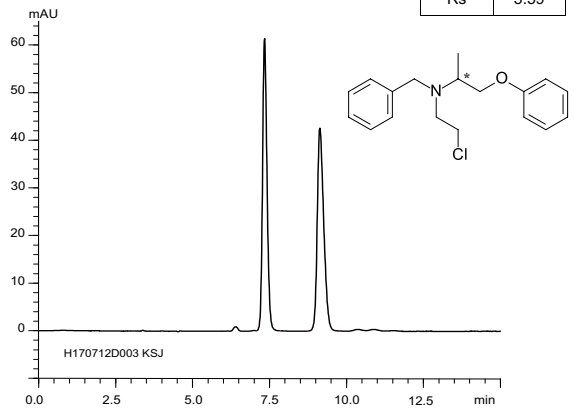



| | |
|---|---|
| Column: | CHIRAL ART Amylose-SA (5 µm) 250 x 4.6 mm ID |
| Part No.: | KSA99S05-2546WT |
| Eluent: | *n*-hexane / 2-propanol / diethylamine (90/10/0.1) |
| Flow rate: | 0.8 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 220 nm |
| Injection: | 20 µL (0.5 mg/mL) |

### Phenoxybenzamine

Using CHIRAL ART Cellulose-SJ

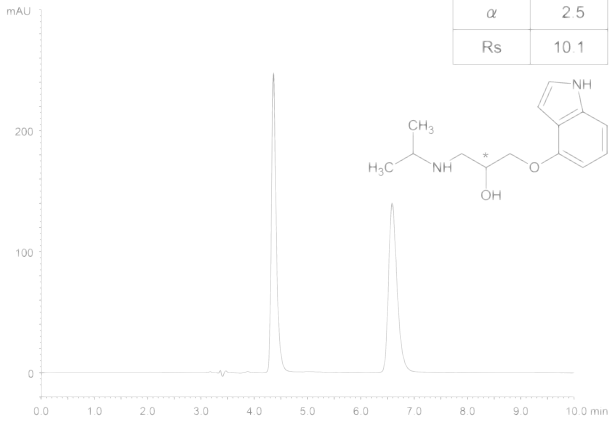
| | |
|---|---|
| α | 1.41 |
| Rs | 5.59 |




| | |
|---|---|
| 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

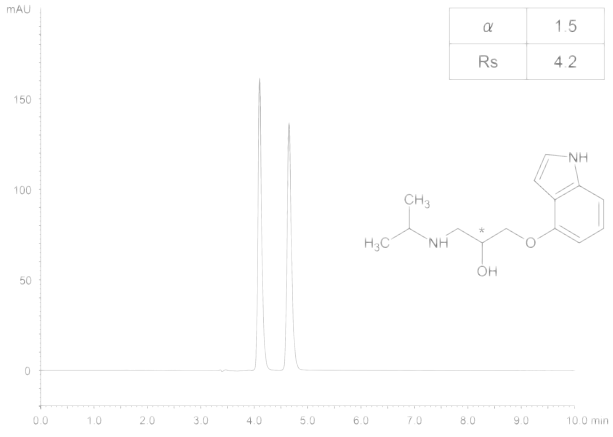
| | |
|---|---|
| α | 2.5 |
| Rs | 10.1 |




| | |
|---|---|
| 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

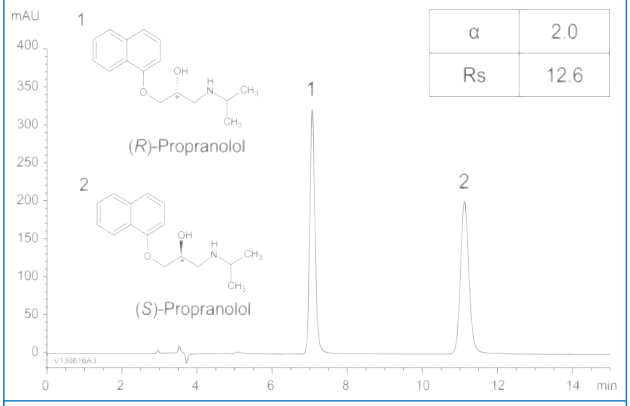
| | |
|---|---|
| α | 1.5 |
| Rs | 4.2 |




| | |
|---|---|
| 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)

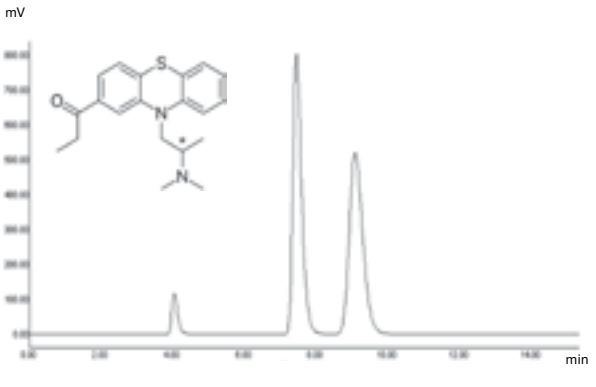
### Propranolol




| | |
|---|---|
| α | 2.0 |
| Rs | 12.6 |

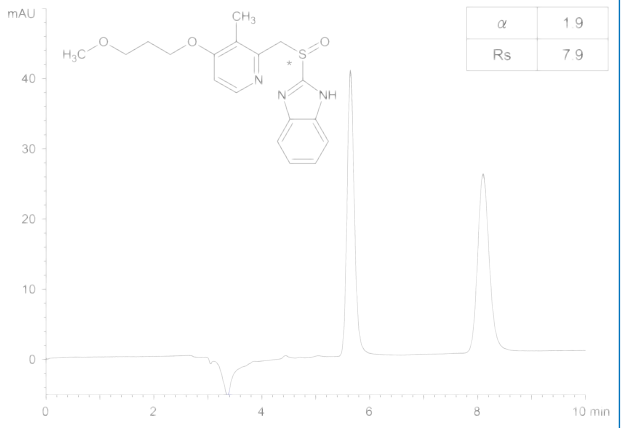
| | |
|---|---|
| Column: | CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID |
| Part No.: | KCN99S05-2546WT |
| Eluent: | *n*-hexane / 2-propanol / diethylamine (80/20/0.1) |
| Flow: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 230 nm |
| Injection: | 10 µL (0.1 mg/mL) |

### 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) |

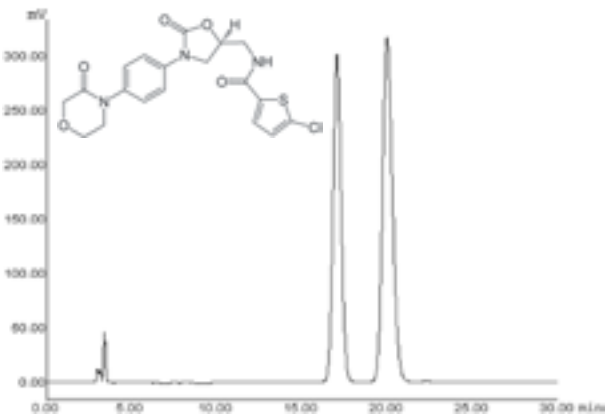
### Rabeprazole




| | |
|---|---|
| α | 1.9 |
| Rs | 7.9 |

| | |
|---|---|
| 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) |

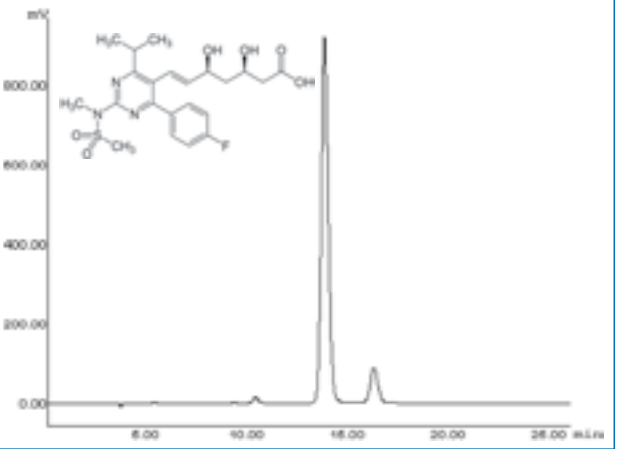
### Rivaroxaban




| | |
|---|---|
| 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) |

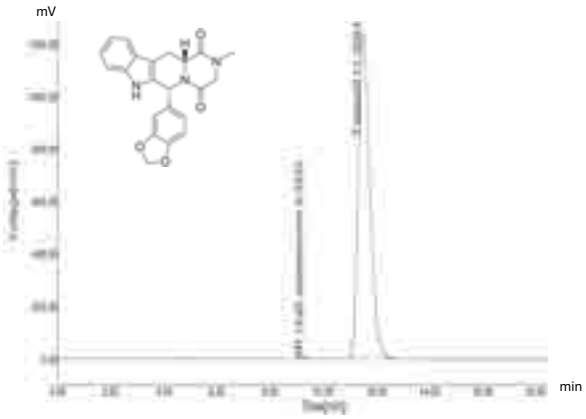
# Applications
## Pharmaceuticals (APIs)

### Rosuvastatin



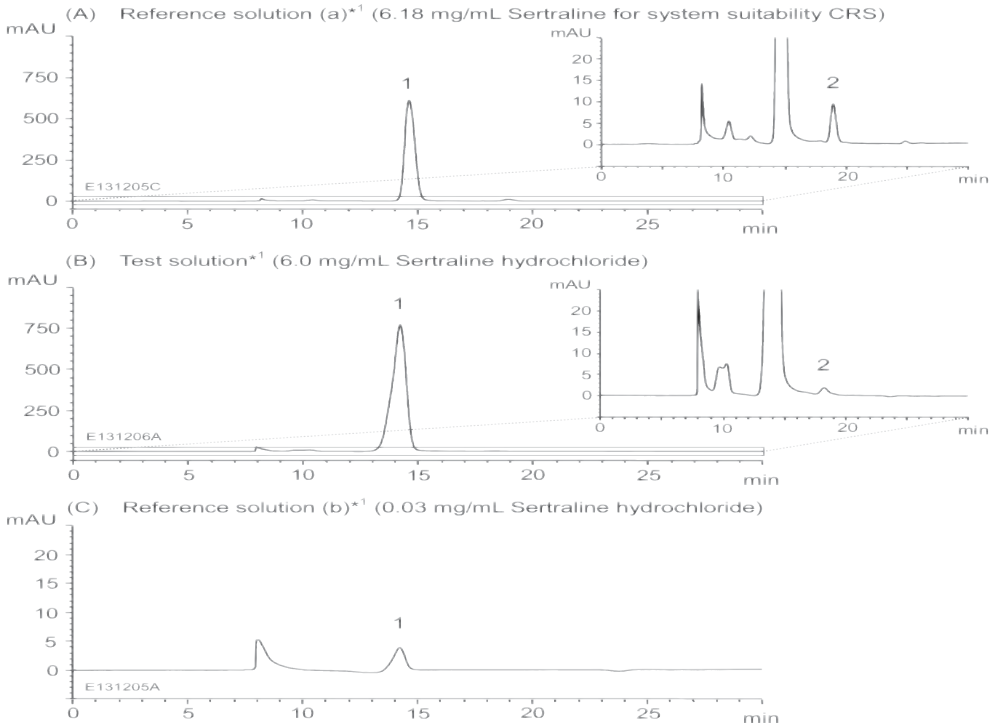
| | |
|---|---|
| Column: | CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID |
| Part No.: | KSB99S05-2546WT |
| Eluent: | *n*-hexane / ethanol / trifluoroacetic acid (85/15/0.1) |
| Flow rate: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 242 nm |
| Injection: | 20 µL (0.5 mg/mL) |

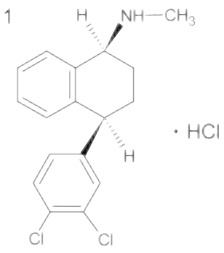
### Tadalafil



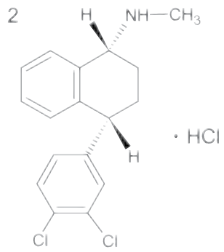

| | |
|---|---|
| Column: | CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID |
| Part No.: | KAN99S05-2546WT |
| Eluent: | *n*-hexane / 2-propanol (50/50) |
| Flow rate: | 0.75 mL/min |
| Temperature: | 30 °C |
| Detection: | UV at 222 nm |
| Injection: | 10 µL (0.5 mg/mL in n-hexane/2-propanol/acetonitrile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

### Sertraline hydrochloride (The European Pharmacopeia)




Sertraline hydrochloride




Sertraline hydrochloride
(enantiomer)

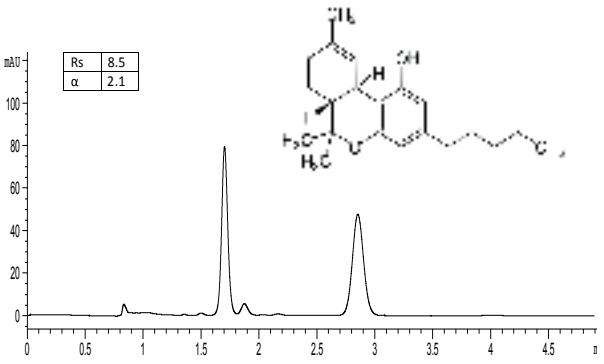
*1 Test solution and Reference solution were prepared from Sertraline hydrochloride supplied as a reagent for laboratory use.

| | |
|---|---|
| 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: | 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)

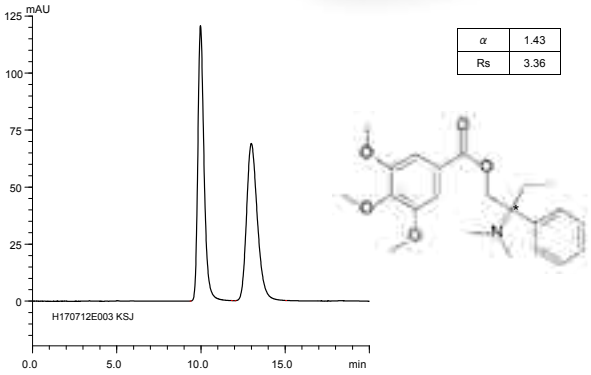
## Tetrahydrocannabinol




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)

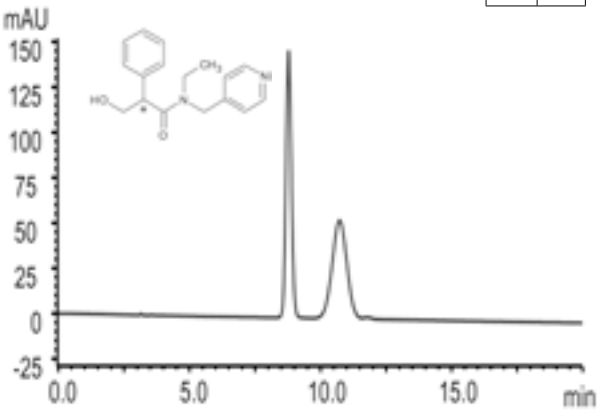
## Trimebutine

Using CHIRAL ART Cellulose-SJ



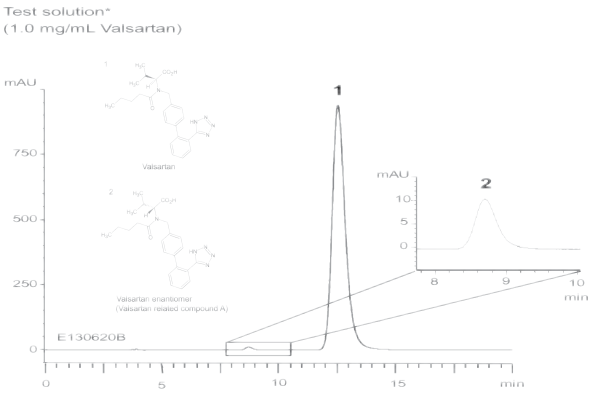

Column: CHIRAL ART Cellulose-SJ (5 µm) 250 X 4.6 mm ID
Part No.: KSJ99S05-2546WT
Eluent: *n*-hexane / ethanol / diethylamine (95/5/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 265 nm
Injection: 5 µL (1 mg/mL)

## 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 (1.0 mg/mL)

## Valsartan (The United States Pharmacopeia)

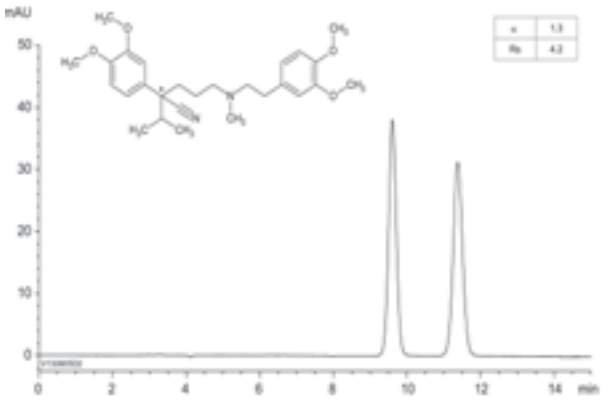



* Test solution was prepared from Valsartan supplied as a reagent for laboratory use.

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: 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)

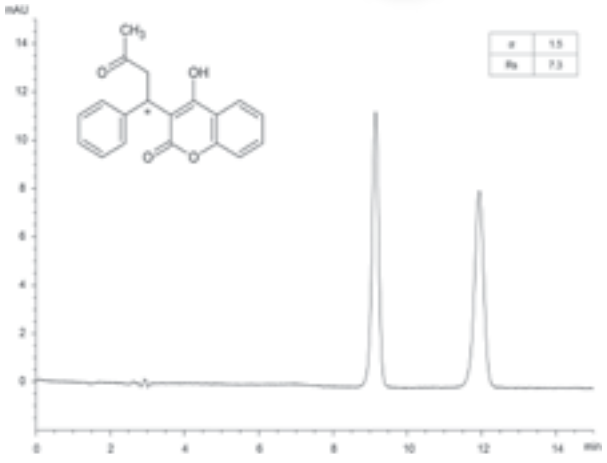
## Verapamil




| | |
|---|---|
| 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: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 254 nm |
| Injection: | 10 µL (1 mg/mL) |

RP-Mode

## Warfarin

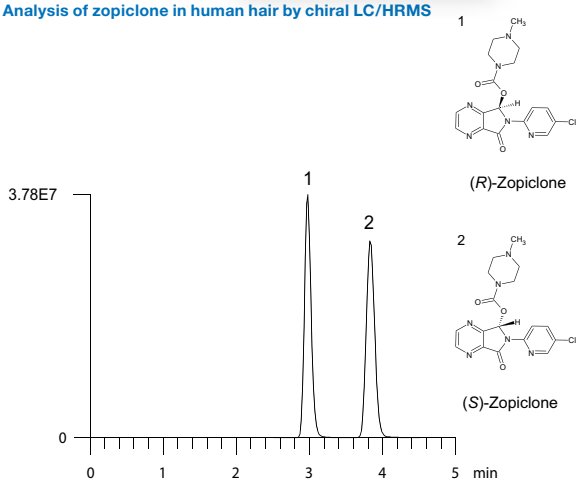



| | |
|---|---|
| Column: | CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID |
| Part No.: | KSB99S05-2546WT |
| Eluent: | 20 mM phosphoric acid / acetonitrile (50/50) |
| Flow rate: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 254 nm |
| Injection: | 2 µL (200 µg/mL) |

