

# Dr. Maisch GmbH

High Performance LC • HPLC-Columns and more

## CONTENT

Independent chiral-SFC study by Syame Khater

and Caroline West, University of Orleans

Comparison of chiral phases with HPLC

Chiral columns, overview and prices

Chiral preparative separations by Hoffmann-La Roche

Free chiral screening



CHIRAL COLUMNS MADE BY DR. MAISCH

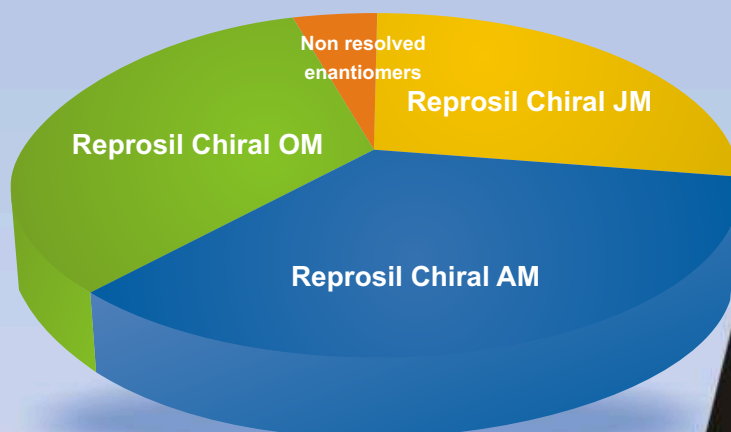
# MORE THAN 90% OF SEPARATIONS

Reprosil chiral columns are complementary and successful in achieving more than 90% of separations of the solute set.

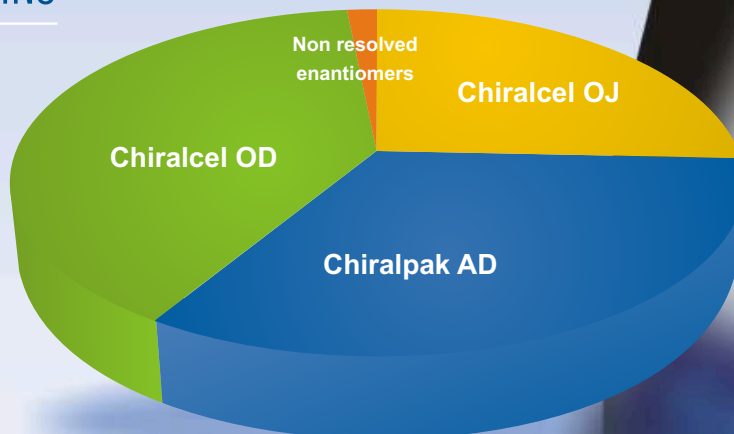
Reprosil Chiral JM and OM allow performing rather equivalent performances compared to their original homologous CSP's.

Only Reprosil Chiral AM shows a lower number of successful separations than Chiralpak AD (similarly to all other AD clones). Reprosil Chiral CM does not resolve the 8% of non-separated enantiomers but is rather redundant to the other three for this particular solute set.

## > REPROSIL CHIRAL COLUMNS



## > DAICEL CHIRAL COLUMNS



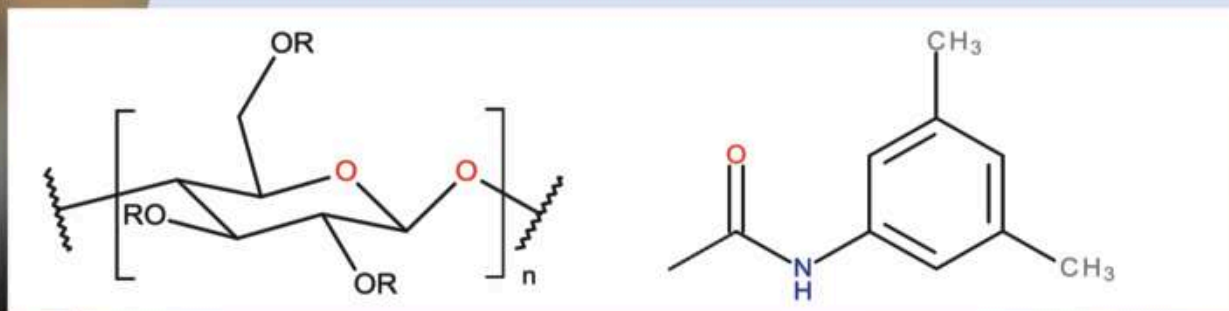
## EVALUATION OF REPOSIL CHIRAL OM vs. OD

