Time to reflect on your chiral columns!

YMC EUROPE GMBH

YMC Chiral Columns

CHIRAL ART Polysaccharides
YMC CHIRAL NEA & CD BR

NP / RP / SFC

Coated / Immobilised

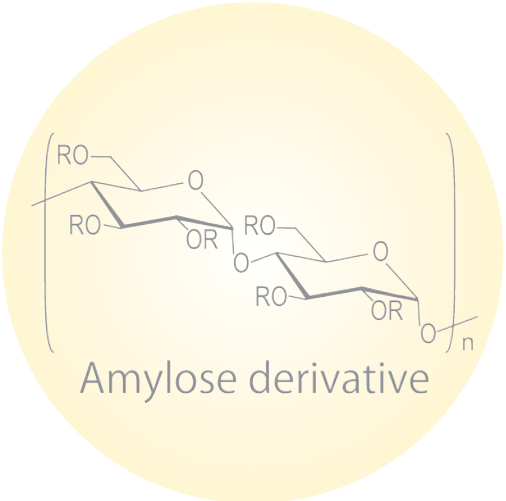
(Semi-)prep

HPLC Columns for Optical Isomer Separation

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

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

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



Chiral Columns

Contents

Verified stability with TFA

Only REAL alternative on the market!

CHIRAL ART
Coated Polysaccharide Derivatives Series

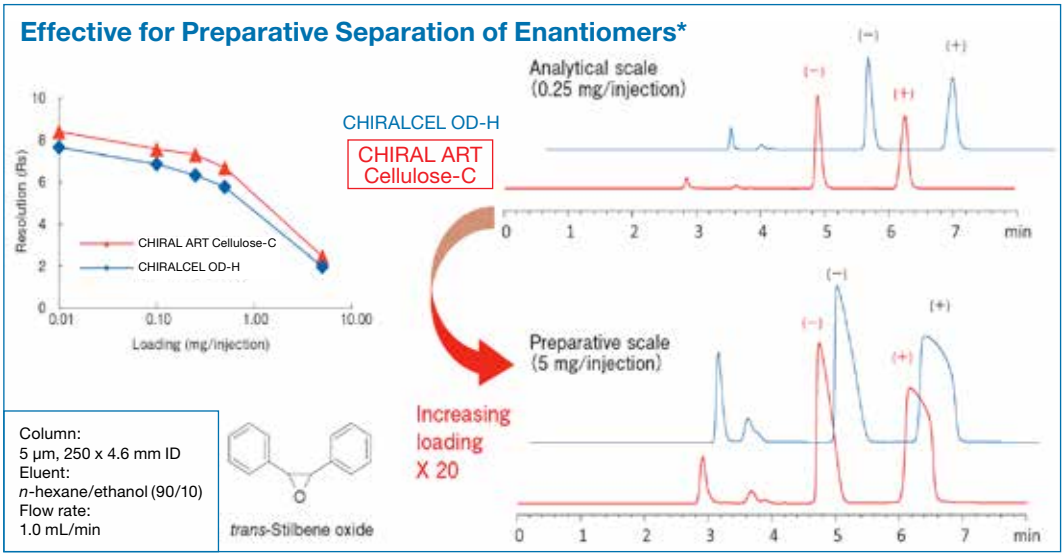
- **polysaccharide chiral selectors**
- **wide application range**
- **with high stability, also for SFC/SMB**
- **HPLC columns and preparative grade bulk media with particle sizes of 3, 5, 10 or 20 µm available**
- **extremely attractive pricing**

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 (eg. 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.



CHIRAL ART
Coated Polysaccharide Derivatives Series

Specifications	CHIRAL ART Amylose-C	CHIRAL ART Cellulose-C
Particle size	3, 5, 10, 20 µm	
CHIRAL selector	Amylose tris (3,5-dimethylphenylcarbamate)	Cellulose tris (3,5-dimethylphenylcarbamate)
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 (4350 psi)	
Recommended flow rate	4.6 mm ID: 0.5 - 1.0 mL/min (Max. flow rate: 3.0 mL/min) 10 mm ID: 2.5 - 5.0 mL/min (Max. flow rate: 15 mL/min)	

Product Line-up

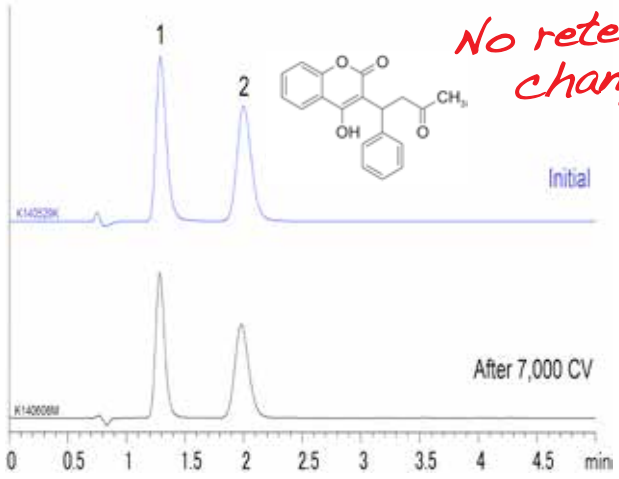
Product name	Particle size [µm]	Chiral selector	Type	Competitive product
CHIRAL ART Amylose-C	3 5 10 20	Amylose tris (3,5-dimethylphenylcarbamate)	Coated	CHIRALPAK® AD, AD-H, AD-3
CHIRAL ART Cellulose-C		Cellulose tris (3,5-dimethylphenylcarbamate)	Coated	CHIRALCEL® OD, OD-H, OD-3

* Application data by courtesy YMC Co., Ltd.

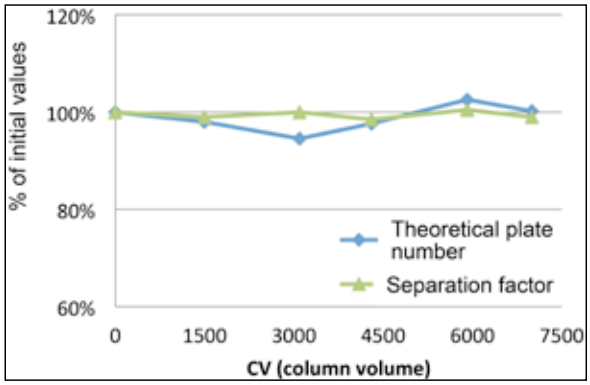
Coated Polysaccharides

Enhanced stability using TFA

Stability evaluation with Warfarin*

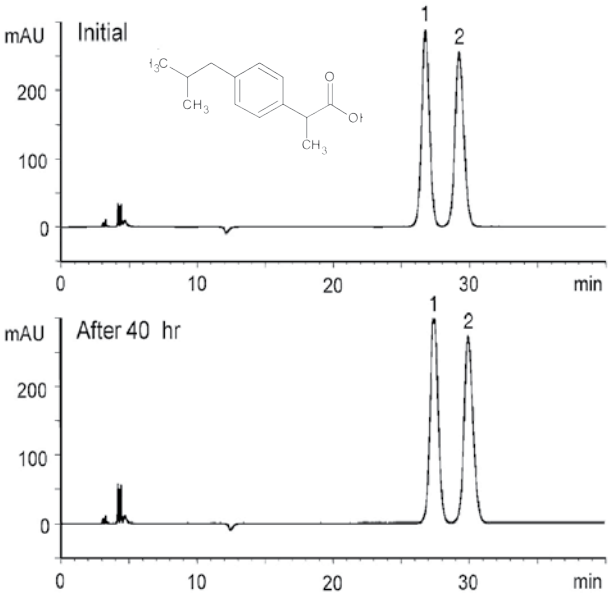


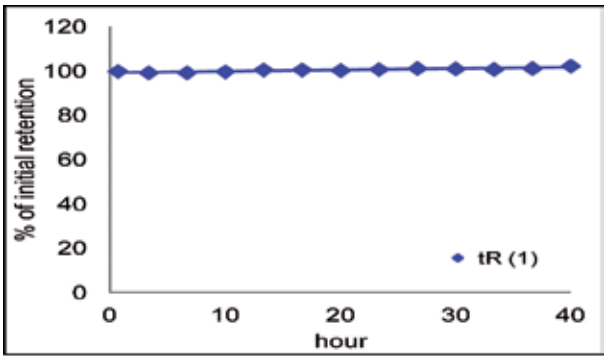
No retention time changes!

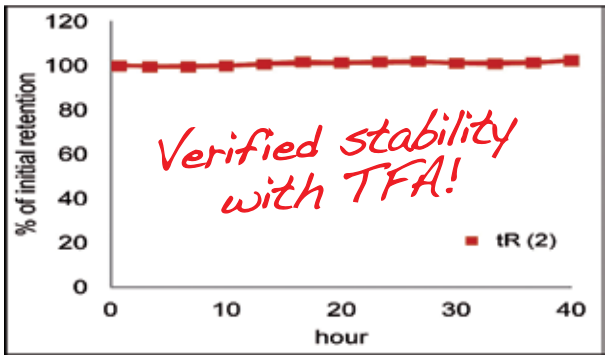


Column:	CHIRAL ART Amylose-C (5 µm) 50 x 3.0 mm ID
Part No.:	KAN99S05-0503WT
Eluent:	*n*-hexane / ethanol / TFA (70/30/0.1)
Flow rate:	0.425 mL/min
Temperature:	25°C
Detection:	UV at 254 nm

Repeated analysis of Ibuprofen*







Verified stability with TFA!

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)

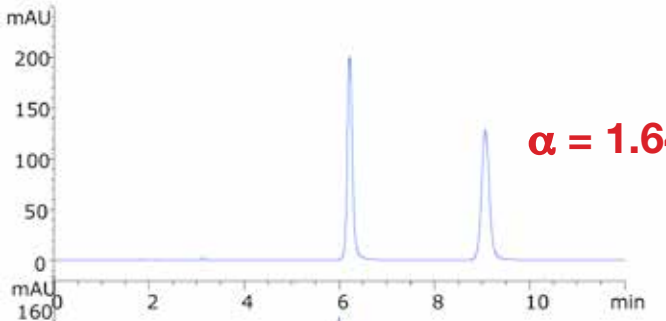
TFA can be challenging for coated amylose phases with regards to stability and lifetime. CHIRAL ART Amylose-C however shows long-term stability using mobile phases containing TFA. The retention behaviour and column efficiency remain completely unaffected.

Coated Polysaccharides

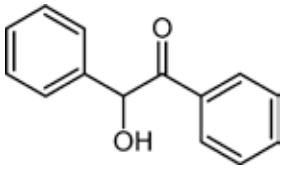
Full scalability from 3 to 20 µm*

3 µm

150 x 4.6 mm ID
at 1.0 mL/min



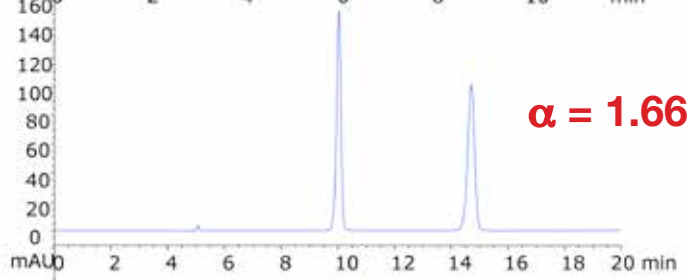
α = 1.64



Benzoin

5 µm

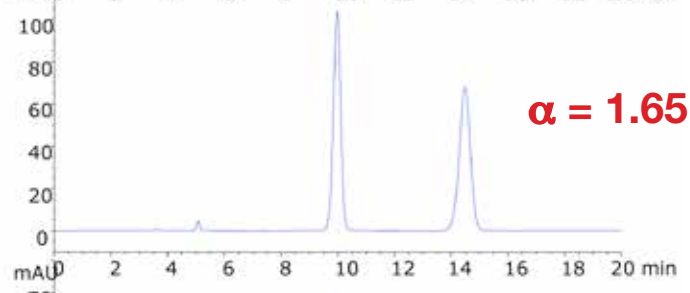
250 x 4.6 mm ID
at 1.0 mL/min



α = 1.66

10 µm

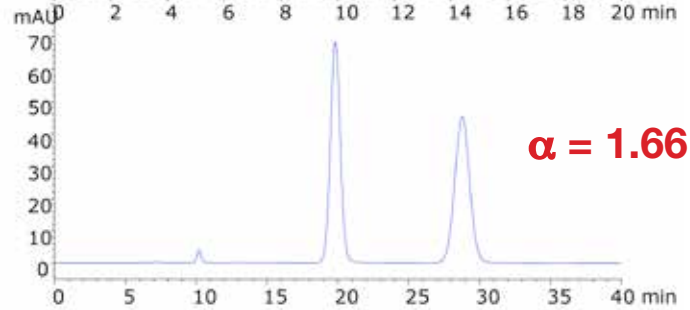
250 x 4.6 mm ID
at 1.0 mL/min



α = 1.65

20 µm

250 x 4.6 mm ID
at 0.5 mL/min



α = 1.66

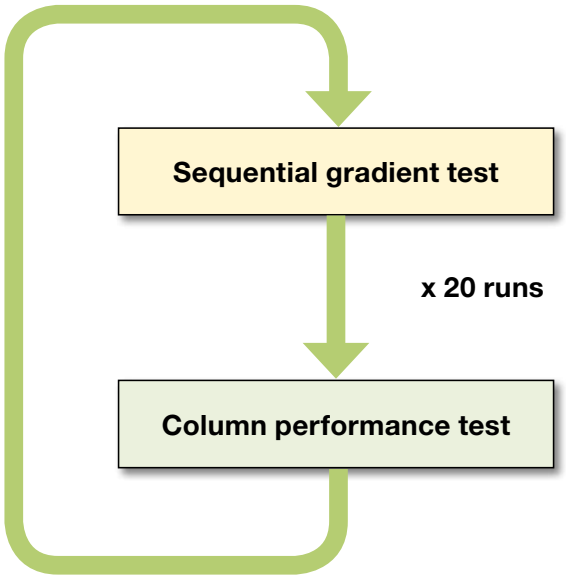
Column:	CHIRAL ART Cellulose-C
Eluent:	*n*-hexane / 2-propanol (90/10)
Flow rate:	1.0 mL/min (for 3, 5, 10 µm) 0.5 mL/min (for 20 µm)
Temperature:	25°C
Detection:	UV at 254 nm
Sample:	Benzoin
Injection:	10 µl (0.1 mg/mL)

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.

* Application data by courtesy YMC Co., Ltd.

Coated Polysaccharides

Extended packing stability*

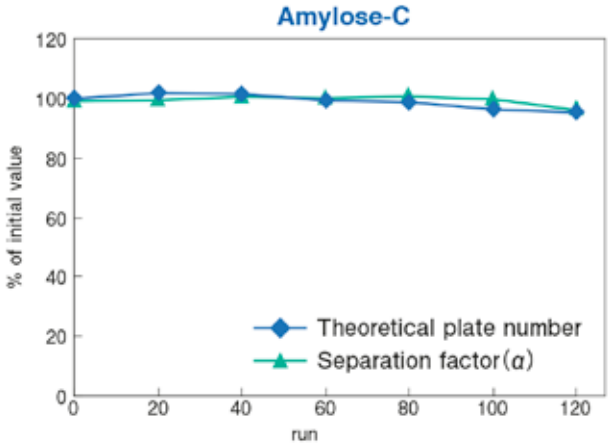


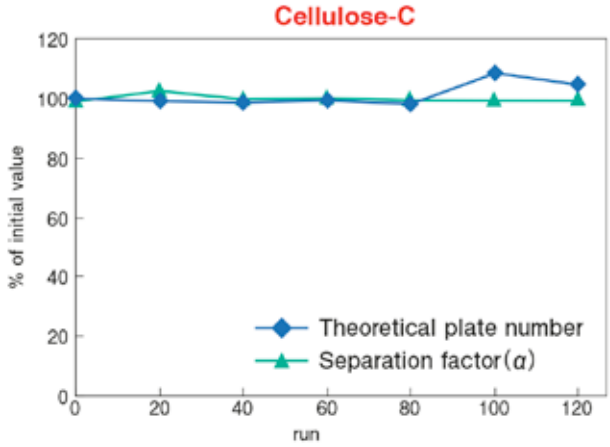
Sequential gradient test

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





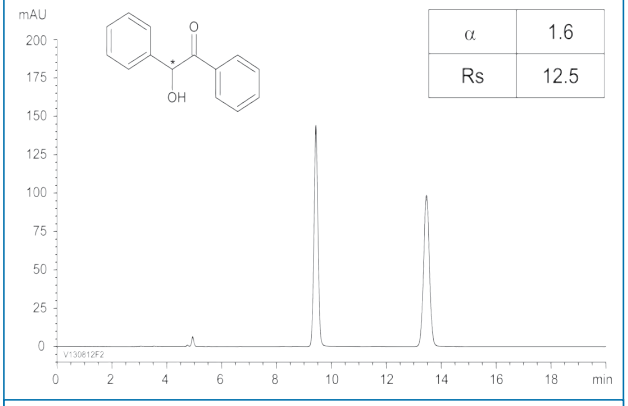
Coated Polysaccharides

Applications

Benzoin*

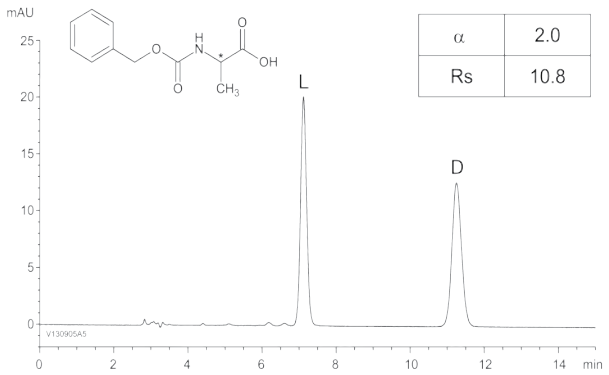
Column: CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.: KAN99S05-2546WT
Eluent: *n*-hexane / 2-propanol (90/10)
Flow: 1.0 mL/min
Temperature: 25°C
Detection: UV at 254 nm
Injection: 10 µL (0.1 mg/mL)

Benzoin*



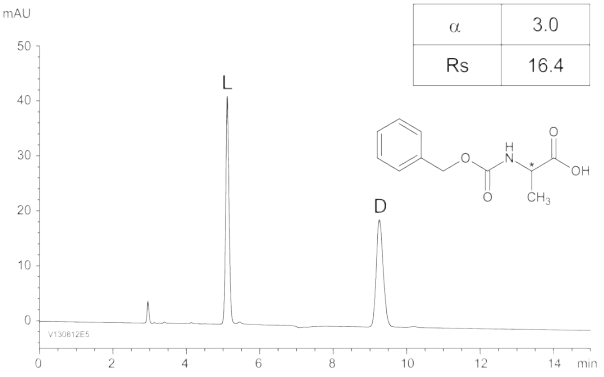
Column: CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.: KCN99S05-2546WT
Eluent: *n*-hexane / 2-propanol (90/10)
Flow: 1.0 mL/min
Temperature: 25°C
Detection: UV at 254 nm
Injection: 10 µL (0.1 mg/mL)

N-CBZ-DL-Alanine*



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: 10 µL (1 mg/mL)

N-CBZ-DL-Alanine*

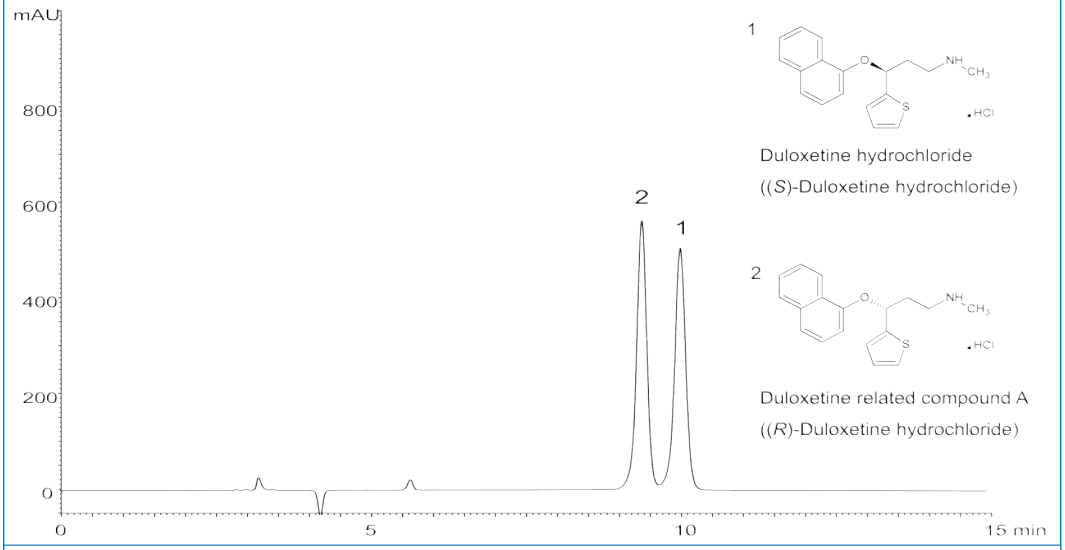


Column: CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.: KCN99S05-2546WT
Eluent: *n*-hexane / 2-propanol / TFA (80/20/0.1)
Flow: 1.0 mL/min
Temperature: 25°C
Detection: UV at 254 nm
Injection: 10 µL (1 mg/mL)

* Application data by courtesy YMC Co., Ltd.