LC-MS

## Zopiclone

**Analysis of zopiclone in human hair by chiral LC/HRMS**

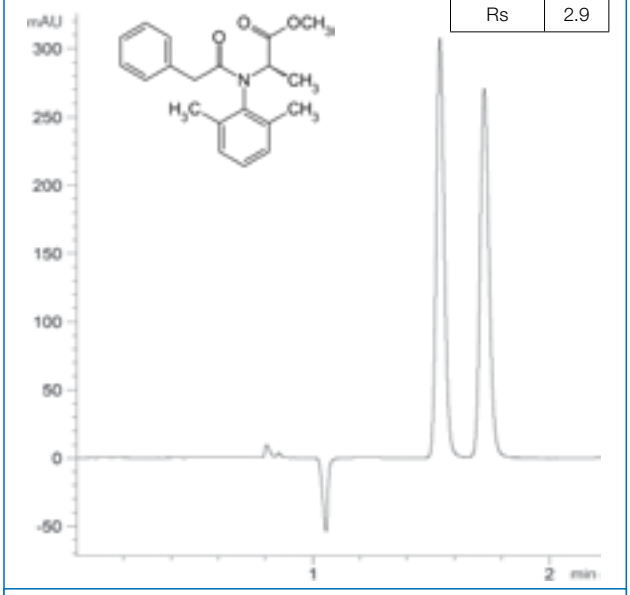



| | |
|---|---|
| Column: | CHIRAL ART Cellulose-SC (3 µm) 150 x 2.0 mm ID |
| Part No.: | KSC99S03-1502WT |
| Eluent: | 10 mM ammonium bicarbonate (pH 8.0 with aqueous ammonia) / acetonitrile (25/75) |
| Flow rate: | 0.2 mL/min |
| Temperature: | 25 °C |
| Detection: | ESI, positive |
| Injection: |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

# Applications
## Pesticides

### Benalaxyl

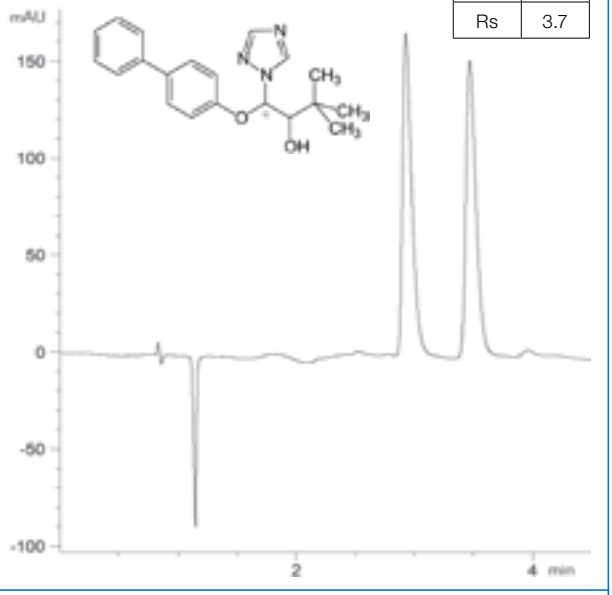
| | |
|---|---|
| α | 1.2 |
| Rs | 2.9 |




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 (1.0 mg/mL)

### Bitertanol

| | |
|---|---|
| α | 1.2 |
| Rs | 3.7 |

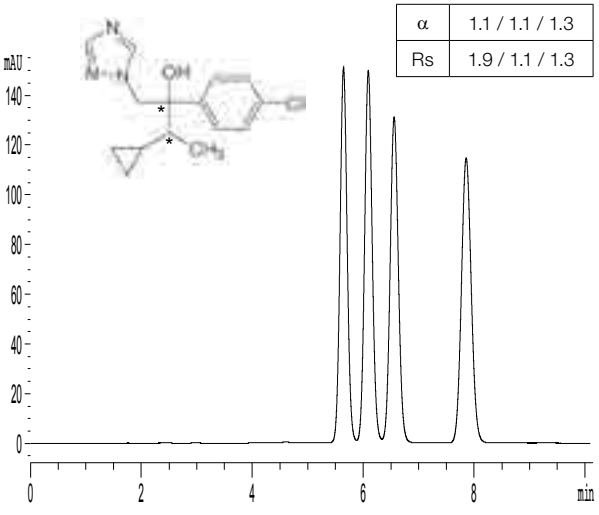



Column: CHIRAL ART Cellulose-C (3 µm) 150 x 3.0 mm ID
Part No.: KCN99S03-1503WT
Eluent: *n*-hexane / 2-propanol / diethylamine (95/5/0.1)
Flow rate: 1.0 mL/min
Temperature: 40 °C
Detection: UV at 220 nm
Injection: 5 µL (1.25 mg/mL)

**RP-Mode**

### Cyproconazole

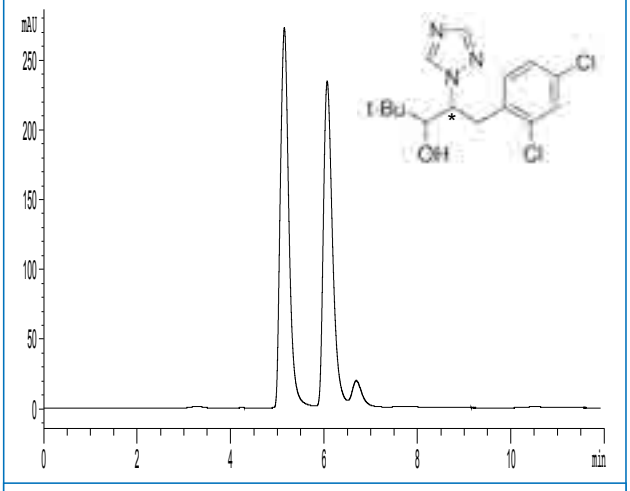
| | |
|---|---|
| α | 1.1 / 1.1 / 1.3 |
| Rs | 1.9 / 1.1 / 1.3 |




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 |

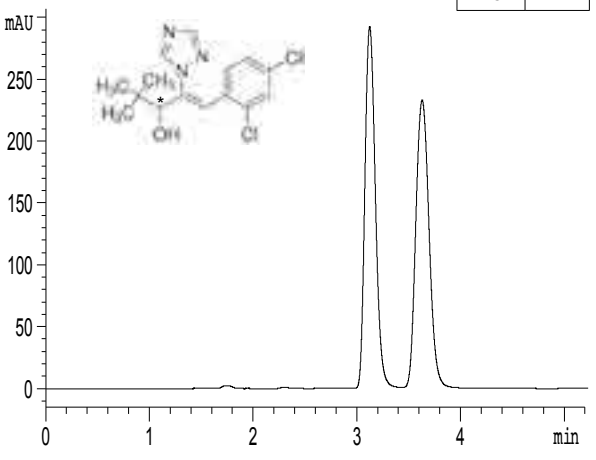



Column: CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.: KSB99S05-2546WT
Eluent: *n*-hexane / 2-propanol / diethylamine (95/5/0.1)
Flow rate: 0.7 mL/min
Temperature: 10 °C
Detection: UV at 220 nm
Injection: 10 µL (1 mg/mL)

# Applications
## Pesticides

### Diniconazole

| | |
|---|---|
| α | 1.3 |
| Rs | 2.4 |

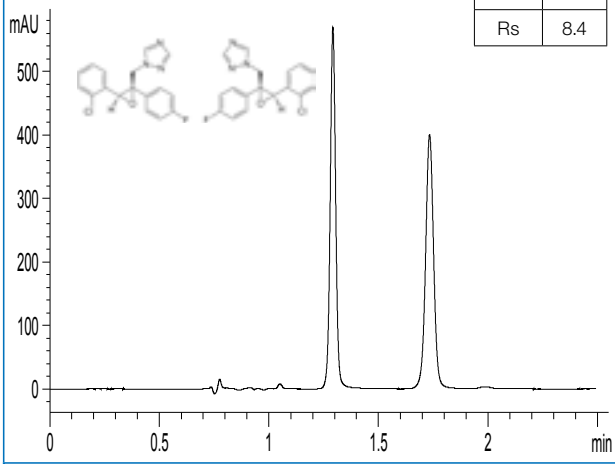



Column: CHIRAL ART Amylose-SA (3 µm) 150 x 3.0 mm ID
Part No.: KSA99S03-1503WT
Eluent: *n*-hexane / ethanol (90/10)
Flow rate: 0.5 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 2 µL (1 mg/mL)

RP-Mode

### Epoxiconazole

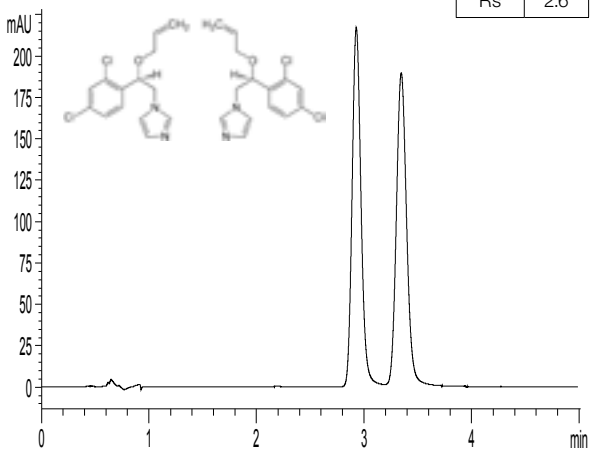
| | |
|---|---|
| α | 1.3 |
| Rs | 8.4 |




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 |



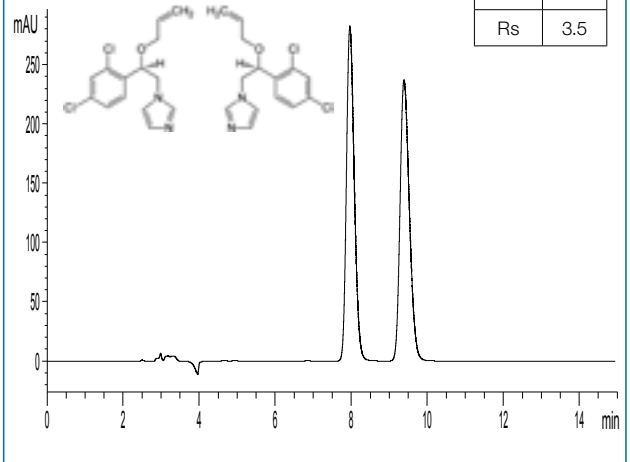

Column: CHIRAL ART Cellulose-SC (3 µm) 50 x 4.6 mm ID
Part No.: KSC99S03-0546WT
Eluent: *n*-hexane / ethanol (90 / 10)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 1 µL (1 mg/mL)

Using CHIRAL ART Cellulose-SJ

RP-Mode

### Enilconazole

| | |
|---|---|
| α | 1.3 |
| Rs | 3.5 |



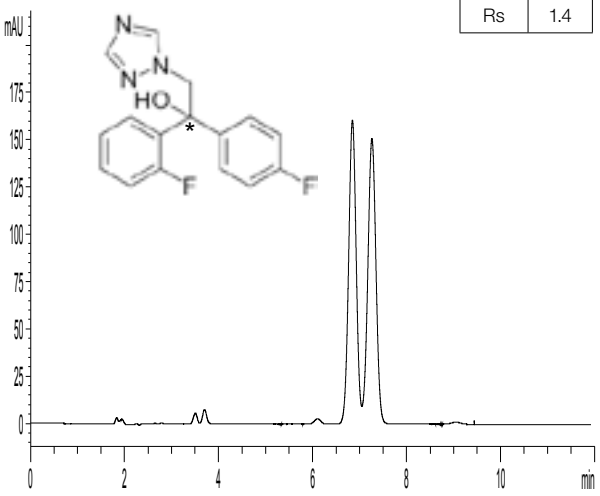

Column: CHIRAL ART Cellulose-SJ (5 µm) 250 x 4.6 mm ID
Part No.: KSJ99S05-2546WT
Eluent: water / methanol / diethylamine (25/75/0.1)
Flow rate: 1.0 mL/min
Temperature: 35 °C
Detection: UV at 220 nm
Injection: 10 µL (1 mg/mL)

# Applications
## Pesticides

RP-Mode

### Flutriafol

| | |
|---|---|
| α | 1.1 |
| Rs | 1.4 |

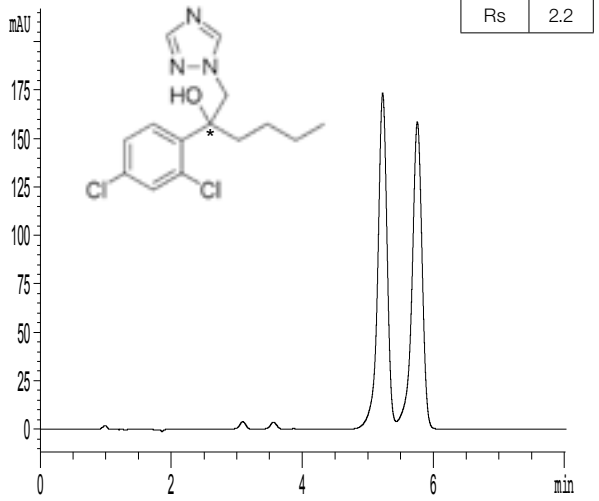



Column: CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.: KSB99S05-2546WT
Eluent: 20 mM $NH_4HCO_3$ / acetonitrile / diethylamine (60/40/0.1)
Flow rate: 1.5 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 5 µL (1mg/mL)

RP-Mode

### Hexaconazole

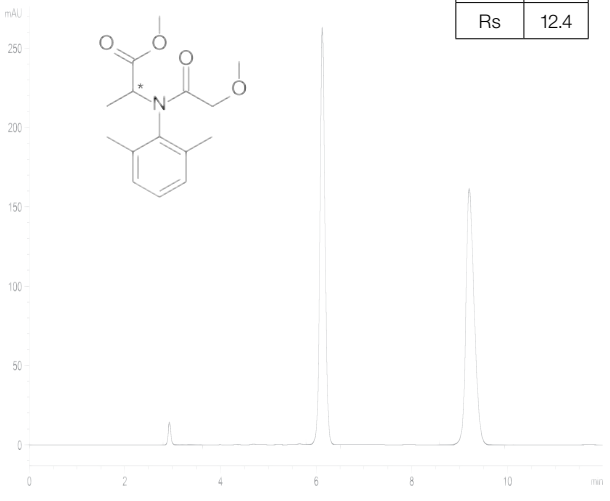
| | |
|---|---|
| α | 1.1 |
| Rs | 2.2 |




Column: CHIRAL ART Cellulose-SC (3 µm) 150 x 3.0 mm ID
Part No.: KSC99S03-1503WT
Eluent: 20 mM $NH_4HCO_3$ / acetonitrile / diethylamine (58/42/0.1)
Flow rate: 0.8 mL/min
Temperature: 40 °C
Detection: UV at 220 nm
Injection: 3 µL (1 mg/mL)

### Metalaxyl

| | |
|---|---|
| α | 1.64 |
| Rs | 12.4 |

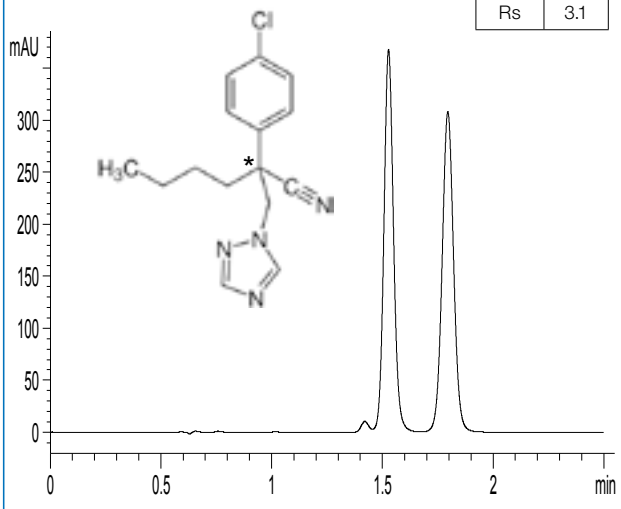



Column: CHIRAL ART Cellulose-SB (5 µm) 250 × 4.6 mm ID
Part No.: KSB99S05-2546WT
Mobile Phase: THF / *n*-hexane (30/70, premixed)
Flow Rate: 1 mL/min
Detection: 230 nm
Temperature: 25 °C
Injection: 20 µL (1 mg/mL dissolved in mobile phase)
Sample: Metalaxyl (PESTANAL®, Sigma-Aldrich)

RP-Mode

### Myclobutanil

| | |
|---|---|
| α | 1.3 |
| Rs | 3.1 |



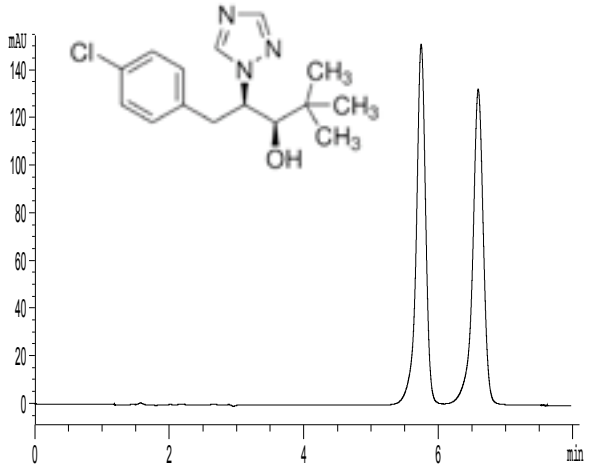

Column: CHIRAL ART Cellulose-SB (3 µm) 50 x 4.6 mm ID
Part No.: KSB99S03-0546WT
Eluent: water / acetonitrile (45 / 55)
Flow rate: 1.0 mL/min
Temperature: 30 °C
Detection: UV at 220 nm
Injection: 1 µL (1 mg/mL)

# Applications
## Pesticides

RP-Mode

### Paclobutrazol

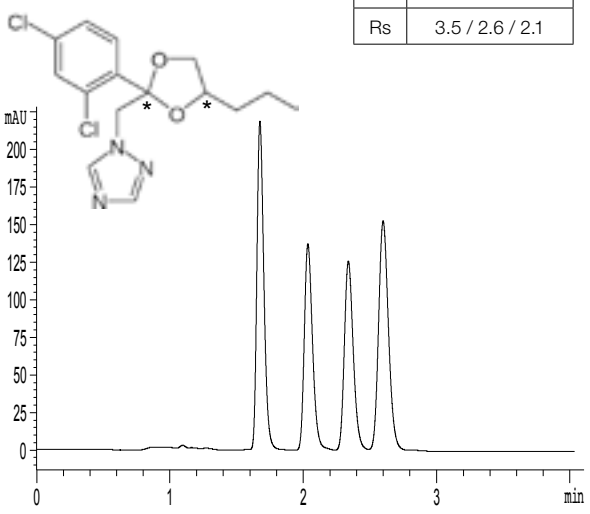
| | |
|---|---|
| α | 1.2 |
| Rs | 3.4 |




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 (60/40/0.1)
Flow rate: 0.5 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 2 µL (1 mg/mL)

### Propiconazole

| | |
|---|---|
| α | 1.3 / 1.2 / 1.2 |
| Rs | 3.5 / 2.6 / 2.1 |

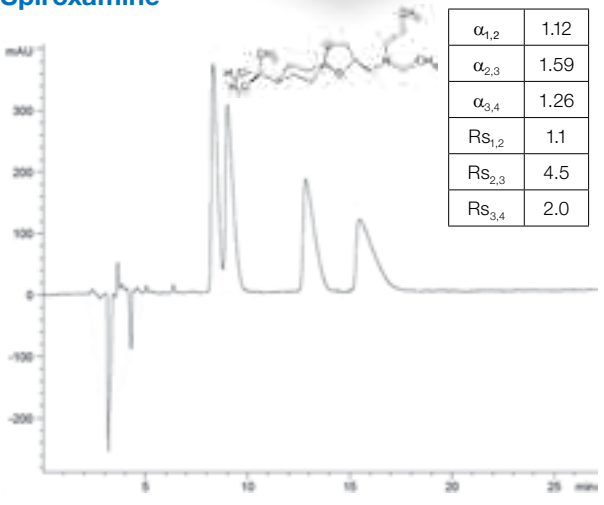



Column: CHIRAL ART Cellulose-C (3 µm) 150 x 3.0 mm ID
Part No.: KCN99S03-1503WT
Eluent: *n*-hexane / 2-propanol (75/25)
Flow rate: 1.0 mL/min
Temperature: 10 °C
Detection: UV at 220 nm
Injection: 5 µL (1 mg/mL)

RP-Mode

### Spiroxamine

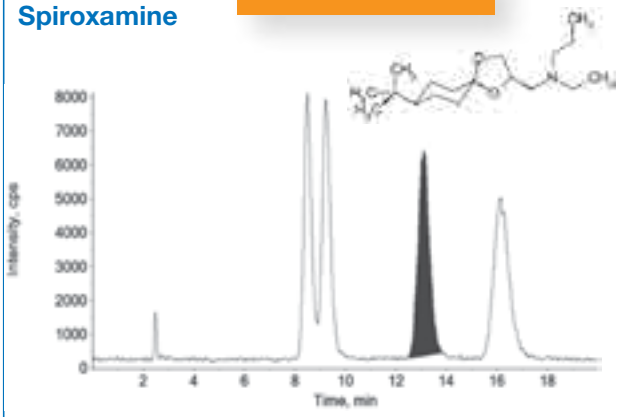
| | |
|---|---|
| $\alpha_{1,2}$ | 1.12 |
| $\alpha_{2,3}$ | 1.59 |
| $\alpha_{3,4}$ | 1.26 |
| $Rs_{1,2}$ | 1.1 |
| $Rs_{2,3}$ | 4.5 |
| $Rs_{3,4}$ | 2.0 |



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

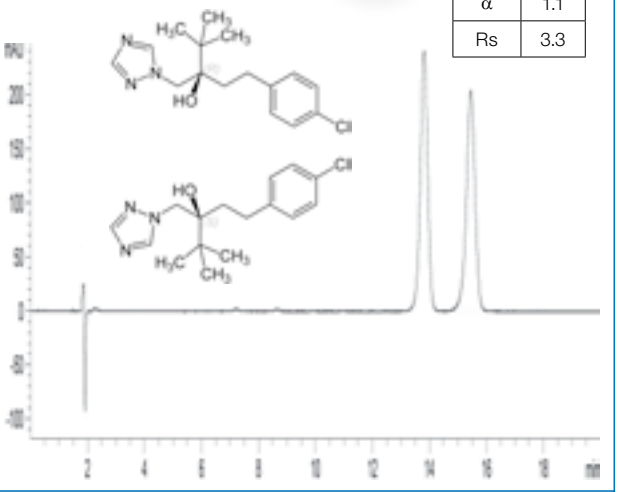
Column: CHIRAL ART Amylose-SA (3 µm) 150 x 3.0 mm ID
Part No.: KSA99S03-1503WT
Eluent: A/B (25/75)
A: water / ethanol +10 mM ammonium carbonate (90/10)
B: water / ethanol +10 mM ammonium carbonate (10/90)
Flow rate: 0.3 ml/min
Temperature: 30 °C
Detection: ESI-MS/MS
Injection: 1 µL (1 µg/L)
post-column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

# Applications
## Pesticides

RP-Mode

### Tebuconazole

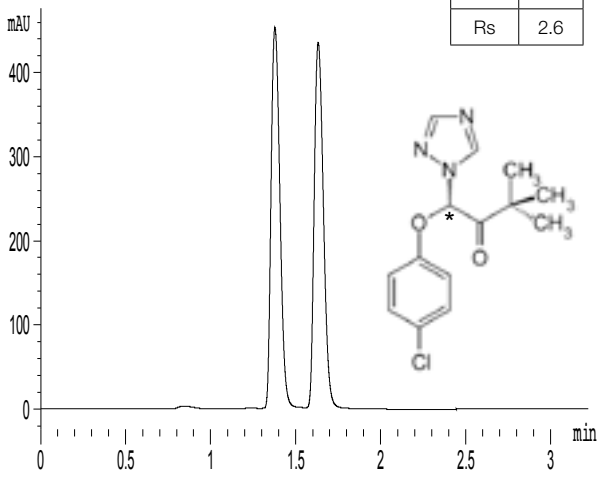
| | |
|---|---|
| α | 1.1 |
| Rs | 3.3 |



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

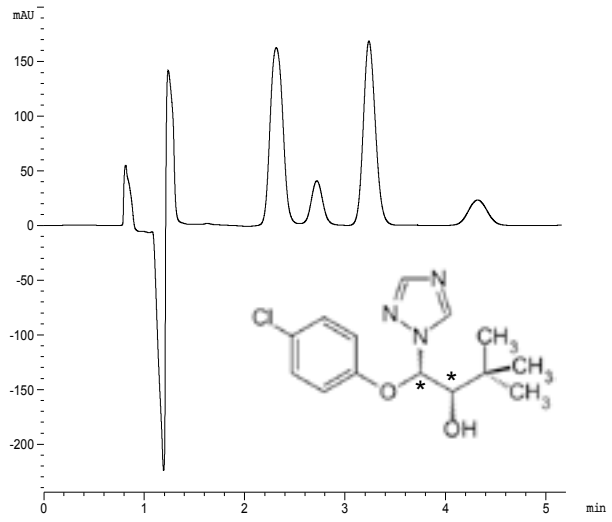
| | |
|---|---|
| α | 1.3 |
| Rs | 2.6 |




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 |

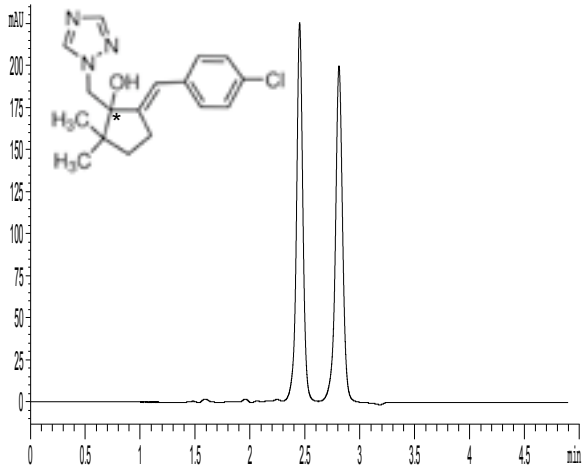



Column: CHIRAL ART Amylose-C (3 µm) 150 x 3.0 mm ID
Part No.: KAN99S03-1503WT
Eluent: *n*-heptane / ethanol / diethylamine (92/8/0.1)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 220 nm
Injection: 5 µL (1 mg/mL)

RP-Mode

### Triticonazole

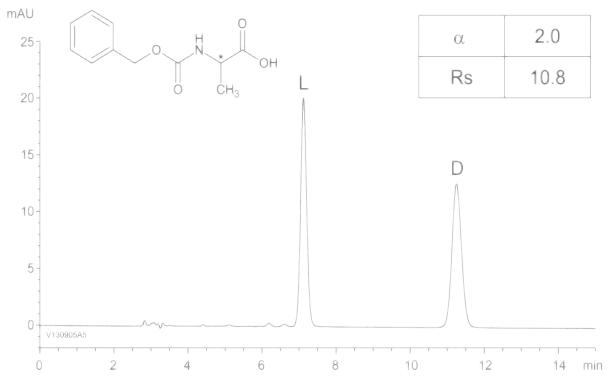
| | |
|---|---|
| α | 1.3 |
| Rs | 3.4 |




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)

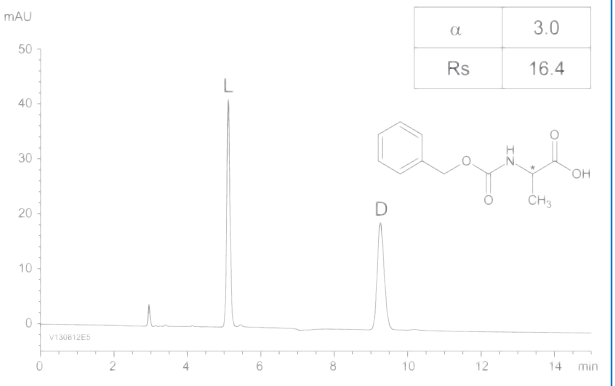
# Applications
## Amino Acids

### *N*-CBZ-DL-Alanine



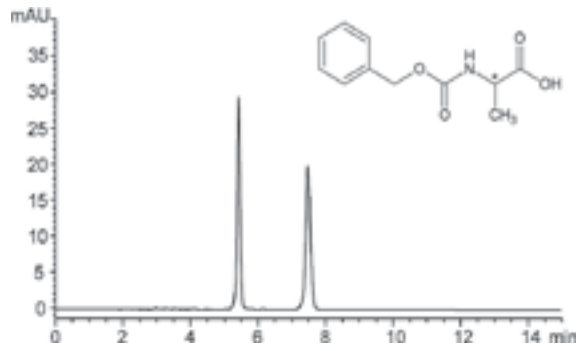

Column: CHIRAL ART Cellulose-C (3 µm) 150 x 3.0 mm ID
Part No: KCN99S03-1503WT
Eluent: *n*-hexane / 2-propanol / diethylamine (90/10/0.1)
Flow rate 1.0 mL/min
Temperature: 10 °C
Detection: UV at 220 nm
Injection: 5 µL (0.5 mg/mL)

### *N*-CBZ-DL-Alanine



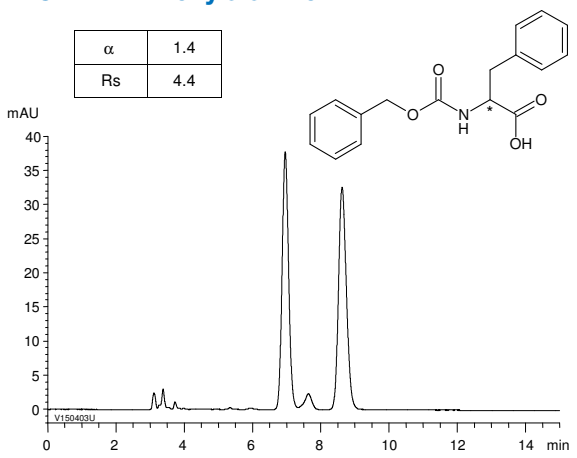

| | |
|---|---|
| Column: | CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID |
| Part No.: | KCN99S05-2546WT |
| Eluent: | *n*-hexane / 2-propanol / TFA (80/20/0.1) |
| Flow: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 254 nm |
| Injection: | 10 µL (1 mg/mL) |

### *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 |

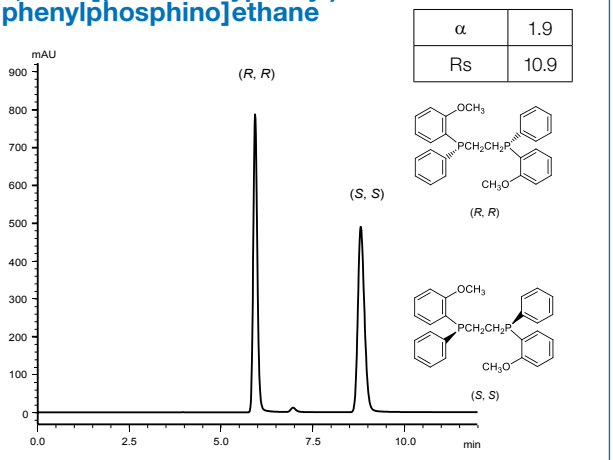
### *N*-CBZ-DL-Phenylalanine




| | |
|---|---|
| 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

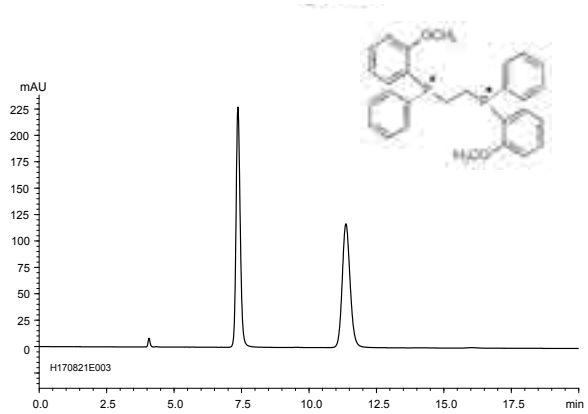
## 1,2-Bis[(2-methoxyphenyl) phenylphosphino]ethane




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)

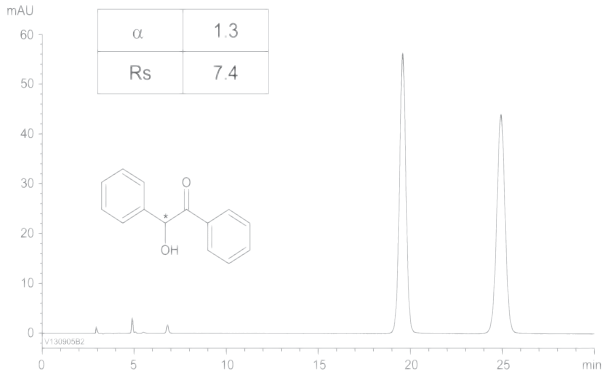
Using CHIRAL ART Cellulose-SJ

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



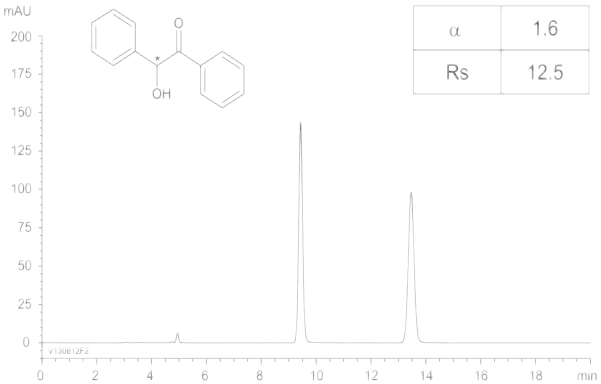

Column: CHIRAL ART Cellulose-SJ (5 µm) 250 X 4.6 mm ID
Part No.: KSJ99S05-2546WT
Eluent: *n*-hexane / chloroform (80/20)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 290 nm
Injection: 5 µL (1 mg/mL)

## 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: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 254 nm
Injection: 10 µL (0.1 mg/mL)

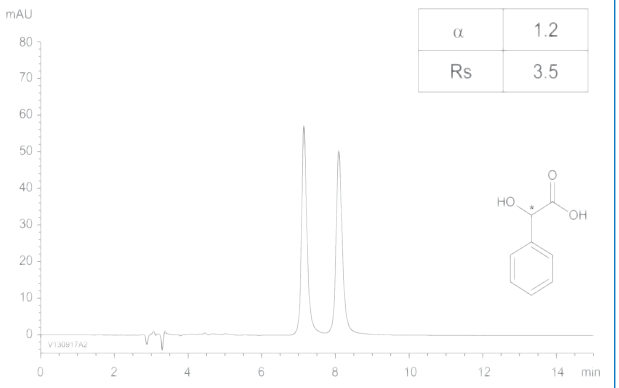
## Benzoin




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: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 254 nm
Injection: 10 µL (0.1 mg/mL)

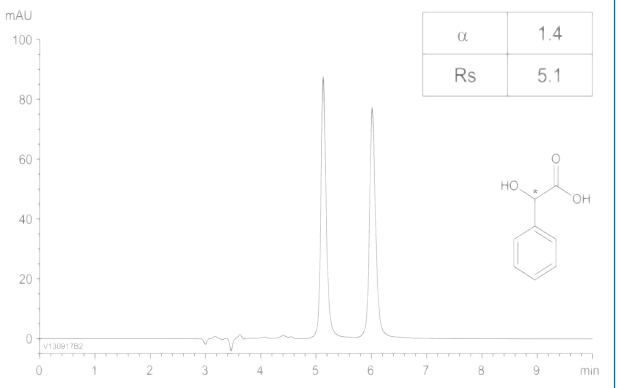
# Applications
## Specialties

### 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: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 254 nm |
| Injection: | 20 µL (1 mg/mL) |

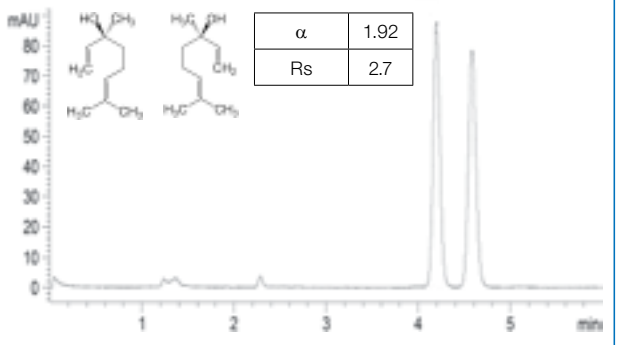
### DL-Mandelic acid




| | |
|---|---|
| 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: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 254 nm |
| Injection: | 20 µL (1 mg/mL) |

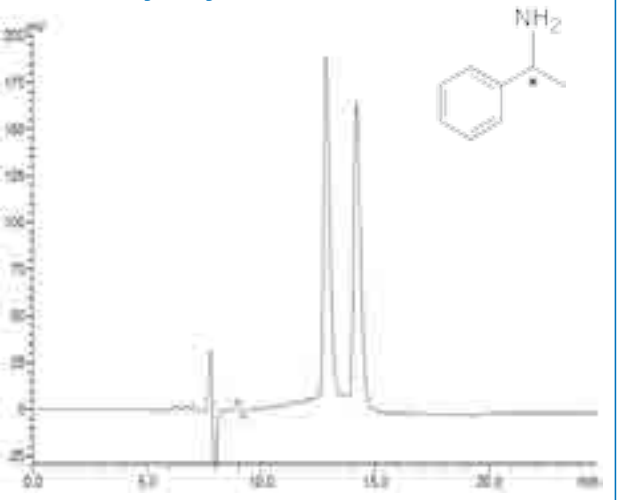
**RP-Mode**

### 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) |

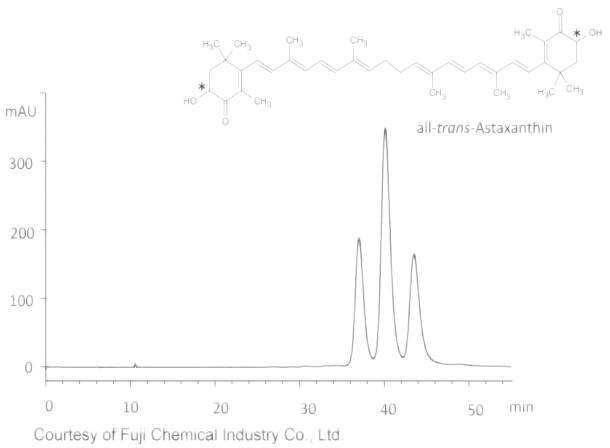
### DL-1-Phenylethyl amine




| | |
|---|---|
| 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) |

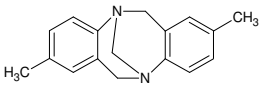
# Applications
## Specialties

### Astaxanthin

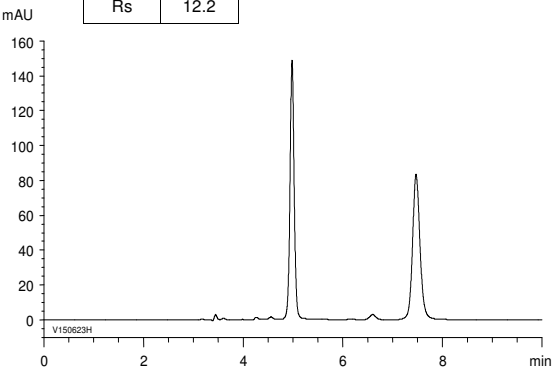



| | |
|---|---|
| Column: | CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID |
| Part No.: | KSB99S05-2546WT |
| Eluent: | *n*-hexane / THF (85/15) |
| Flow rate: | 0.5 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 476 nm |

### Troger´s base



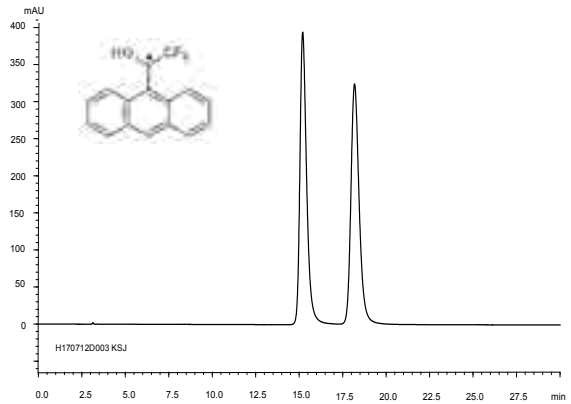
| | |
|---|---|
| α | 2.3 |
| Rs | 12.2 |




| | |
|---|---|
| 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

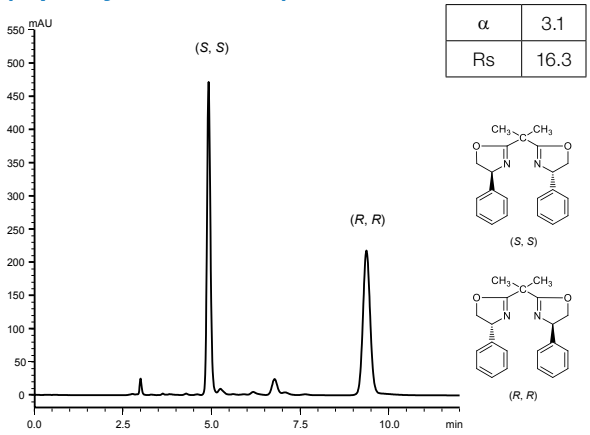
Using CHIRAL ART Cellulose-SJ




| | |
|---|---|
| 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)