Coated Polysaccharides

Duloxetine hydrochloride*

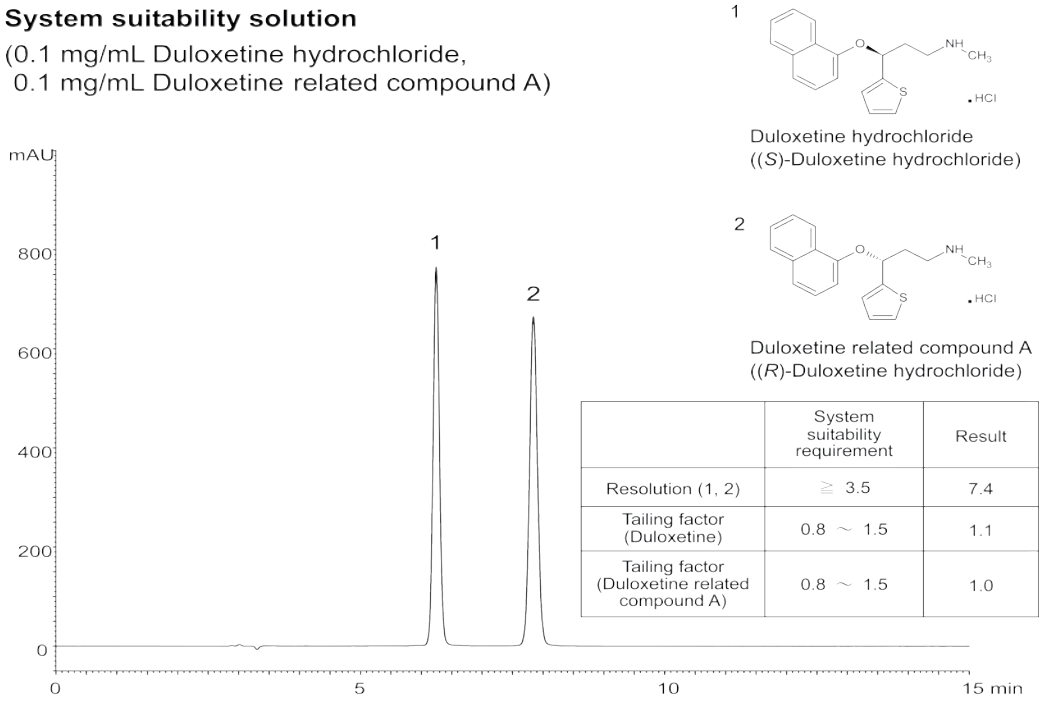


Column:	CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID	Temperature:	30°C
Part No.:	KAN99S05-2546WT	Detection:	UV at 230 nm
Eluent:	*n*-hexane / ethanol / diethylamine (95/5/0.2)	Injection:	10 µL (0.1 mg/mL)
Flow:	1.0 mL/min		

Duloxetine hydrochloride*

System suitability solution

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



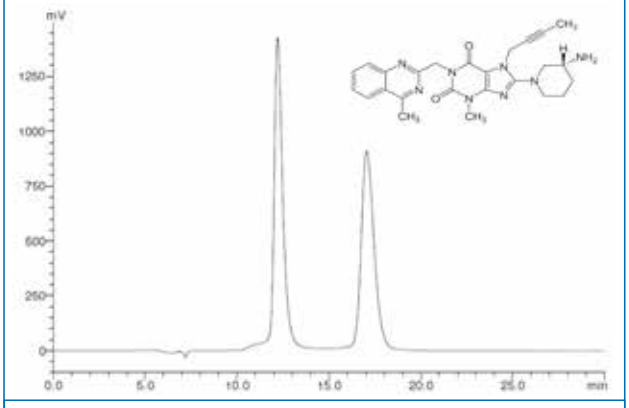
	System suitability requirement	Result
Resolution (1, 2)	≧ 3.5	7.4
Tailing factor (Duloxetine)	0.8 ~ 1.5	1.1
Tailing factor (Duloxetine related compound A)	0.8 ~ 1.5	1.0

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

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

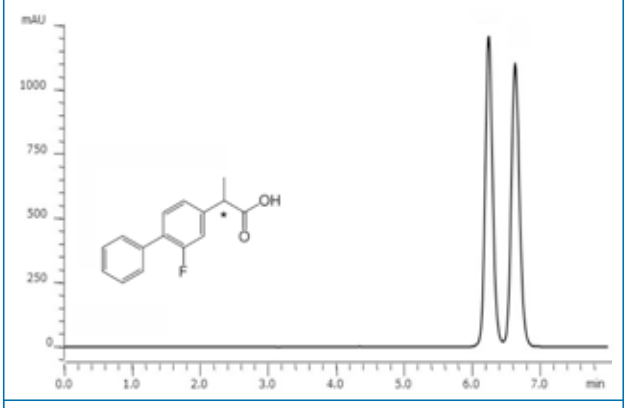
Coated Polysaccharides

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)

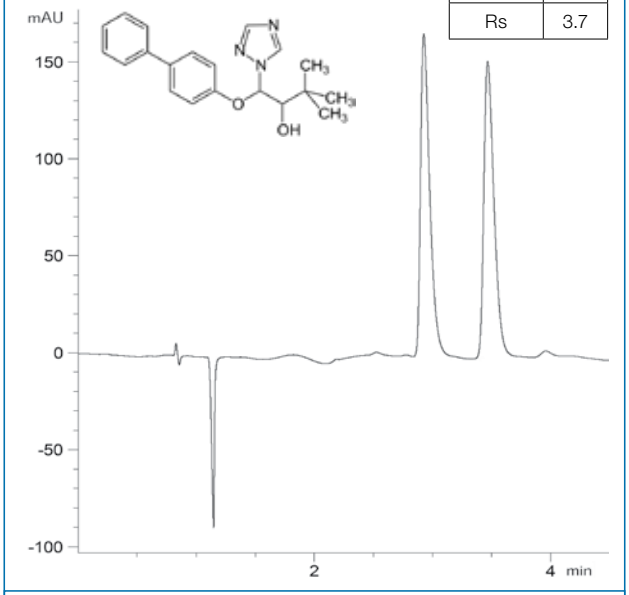
Flurbiprofen*



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)

Bitertanol

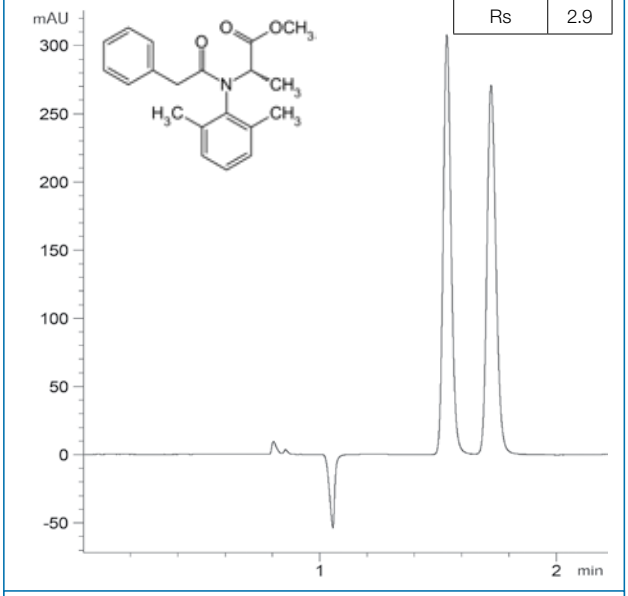
α	1.2
Rs	3.7



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)

Benalaxyl

α	1.2
Rs	2.9

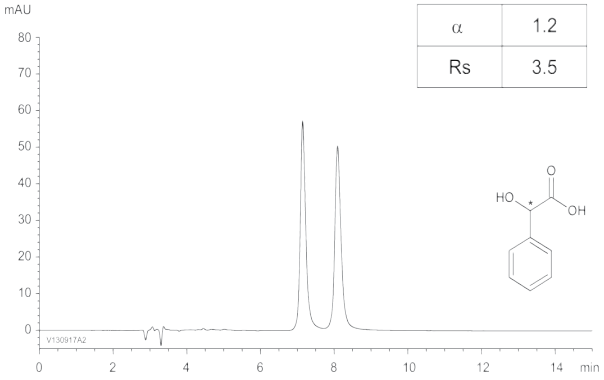


Column:	CHIRAL ART Cellulose-C (3 µm) 150 x 3.0 mm ID
Part No.:	KCN99S03-1503WT
Eluent:	*n*-hexane / 2-propanol / diethylamine (80/20/0.1)
Flow rate:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 220 nm
Injection:	2 µL (1.0 mg/mL)

* Application data by courtesy YMC Co., Ltd.

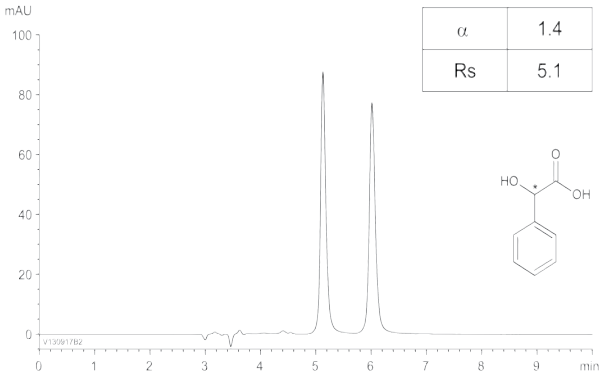
Coated Polysaccharides

DL-Mandelic acid*



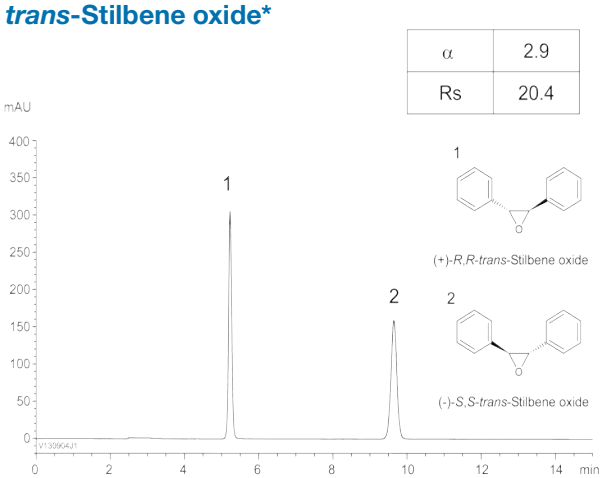
Column:	CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KAN99S05-2546WT
Eluent:	*n*-hexane / 2-propanol / TFA (80/20/0.1)
Flow:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 254 nm
Injection:	20 µL (1 mg/mL)

DL-Mandelic acid*



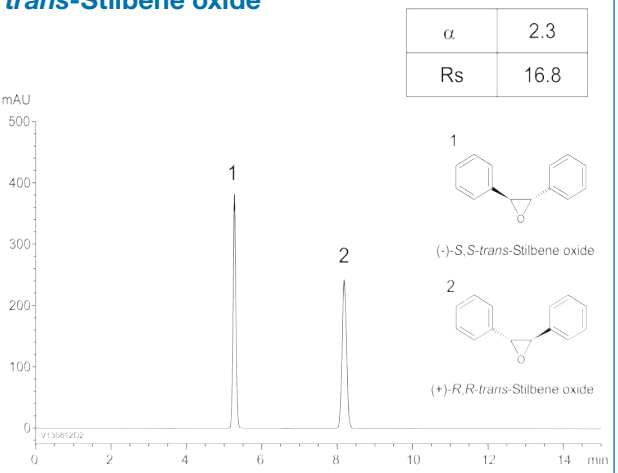
Column:	CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KCN99S05-2546WT
Eluent:	*n*-hexane / 2-propanol / TFA (80/20/0.1)
Flow:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 254 nm
Injection:	20 µL (1 mg/mL)

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)

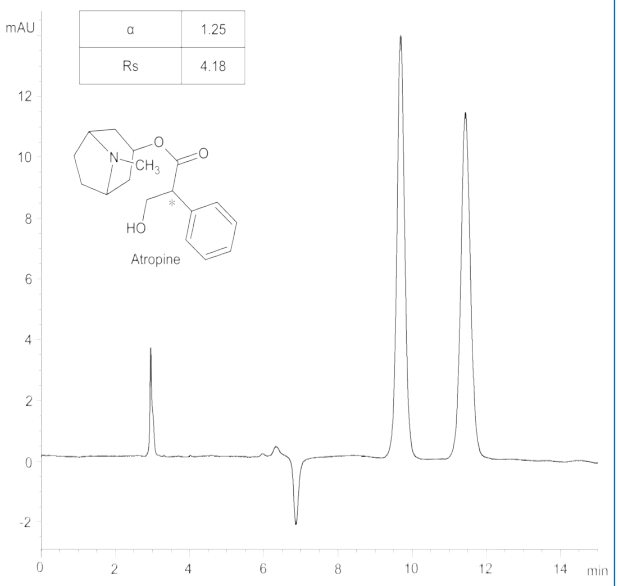
trans-Stilbene oxide*



Column:	CHIRAL ART 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)

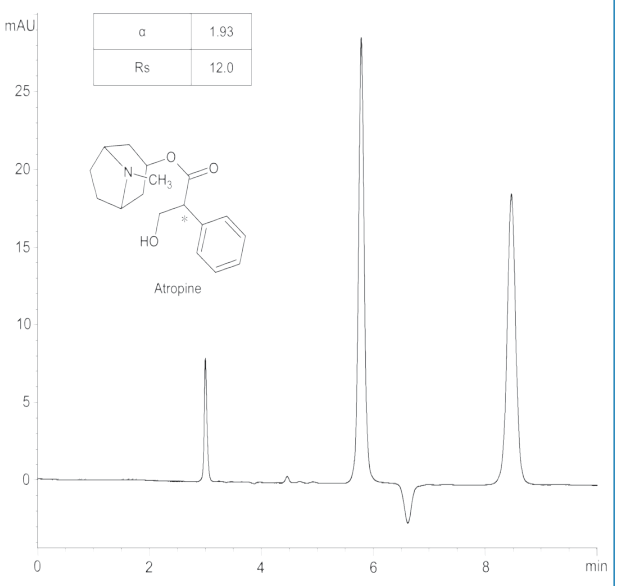
Coated Polysaccharides

Atropine*



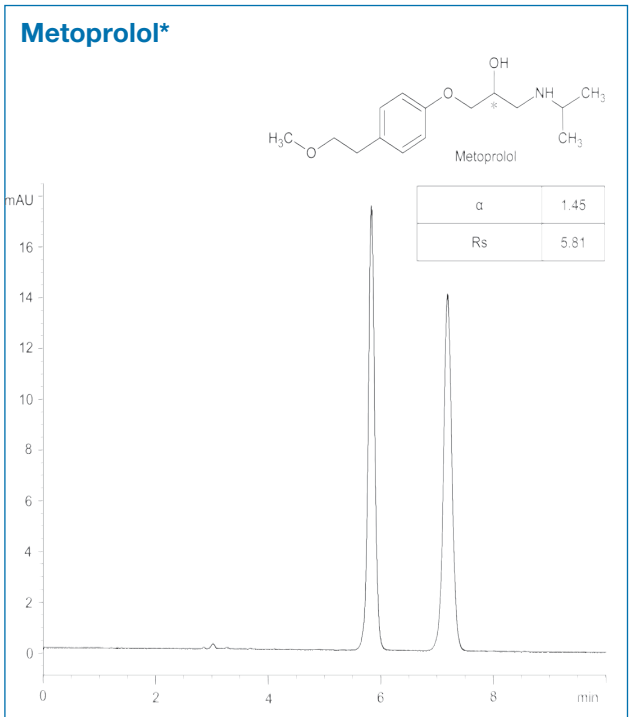
Column:	CHIRAL ART Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KAN99S05-2546WT
Eluent:	*n*-hexane / ethanol / ethanolamine (87/13/0.1)
Flow:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 230 nm
Injection:	2 µL (1 mg/mL)

Atropine*



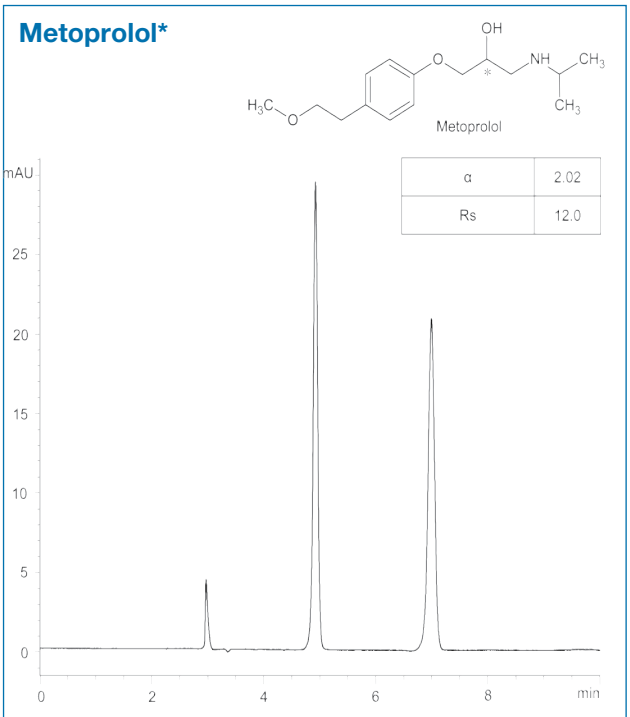
Column:	CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KCN99S05-2546WT
Eluent:	*n*-hexane / ethanol / ethanolamine (90/10/0.1)
Flow:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 230 nm
Injection:	2 µL (1 mg/mL)

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*



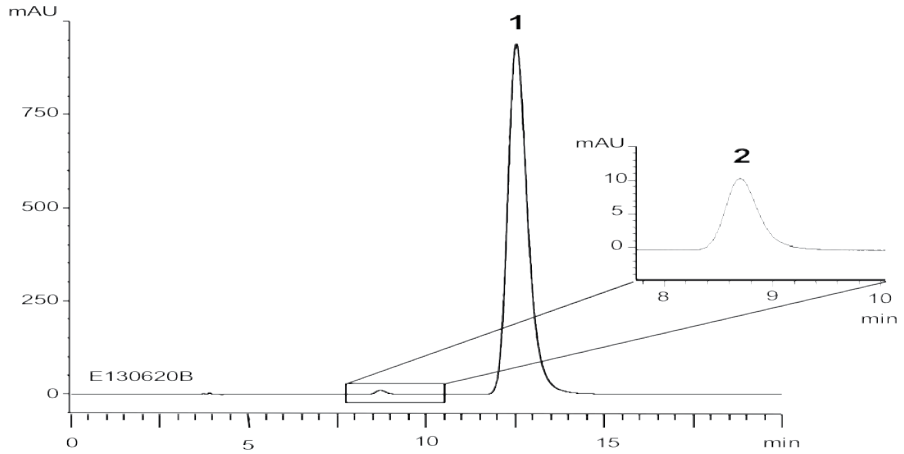
Column:	CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KCN99S05-2546WT
Eluent:	*n*-hexane / ethanol / ethanolamine (90/10/0.1)
Flow:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 254 nm
Injection:	5 µL (1 mg/mL)

* Application data by courtesy YMC Co., Ltd.