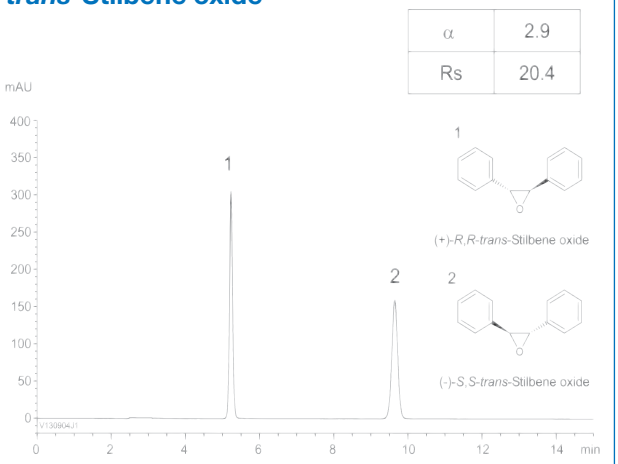
| | |
|---|---|
| α | 3.1 |
| Rs | 16.3 |




| | |
|---|---|
| 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) |

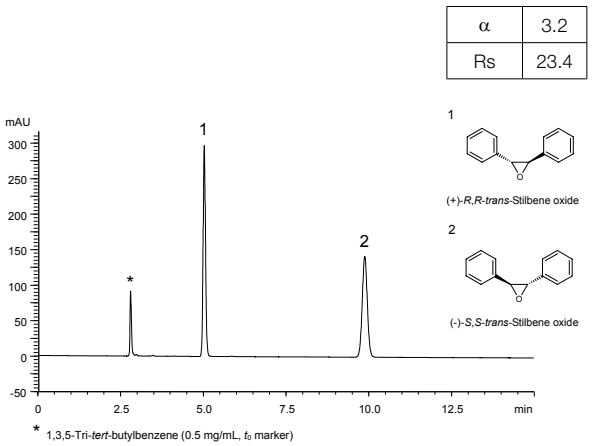
# Applications
## Specialties

### *trans*-Stilbene oxide



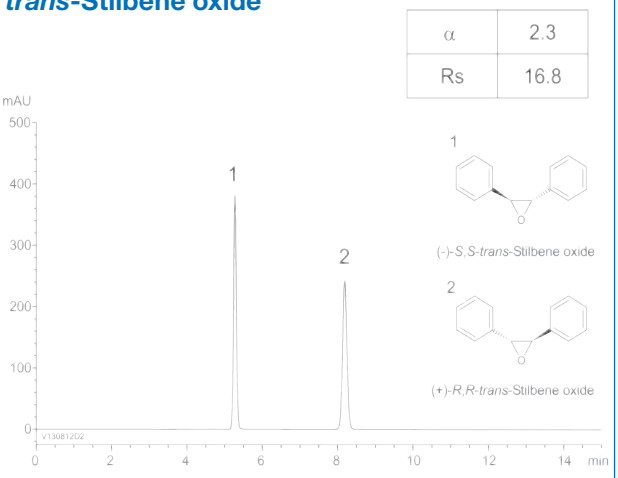

Column: CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.: KAN99S05-2546WT
Eluent: *n*-hexane / 2-propanol (90/10)
Flow: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 230 nm
Injection: 5 µL (0.1 mg/mL)

### *trans*-Stilbene oxide




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



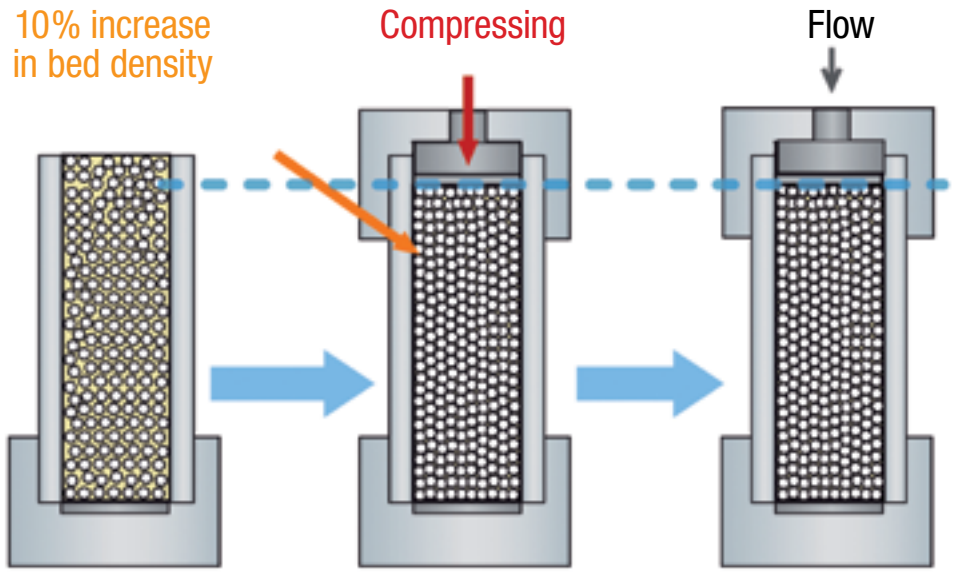

Column: CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.: KCN99S05-2546WT
Eluent: *n*-hexane / 2-propanol (90/10)
Flow: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 230 nm
Injection: 5 µL (0.1 mg/mL)

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

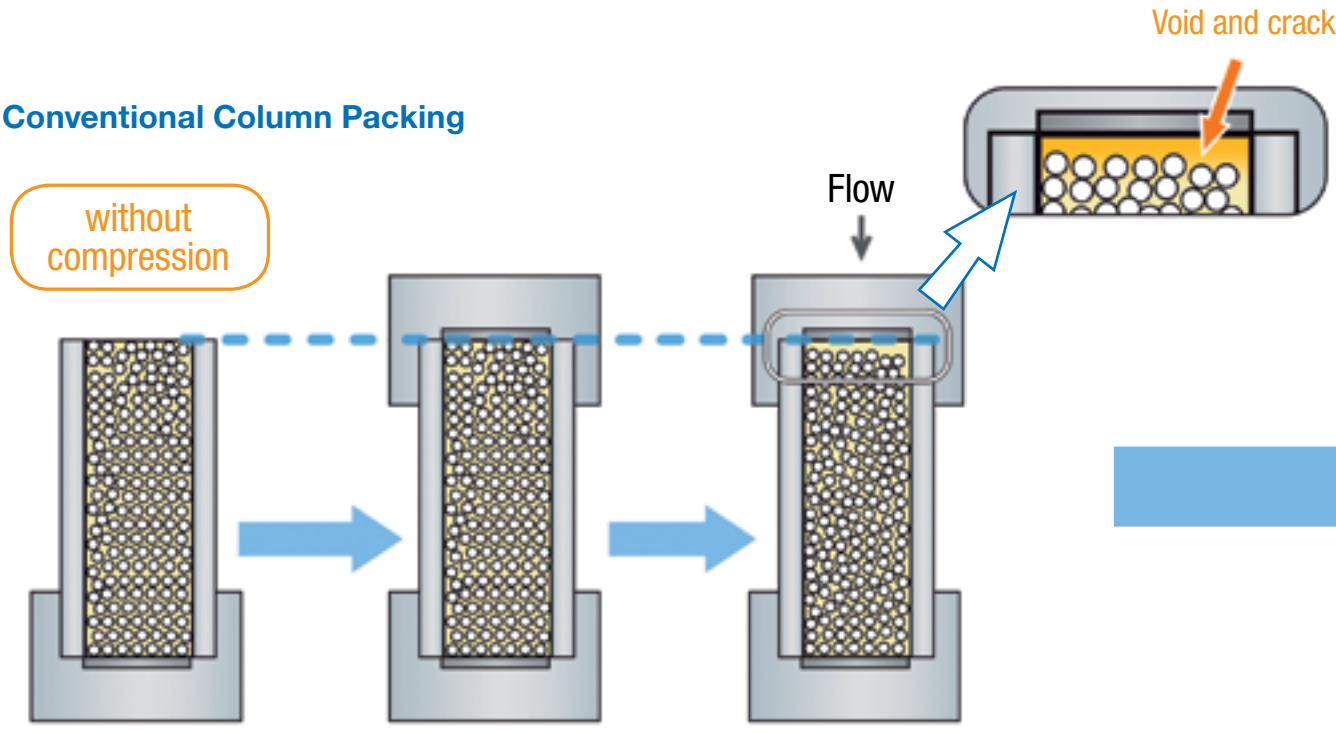
## How to obtain long lasting columns?

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

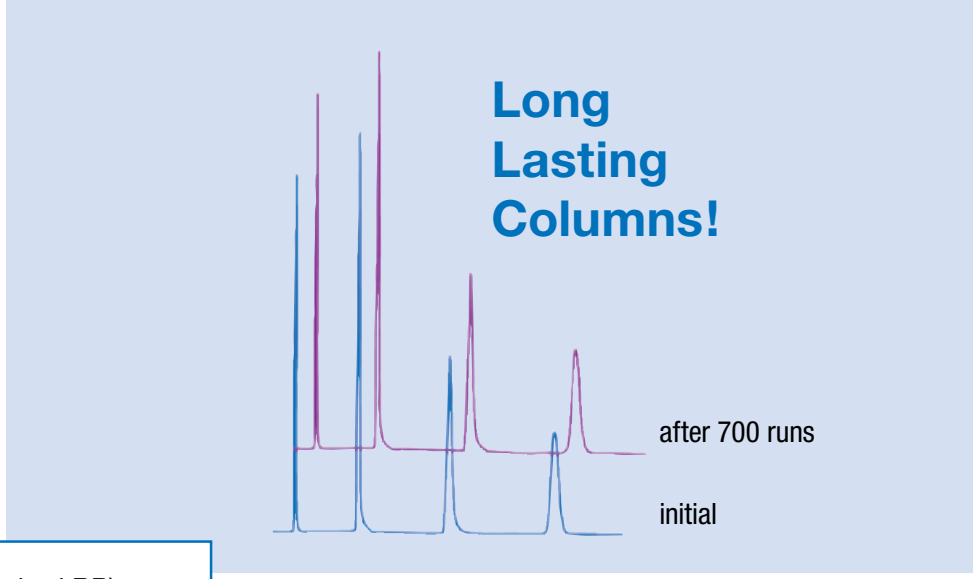



## Conventional Column Packing



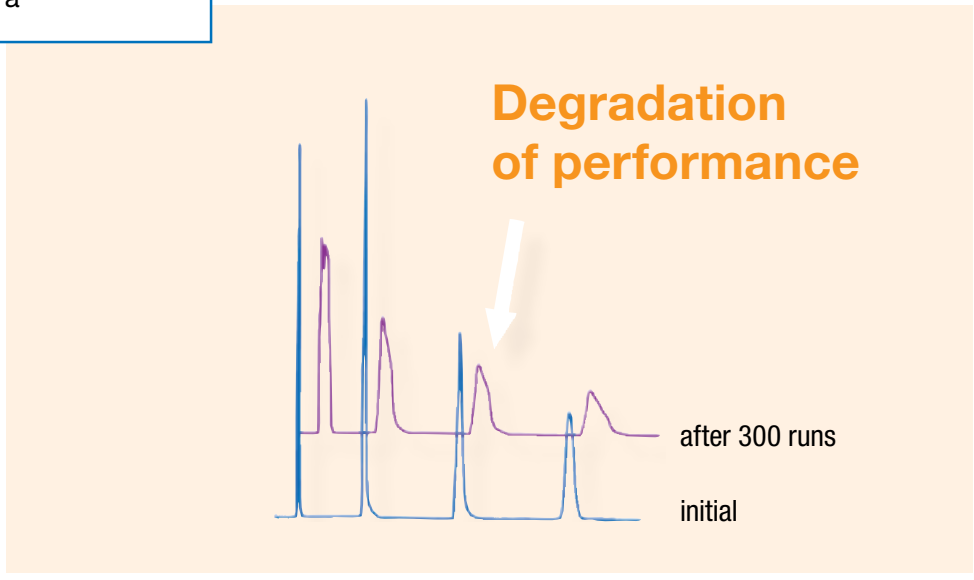
# High Performance Chiral Purifications with YMC-Actus CHIRAL ART (Semi-)Preparative Columns

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.




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 |



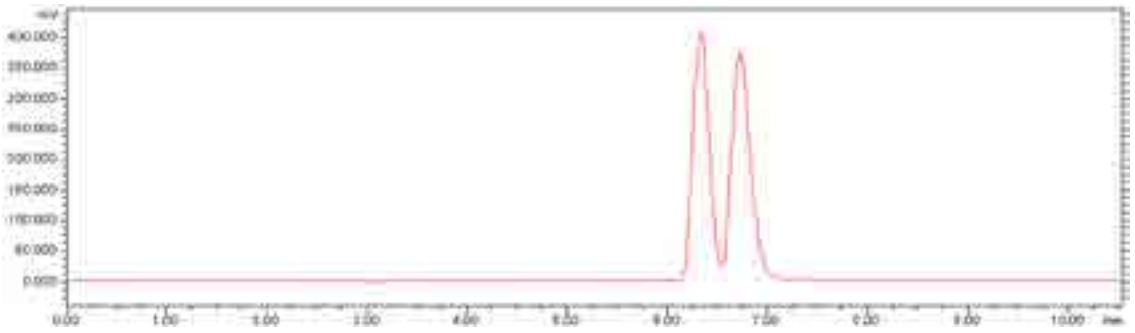
# High Performance Chiral Purifications with YMC-Actus CHIRAL ART (Semi-)Preparative Columns

## Cost efficiency

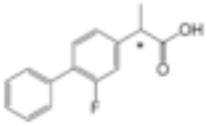
Rapid pressure changes under high-speed gradient conditions can lead to column degradation and loss of column performance. As with all YMC-Actus columns, a specific hardware and packing technology has been applied to these (semi-)preparative columns to provide a uniform packing density, which results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



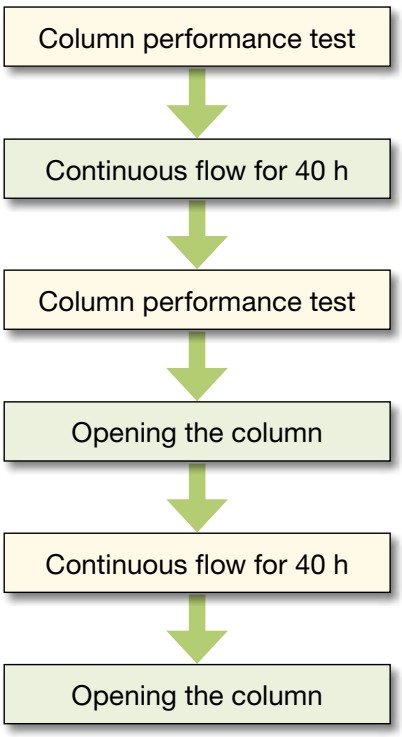
Column: YMC-Actus CHIRAL ART Cellulose-C (5 µm) 250 x 30 mm ID
Part No.: KSC99S05-2530WX
Eluent: *n*-hexane / 2-propanol / TFA (95/5/0.1)
Flow rate: 45 mL/min
Detection: UV 280 nm
Injection: 585 µL (20 mg/mL)




Flurbiprofen

# 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 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 |

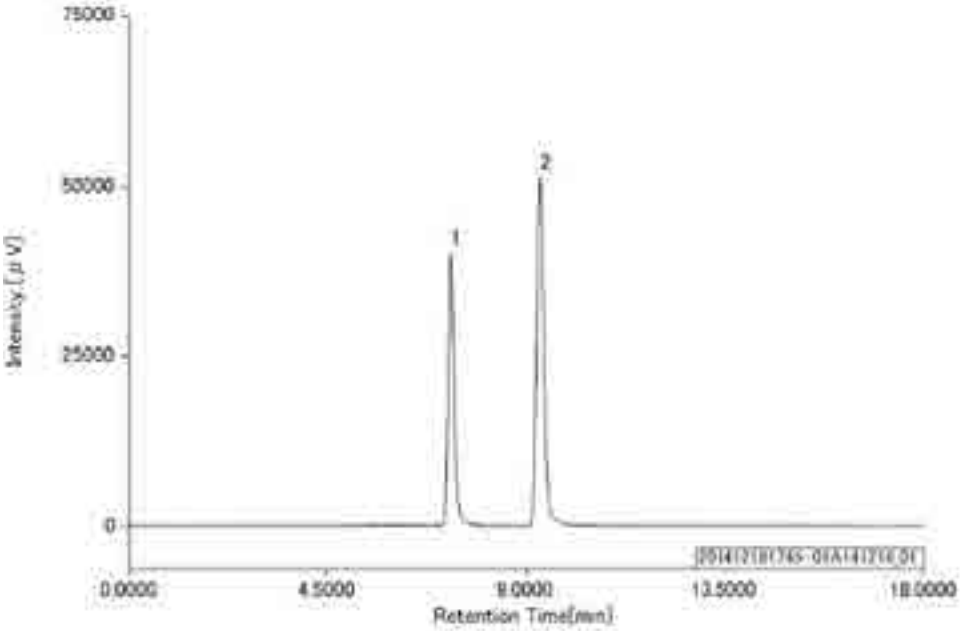
### Column performance test

| | |
|---|---|
| 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)<br>2. Nitrobenzene (10 µL/mL) |
| Injection: | 20 µL |

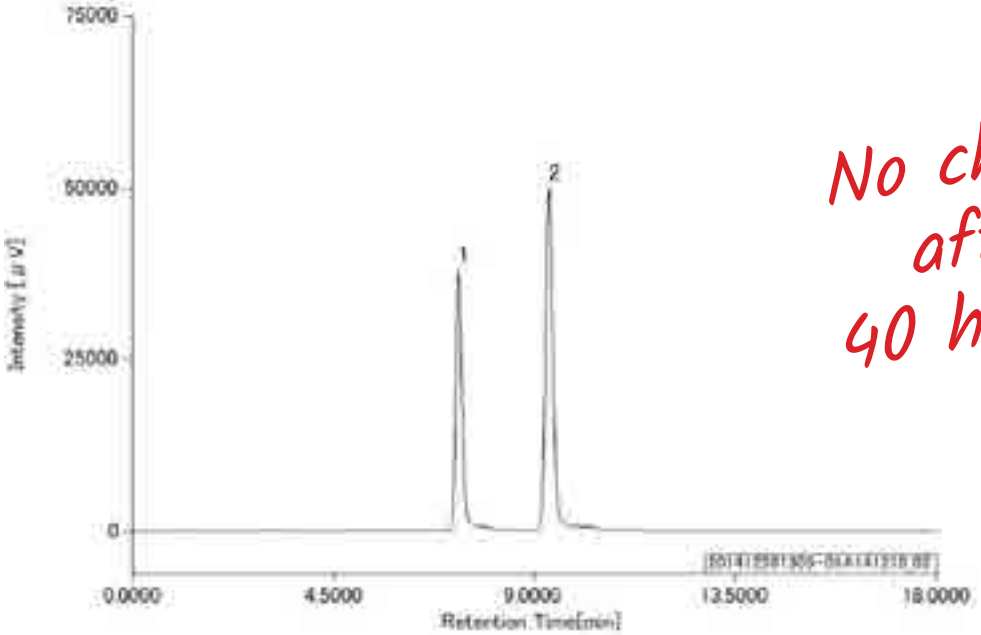
*YMC-Actus columns remain stable even after use at maximum pressure!*

# Secured Hardware Stability of YMC-Actus CHIRAL ART

## Initial




## After 40 hours




No change after 40 hours!

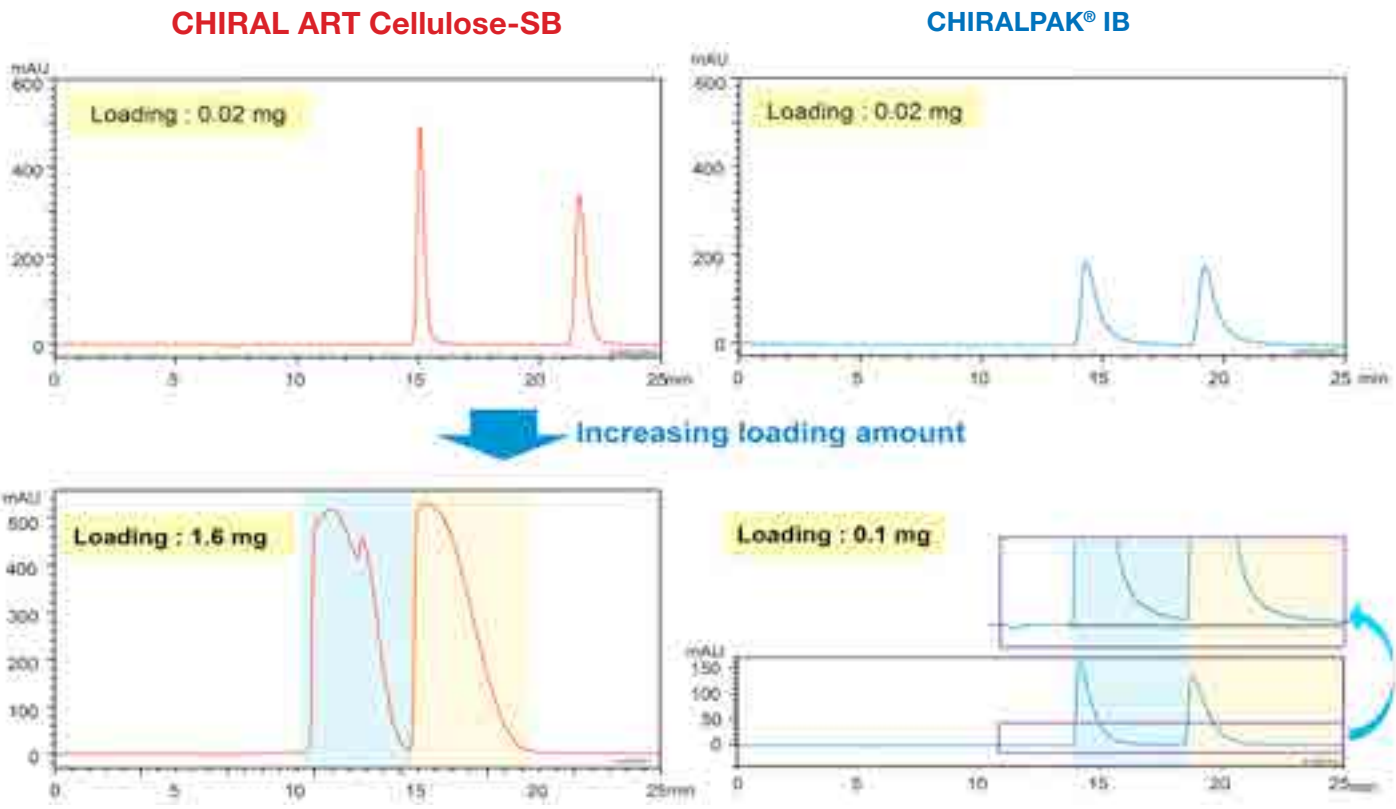
| Step | Theoretical plate number N* | Tailing factor Tf* | Backpressure (bar) |
|---|---|---|---|
| Initial | 16,093 | 1.18 | 20 |
| After 40 h | 15,693 | 1.16 | 22 |

*values for nitrobenzene (peak 2)

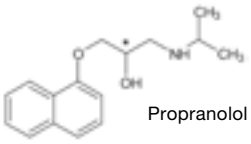
The inlet frit was inspected after 40 and 80 hours. On opening, neither frit distortion nor gel leakage was observed.

# 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

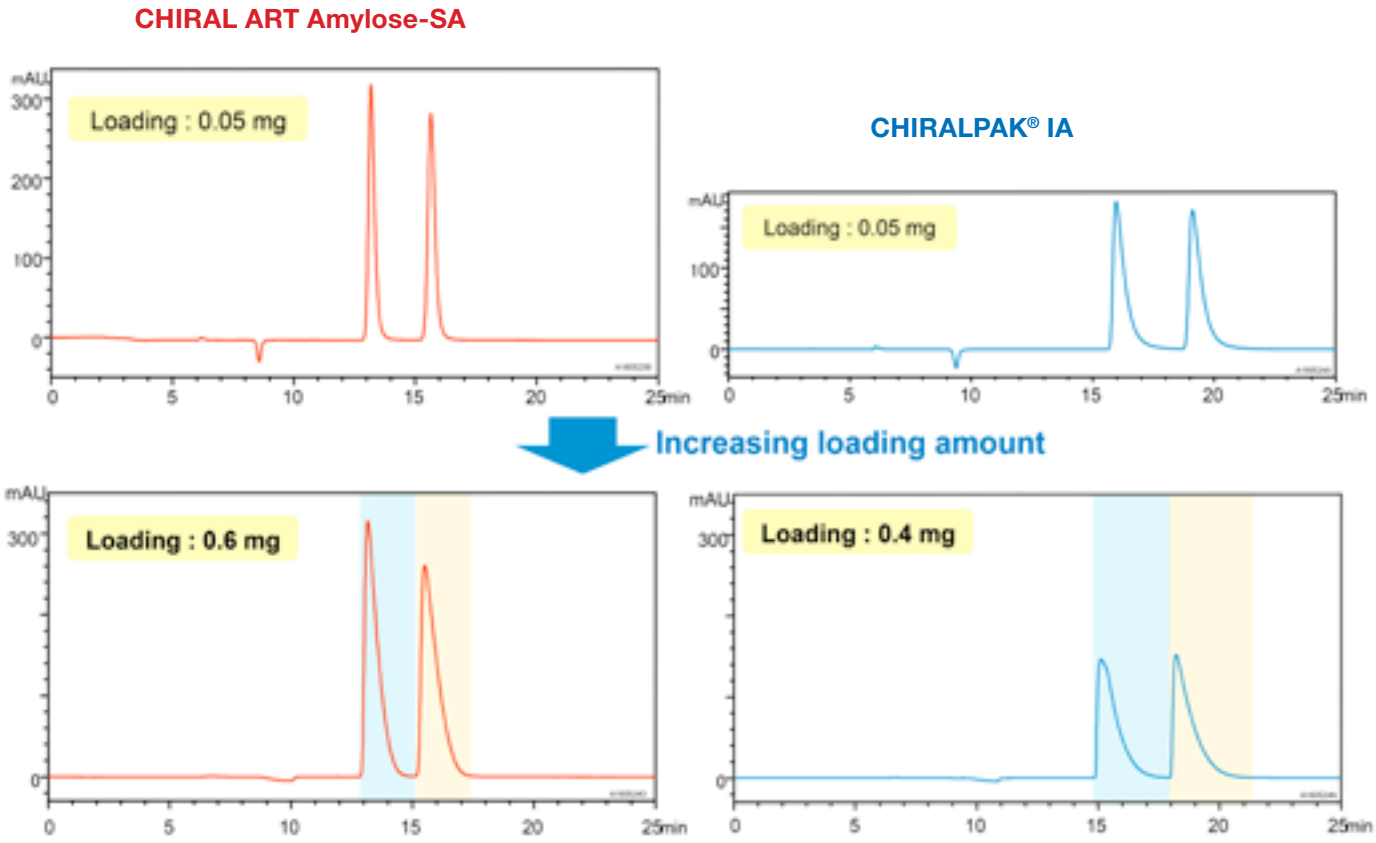
For the competitor's product, loading amount of more than 0.1 mg was not possible because the enantiomeric excess of the 2nd peak was already less than 98%ee with a loading amount of 0.1 mg.

| | 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 |

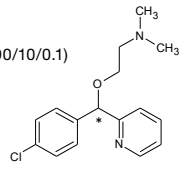
*Calculated for repeated injections every 15 minutes (CHIRAL ART Cellulose-SB) and every 10 minutes (CHIRALPAK® IB).

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

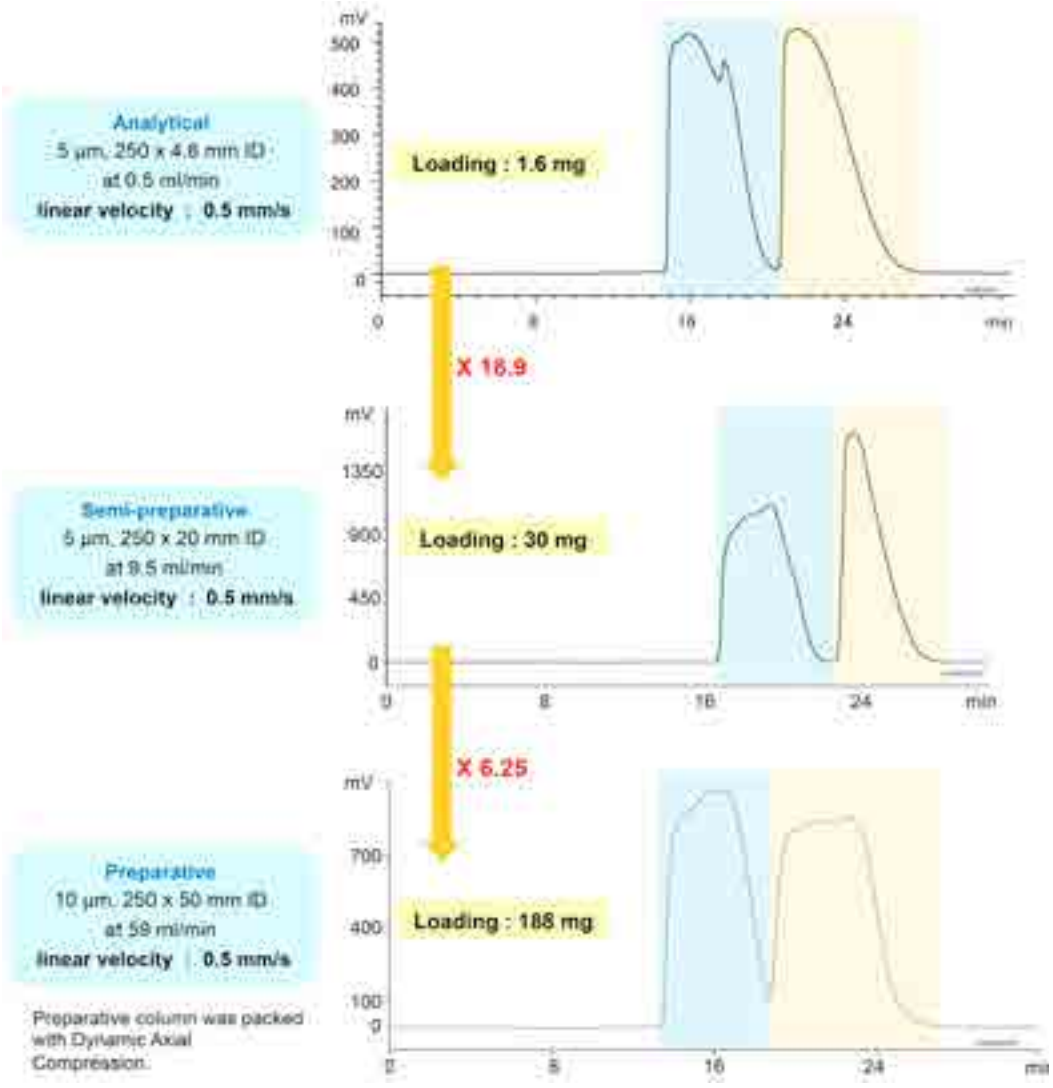
| | CHIRAL ART Amylose-SA | | CHIRALPAK® IA | |
|---|---|---|---|---|
| | 1st peak | 2nd peak | 1st peak | 2nd peak |
| Enantiomeric excess | >99.9%ee | 99.4%ee | >99.9%ee | 98.9%ee |
| Recovery | 99% | 99% | 99% | 98% |
| Productivity (mg/h)* | 2.9 | 2.9 | 1.5 | 1.4 |

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

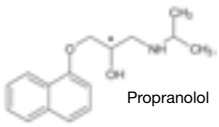
The calculated maximum loading amount on CHIRAL ART Amylose-SA was double that obtained for the competitor's product due to the good peak shape with no tailing, which also allowed increased productivity.

# 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 (p. 4-15)***
- **SFC dedicated columns: Alcyon SFC CSP**

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

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.

## Specifications Alcyon SFC CSP columns

| CHIRAL | Alcyon SFC Coated Polysaccharides | | Alcyon SFC Immobilised Polysaccharides | | | |
|---|---|---|---|---|---|---|
| | Alcyon SFC CSP Amylose-C/Amylose-C Neo | Alcyon SFC CSP Cellulose-C | Alcyon SFC CSP Amylose-SA | Alcyon SFC CSP Cellulose-SB | Alcyon SFC CSP Cellulose-SC | Alcyon SFC CSP Cellulose-SJ |
| Particle size | 3, 5 µm | | | | | |
| Chiral Selector | Amylose tris (3,5-dimethyl-phenylcarbamate) | Cellulose tris (3,5-dimethyl-phenylcarbamate) | Amylose tris (3,5-dimethyl-phenylcarbamate) | Cellulose tris (3,5-dimethyl-phenylcarbamate) | Cellulose tris (3,5-dichloro-phenylcarbamate) | Cellulose tris (4-methylbenzoat) |
| USP | L51 | L40 | L99 | — | — | — |
| Shipping Solvent | 2-propanol | | | | | |
| Usable pH-range | 3.5 - 6.5 | 3.5 - 6.5 | 2.0 - 9.0 | 2.0 - 9.0 | 2.0 - 9.0 | 2.0 - 9.0 |
| Tempera-ture range | 0-40°C | | | | | |
| Pressure limit | 2.1, 3.0 and 4.6 mm ID: 30 MPa (4,350 psi)<br>10 and 20 mm ID: 20 MPa (2,980 psi) | | | | | |

## Product Line-up

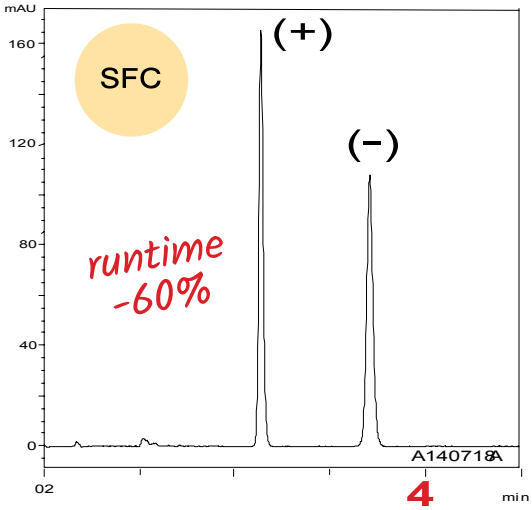
| PRODUCT NAME | Particle size | Type | Alternative YMC LC product | Competitive product |
|---|---|---|---|---|
| Alcyon SFC CSP Amylose-C/Amylose-C Neo | 3 µm<br>5 µm | Coated | CHIRAL ART Amylose-C/Amylose-C Neo | CHIRALPAK® AD-H (SFC), AD-3 |
| Alcyon SFC CSP Cellulose-C | | | CHIRAL ART Cellulose-C | CHIRALCEL® OD-H (SFC), OD-3 |
| Alcyon SFC CSP Amylose-SA | | Immobilised | CHIRAL ART Amylose-SA | CHIRALPAK® IA (SFC), IA-3 |
| Alcyon SFC CSP Cellulose-SB | | | CHIRAL ART Cellulose-SB | CHIRALPAK® IB (SFC), IB-3 |
| Alcyon SFC CSP Cellulose-SC | | | CHIRAL ART Cellulose-SC | CHIRALPAK® IC (SFC), IC-3 |
| Alcyon SFC CSP Cellulose-SJ | | | CHIRAL ART Cellulose-SJ | — |

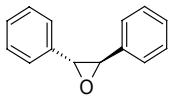
### Properties of Alcyon SFC CSP Columns

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.

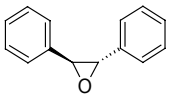
# Chiral Separations in SFC Mode

## Fast separation with high resolution

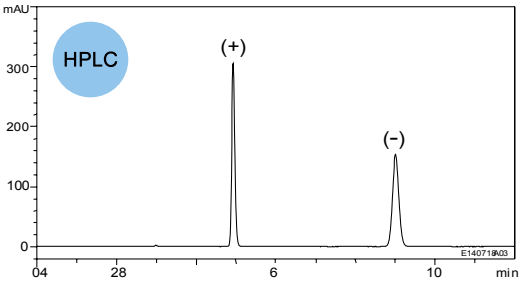


(+)-*R,R-trans*-Stilbene oxide



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

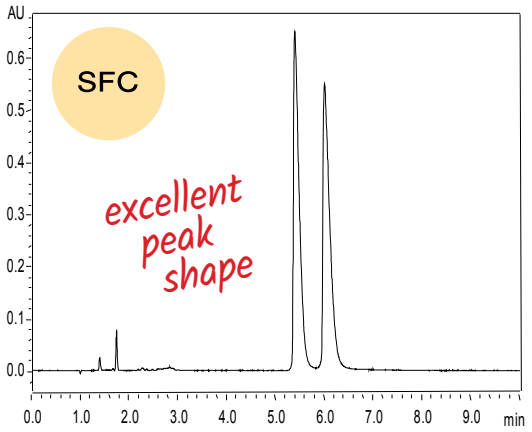


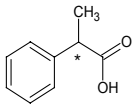

Column: **Alcyon SFC CSP Amylose-C** (5 µm) 250 x 4.6 mm ID
Part No.: KAN99S05-2546WTS
Eluent: $CO_2$ / methanol (60/40)
Flow: 3.0 mL/min
Temperature: 40 °C
Detection: UV at 220 nm
Back pressure: 17.2 MPa (2500 psi)

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: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 220 nm

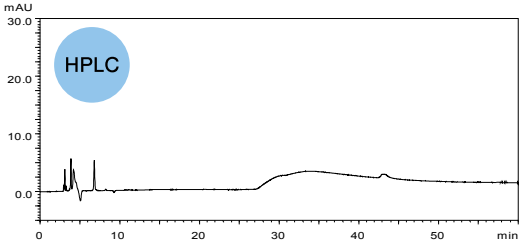
Faster chiral separation of trans-stilbene oxide is achieved using supercritical fluid chromatography compared to HPLC as the separation mode. Lower viscosity and larger diffusion coefficients for supercritical fluid provide rapid separations of both chiral and achiral compounds.