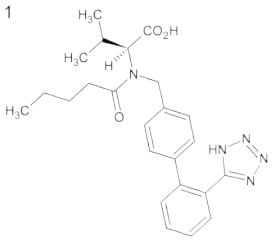
Coated Polysaccharides

Valsartan* (The United States Pharmacopeia)

Test solution*
(1.0 mg/mL Valsartan)

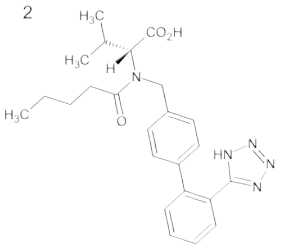


1



Valsartan

2

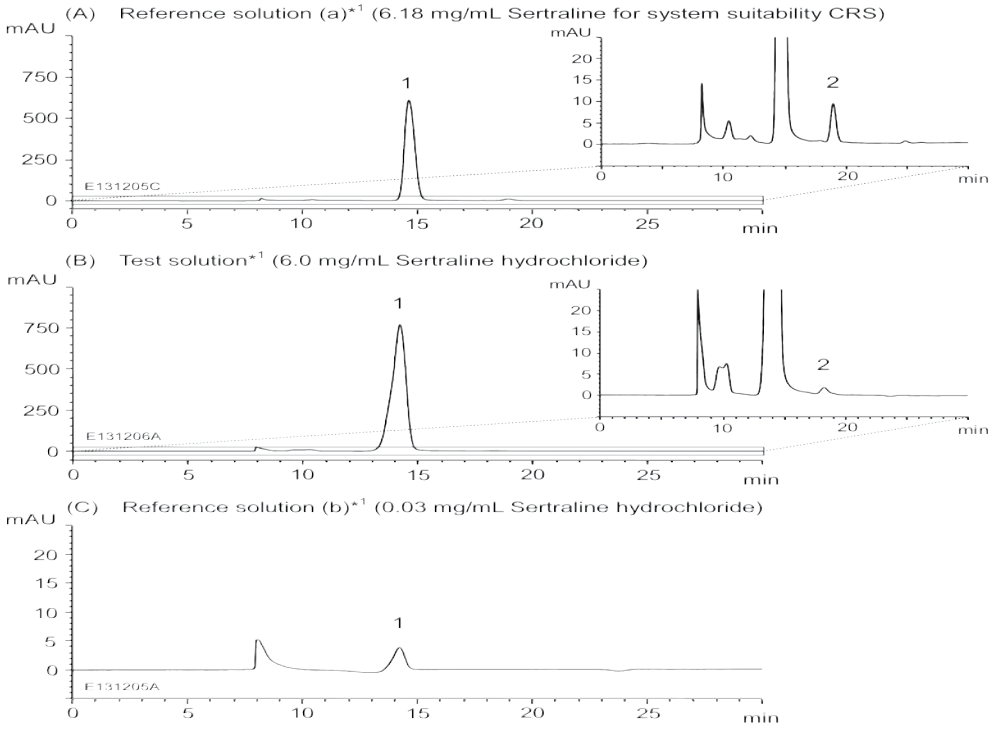


Valsartan enantiomer
(Valsartan related compound A)

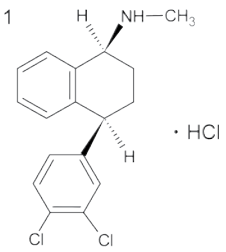
* Test solution was prepared from Valsartan supplied as a reagent for laboratory use.

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

Sertraline hydrochloride* (The European Pharmacopeia)

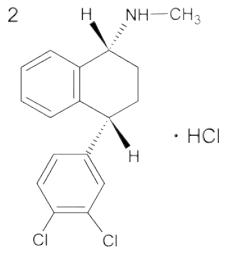


1



Sertraline hydrochloride

2



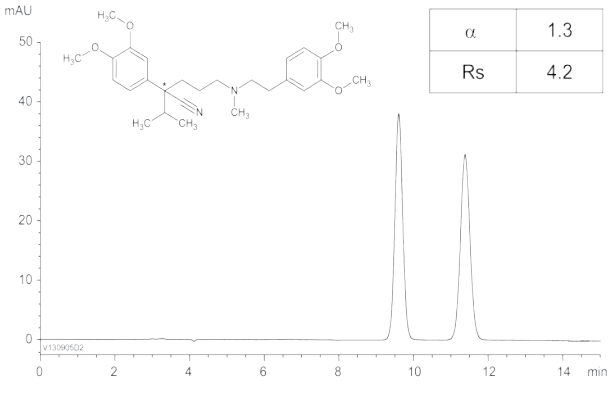
Sertraline hydrochloride
(enantiomer)

*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	Temperature:	25°C
Part No.:	KAN99S05-2546WT	Detection:	UV at 275 nm
Eluent:	mixture*2 / *n*-hexane (70/30)	Injection:	20 µL
	*2 *n*-hexane / 2-propanol / diethylamine (75/25/1)	(The draft for The European Pharmacopeia, Enantiomeric purity)	
Flow:	0.4 mL/min		

Coated Polysaccharides

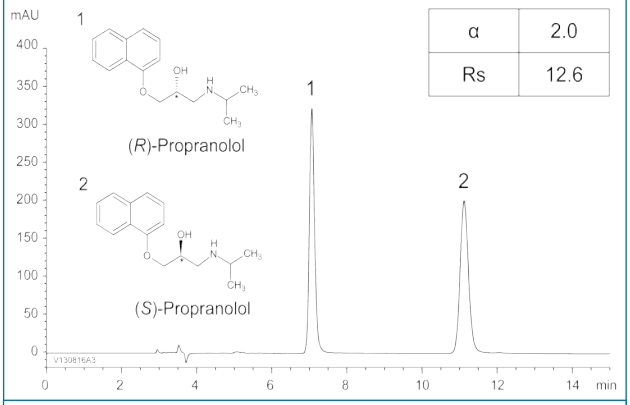
Verapamil*



α	1.3
Rs	4.2

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)

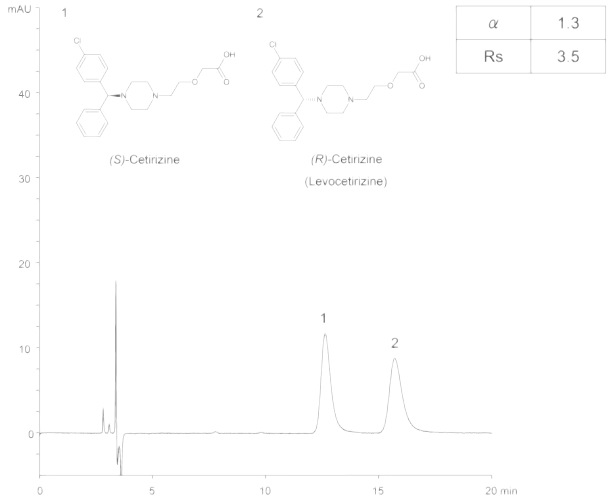
Propanolol*



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)

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)

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.

* Application data by courtesy YMC Co., Ltd.

CHIRAL ART
Immobilised Polysaccharide Derivatives Series

- **applicable for normal and reversed phase modes**
- **more flexibility due to wide range of usable solvents**
- **highly robust, also suitable for SFC/SMB**
- **remarkably reduced background signal**
- **HPLC columns and preparative grade bulk media with particle sizes of 3, 5, 10 or 20 µm available**
- **extremely attractive pricing**

Introduction

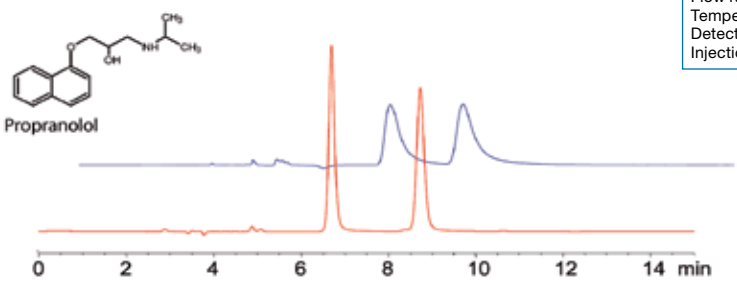
CHIRAL ART polysaccharides derivatives are a series of chiral separation columns / packing materials with high stereo-selectivity. They are suitable for separations of a wide range of chiral compounds, cis-trans isomers and geometric isomers. The range of particle sizes and column dimensions available 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.

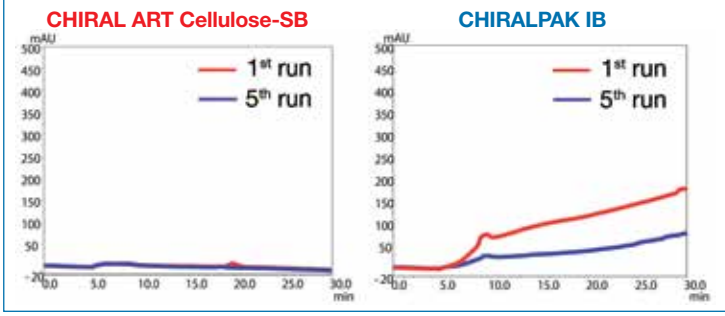
Excellent peak shape*

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)



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

Low Column Bleeding*



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

CHIRAL ART
Immobilised Polysaccharide Derivatives Series

Item	CHIRAL ART Amylose-SA	CHIRAL ART Cellulose-SB	CHIRAL ART Cellulose-SC
Particle size	3, 5, 10, 20 µm	3, 5, 10, 20 µm	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)
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		
Pressure limit	30 MPa (4350 psi)		
Recommended flow rate	4.6 mm ID: 0.5 - 1.0 mL/min (Max. flow rate: 3.0 mL/min) 10 mm ID: 2.5 - 5.0 mL/min (Max. flow rate: 15 mL/min)		

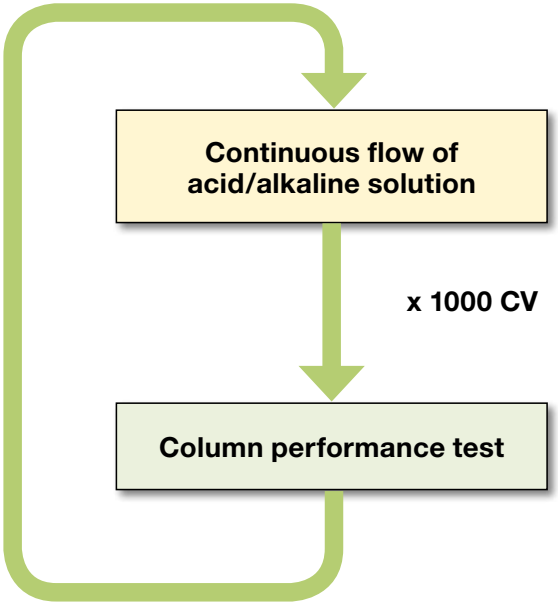
Product Line-up

Product name	Particle size [µm]	CHIRAL selector	Type	Competitive product
CHIRAL ART Amylose-SA	3	Amylose tris (3,5-dimethylphenylcarbamate)	Immobilised	CHIRALPAK® IA, IA-3
CHIRAL ART Cellulose-SB	5	Cellulose tris (3,5-dimethylphenylcarbamate)		CHIRALPAK® IB, IB-3
CHIRAL ART Cellulose-SC	10 20	Cellulose tris (3,5-dichlorophenylcarbamate)		CHIRALPAK® IC, IC-3

* Application data by courtesy YMC Co., Ltd.

Immobilised Polysaccharides

Wide usable pH range*



Continuous flow of acid/alkaline solution

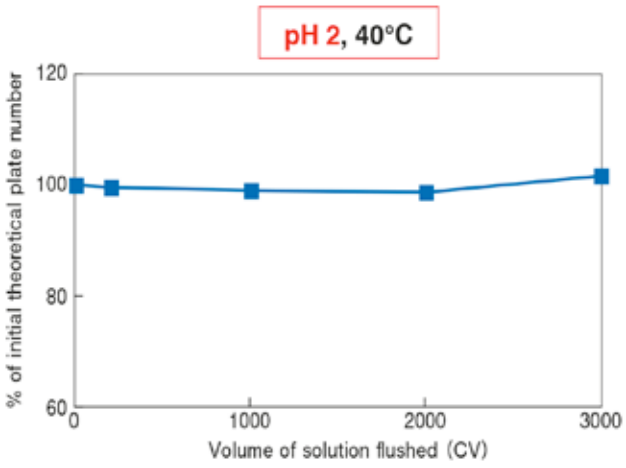
Column: CHIRAL ART Cellulose-SB 5 µm, 50 x 4.6 mm ID
Eluent: buffer/methanol (90/10)
Flow rate: 1.0 mL/min

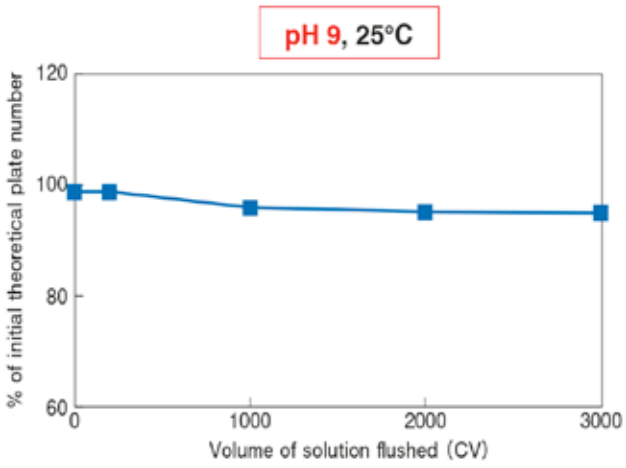
Acidic condition
Buffer: 0.1% H_3PO_4 (**pH 2**)
Temperature: 40 °C

Basic condition
Buffer: 20 mM NH_4HCO_3-DEA (**pH 9**)
Temperature: 25 °C

Column performance test

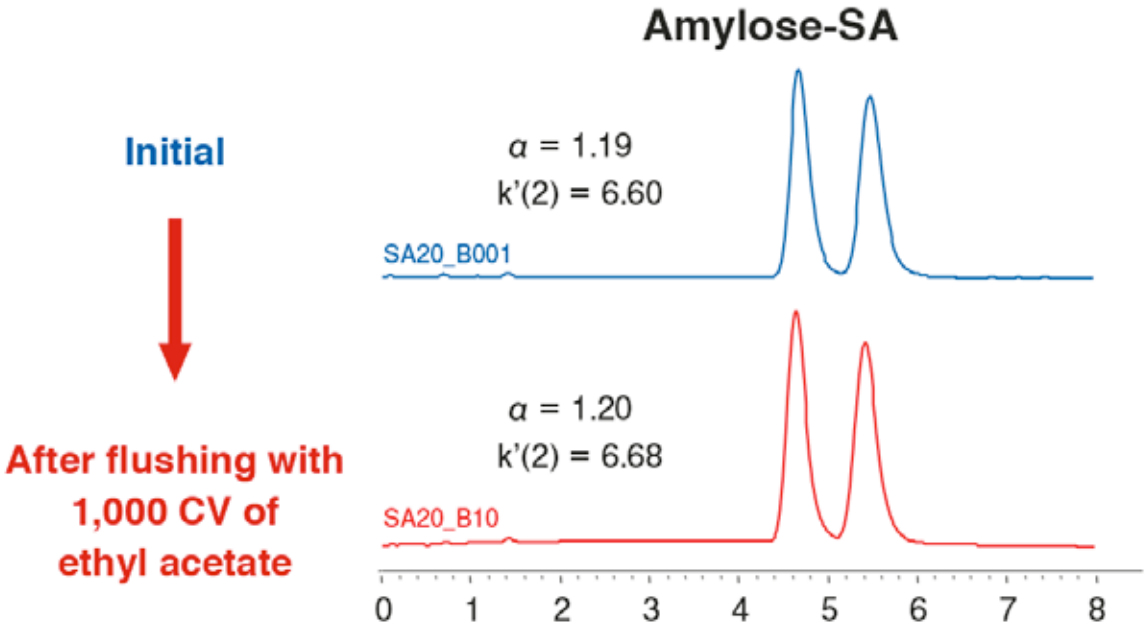
Column: CHIRAL ART Cellulose-SB 5 µm, 50 x 4.6 mm ID
Eluent: acetonitrile/water (30/70)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 254 nm
Sample: Benzoin

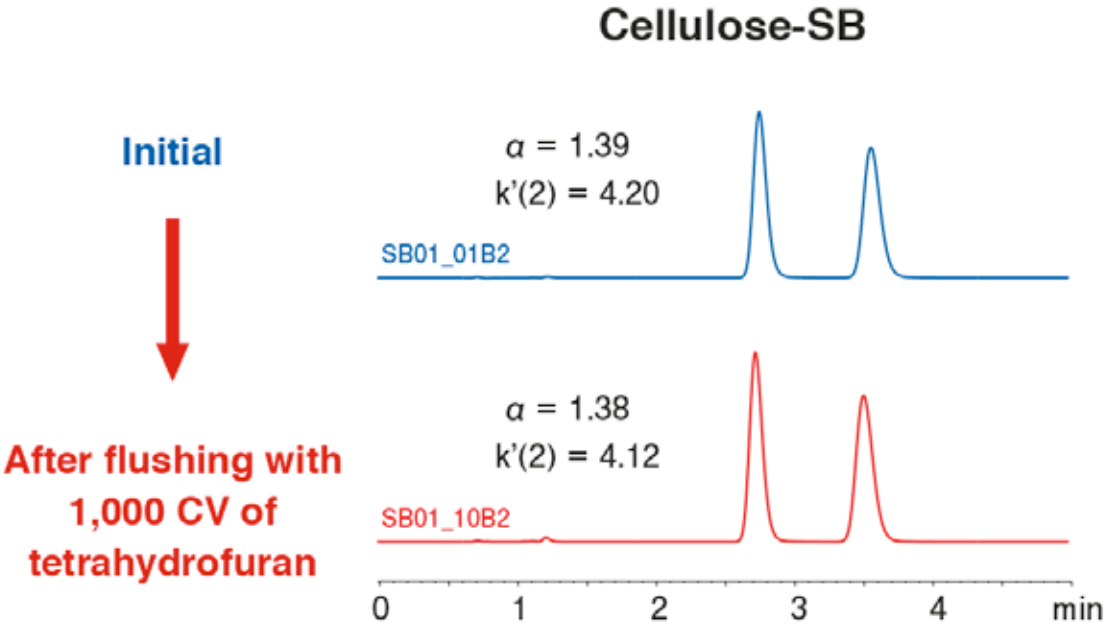




Immobilised Polysaccharides

High stability against various solvents*





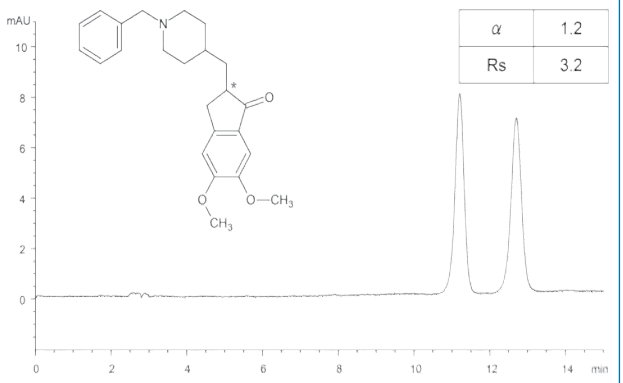
Column:	5 µm, 50 x 4.6 mm ID	Flow rate:	1.0 mL/min
Eluent:	*n*-hexane / 2-propanol (95/5)	Temperature:	25°C
		Sample:	Benzoin

* Application data by courtesy YMC Co., Ltd.