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




2-Phenylpropionic acid




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

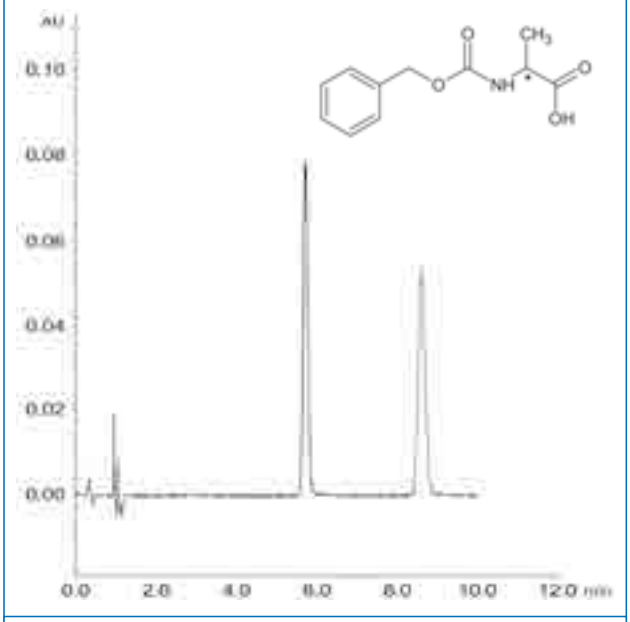
Column: CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.: KCN99S05-2546WT
Eluent: *n*-hexane / 2-propanol (99/1)
Flow: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 220 nm

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

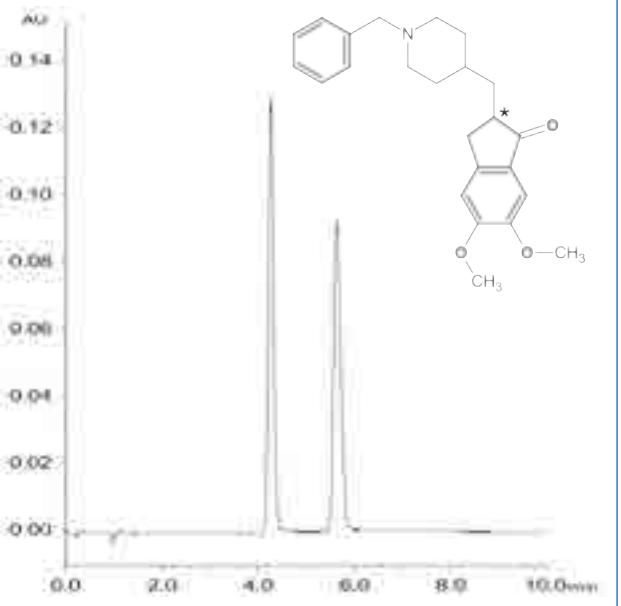
## Applications

### *N*-CBZ-DL-Alanine



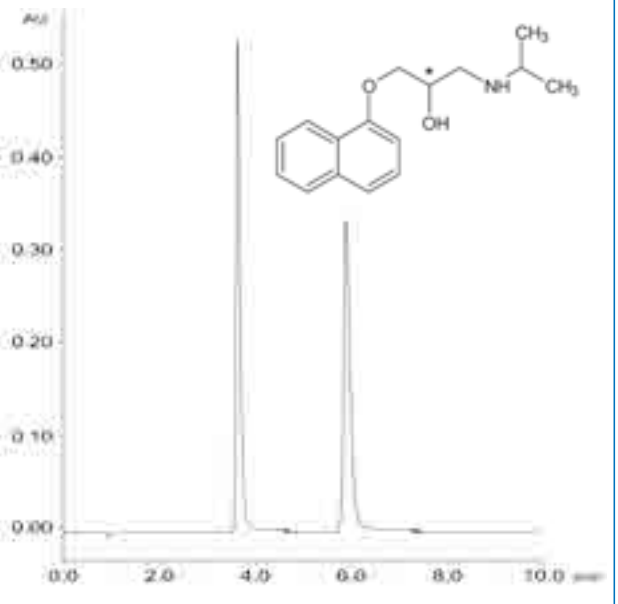

| | |
|---|---|
| Column: | Alcyon SFC CSP Amylose-C (5 µm) 250 x 4.6 mm ID |
| Part No.: | KAN99S05-2546WTS |
| Eluent: | $CO_2$ / 2-propanol containing 0.1% TFA (90/10) |
| Flow rate: | 3.0 mL/min |
| Temperature: | 35 °C |
| Detection: | UV at 215 nm |
| Backpressure: | 13.8 MPa (2000 psi) |
| Injection: | 5 µL (1.0 mg/mL) |

### Donepezil



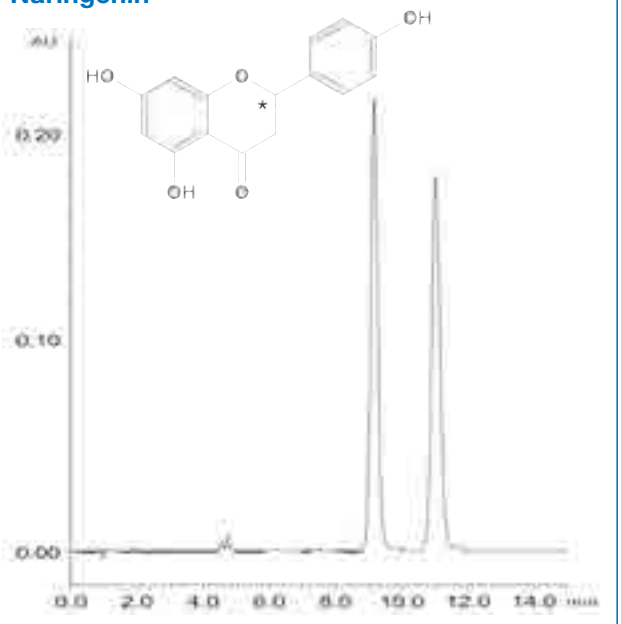

| | |
|---|---|
| Column: | Alcyon SFC CSP Cellulose-C (5 µm) 250 x 4.6 mm ID |
| Part No.: | KCN99S05-2546WTS |
| Eluent: | $CO_2$ / 2-propanol containing 0.1% DEA (70/30) |
| Flow rate: | 3.0 mL/min |
| Temperature: | 35 °C |
| Detection: | UV at 268 nm |
| Backpressure: | 13.8 MPa (2000 psi) |
| Injection: | 5 µL (1.0 mg/mL) |

### Propranolol




| | |
|---|---|
| Column: | Alcyon SFC CSP Cellulose-C (5 µm) 250 x 4.6 mm ID |
| Part No.: | KCN99S05-2546WTS |
| 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 (1.0 mg/mL) |

### Naringenin



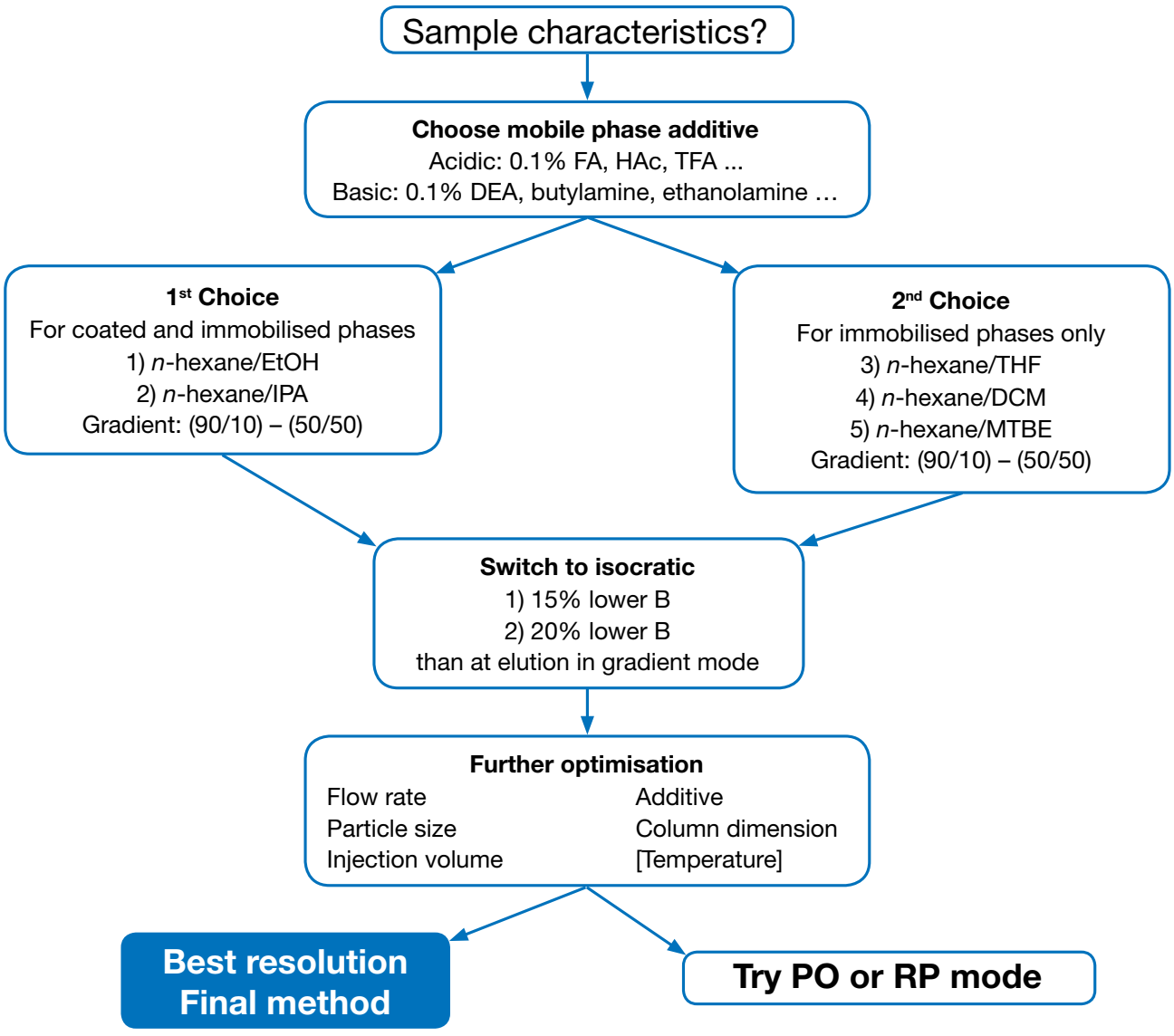

| | |
|---|---|
| Column: | Alcyon SFC CSP Cellulose-SB (5 µm) 250 x 4.6 mm ID |
| Part No.: | KSB99S05-2546WTS |
| Eluent: | $CO_2$ / 2-propanol (80/20) |
| Flow rate: | 3.0 mL/min |
| Temperature: | 35 °C |
| Detection: | UV at 220 nm |
| Backpressure: | 13.8 MPa (2000 psi) |
| Injection: | 5 µL (1.0 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

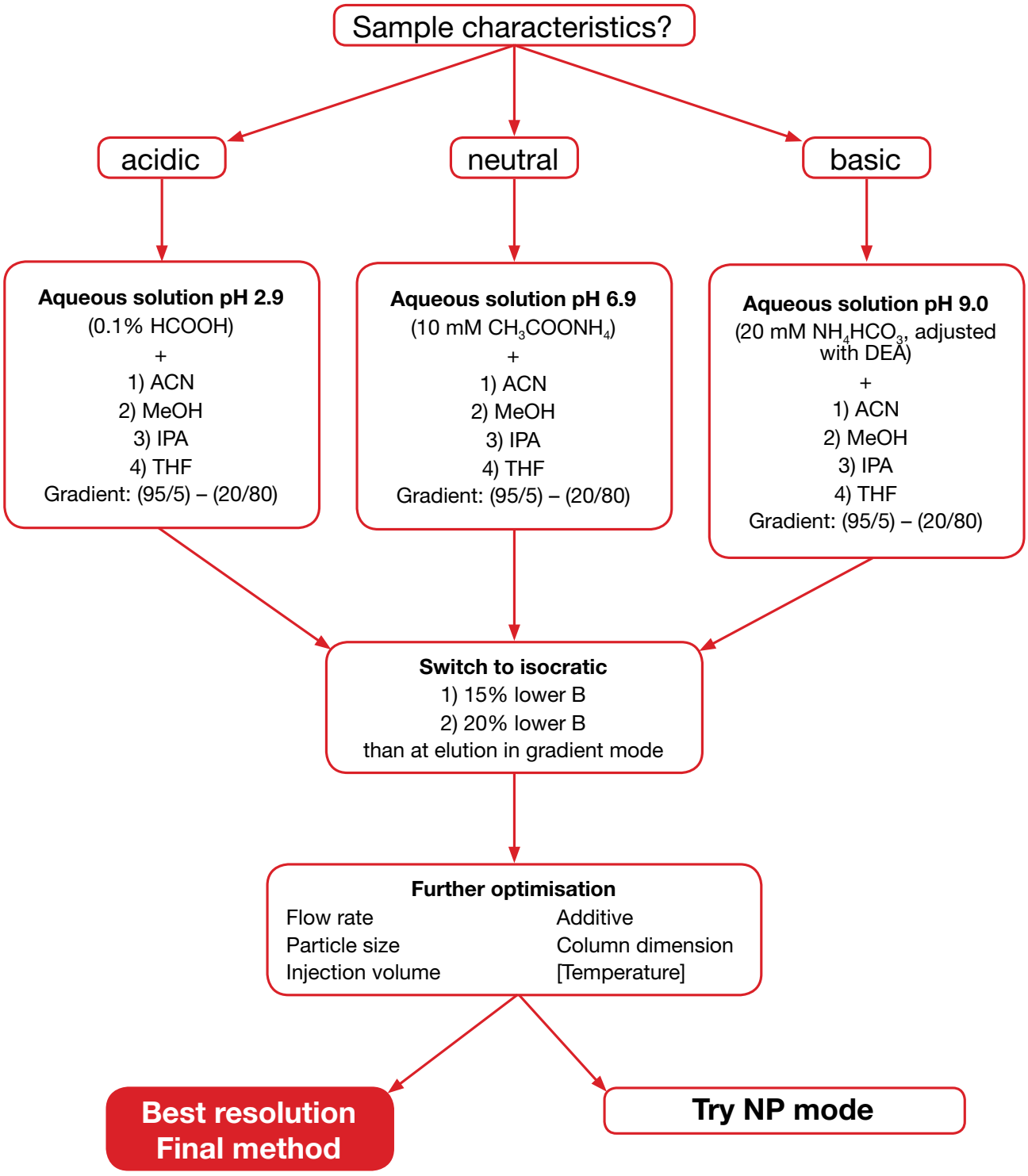
## Use of Screening Gradients

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.

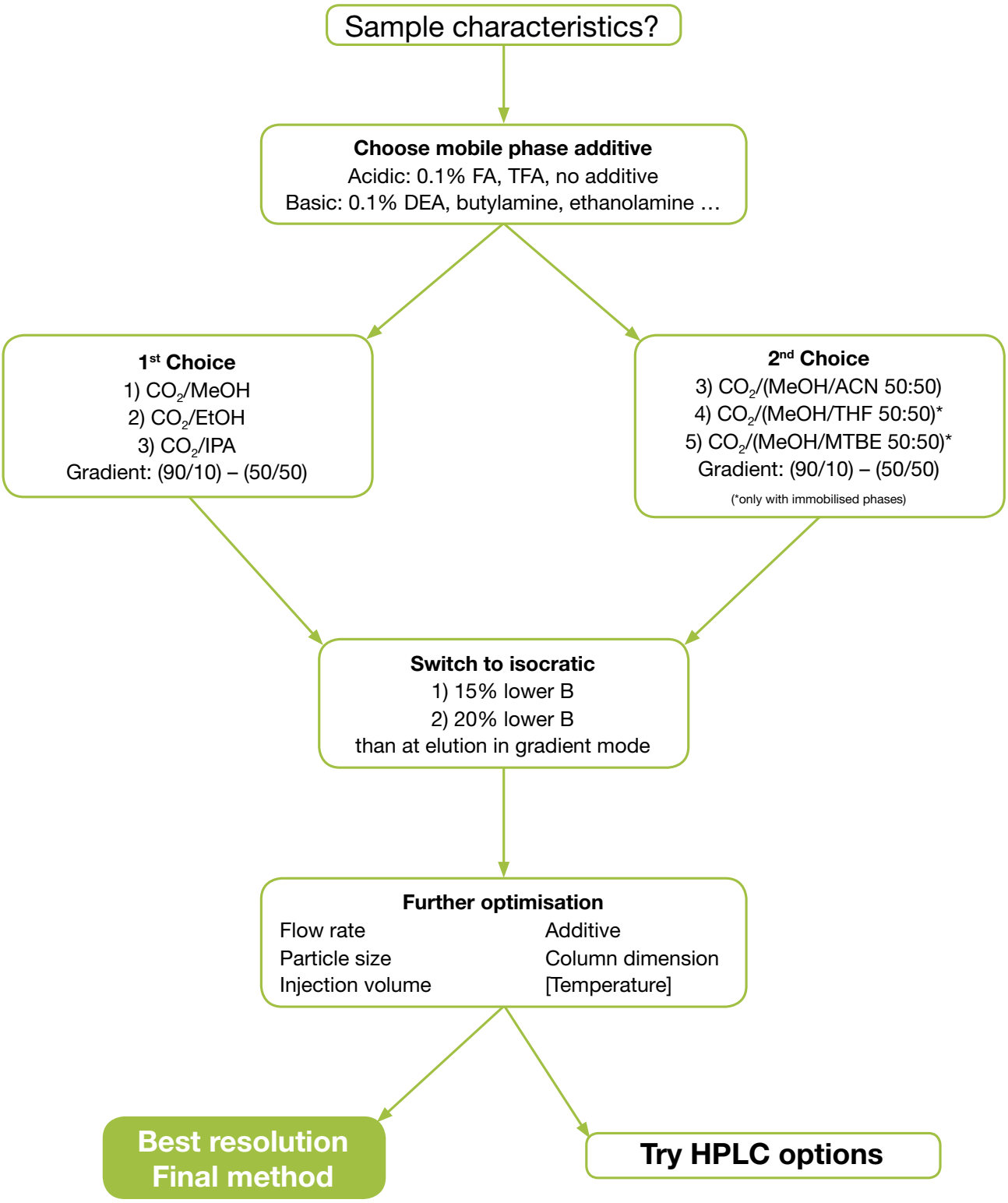
## RP Screening Strategy

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 **http://ymc.de/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 3–6 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

## Your YMC Success Rate

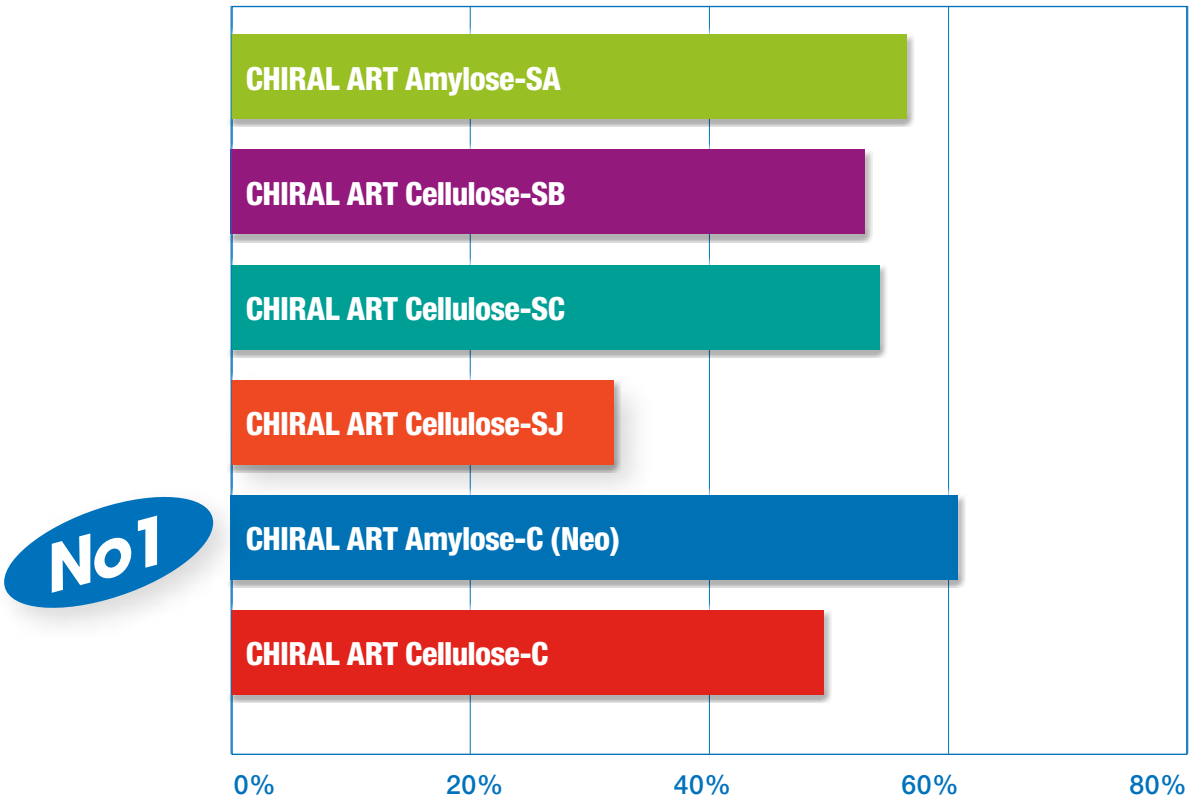
- Hit criteria : Rs>1.5
- Hit database: compiled from more than 500 samples supplied for HPLC/SFC contract service
- The 6 CHIRAL ART phases can cover >90% of chiral separations
- About 95% of the LC applications are in NP/PO mode, while 5% are in RP mode

## 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 50 L/min

## GMP compliant purification service

# Contract Purification of Chiral Compounds

| Scale | several mg - tens of g | | | tens of g - several tons | | |
|---|---|---|---|---|---|---|
| Location | Kyoto Research Laboratories | | | YMC Komatsu Works | | |
| | System | Column ID | Purpose | System | Column ID | Purpose |
| Equipment | Preparative HPLC LC-Forte/R | 20, 30 mm | Purification of trace impurities, recycling purification of enantiomers | Dynamic Axial Compression Columns + K-Prep system | 100 – 1000 mm max. flow rate 0.5 – 50 L/min | Production-scale purification of enantiomers |
| | K-Prep LAB | 50 mm | Single column purification with stacked injection | | | |
| | Preparative SFC | 20, 30 mm | Preparative SFC purification of enantiomers | Large SMB (Planned) | | Production-scale purification of API |
| | SMB | 20, 30 mm | Continuous purification, Simulation for scaling up SMB processes | | | |
| | | | | | | |

# YMC CHIRAL NEA(R)(S)

- *normal and reversed phase mode*
- *reversal of elution order*
- *nonpolar to medium polar compounds*
- *available in bulk quantities*

| YMC CHIRAL NEA(R)(S) | Specification |
|---|---|
| **Particle Size / µm** | **5** |
| **Pore Size / nm** | **30** |
| **Surface area / $m^2g^{-1}$** | **proprietary** |
| **Carbon content / %** | **proprietary** |
| **Recommended pH range** | **2.0 - 6.5 (reversed phase)** |

## Properties

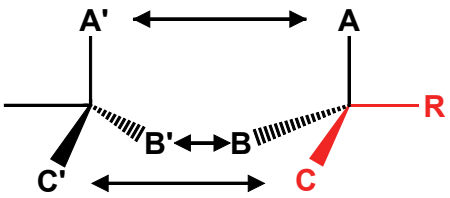
Although separation modes are chosen according to the purpose of separation, it is recommended to use one column dedicated for one separation mode in order to maximise the lifetime of the column.
In normal phase mode YMC CHIRAL NEA allows the separation of a wide range of non-polar to moderately polar compounds.
The separation mechanisms involve a combination of:

- π-π interactions
- hydrogen bonding
- dipole interactions
- steric effects.