Immobilised Polysaccharides

Applications

Donepezil*

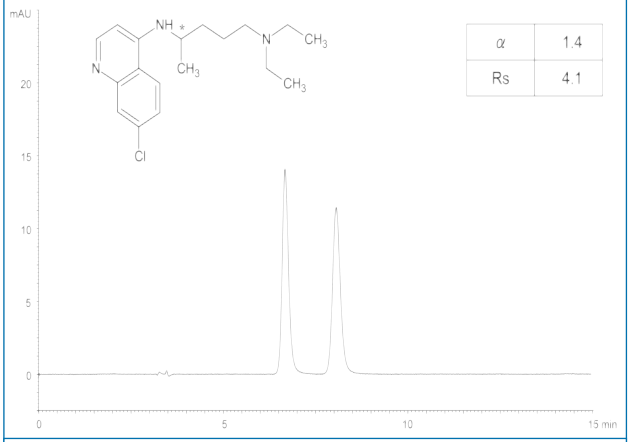


Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	20 mM NH_4HCO_3-diethylamine (pH 9.0) / acetonitrile (40/60)
Flow rate:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 254 nm
Injection:	2 µL (200 µg/mL)

Donepezil*

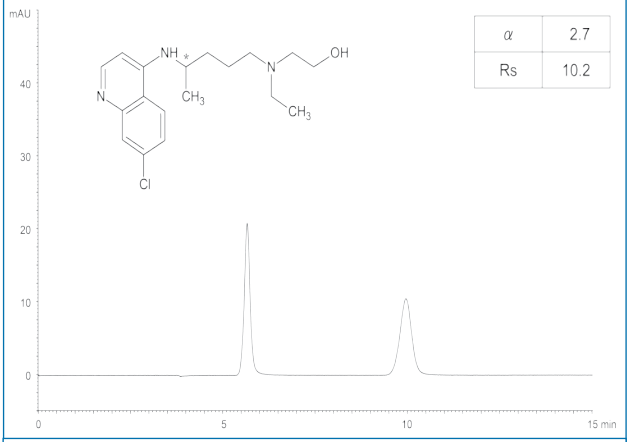
Column:	CHIRAL ART Amylose-SA (5 µm) 250 x 4.6 mm ID
Part No.:	KSA99S05-2546WT
Eluent:	*n*-hexane / 2-propanol / diethylamine (80/20/0.1)
Flow rate:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 230 nm

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)

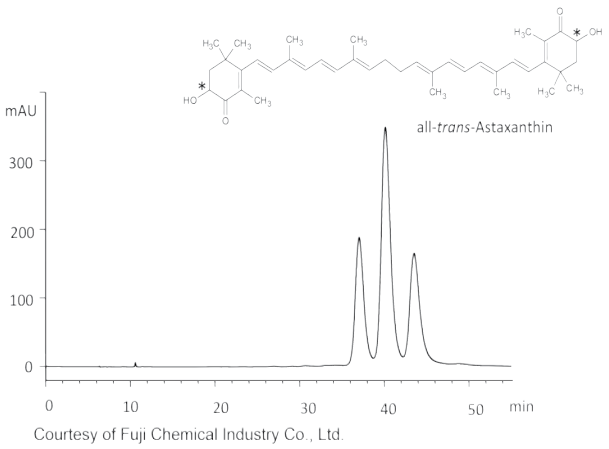
Hydroxychloroquine*



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)

Immobilised Polysaccharides

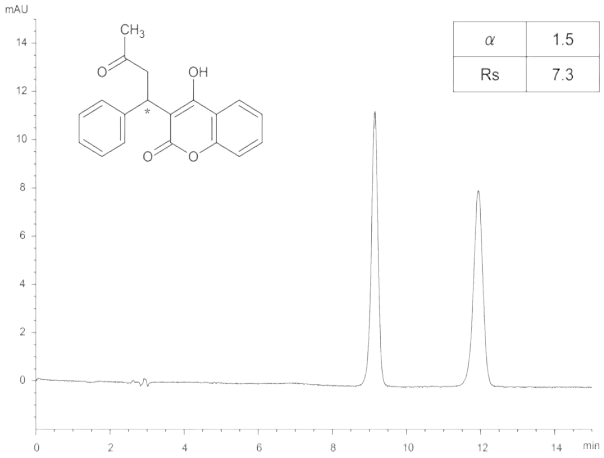
Astaxanthin*



Courtesy of Fuji Chemical Industry Co., Ltd.

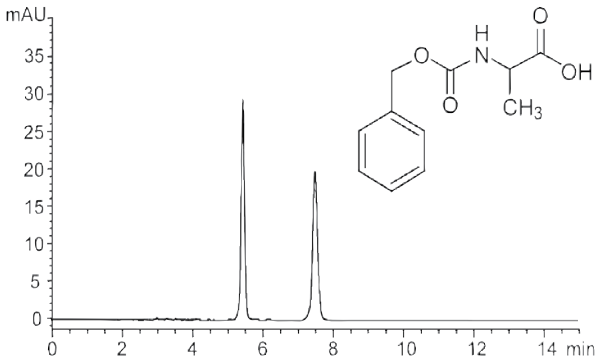
Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	*n*-hexane / THF (85/15)
Flow rate:	0.5 mL/min
Temperature:	25°C
Detection:	UV at 476 nm

Warfarin*



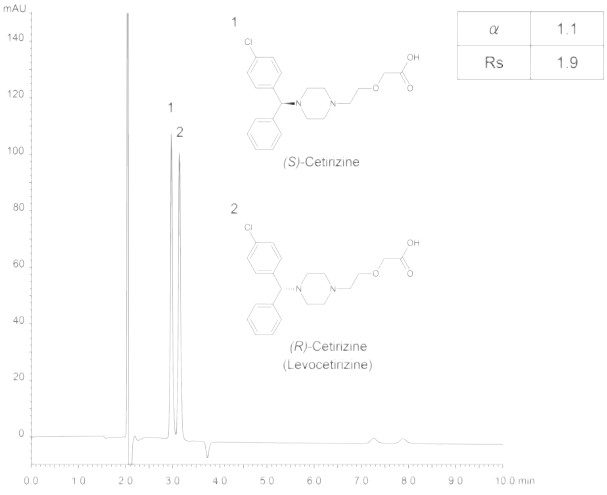
Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	acetonitrile / 20 mM phosphoric acid (50/50)
Flow rate:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 254 nm
Injection:	2 µL (200 µg/mL)

CBZ-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

Cetirizine*

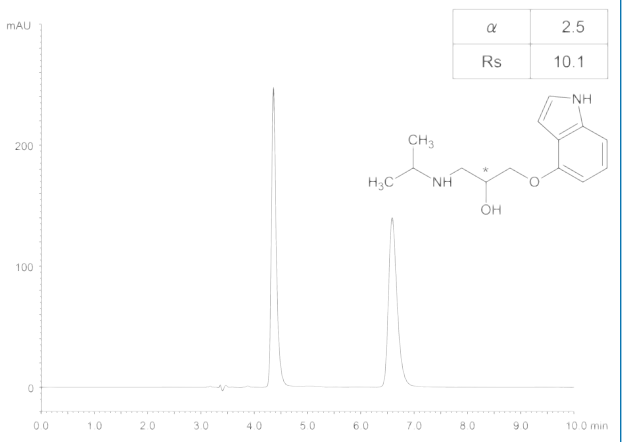


Column:	CHIRAL ART Cellulose-SB (3 µm) 150 x 4.6 mm ID
Part No.:	KSB99S03-1546WT
Eluent:	acetonitrile / formic acid / diethylamine (100/0.1/0.1)
Flow rate:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 230 nm
Injection:	2 µL (200 µg/mL)

* Application data by courtesy YMC Co., Ltd.

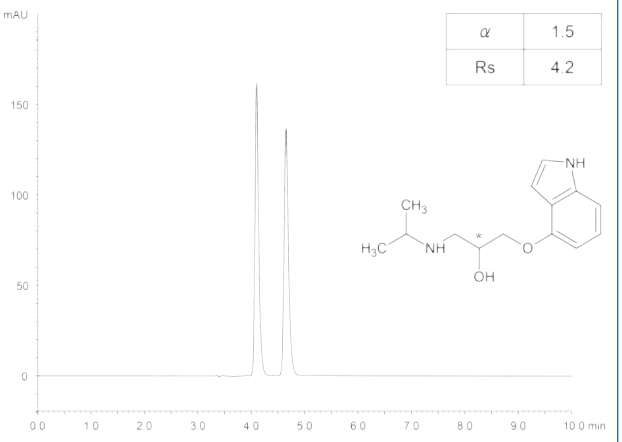
Immobilised Polysaccharides

Pindolol*



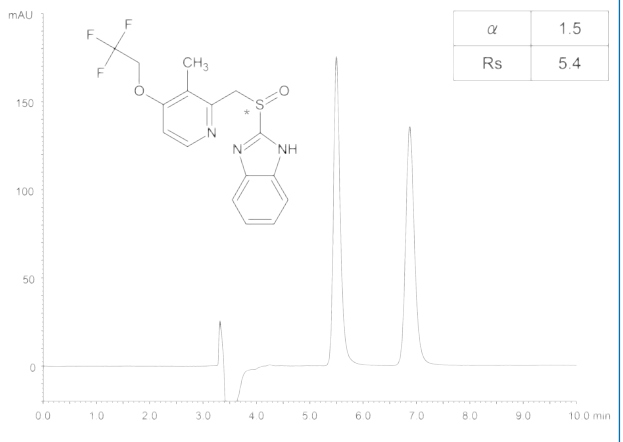
Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	*n*-hexane / ethanol / diethylamine (40/60/0.1)
Flow rate:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 265 nm
Injection:	10 µL (100 µg/mL)

Pindolol*



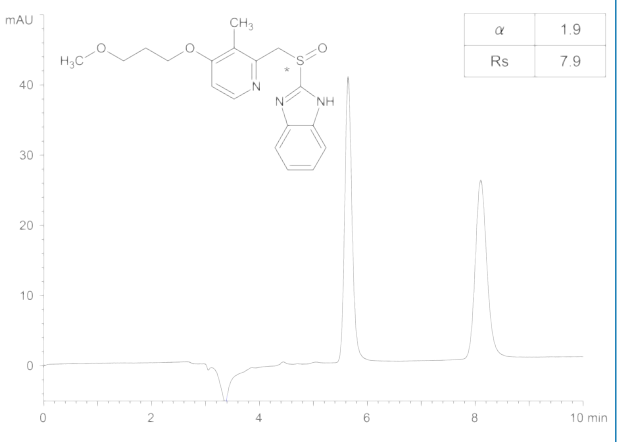
Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	methanol / diethylamine (100/0.1)
Flow rate:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 265 nm
Injection:	10 µL (100 µg/mL)

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)

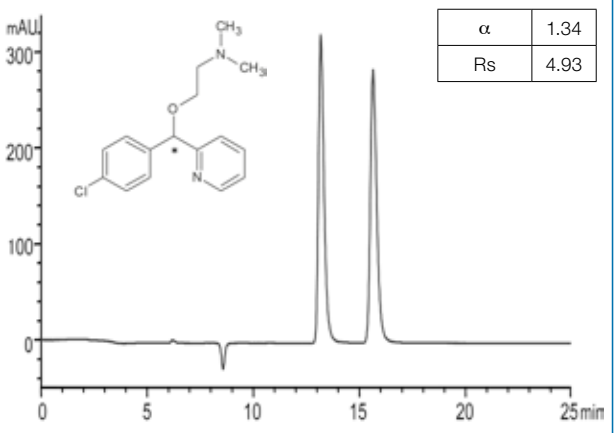
Rabeprazole*



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

Immobilised Polysaccharides

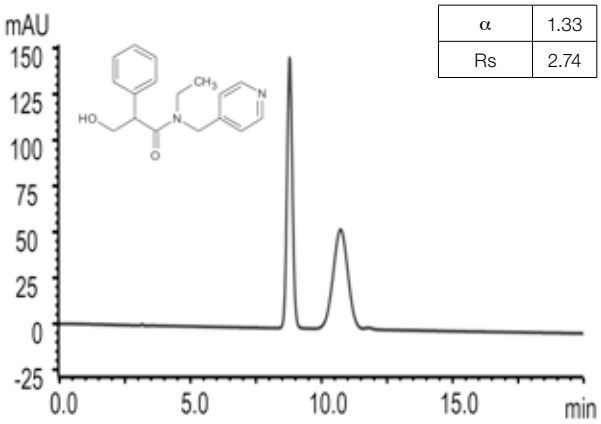
Carbinoxamine*



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 / isopropanol / 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)

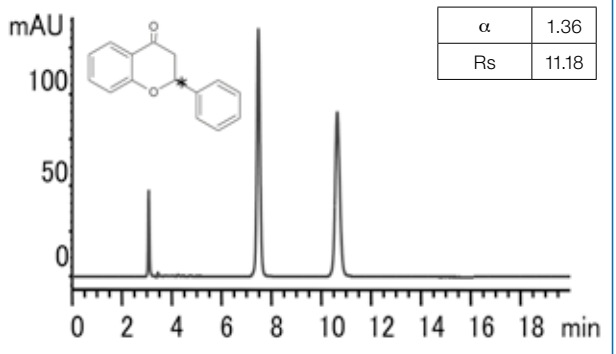
Tropicamide*



α	1.33
Rs	2.74

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)

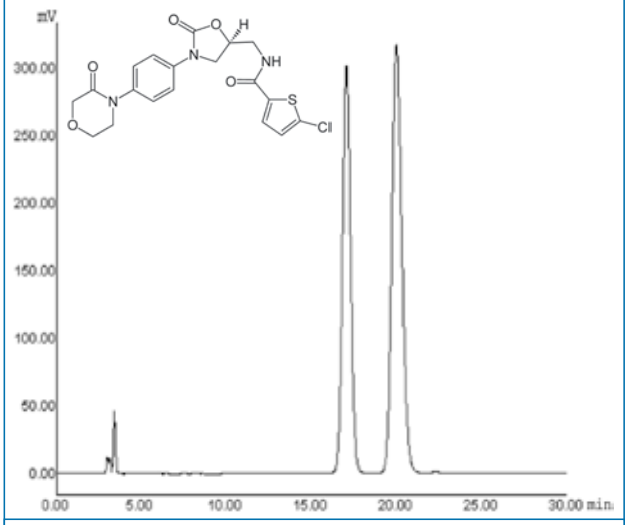
Flavanone*



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)

Rivaroxaban**

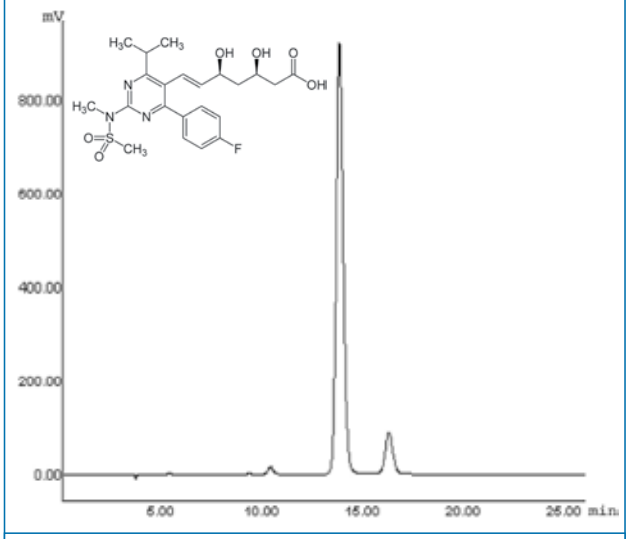


Column: CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.: KSB99S05-2546WT
Eluent: *n*-hexane / ethanol / trifluoroacetic acid (50/50/0.1)
Flow rate: 1.0 mL/min
Temperature: 35°C
Detection: UV at 250 nm
Injection: 20 µL (0.5 mg/mL)

* Application data by courtesy YMC Co., Ltd. ** Application data by courtesy YMC India Pvt. Ltd.

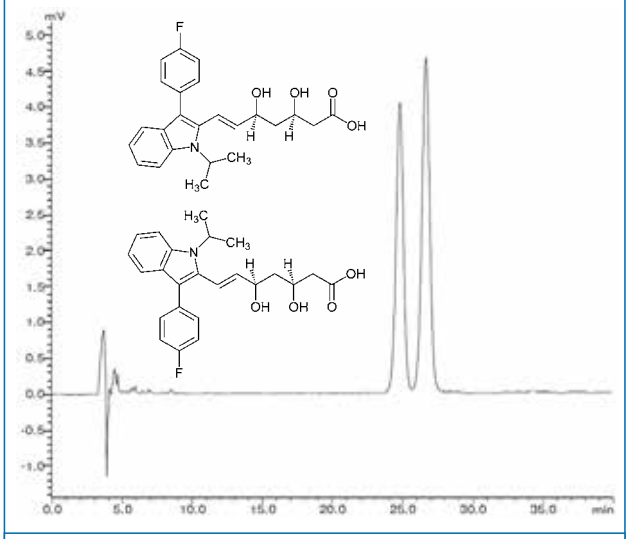
Immobilised Polysaccharides

Rosuvastatin**



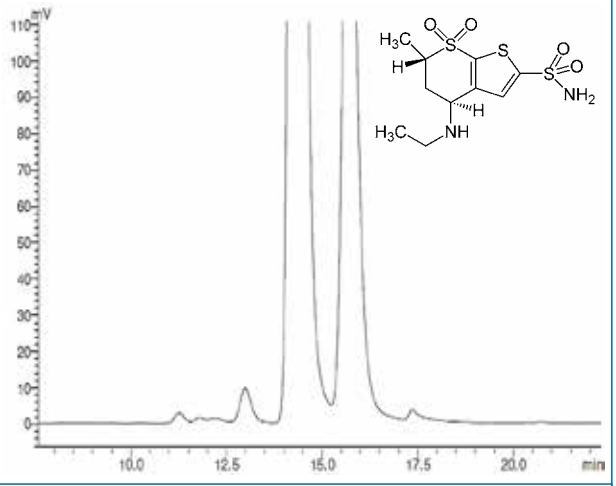
Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	*n*-hexane / ethanol / trifluoroacetic acid (85/15/0.1)
Flow rate:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 242 nm
Injection:	20 µL (0.5 mg/mL)

Fluvastatin**



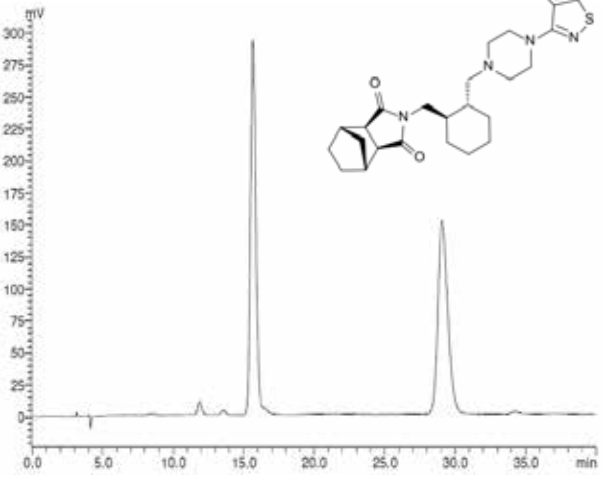
Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	water / acetonitrile / formic acid (65/35/0.1)
Flow rate:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 300 nm
Injection:	20 µL (5 mg/mL)

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)

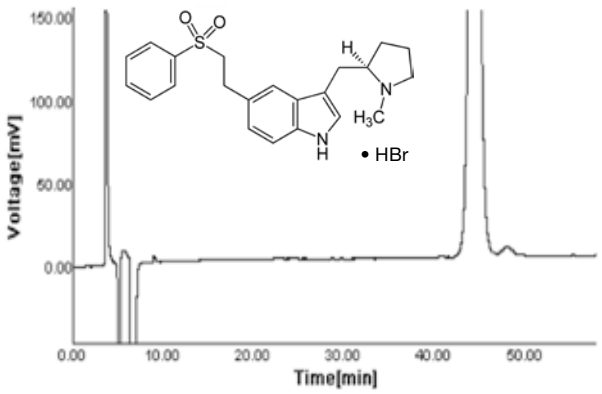
Lurasidone**



Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	*n*-hexane / isopropanol / 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)

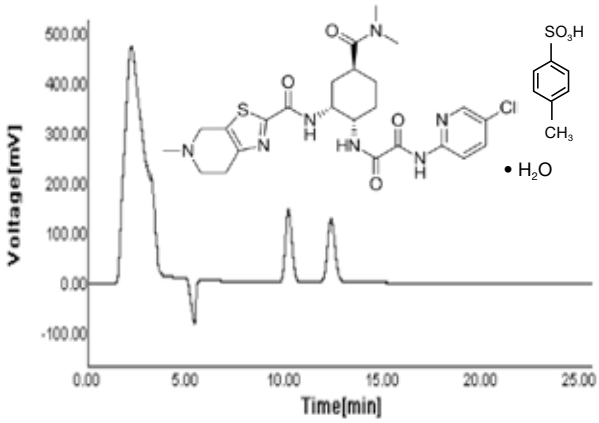
Immobilised Polysaccharides

Eletriptan hydrobromide**



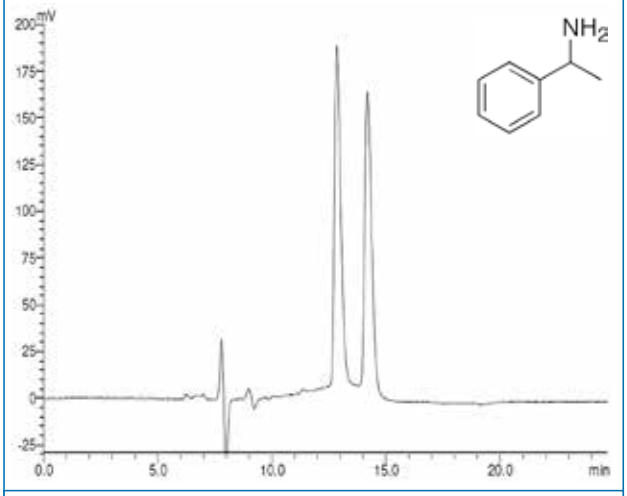
Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	*n*-hexane / ethanol / trifluoroacetic acid / diethylamine (85/15/0.5/0.5)
Flow rate:	0.8 mL/min
Temperature:	10°C
Detection:	UV at 223 nm
Injection:	20 µL (0.2 mg/mL)

Edoxaban tosylate hydrate**



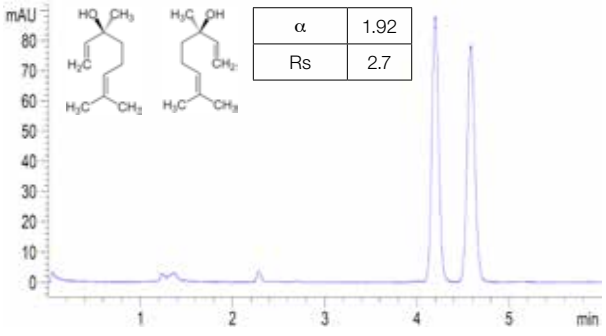
Column:	CHIRAL ART Cellulose-SC (5 µm) 250 x 4.6 mm ID
Part No.:	KSC99S05-2546WT
Eluent:	*n*-hexane / ethanol / ethanolamine (55/45/0.01)
Flow rate:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 210 nm
Injection:	20 µL (0.5 mg/mL)

DL-Phenylethyl amine**



Column:	CHIRAL ART Cellulose-SB (5 µm) 250 x 4.6 mm ID
Part No.:	KSB99S05-2546WT
Eluent:	*n*-hexane / isopropanol / 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)

Linalool



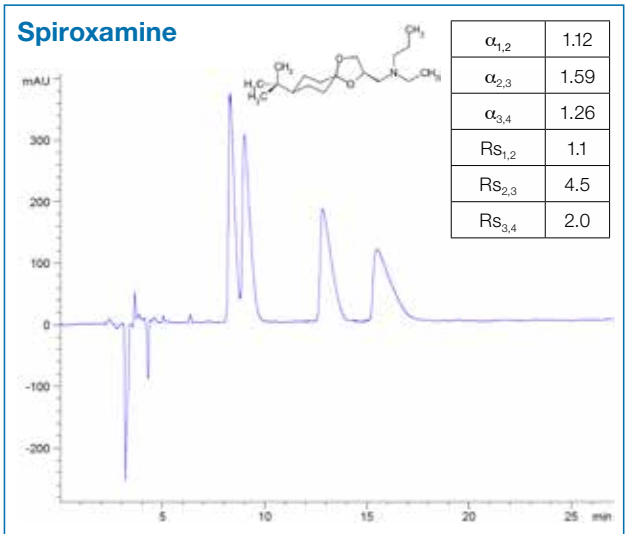
α	1.92
Rs	2.7

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)

** Application data by courtesy YMC India Pvt. Ltd.

Immobilised Polysaccharides

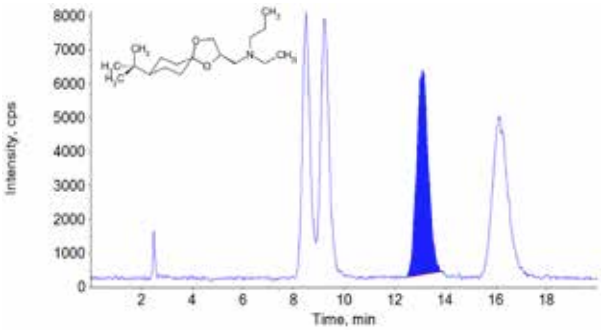
Spiroxamine



$\alpha_{1,2}$	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)

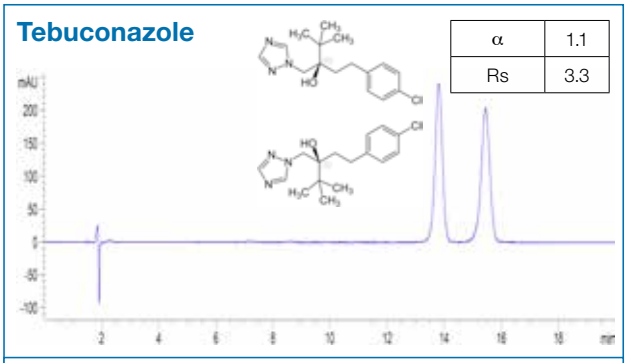
Spiroxamine



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.

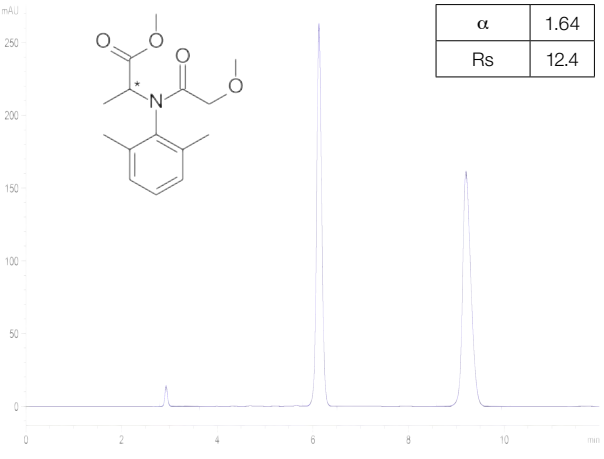
Tebuconazole



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)

Metalaxyl

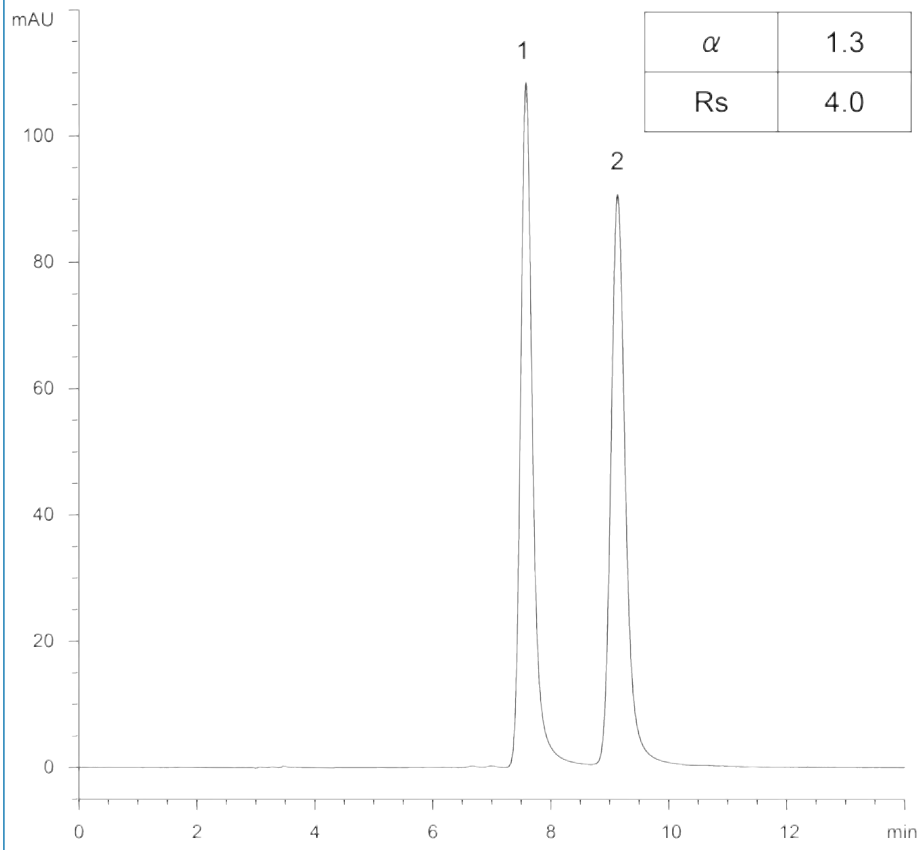


α	1.64
Rs	12.4

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)

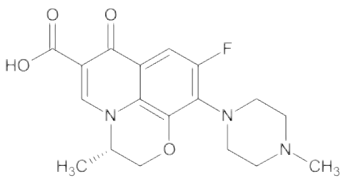
Immobilised Polysaccharides

Ofloxacin (Levofloxacin)*



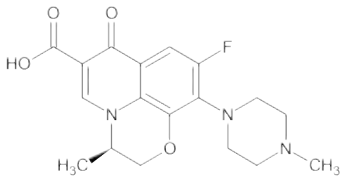
α	1.3
Rs	4.0

1



(S)-(-)-Ofloxacin
(Levofloxacin)

2



(R)-(+)-Ofloxacin

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

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.

* Application data by courtesy YMC Co., Ltd.

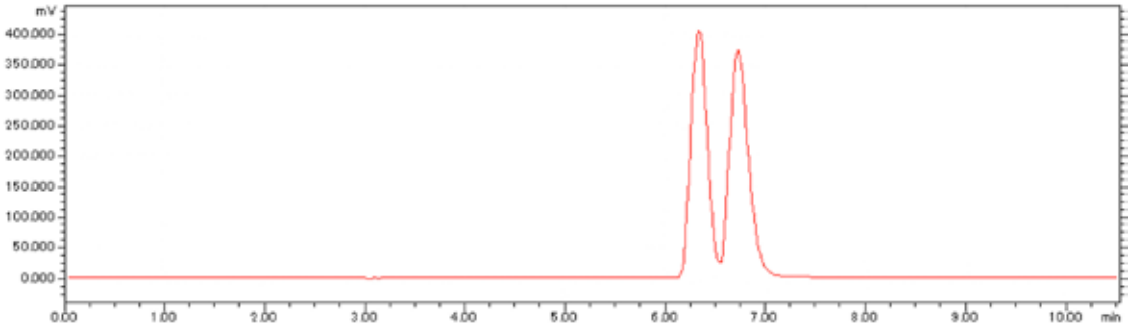
High Performance Chiral Purifications with YMC-Actus CHIRAL ART (Semi-)Preparative Columns

Cost efficiency

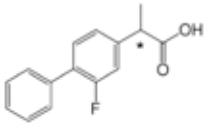
Rapid pressure changes under high-speed gradient conditions can lead to column degradation and loss of column performance. As with all YMC-Actus columns, a specific hardware and packing technology has been applied to these (semi-)preparative columns to provide a uniform packing density, which results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



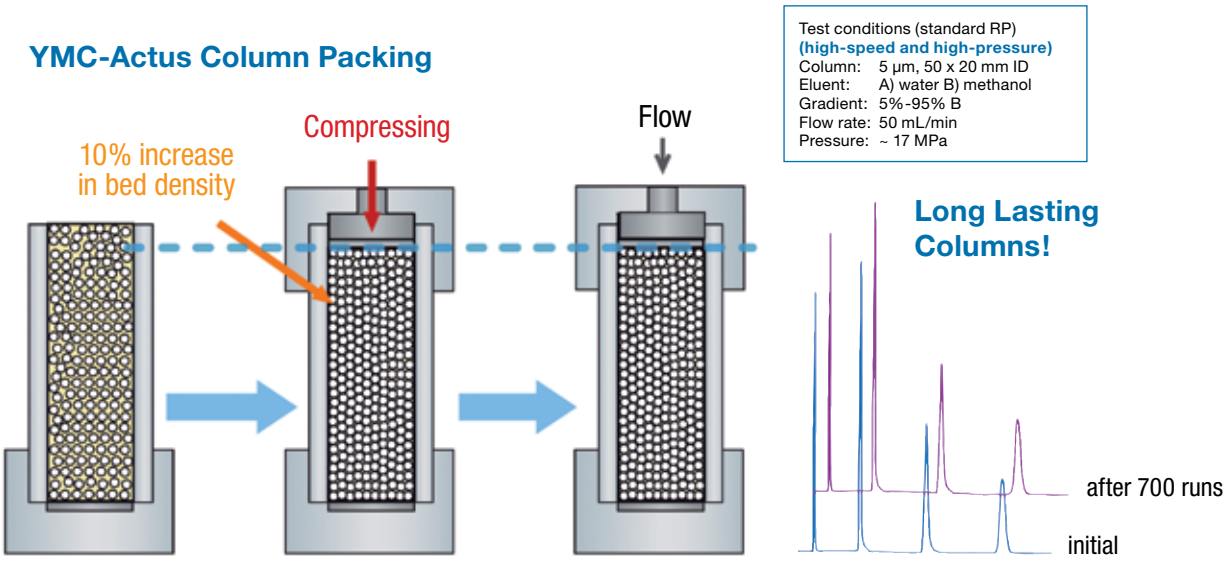
Flurbiprofen

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

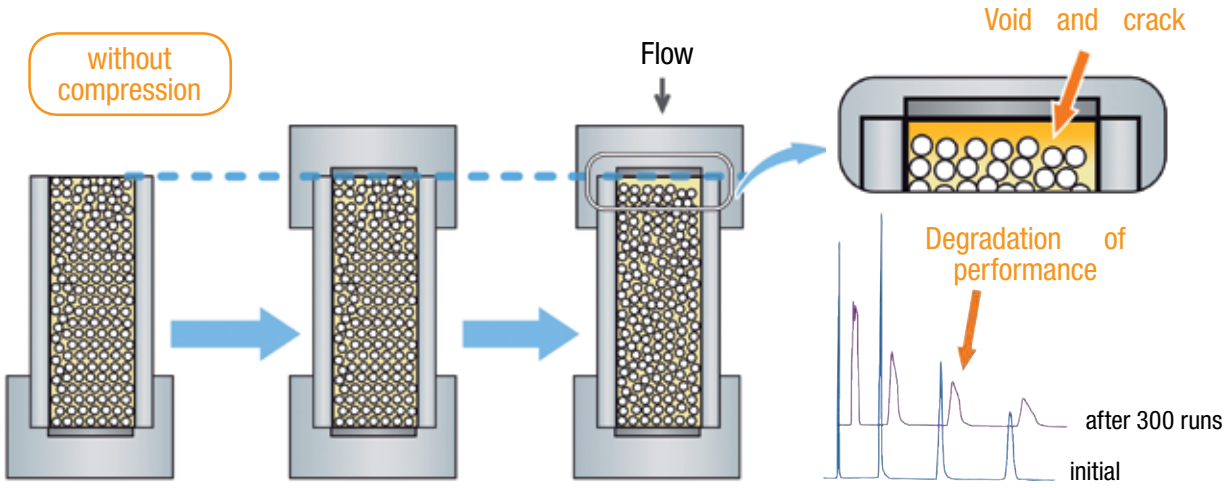
How to obtain long lasting columns?

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



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.

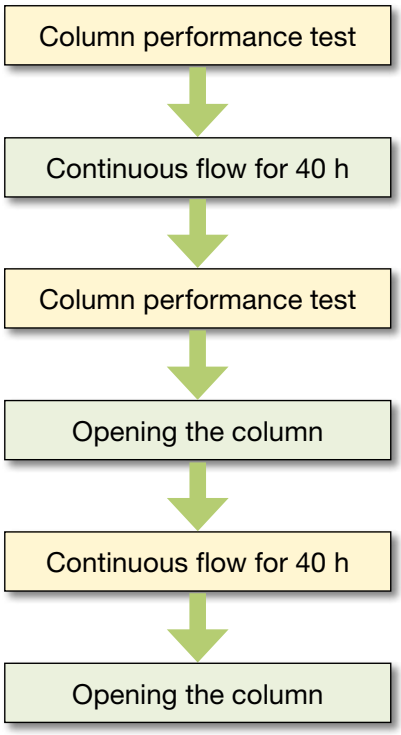
YMC-Actus series columns have been developed by applying this Axial Compression Technology to semi-prep column production. The column bed is compressed appropriately when attaching the inlet end assembly of the newly designed YMC-Actus hardware. It provides increased bed density (10% higher than conventional columns) and bed uniformity.

* Application data by courtesy YMC Co., Ltd.

YMC-Actus CHIRAL ART

Secured hardware stability*

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

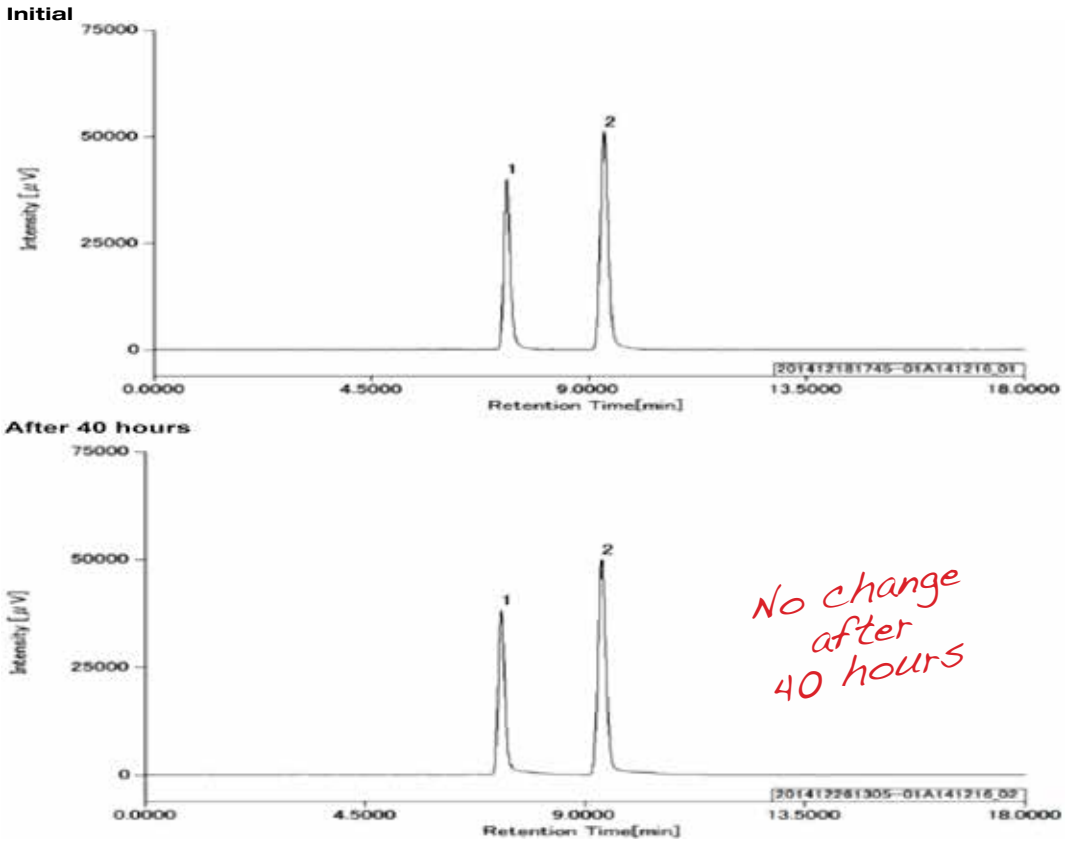
Column:	YMC-Actus SIL (12 nm, 5 µm) 250 x 50 mm ID
Part.-No.:	SL12S05-2553DX
Eluent:	*n*-hexane / ethanol (90/10)
Flow rate:	240 mL/min
Pressure:	200 bar
Temperature:	ambient

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) 2. Nitrobenzene (10 µL/mL)
Injection:	20 µL

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

YMC-Actus CHIRAL ART



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

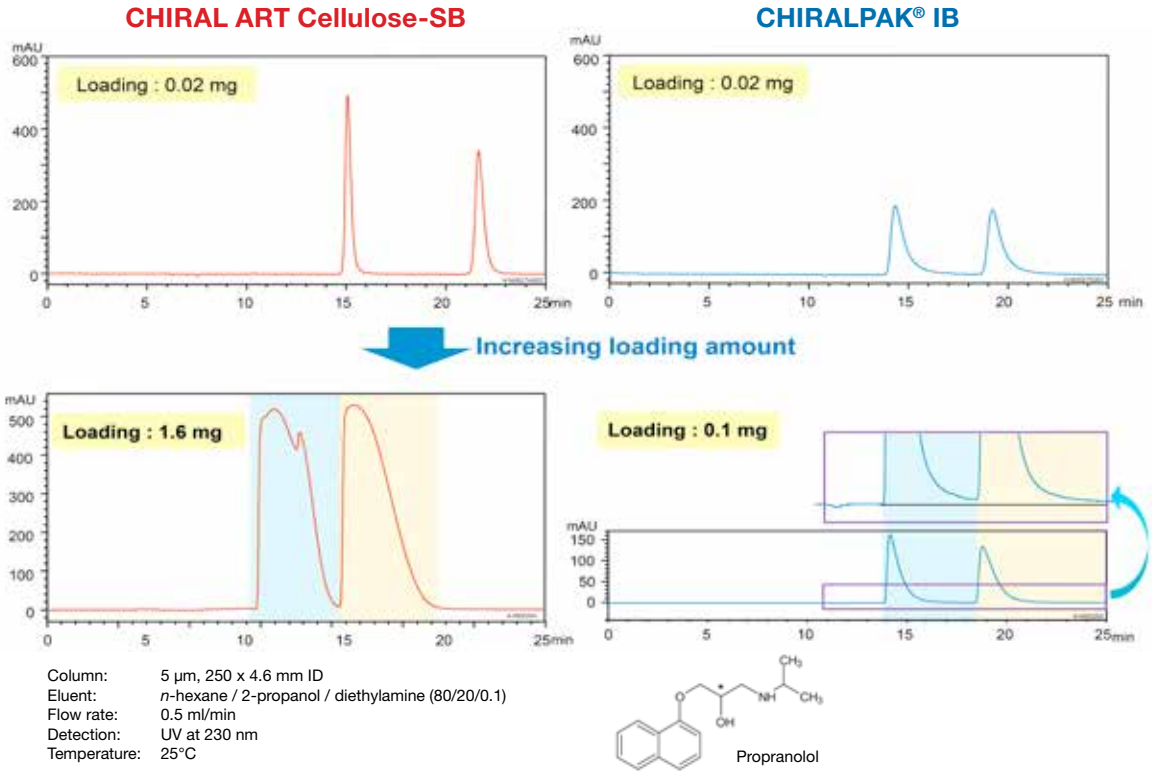
*values for nitrobenzene (peak 2)

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

* Application data by courtesy YMC Co., Ltd.