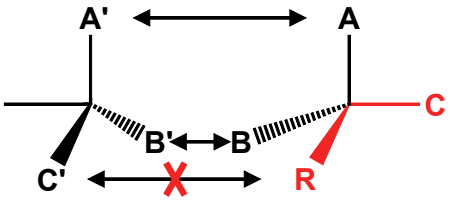
For a successful separation at least three points of interaction between the CSP and the target compound must exist. Occasionally, for analytical separations, there may be a need to derivatise
the sample with, for example π-donating groups such as dinitobenzoyl, dinitrophenylurea or dinitrophenylcarbamate groups. In some cases, the increase in detectability can offset the disadvantages of derivatisation

## Chiral Separation Mechanism

**3 points of interaction: separation**




**2 points of interaction: no separation**



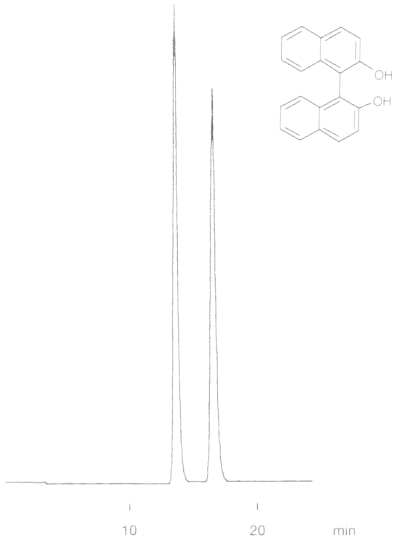

## Column Care

The recommended pH range for using YMC CHIRAL NEA(R)(S) columns is 2.0-6.5. Remove acid and buffer salts before storage. Store the column in methanol/water = 50/50. If columns are affected by undesired contaminants or clogged inlet frits which cause back pressure increases, flush the column with THF in the opposite flow direction.
For detailed information please refer to the “Column Care and Use Instructions” which can be downloaded from www.ymc.de/support-documentation.html.

# YMC CHIRAL NEA(R)(S)

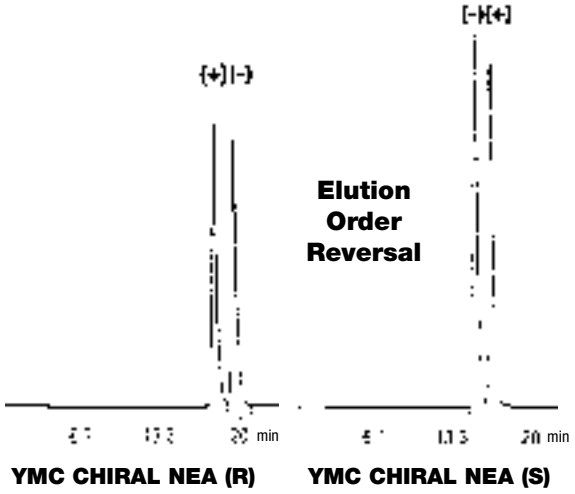
## Applications used in normal phase mode

### 1,1'-Bi-2-Naphthol



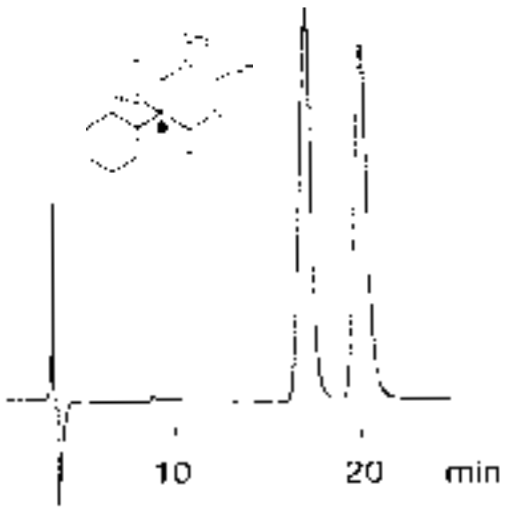

| | |
|---|---|
| Column: | YMC CHIRAL NEA (R) 250 x 4.6 mm ID |
| Part No.: | CR30S05-2546WT |
| Eluent: | *n*-hexane / dichloromethane / ethanol (70/30/2) |
| Flow rate: | 1.0 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 254 nm |

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



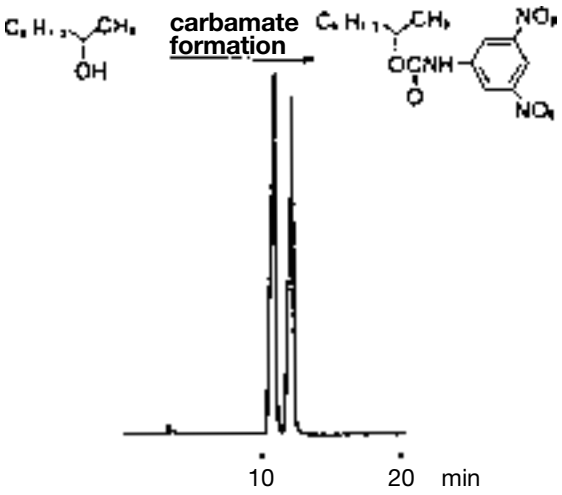

| | |
|---|---|
| Column: | YMC CHIRAL NEA (R) and YMC CHIRAL NEA (S) 250 x 4.6 mm ID |
| Part No.: | CR30S05-2546WT and CS30S05-2546WT |
| Eluent: | *n*-hexane / dichloromethane / ethanol (70/30/1) |
| Flow rate: | 0.5 mL/min |
| Temperature: | 25 °C |
| Detection: | UV at 254 nm |

### Hexobarbital




| | |
|---|---|
| Column: | YMC CHIRAL NEA (R) 250 x 4.6 mm ID |
| Part No.: | CR30S05-2546WT |
| Eluent: | *n*-hexane / $CH_2Cl_2$ / ethanol (90/10/2) |
| Flow rate: | 1.0 mL/min |
| Temperature: | ambient |
| Detection: | UV at 220 nm |

### 1-Phenylethanol

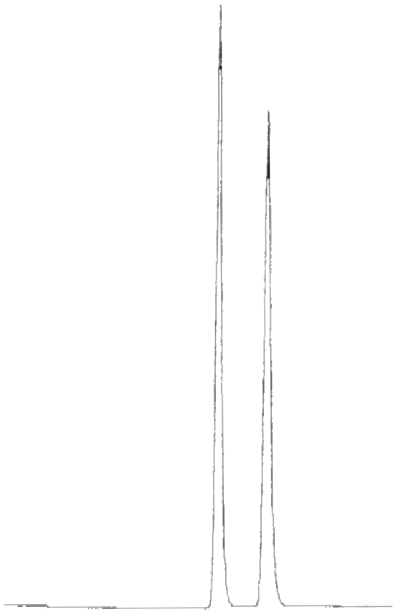



| | |
|---|---|
| Column: | YMC CHIRAL NEA (R) 250 x 4.6 mm ID |
| Part No.: | CR30S05-2546WT |
| Eluent: | *n*-hexane / $CH_2Cl_2$ / ethanol (90/10/5) |
| Flow rate: | 1.0 mL/min |
| Temperature: | 35 °C |
| Detection: | UV at 254 nm |

# YMC CHIRAL NEA(R)(S)

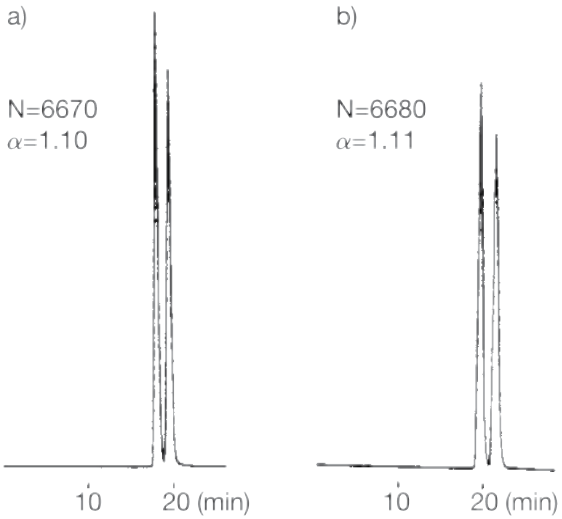
## Applications used in reversed phase mode

### 1,1'-Bi-2-Naphthol



| | |
|---|---|
| Column: | YMC CHIRAL NEA (R) 250 x 4.6 mm ID |
| Part No.: | NR30S05-2546WT |
| Eluent: | acetonitrile / water (50/50) |
| Flow: | 1.0 mL/min |
| Pressure: | 80 bar |
| Detection: | UV at 235 nm |
| Injection: | 1.0 µL (2.8 mg/mL) |
| Temperature: | ambient |

### Propranolol · HCl



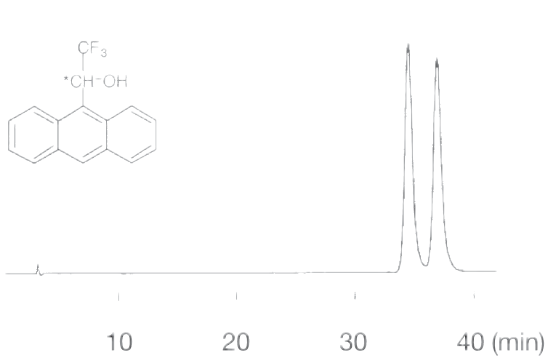

a)

| | |
|---|---|
| Column: | YMC CHIRAL NEA (R) 250 x 4.6 mm ID |
| Part No.: | NR30S05-2546WT |
| Eluent: | acetonitrile / 0.5M $NaClO_4$ (40/60) |
| Flow: | 1.0 mL/min |
| Temperature: | ambient |
| Time: | 100 hours |

b)

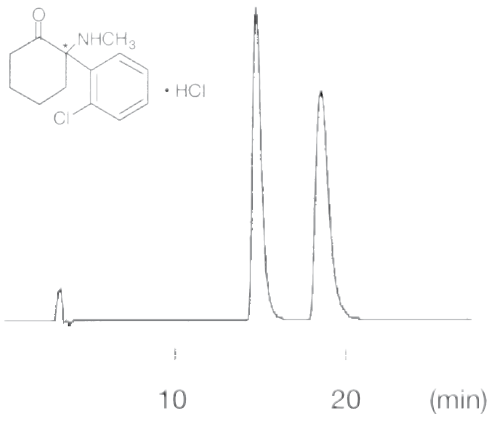
| | |
|---|---|
| Eluent: | acetonitrile / 0.5M $NaClO_4$ (40/60) |
| Flow: | 1.0 mL/min |
| Temperature: | ambient |
| Detection: | UV at 254 nm |

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




| | |
|---|---|
| Column: | YMC CHIRAL NEA (R) 250 x 4.6 mm ID |
| Part No.: | NR30S05-2546WT |
| Eluent: | acetonitrile / water (40/60) |
| Flow: | 1.0 mL/min |
| Detection: | UV at 254 nm |
| Injection: | 1.0 µL (0.14 mg/mL) |
| Temperature: | ambient |

### Ketamine · HCl




| | |
|---|---|
| Column: | YMC CHIRAL NEA (R) 250 x 4.6 mm ID |
| Part No.: | NR30S05-2546WT |
| Eluent: | acetonitrile / 0.5M $NaClO_4$ (40/60) |
| Flow: | 1.0 mL/min |
| Detection: | UV at 268 nm |
| Injection: | 10 µL (1.4 mg/mL) |
| Temperature: | ambient |

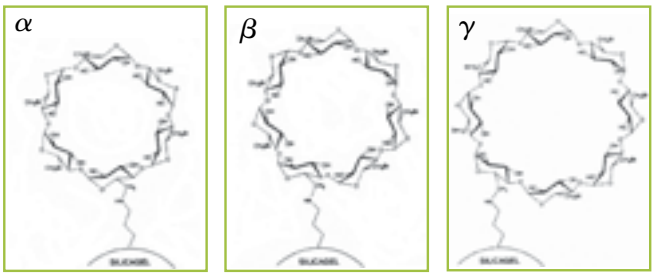
# YMC CHIRAL CD BR

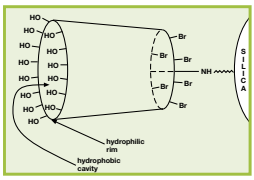
- *reversed phase*
- *polar pharmaceuticals*
- *positional isomers*
- *water-soluble compounds*

| YMC CHIRAL CD BR | Specification |
|---|---|
| **Particle Size / µm** | **5** |
| **Pore Size / nm** | **12** |
| **Surface area / $m^2g^{-1}$** | **proprietary** |
| **Carbon content / %** | **proprietary** |
| **Recommended pH range** | **3.5 - 6.5** |

## Properties

YMC CHIRAL CD BR columns offer an alternative approach to enantioseparation. Covalent bonding of a bromide derivative of a cyclodextrin to YMC silica provides a novel CSP. The bromide derivative, in which the primary hydroxyl groups at carbon 6 are substituted for bromine, provides a different chiral selectivity to the 'normal' cyclodextrins. These cyclodextrin bromide derivatives are used in reversed phase mode to separate a wide range of polar, water-soluble compounds.
In addition they will separate, under similar conditions, positional isomers of substituted aromatic compounds.




**β-CD BR**

## Column Care

The recommended pH range for using YMC CHIRAL CD BR columns is 3.5-6.5. Remove acid and buffer salts before storage. Store the column in methanol/water = 50/50. If columns are affected by undesired contaminants or clogged inlet frits which cause back pressure increases, flush the column with THF in the opposite flow direction.

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

# Ordering Information

## CHIRAL ART Amylose-C

| Phase dimension | Column ID [mm] | Column length [mm] | | | Guard cartridges* with 10 mm length |
|---|---|---|---|---|---|
| | | 50 | 100 | 150 | |
| 3 µm | 2 | KAN99S03-0502WT | KAN99S03-1002WT | KAN99S03-1502WT | KAN99S03-01Q1GC (pack of 5) |
| | 3 | KAN99S03-0503WT | KAN99S03-1003WT | KAN99S03-1503WT | KAN99S03-0103GC (pack of 5) |
| | 4.6 | KAN99S03-0546WT | KAN99S03-1046WT | KAN99S03-1546WT | KAN99S03-0104GC (pack of 5) |

| Phase dimension | Column ID [mm] | Column length [mm] | | Guard cartridges* with 10 mm length |
|---|---|---|---|---|
| | | 150 | 250 | |
| 5 µm | 2 | KAN99S05-1502WT | KAN99S05-2502WT | KAN99S05-01Q1GC (pack of 5) |
| | 4.6 | KAN99S05-1546WT | KAN99S05-2546WT | KAN99S05-0104GC (pack of 5) |
| | 10 | KAN99S05-1510WT | KAN99S05-2510WT | KAN99S05-0110CC (pack of 2) |
| | 20 | KAN99S05-1520WX | KAN99S05-2520WX | KAN99S05-0120CC (pack of 2) |
| | 30 | KAN99S05-1530WX | KAN99S05-2530WX | KAN99S05-0130CC (pack of 2) |
| | 50 | KAN99S05-1553DX | KAN99S05-2553DX | KAN99S05-0553DXG |

## Alcyon SFC CSP Amylose-C

| Phase dimension | Column ID [mm] | Column length [mm] | | | |
|---|---|---|---|---|---|
| | | 50 | 100 | 150 | 250 |
| 3 µm | 2.1 | — | — | KAN99S03-15Q1WTS | — |
| | 3 | KAN99S03-0503WTS | KAN99S03-1003WTS | KAN99S03-1503WTS | — |
| | 4.6 | — | — | KAN99S03-1546WTS | KAN99S03-2546WTS |

| Phase dimension | Column ID [mm] | Column length [mm] | |
|---|---|---|---|
| | | 150 | 250 |
| 5 µm | 2.1 | KAN99S05-15Q1WTS | — |
| | 4.6 | KAN99S05-1546WTS | KAN99S05-2546WTS |
| | 10 | — | KAN99S05-2510WTS |
| | 20 | — | KAN99S05-2520WTS |

*Guard cartridge holder required, part no. XPGCH-Q1 (2.1, 3, 4 mm ID)
XPCHSPW1 (10 mm ID)
XPCHSPW2 (20 mm ID)
XPCHSPW3 (30 mm ID)
*no holder required for 50 mm ID

# Ordering Information

## CHIRAL ART Amylose-C Neo

| Phase dimension | Column ID [mm] | Column length [mm] | | | Guard cartridges* with 10 mm length |
|---|---|---|---|---|---|
| | | 50 | 100 | 150 | |
| 3 µm | 2 | KBN99S03-0502WT | KBN99S03-1002WT | KBN99S03-1502WT | KBN99S03-01Q1GC (pack of 5) |
| | 3 | KBN99S03-0503WT | KBN99S03-1003WT | KBN99S03-1503WT | KBN99S03-0103GC (pack of 5) |
| | 4.6 | KBN99S03-0546WT | KBN99S03-1046WT | KBN99S03-1546WT | KBN99S03-0104GC (pack of 5) |

| Phase dimension | Column ID [mm] | Column length [mm] | | Guard cartridges* with 10 mm length |
|---|---|---|---|---|
| | | 150 | 250 | |
| 5 µm | 2 | KBN99S05-1502WT | KBN99S05-2502WT | KBN99S05-01Q1GC (pack of 5) |
| | 4.6 | KBN99S05-1546WT | KBN99S05-2546WT | KBN99S05-0104GC (pack of 5) |
| | 10 | KBN99S05-1510WT | KBN99S05-2510WT | KBN99S05-0110CC (pack of 2) |
| | 20 | KBN99S05-1520WX | KBN99S05-2520WX | KBN99S05-0120CC (pack of 2) |
| | 30 | KBN99S05-1530WX | KBN99S05-2530WX | KBN99S05-0130CC (pack of 2) |
| | 50 | KBN99S05-1553DX | KBN99S05-2553DX | KBN99S05-0553DXG |