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

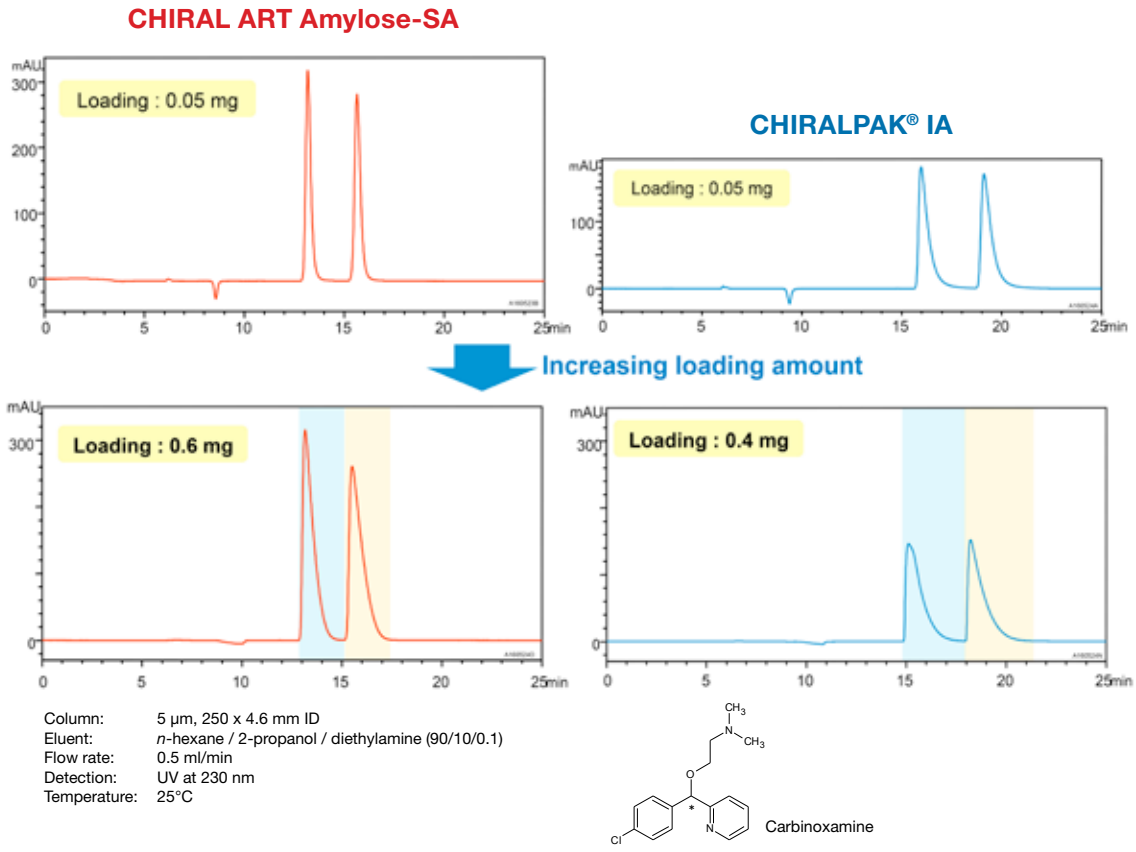
For the competitor's product, loading amount of more than 0.1 mg was not possible because the enantiomeric excess of the 2nd peak was already less than 98%ee with a loading amount of 0.1 mg.

	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).

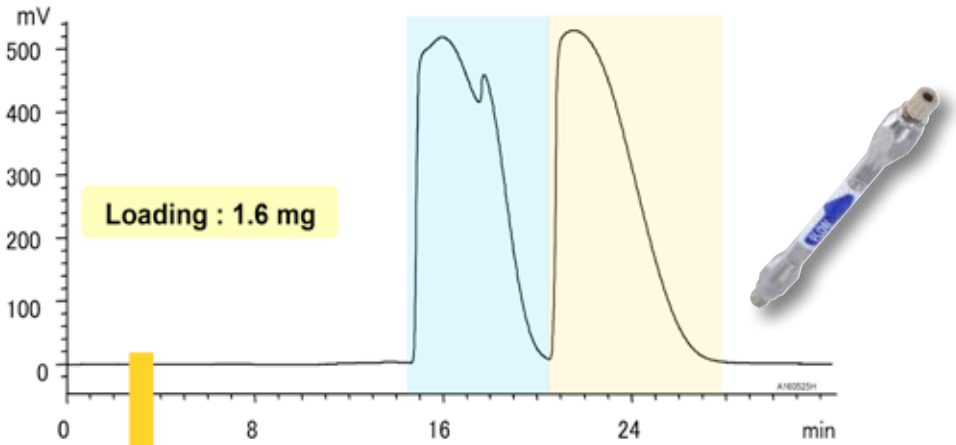
The calculated maximum loading amount on CHIRAL ART Amylose-SA was double that obtained for the competitor's product due to the good peak shape with no tailing, which also allowed increased productivity.

* Application data by courtesy YMC Co., Ltd.

Efficient Purification Using YMC-Actus CHIRAL ART

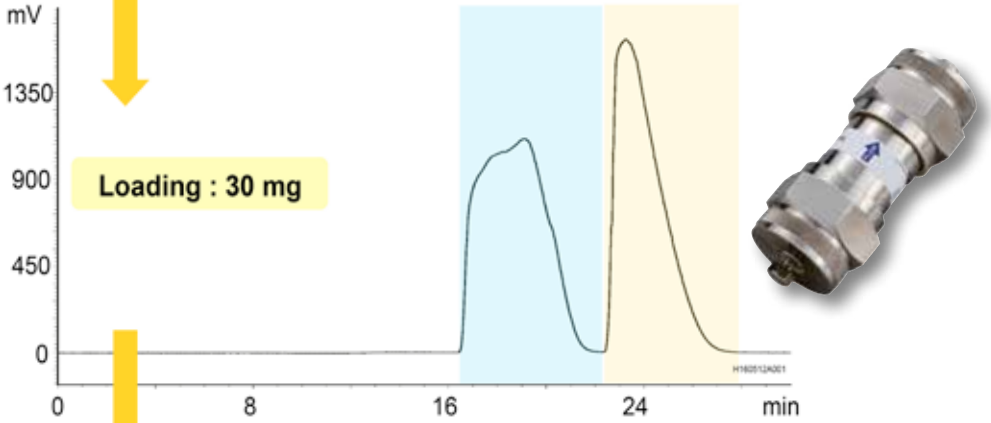
Scale-up with YMC-Actus CHIRAL ART*

Analytical
5 µm, 250 x 4.6 mm ID
at 0.5 ml/min
linear velocity : 0.5 mm/s



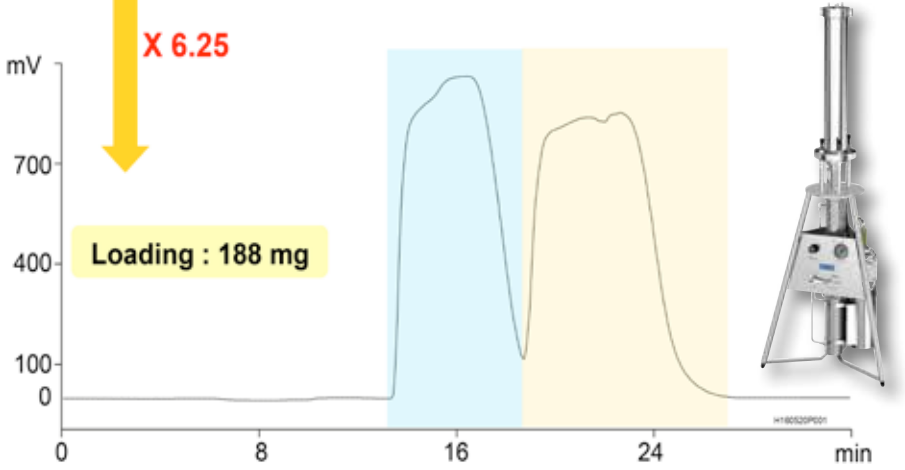
X 18.9

Semi-preparative
5 µm, 250 x 20 mm ID
at 9.5 ml/min
linear velocity : 0.5 mm/s



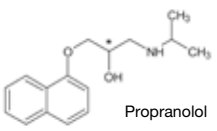
X 6.25

Preparative
10 µm, 250 x 50 mm ID
at 59 ml/min
linear velocity : 0.5 mm/s



Preparative column was packed with Dynamic Axial Compression.

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

Efficient Purification Using YMC-Actus CHIRAL ART

	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.

* Application data by courtesy YMC Co., Ltd.

Chiral Separations in SFC Mode

Chiral SFC columns by YMC

2 options are available:

- **SFC compatible LC columns: CHIRAL ART (p. 4-27)***
- **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	Alcyon SFC CSP Cellulose-C	Alcyon SFC CSP Amylose-SA	Alcyon SFC CSP Cellulose-SB	Alcyon SFC CSP Cellulose-SC
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)
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
Tempera-ture range	0-40°C				
Pressure limit	2.1, 3.0 and 4.6 mm ID: 30 MPa (4350 psi) 10 and 20 mm ID: 20 MPa (2980 psi)				

Product Line-up

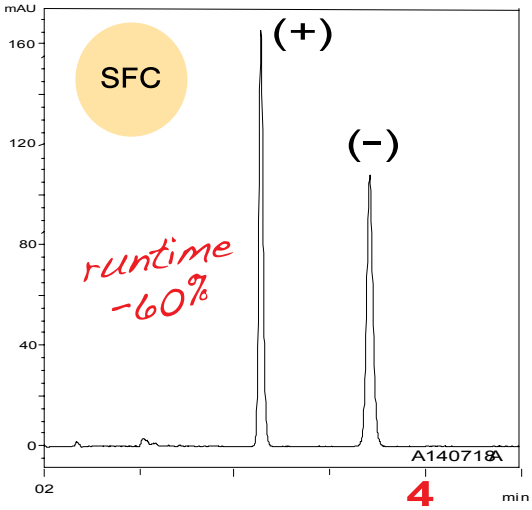
PRODUCT NAME	Particle size [µm]	Type	Alternative YMC LC product	Competitive product
Alcyon SFC CSP Amylose-C	3 5	Coated	CHIRAL ART Amylose-C	CHIRALPAK® AD-H (SFC), AD-3
Alcyon SFC CSP Cellulose-C			CHIRAL ART Cellulose-C	CHIRALCEL® OD-H (SFC), OD-3
Alcyon SFC CSP Amylose-SA		Immobilised	CHIRAL ART Amylose-SA	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

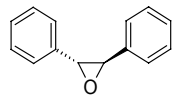
Properties of Alcyon SFC CSP Columns

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.

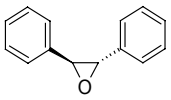
Chiral Separations in SFC Mode

Fast separation with high resolution*

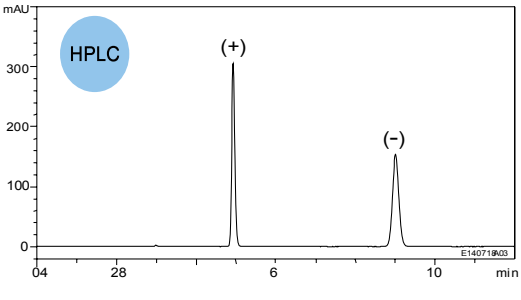




(+)-*R,R-trans*-Stilbene oxide



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

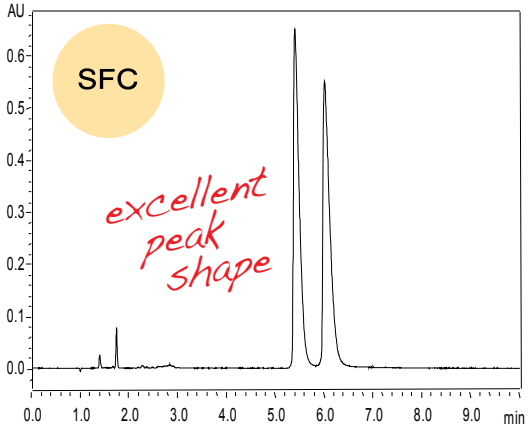


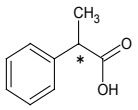
Column: **Alcyon SFC CSP Amylose-C** (5 µm) 250 x 4.6 mm ID
Part No.: KAN99S05-2546WTS
Eluent: CO_2 / methanol (60/40)
Flow: 3.0 mL/min
Temperature: 40°C
Detection: UV at 220 nm
Back pressure: 17.2 MPa (2500 psi)

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

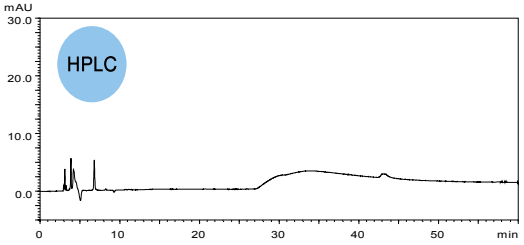
Faster chiral separation of trans-stilbene oxide is achieved using supercritical fluid chromatography compared to HPLC as the separation mode. Lower viscosity and larger diffusion coefficients for supercritical fluid provide rapid separations of both chiral and achiral compounds.

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)

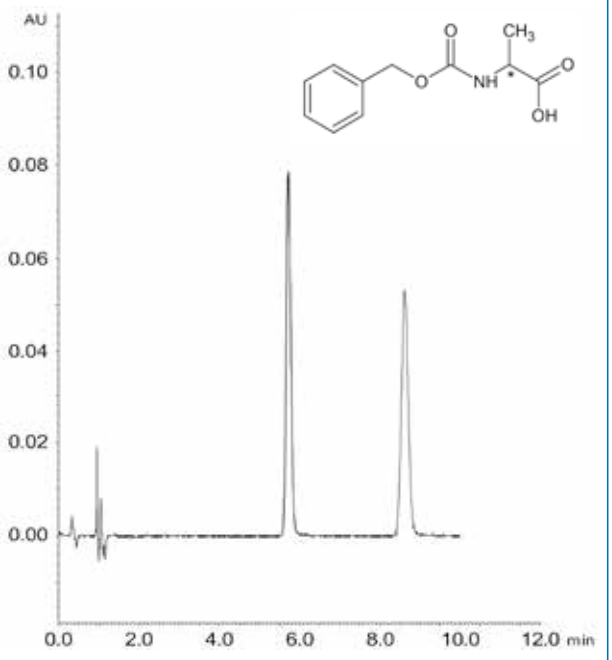
Column: CHIRAL ART Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.: KCN99S05-2546WT
Eluent: *n*-hexane / 2-propanol (99/1)
Flow: 1.0 mL/min
Temperature: 25°C
Detection: UV at 220 nm

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.

* Application data by courtesy YMC Co., Ltd.

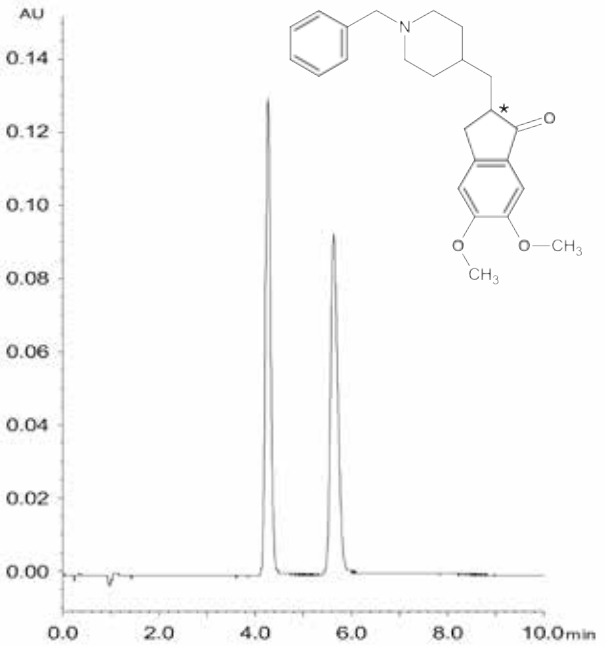
Applications

N-CBZ-DL-Alanine*



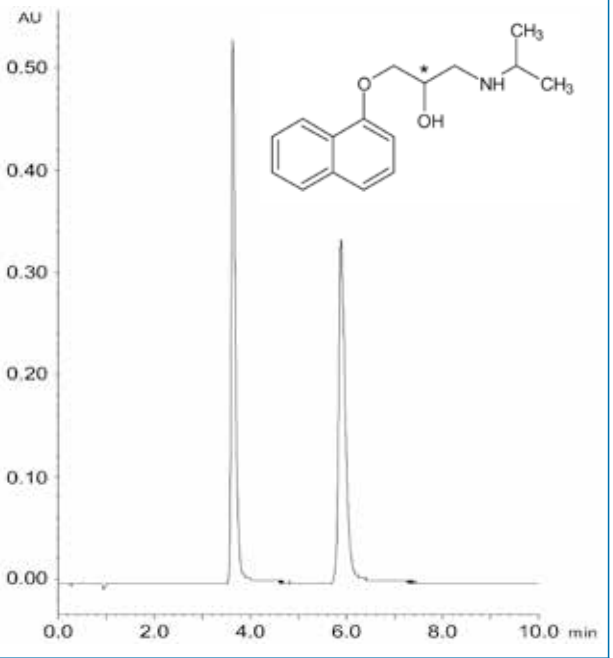
Column:	Alcyon SFC CSP Amylose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KAN99S05-2546WTS
Eluent:	CO_2 / 2-propanol containing 0.1% TFA (90/10)
Flow rate:	3.0 mL/min
Temperature:	35°C
Detection:	UV at 215 nm
Backpressure:	13.8 MPa (2000 psi)
Injection:	5 µL (1.0 mg/mL)

Donepezil*



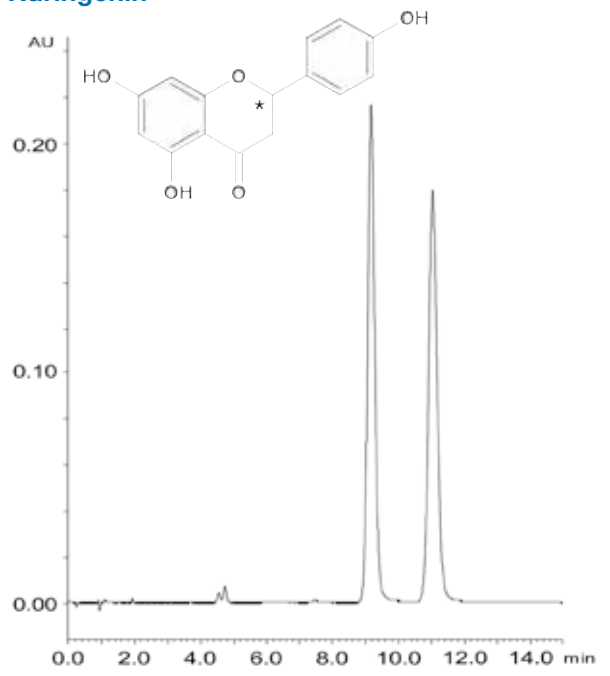
Column:	Alcyon SFC CSP Cellulose-C (5 µm) 250 x 4.6 mm ID
Part No.:	KCN99S05-2546WTS
Eluent:	CO_2 / 2-propanol containing 0.1% DEA (70/30)
Flow rate:	3.0 mL/min
Temperature:	35°C
Detection:	UV at 268 nm
Backpressure:	13.8 MPa (2000 psi)
Injection:	5 µL (1.0 mg/mL)

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

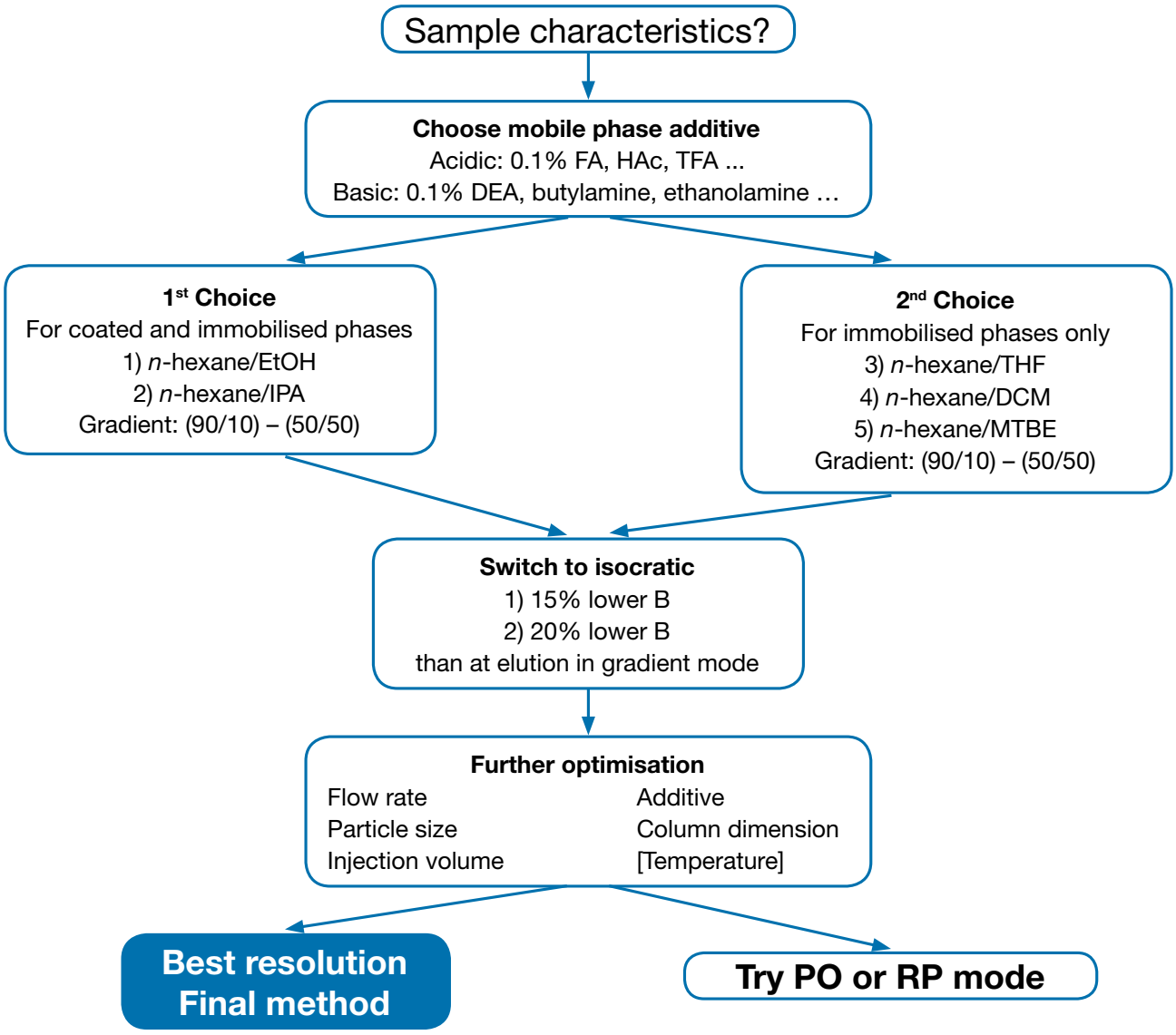
When NP mode, when RP mode?

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.

* Application data by courtesy YMC Co., Ltd.

Method Screening Strategy

Use of Screening Gradients

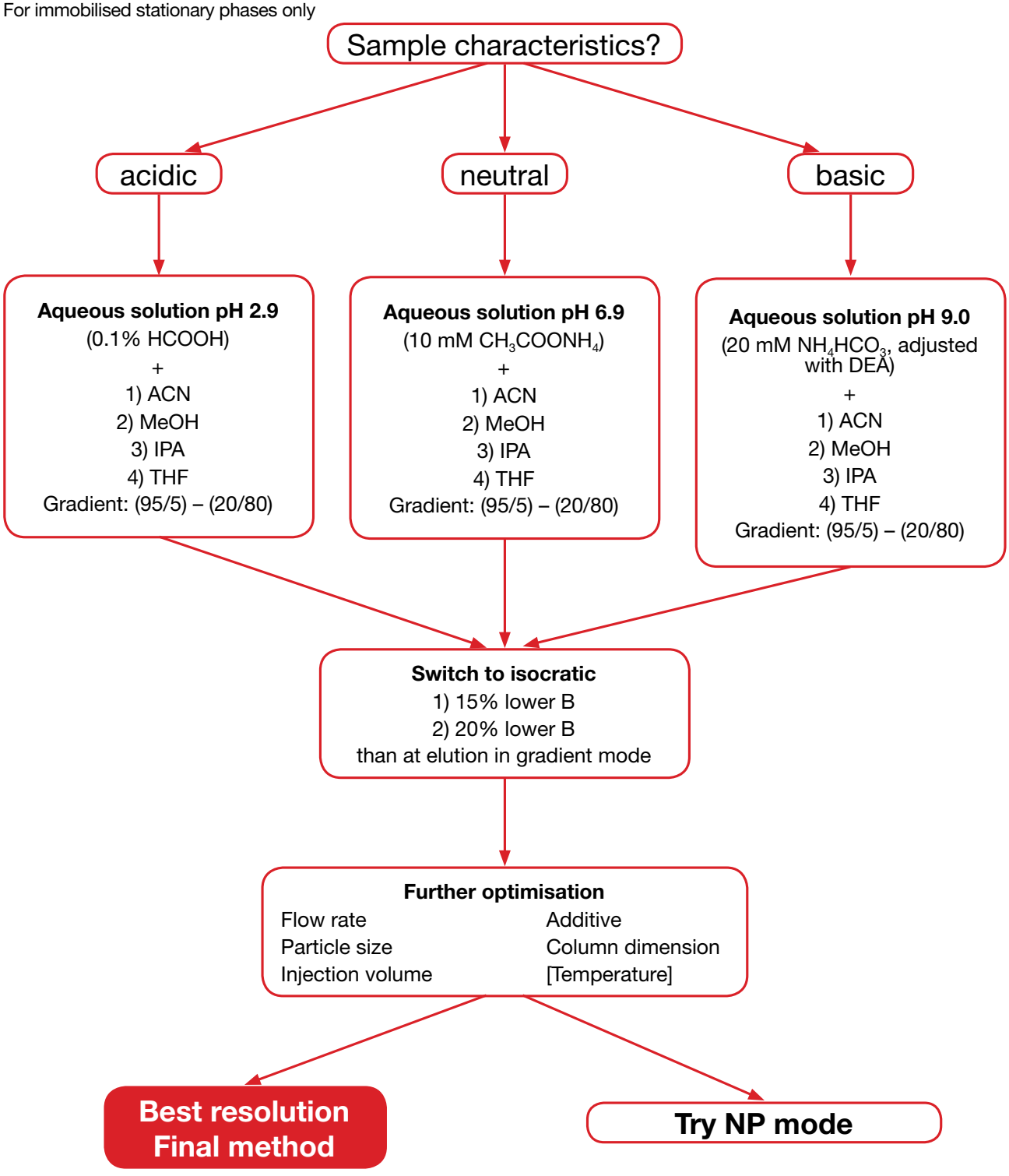
YMC recommends using a gradient based screening strategy as it is much faster than isocratic screening when using different mobile phase compositions.

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.

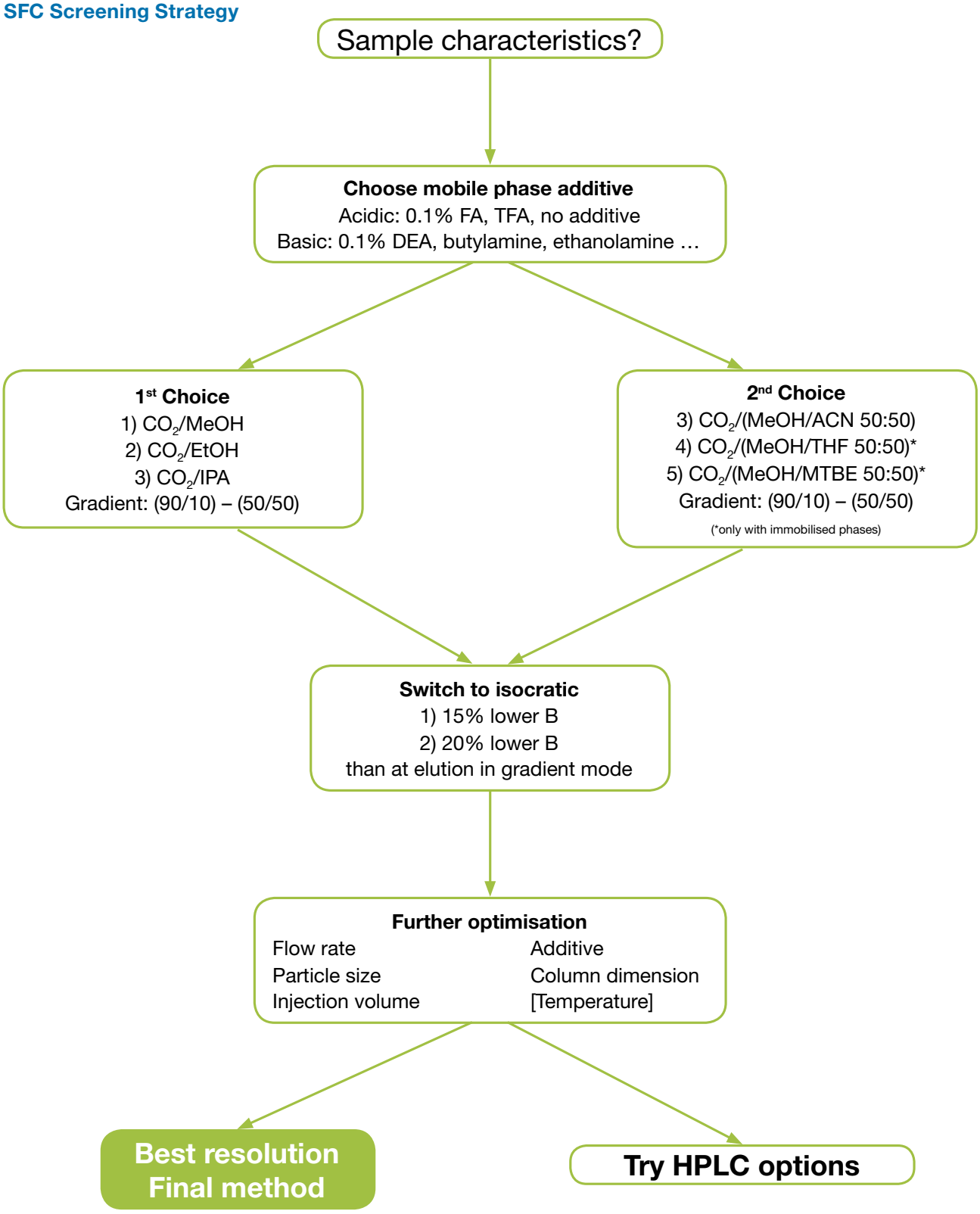
RP Screening Strategy

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)

* Application data by courtesy YMC Co., Ltd.

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.

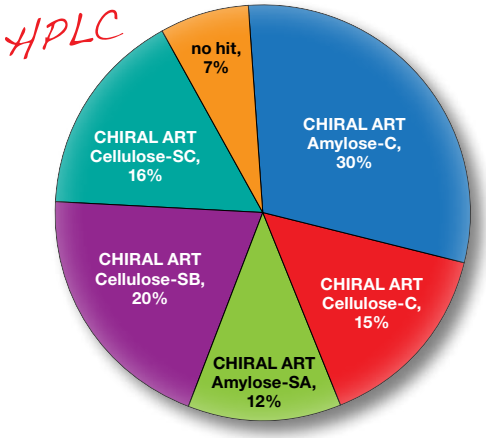
Alternatively you can choose one of the YMC method development kits or request a customised screening kit with 2, 3, 4 or 5 different CHIRAL ART phases. You only need to contact your local YMC contact for details.

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

Success Rate

- Hit criteria : Rs>1.5
- Hit database: compiled from 300 samples (199 LC/101 SFC) supplied for contract service
- The 5 CHIRAL ART phases available so far can cover >90% of chiral separations
- Hit ratios varied between 6% and 34% for each of the 5 phases
- About 95% of the LC applications are in NP/PO mode, while 5% are in RP mode

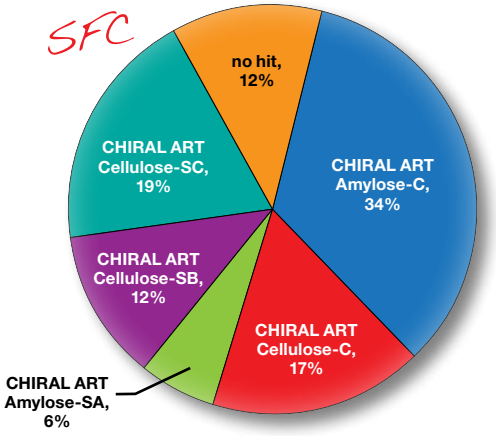


Method Development

- 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

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			
						

* Application data by courtesy YMC Co., Ltd.

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

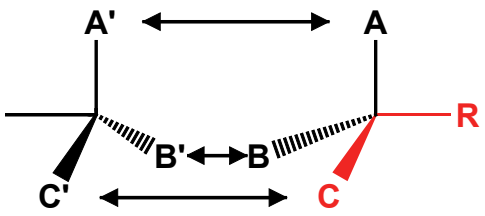
Although separation modes are chosen according to the purpose of separation, it is recommended to use one column dedicated for one separation mode in order to maximise the lifetime of the column.
In normal phase mode YMC CHIRAL NEA allows the separation of a wide range of non-polar to moderately polar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

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

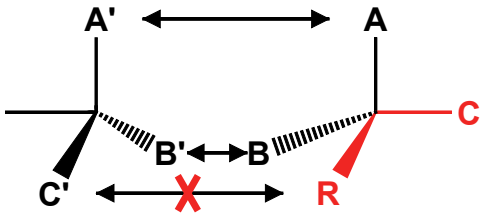
For a successful separation at least three points of interaction between the CSP and the target compound must exist. Occasionally, for analytical separations, there may be a need to derivatise the sample with, for example π-donating groups such as dinitobenzoyl, dinitrophenylurea or dinitrophenylcarbamate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

Chiral Separation Mechanism

3 points of interaction: separation



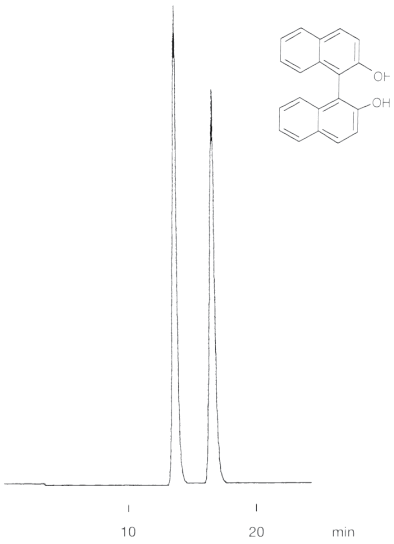
2 points of interaction: no separation



YMC CHIRAL NEA(R)(S)

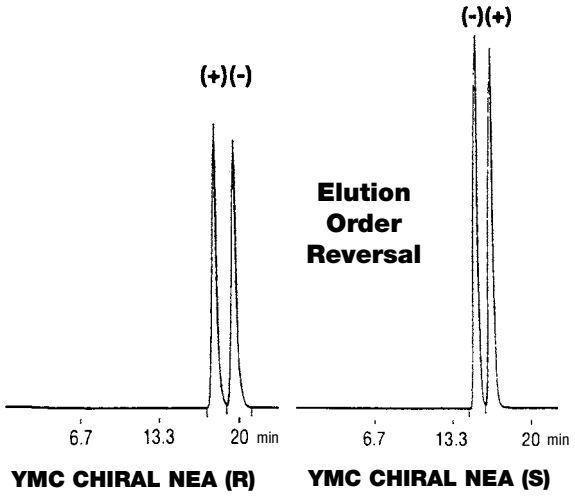
Applications used in normal phase mode

1,1'-Bi-2-Naphthol*



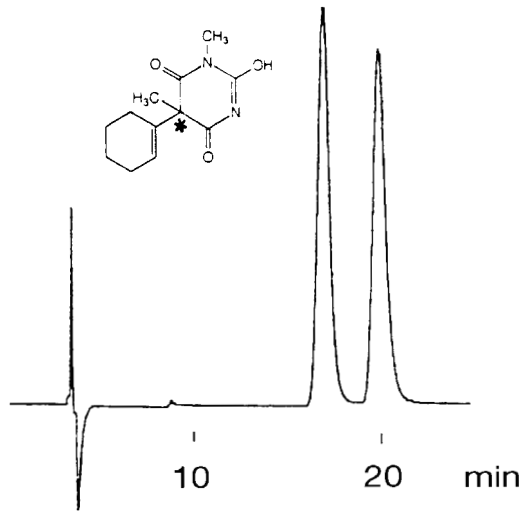
Column: YMC CHIRAL NEA (R) 250 x 4.6 mm ID
Part No.: CR30S05-2546WT
Eluent: *n*-hexane / dichloromethane / ethanol (70/30/2)
Flow rate: 1.0 mL/min
Temperature: 25°C
Detection: UV at 254 nm

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



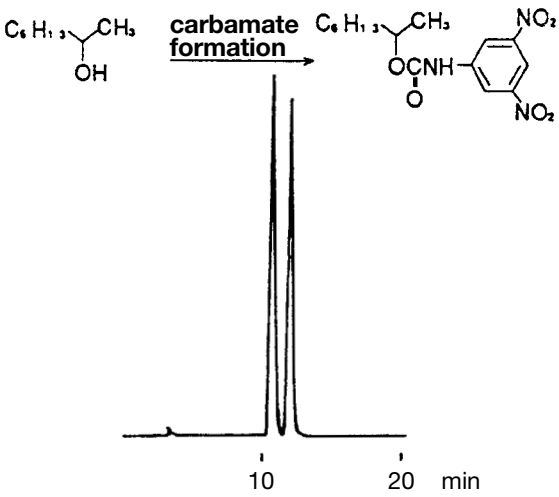
Column: YMC CHIRAL NEA (R) and YMC CHIRAL NEA (S) 250 x 4.6 mm ID
Part No.: CR30S05-2546WT and CS30S05-2546WT
Eluent: *n*-hexane / dichloromethane / ethanol (70/30/1)
Flow rate: 0.5 mL/min
Temperature: 25°C
Detection: UV at 254 nm

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



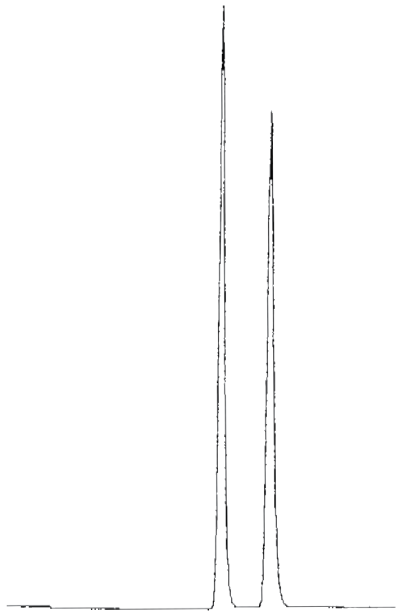
Column: YMC CHIRAL NEA (R) 250 x 4.6 mm ID
Part No.: CR30S05-2546WT
Eluent: *n*-hexane / CH_2Cl_2 / ethanol (90/10/5)
Flow rate: 1.0 mL/min
Temperature: 35°C
Detection: UV at 254 nm

* Application data by courtesy YMC Co., Ltd.