## Alcyon SFC CSP Amylose-C Neo

| Phase dimension | Column ID [mm] | Column length [mm] | | | |
|---|---|---|---|---|---|
| | | 50 | 100 | 150 | 250 |
| 3 µm | 2.1 | — | — | KBN99S03-15Q1WTS | — |
| | 3 | KBN99S03-0503WTS | KBN99S03-1003WTS | KBN99S03-1503WTS | — |
| | 4.6 | — | — | KBN99S03-1546WTS | KBN99S03-2546WTS |

| Phase dimension | Column ID [mm] | Column length [mm] | |
|---|---|---|---|
| | | 150 | 250 |
| 5 µm | 2.1 | KBN99S05-15Q1WTS | — |
| | 4.6 | KBN99S05-1546WTS | KBN99S05-2546WTS |
| | 10 | — | KBN99S05-2510WTS |
| | 20 | — | KBN99S05-2520WTS |

*Guard cartridge holder required, part no. XPGCH-Q1 (2.1, 3, 4 mm ID)
XPCHSPW1 (10 mm ID)
XPCHSPW2 (20 mm ID)
XPCHSPW3 (30 mm ID)
*no holder required for 50 mm ID

# Ordering Information

## CHIRAL ART Cellulose-C

| Phase dimension | Column ID [mm] | Column length [mm] | | | Guard cartridges* with 10 mm length |
|---|---|---|---|---|---|
| | | 50 | 100 | 150 | |
| 3 µm | 2 | KCN99S03-0502WT | KCN99S03-1002WT | KCN99S03-1502WT | KCN99S03-01Q1GC (pack of 5) |
| | 3 | KCN99S03-0503WT | KCN99S03-1003WT | KCN99S03-1503WT | KCN99S03-0103GC (pack of 5) |
| | 4.6 | KCN99S03-0546WT | KCN99S03-1046WT | KCN99S03-1546WT | KCN99S03-0104GC (pack of 5) |

| Phase dimension | Column ID [mm] | Column length [mm] | | Guard cartridges* with 10 mm length |
|---|---|---|---|---|
| | | 150 | 250 | |
| 5 µm | 2 | KCN99S05-1502WT | KCN99S05-2502WT | KCN99S05-01Q1GC (pack of 5) |
| | 4.6 | KCN99S05-1546WT | KCN99S05-2546WT | KCN99S05-0104GC (pack of 5) |
| | 10 | KCN99S05-1510WT | KCN99S05-2510WT | KCN99S05-0110CC (pack of 2) |
| | 20 | KCN99S05-1520WX | KCN99S05-2520WX | KCN99S05-0120CC (pack of 2) |
| | 30 | KCN99S05-1530WX | KCN99S05-2530WX | KCN99S05-0130CC (pack of 2) |
| | 50 | KCN99S05-1553DX | KCN99S05-2553DX | KCN99S05-0553DXG |

## Alcyon SFC CSP Cellulose-C

| Phase dimension | Column ID [mm] | Column length [mm] | | | |
|---|---|---|---|---|---|
| | | 50 | 100 | 150 | 250 |
| 3 µm | 2.1 | — | — | KCN99S03-15Q1WTS | — |
| | 3 | KCN99S03-0503WTS | KCN99S03-1003WTS | KCN99S03-1503WTS | — |
| | 4.6 | — | — | KCN99S03-1546WTS | KCN99S03-2546WTS |

| Phase dimension | Column ID [mm] | Column length [mm] | |
|---|---|---|---|
| | | 150 | 250 |
| 5 µm | 2.1 | KCN99S05-15Q1WTS | — |
| | 4.6 | KCN99S05-1546WTS | KCN99S05-2546WTS |
| | 10 | — | KCN99S05-2510WTS |
| | 20 | — | KCN99S05-2520WTS |

*Guard cartridge holder required, part no. XPGCH-Q1 (2.1, 3, 4 mm ID)
XPCHSPW1 (10 mm ID)
XPCHSPW2 (20 mm ID)
XPCHSPW3 (30 mm ID)
*no holder required for 50 mm ID

# Ordering Information

## CHIRAL ART Amylose-SA

| Phase dimension | Column ID [mm] | Column length [mm] | | | Guard cartridges* with 10 mm length |
|---|---|---|---|---|---|
| | | 50 | 100 | 150 | |
| 3 µm | 2 | KSA99S03-0502WT | KSA99S03-1002WT | KSA99S03-1502WT | KSA99S03-01Q1GC (pack of 5) |
| | 3 | KSA99S03-0503WT | KSA99S03-1003WT | KSA99S03-1503WT | KSA99S03-0103GC (pack of 5) |
| | 4.6 | KSA99S03-0546WT | KSA99S03-1046WT | KSA99S03-1546WT | KSA99S03-0104GC (pack of 5) |

| Phase dimension | Column ID [mm] | Column length [mm] | | Guard cartridges* with 10 mm length |
|---|---|---|---|---|
| | | 150 | 250 | |
| 5 µm | 2 | KSA99S05-1502WT | KSA99S05-2502WT | KSA99S05-01Q1GC (pack of 5) |
| | 4.6 | KSA99S05-1546WT | KSA99S05-2546WT | KSA99S05-0104GC (pack of 5) |
| | 10 | KSA99S05-1510WT | KSA99S05-2510WT | KSA99S05-0110CC (pack of 2) |
| | 20 | KSA99S05-1520WX | KSA99S05-2520WX | KSA99S05-0120CC (pack of 2) |
| | 30 | KSA99S05-1530WX | KSA99S05-2530WX | KSA99S05-0130CC (pack of 2) |
| | 50 | KSA99S05-2553DX | KSA99S05-2553DX | KSA99S05-0553DXG |

## Alcyon SFC CSP Amylose-SA

| Phase dimension | Column ID [mm] | Column length [mm] | | | |
|---|---|---|---|---|---|
| | | 50 | 100 | 150 | 250 |
| 3 µm | 2.1 | — | — | KSA99S03-15Q1WTS | — |
| | 3 | KSA99S03-0503WTS | KSA99S03-1003WTS | KSA99S03-1503WTS | — |
| | 4.6 | — | — | KSA99S03-1546WTS | KSA99S03-2546WTS |

| Phase dimension | Column ID [mm] | Column length [mm] | |
|---|---|---|---|
| | | 150 | 250 |
| 5 µm | 2.1 | KSA99S05-15Q1WTS | — |
| | 4.6 | KSA99S05-1546WTS | KSA99S05-2546WTS |
| | 10 | — | KSA99S05-2510WTS |
| | 20 | — | KSA99S05-2520WTS |

*Guard cartridge holder required, part no. XPGCH-Q1 (2.1, 3, 4 mm ID)
XPCHSPW1 (10 mm ID)
XPCHSPW2 (20 mm ID)
XPCHSPW3 (30 mm ID)
*no holder required for 50 mm ID

# Ordering Information

## CHIRAL ART Cellulose-SB

| Phase dimension | Column ID [mm] | Column length [mm] | | | Guard cartridges* with 10 mm length |
|---|---|---|---|---|---|
| | | 50 | 100 | 150 | |
| 3 µm | 2 | KSB99S03-0502WT | KSB99S03-1002WT | KSB99S03-1502WT | KSB99S03-01Q1GC (pack of 5) |
| | 3 | KSB99S03-0503WT | KSB99S03-1003WT | KSB99S03-1503WT | KSB99S03-0103GC (pack of 5) |
| | 4.6 | KSB99S03-0546WT | KSB99S03-1046WT | KSB99S03-1546WT | KSB99S03-0104GC (pack of 5) |

| Phase dimension | Column ID [mm] | Column length [mm] | | Guard cartridges* with 10 mm length |
|---|---|---|---|---|
| | | 150 | 250 | |
| 5 µm | 2 | KSB99S05-1502WT | KSB99S05-2502WT | KSB99S05-01Q1GC (pack of 5) |
| | 4.6 | KSB99S05-1546WT | KSB99S05-2546WT | KSB99S05-0104GC (pack of 5) |
| | 10 | KSB99S05-1510WT | KSB99S05-2510WT | KSB99S05-0110CC (pack of 2) |
| | 20 | KSB99S05-1520WX | KSB99S05-2520WX | KSB99S05-0120CC (pack of 2) |
| | 30 | KSB99S05-1530WX | KSB99S05-2530WX | KSB99S05-0130CC (pack of 2) |
| | 50 | KSB99S05-1553DX | KSB99S05-2553DX | KSB99S05-0553DXG |

## Alcyon SFC CSP Cellulose-SB

| Phase dimension | Column ID [mm] | Column length [mm] | | | |
|---|---|---|---|---|---|
| | | 50 | 100 | 150 | 250 |
| 3 µm | 2.1 | — | — | KSB99S03-15Q1WTS | — |
| | 3 | KSB99S03-0503WTS | KSB99S03-1003WTS | KSB99S03-1503WTS | — |
| | 4.6 | — | — | KSB99S03-1546WTS | KSB99S03-2546WTS |

| Phase dimension | Column ID [mm] | Column length [mm] | |
|---|---|---|---|
| | | 150 | 250 |
| 5 µm | 2.1 | KSB99S05-15Q1WTS | — |
| | 4.6 | KSB99S05-1546WTS | KSB99S05-2546WTS |
| | 10 | — | KSB99S05-2510WTS |
| | 20 | — | KSB99S05-2520WTS |

*Guard cartridge holder required, part no. XPGCH-Q1 (2.1, 3, 4 mm ID)
XPCHSPW1 (10 mm ID)
XPCHSPW2 (20 mm ID)
XPCHSPW3 (30 mm ID)
*no holder required for 50 mm ID

# Ordering Information

## CHIRAL ART Cellulose-SC

| Phase dimension | Column ID [mm] | Column length [mm] | | | Guard cartridges* with 10 mm length |
|---|---|---|---|---|---|
| | | 50 | 100 | 150 | |
| 3 µm | 2 | KSC99S03-0502WT | KSC99S03-1002WT | KSC99S03-1502WT | KSC99S03-01Q1GC (pack of 5) |
| | 3 | KSC99S03-0503WT | KSC99S03-1003WT | KSC99S03-1503WT | KSC99S03-0103GC (pack of 5) |
| | 4.6 | KSC99S03-0546WT | KSC99S03-1046WT | KSC99S03-1546WT | KSC99S03-0104GC (pack of 5) |

| Phase dimension | Column ID [mm] | Column length [mm] | | Guard cartridges* with 10 mm length |
|---|---|---|---|---|
| | | 150 | 250 | |
| 5 µm | 2 | KSC99S05-1502WT | KSC99S05-2502WT | KSC99S05-01Q1GC (pack of 5) |
| | 4.6 | KSC99S05-1546WT | KSC99S05-2546WT | KSC99S05-0104GC (pack of 5) |
| | 10 | KSC99S05-1510WT | KSC99S05-2510WT | KSC99S05-0110CC (pack of 2) |
| | 20 | KSC99S05-1520WX | KSC99S05-2520WX | KSC99S05-0120CC (pack of 2) |
| | 30 | KSC99S05-1530WX | KSC99S05-2530WX | KSC99S05-0130CC (pack of 2) |
| | 50 | KSC99S05-1553DX | KSC99S05-2553DX | KSC99S05-0553DXG |

## Alcyon SFC CSP Cellulose-SC

| Phase dimension | Column ID [mm] | Column length [mm] | | | |
|---|---|---|---|---|---|
| | | 50 | 100 | 150 | 250 |
| 3 µm | 2.1 | — | — | KSC99S03-15Q1WTS | — |
| | 3 | KSC99S03-0503WTS | KSC99S03-1003WTS | KSC99S03-1503WTS | — |
| | 4.6 | — | — | KSC99S03-1546WTS | KSC99S03-2546WTS |

| Phase dimension | Column ID [mm] | Column length [mm] | |
|---|---|---|---|
| | | 150 | 250 |
| 5 µm | 2.1 | KSC99S05-15Q1WTS | — |
| | 4.6 | KSC99S05-1546WTS | KSC99S05-2546WTS |
| | 10 | — | KSC99S05-2510WTS |
| | 20 | — | KSC99S05-2520WTS |

*Guard cartridge holder required, part no. XPGCH-Q1 (2.1, 3, 4 mm ID)
XPCHSPW1 (10 mm ID)
XPCHSPW2 (20 mm ID)
XPCHSPW3 (30 mm ID)
*no holder required for 50 mm ID

# Ordering Information

## CHIRAL ART Cellulose-SJ

| Phase dimension | Column ID [mm] | Column length [mm] | | | Guard cartridges* with 10 mm length |
|---|---|---|---|---|---|
| | | 50 | 100 | 150 | |
| 3 µm | 2 | KSJ99S03-0502WT | KSJ99S03-1002WT | KSJ99S03-1502WT | KSJ99S03-01Q1GC (pack of 5) |
| | 3 | KSJ99S03-0503WT | KSJ99S03-1003WT | KSJ99S03-1503WT | KSJ99S03-0103GC (pack of 5) |
| | 4.6 | KSJ99S03-0546WT | KSJ99S03-1046WT | KSJ99S03-1546WT | KSJ99S03-0104GC (pack of 5) |

| Phase dimension | Column ID [mm] | Column length [mm] | | Guard cartridges* with 10 mm length |
|---|---|---|---|---|
| | | 150 | 250 | |
| 5 µm | 2 | KSJ99S05-1502WT | KSJ99S05-2502WT | KSJ99S03-01Q1GC (pack of 5) |
| | 4.6 | KSJ99S05-1546WT | KSJ99S05-2546WT | KSJ99S03-0104GC (pack of 5) |
| | 10 | KSJ99S05-1510WT | KSJ99S05-2510WT | KSJ99S05-0110CC (pack of 2) |
| | 20 | KSJ99S05-1520WX | KSJ99S05-2520WX | KSJ99S05-0120CC (pack of 2) |
| | 30 | KSJ99S05-1530WX | KSJ99S05-2530WX | KSJ99S05-0130CC (pack of 2) |
| | 50 | KSJ99S05-1553DX | KSJ99S05-2553DX | KSJ99S05-0553DXG |

## Alcyon SFC CSP Cellulose-SJ

| Phase dimension | Column ID [mm] | Column length [mm] | | | |
|---|---|---|---|---|---|
| | | 50 | 100 | 150 | 250 |
| 3 µm | 2.1 | — | — | KSJ99S03-15Q1WTS | — |
| | 3 | KSJ99S03-0503WTS | KSJ99S03-1003WTS | KSJ99S03-1503WTS | — |
| | 4.6 | — | — | KSJ99S03-1546WTS | KSJ99S03-2546WTS |

| Phase dimension | Column ID [mm] | Column length [mm] | |
|---|---|---|---|
| | | 150 | 250 |
| 5 µm | 2.1 | KSJ99S05-15Q1WTS | - |
| | 4.6 | KSJ99S05-1546WTS | KSJ99S05-2546WTS |
| | 10 | - | KSJ99S05-2510WTS |
| | 20 | - | KSJ99S05-2520WTS |

*Guard cartridge holder required, part no. XPGCH-Q1 (2.1, 3, 4 mm ID)
XPCHSPW1 (10 mm ID)
XPCHSPW2 (20 mm ID)
XPCHSPW3 (30 mm ID)
*no holder required for 50 mm ID

# Ordering Information

## Normal Phase: YMC CHIRAL NEA(R)(S)

| Phase dimension | Column ID [mm] | Column length [mm] | | | | Guard cartridges* with 10 mm length [pack of 5] |
|---|---|---|---|---|---|---|
| | | 50 | 100 | 150 | 250 | |
| 30 nm 5 µm NEA(R) | 4.6 | CR30S05-0546WT | CR30S05-1046WT | CR30S05-1546WT | CR30S05-2546WT | CR30S05-0104GC |
| 30 nm 5 µm NEA(S) | 4.6 | CS30S05-0546WT | CS30S05-1046WT | CS30S05-1546WT | CS30S05-2546WT | CS30S05-0104GC |

*Guard cartridge holder required, part no. XPGCH-Q1

## Reversed Phase: YMC CHIRAL NEA(R)(S)

| Phase dimension | Column ID [mm] | Column length [mm] | | | | Guard cartridges* with 10 mm length [pack of 5] |
|---|---|---|---|---|---|---|
| | | 50 | 100 | 150 | 250 | |
| 30 nm 5 µm NEA(R) | 4.6 | NR30S05-0546WT | NR30S05-1046WT | NR30S05-1546WT | NR30S05-2546WT | NR30S05-0104GC |
| 30 nm 5 µm NEA(S) | 4.6 | NS30S05-0546WT | NS30S05-1046WT | NS30S05-1546WT | NS30S05-2546WT | NS30S05-0104GC |

*Guard cartridge holder required, part no. XPGCH-Q1

## a-CD BR: YMC CHIRAL CD BR

| Phase dimension | Column ID [mm] | Column length [mm] | | | | Guard cartridges* with 10 mm length [pack of 5] |
|---|---|---|---|---|---|---|
| | | 50 | 100 | 150 | 250 | |
| 12 nm 5 µm | 4.6 | DA12S05-0546WT | — | DA12S05-1546WT | DA12S05-2546WT | DA12S05-0104GC |

*Guard cartridge holder required, part no. XPGCH-Q1

## b-CD BR: YMC CHIRAL CD BR

| Phase dimension | Column ID [mm] | Column length [mm] | | | | Guard cartridges* with 10 mm length [pack of 5] |
|---|---|---|---|---|---|---|
| | | 50 | 100 | 150 | 250 | |
| 12 nm 5 µm | 4.6 | DB12S05-0546WT | — | DB12S05-1546WT | DB12S05-2546WT | DB12S05-0104GC |

*Guard cartridge holder required, part no. XPGCH-Q1

## g-CD BR: YMC CHIRAL CD BR

| Phase dimension | Column ID [mm] | Column length [mm] | | | | Guard cartridges* with 10 mm length [pack of 5] |
|---|---|---|---|---|---|---|
| | | 50 | 100 | 150 | 250 | |
| 12 nm 5 µm | 4.6 | DG12S05-0546WT | — | DG12S05-1546WT | DG12S05-2546WT | DG12S05-0104GC |

*Guard cartridge holder required, part no. XPGCH-Q1

Several other dimensions or particle sizes available. Check www.ymc.de/chiral-columns.html

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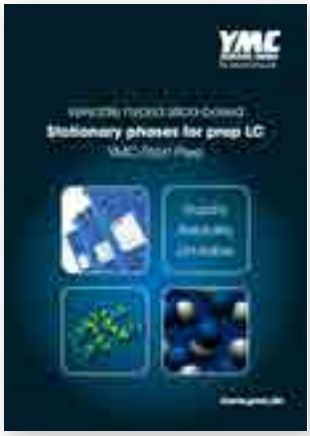
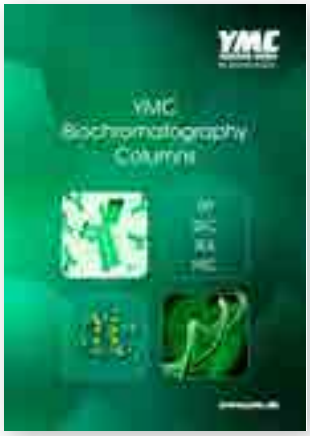
# Other Brochures Available

**(U)HPLC columns YMC-Triart**




**YMC-Triart Prep**




**YMC Biochromatography columns**

Your local distributor:

**YMC Europe GmbH**
Schöttmannshof 19
D-46539 Dinslaken
Germany
Phone +49(0)2064/427-0, Fax +49(0)2064/427-222
www.ymc.de

**YMC Schweiz GmbH**
Im Wasenboden 8
4056 Basel
Switzerland
Phone + 41 61 561 80 50, Fax + 41 61 561 80 59
www.ymc-schweiz.ch

**YMC CO., LTD.**
YMC Karasuma-Gojo Bld. 284 Daigo-cho,
Karasuma Nishiiru Gojo-dori Shimogyo-ku,
Kyoto 600-8106 Japan
Phone +81(0)75-342-4515, Fax +81(0)75-342-4550
www.ymc.co.jp