YMC CHIRAL NEA(R)(S)

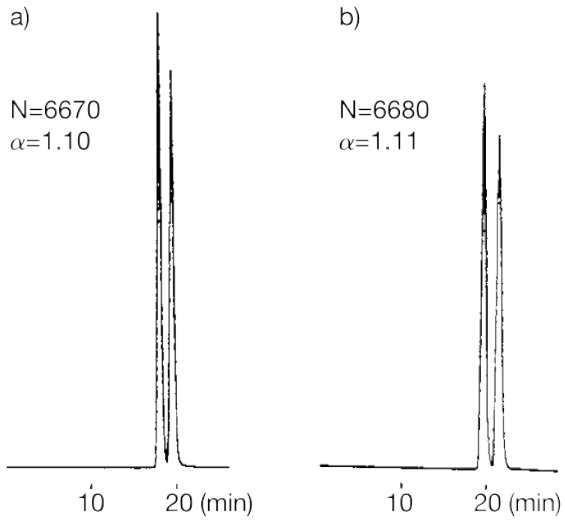
Applications used in reversed phase mode

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*



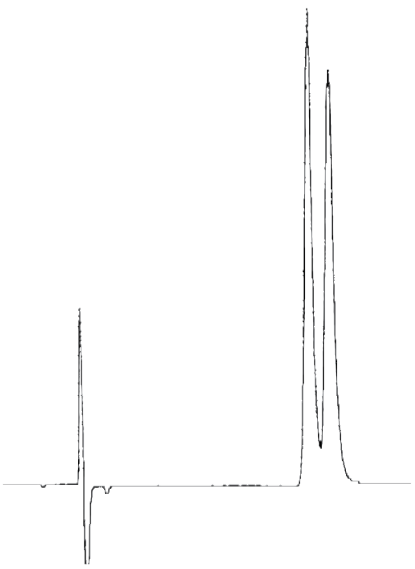
a)

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)

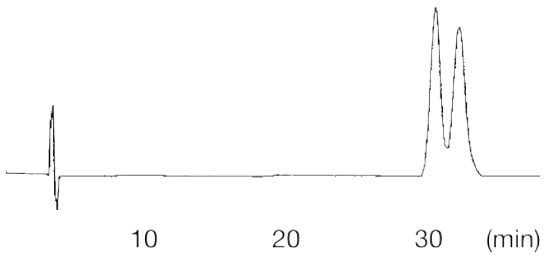
Eluent:	acetonitrile / 0.5M $NaClO_4$ (40/60)
Flow:	1.0 mL/min
Temperature:	ambient
Detection:	UV at 254 nm

Hexobarbital*



Column:	YMC CHIRAL NEA (R) 250 x 4.6 mm ID
Part No.:	NR30S05-2546WT
Eluent:	acetonitrile / water (30/70)
Flow:	0.7 mL/min
Detection:	UV at 210 nm
Injection:	1.0 µL (1.2 mg/mL)
Temperature:	ambient

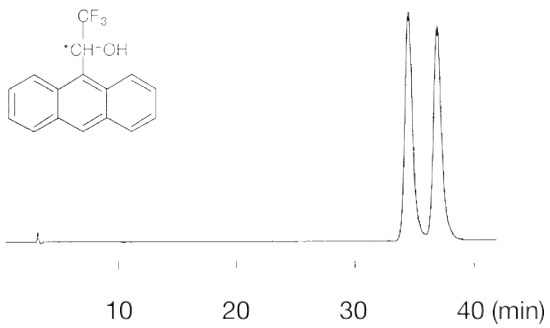
CBZ-Phenylalanine (Z-Phe-OH)*



Column:	YMC CHIRAL NEA (R) 250 x 4.6 mm ID
Part No.:	NR30S05-2546WT
Eluent:	0.5M $NaClO_4$-$HClO_4$ (pH 2.0) / acetonitrile (70/30)
Flow:	1.0 mL/min
Detection:	UV at 254 nm
Injection:	10 µL (1.5 mg/mL)
Temperature:	ambient

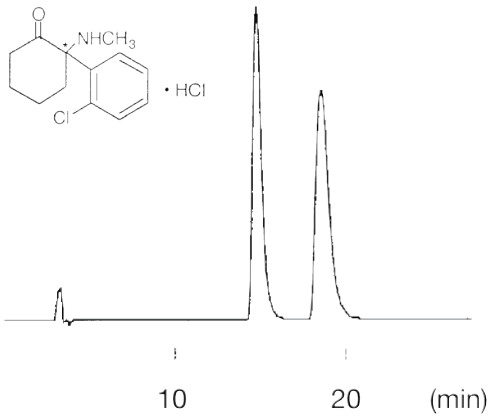
YMC CHIRAL NEA(R)(S)

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

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.

* Application data by courtesy YMC Co., Ltd.

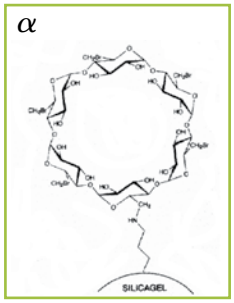
YMC CHIRAL CD BR

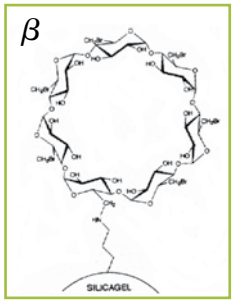
- **reversed phase**
- **polar pharmaceuticals**
- **positional isomers**
- **water-soluble compounds**

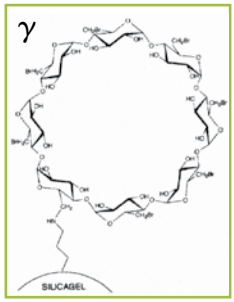
YMC CHIRAL CD BR	Specification
Particle Size / µm	5
Pore Size / nm	12
Surface area / m^2g^{-1}	proprietary
Carbon content / %	proprietary
Recommended pH range	3.5 - 6.5

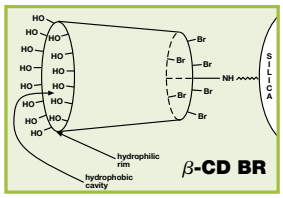
Properties

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.





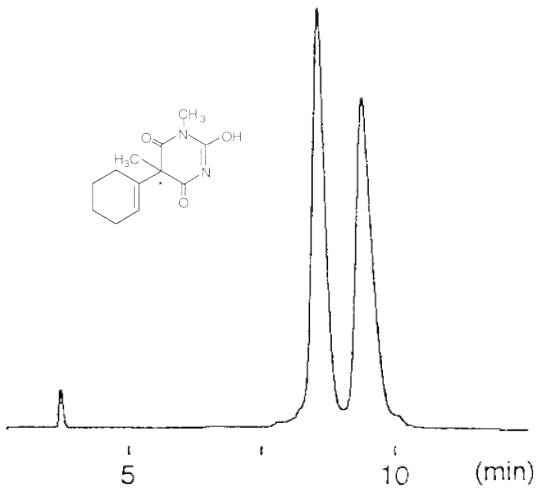




YMC CHIRAL CD BR

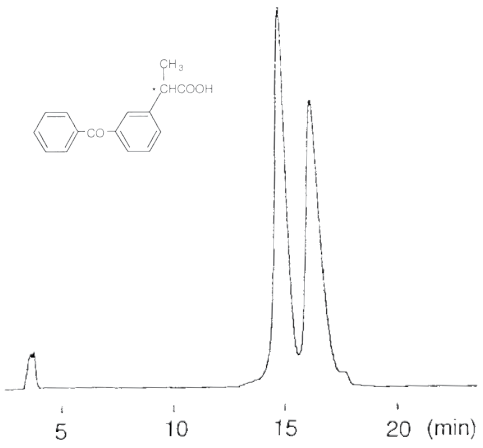
Applications

Hexobarbital*



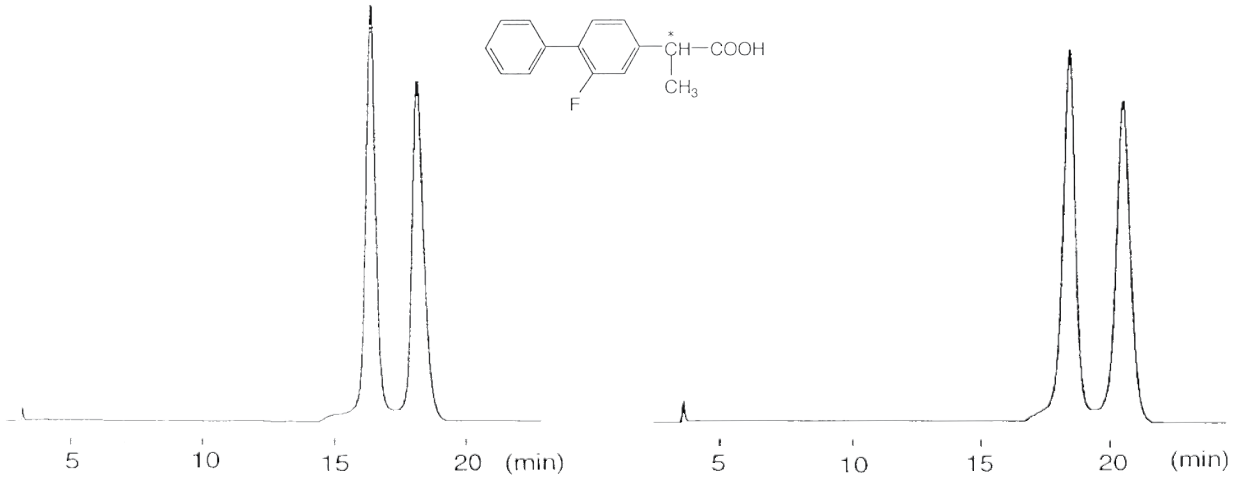
Column:	YMC CHIRAL β-CD BR 250 x 4.6 mm ID
Part No.:	DB12S05-2546WT
Eluent:	0.1M acetic acid-triethylamine in water (pH5.6) / methanol (30/70)
Flow:	1.0 mL/min
Temperature:	30°C
Detection:	UV at 254 nm
Injection:	5 µL (1 mg/mL)

Ketoprofen*



Column:	YMC CHIRAL β-CD BR 250 x 4.6 mm ID
Part No.:	DB12S05-2546WT
Eluent:	0.1M acetic acid-triethylamine in water (pH5.6) / methanol (30/70)
Flow:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 254 nm
Injection:	10 µL (1 mg/mL)

Flurbiprofen*



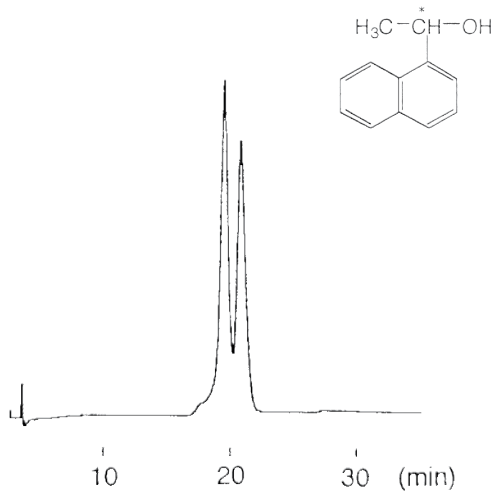
Column:	YMC CHIRAL β-CD BR 250 x 4.6 mm ID
Part No.:	DB12S05-2546WT
Eluent:	0.1M acetic acid-triethylamine in water (pH4.0) / acetonitrile (10/90)
Flow:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 254 nm
Injection:	2 µL (1 mg/mL)

Column:	YMC CHIRAL γ-CD BR 250 x 4.6 mm ID
Part No.:	DG12S05-2546WT
Eluent:	0.1M acetic acid-triethylaminein water (pH4.0) / methanol (30/70)
Flow:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 254 nm
Injection:	2 µL (1 mg/mL)

* Application data by courtesy YMC Co., Ltd.

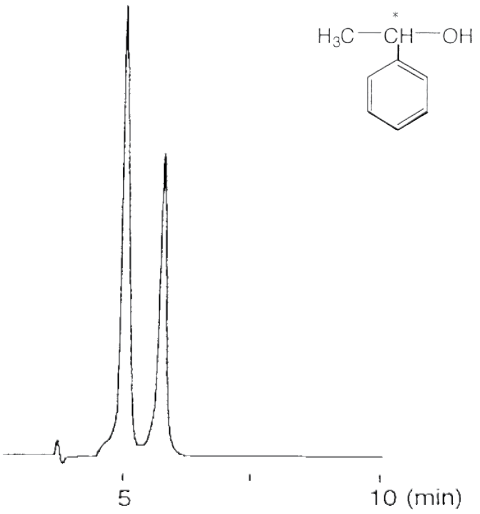
YMC CHIRAL CD BR

1-(1-naphthyl)-ethylalcohol*



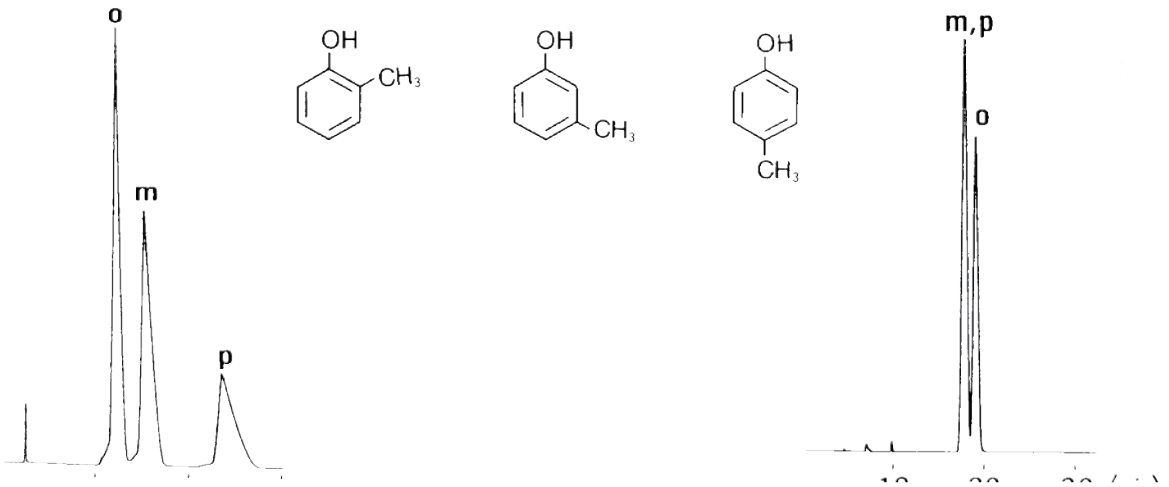
Column:	YMC CHIRAL γ-CD BR 250 x 4.6 mm ID
Part No.:	DG12S05-2546WT
Eluent:	0.1M $AcOH_{aq}$-TEA (Triethylamine)$_{aq}$ (pH5.6) / methanol (90/10)
Flow:	1.0 mL/min
Temperature:	30°C
Detection:	UV at 254 nm
Injection:	5 µL (1 mg/mL)

Phenylethylalcohol*



Column:	YMC CHIRAL γ-CD BR 250 x 4.6 mm ID
Part No.:	DG12S05-2546WT
Eluent:	0.1M $AcOH_{aq}$-TEA (Triethylamine)$_{aq}$ (pH4.0) / methanol (90/10)
Flow:	1.0 mL/min
Temperature:	30°C
Detection:	UV at 254 nm
Injection:	5 µL (10 mg/mL)

Cresols*

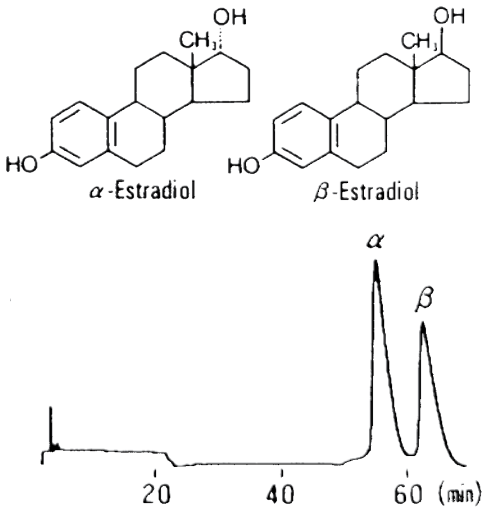


Column:	YMC CHIRAL β-CD BR 250 x 4.6 mm ID
Part No.:	DB12S05-2546WT
Eluent:	methanol / water (20/80)
Flow:	1.0 mL/min
Temperature:	ambient
Detection:	UV at 254 nm

Column:	YMC Pack ODS-AM 250 x 4.6 mm ID
Part No.:	AM12S05-2546WT
Eluent:	methanol / water (40/60)
Flow:	1.0 mL/min
Temperature:	ambient
Detection:	UV at 254 nm

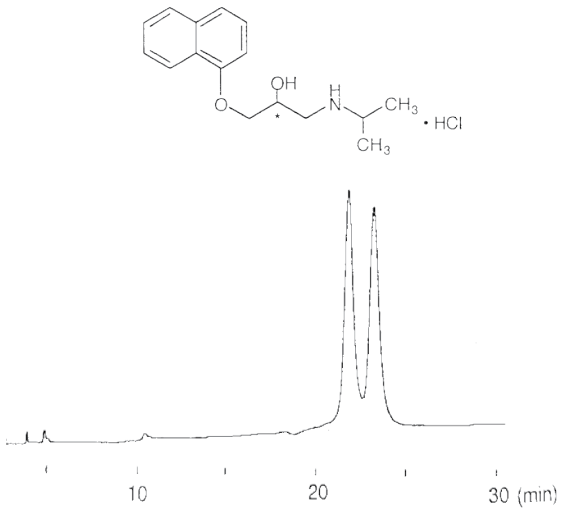
YMC CHIRAL CD BR

Estradiols*



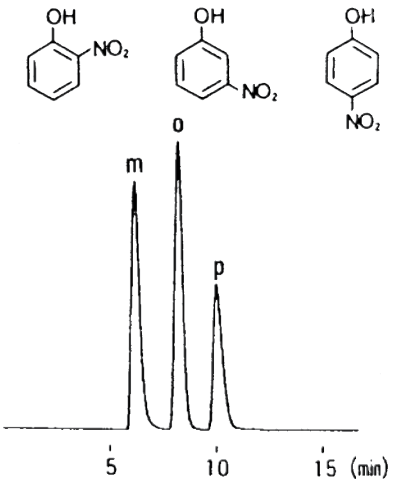
Column:	YMC CHIRAL γ-CD BR 250 x 4.6 mm ID
Part No.:	DG12S05-2546WT
Eluent:	methanol / water (50/50)
Flow:	1.0 mL/min
Temperature:	30°C
Detection:	UV at 230 nm

Propranolol HCl*



Column:	YMC CHIRAL γ-CD BR 250 x 4.6 mm ID
Part No.:	DG12S05-2546WT
Eluent:	acetonitrile / methanol / acetic acid / triethylamine (99/1/0.3/0.25)
Flow:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 254 nm
Injection:	5 µL (1 mg/mL)

Nitrophenols*



Column:	YMC CHIRAL α-CD BR 250 x 4.6 mm ID
Part No.:	DA12S05-2546WT
Eluent:	0.1M CH_3COOH-CH_3COONa (pH4.0) / methanol (90/10)
Flow:	1.0 mL/min
Temperature:	25°C
Detection:	UV at 254 nm

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.

* Application data by courtesy YMC Co., Ltd.

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)

Alcyon CSP SFC 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

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)

Alcyon CSP SFC 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

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)

Alcyon CSP SFC 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

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)

Alcyon CSP SFC 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

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)

Alcyon CSP SFC 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)

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

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

α-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

β-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

γ-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

Substance Index

Substance **page**

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www.ymc.co.jp

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