Evaluation of a silica phase modified with cellulose tris-(3,5-dimethylphenyl-carbamate) "Reposil Chiral-OM" in supercritical fluid chromatography.  
Syame Khater and Caroline West, University of Orleans, CNRS UMR 7311, ICOA

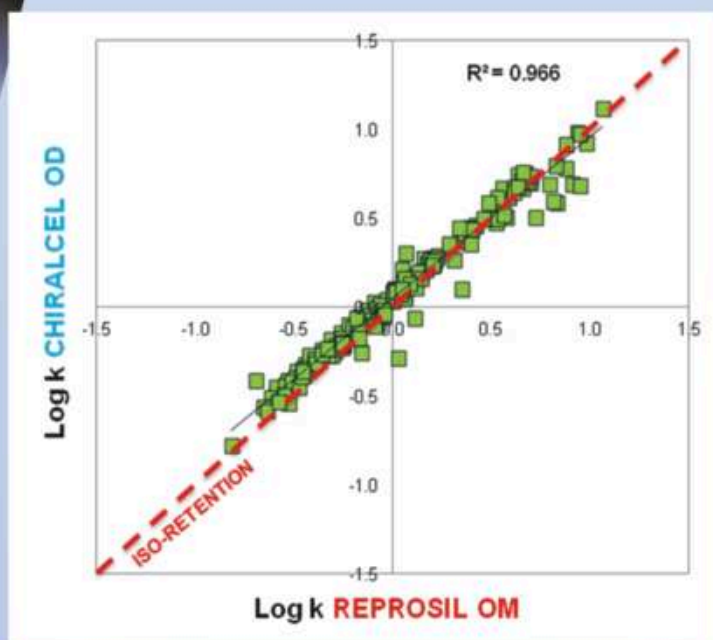
### EXPERIMENTAL

All experiments were performed on a Jasco SFC system and an Acquity UPC<sup>2</sup> system. Reposil Chiral-OM is based on silica coated with tris-(3,5-dimethylphenylcarbamate) of cellulose. Two hundred and thirty achiral compounds and one hundred and thirty chiral racemic compounds were screened on different polysaccharide-type chiral stationary phases in SFC in the following operating conditions: CO<sub>2</sub>/MeOH (90:10), flow rate 3 ml/min, oven temperature 25°C, outlet pressure 150 bars.

### NON-SPECIFIC INTERACTIONS AND RETENTION



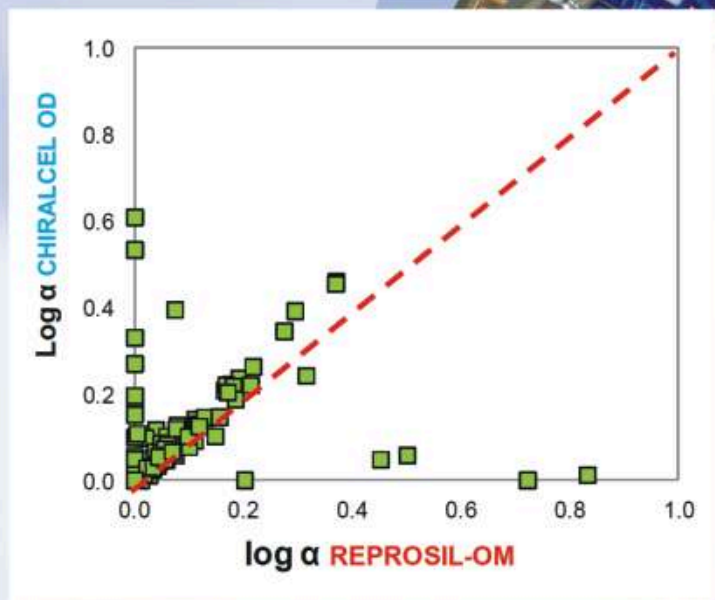
Retention on cellulose tris-(3,5-dimethylphenylcarbamate) could be explained by non-specific interactions such as  $\pi$ - $\pi$  interactions, hydrogen bonding and stereo-induced interactions.



The investigation on non-specific interactions that control retention is based on the analysis of 230 achiral compounds.

The  $\kappa$ - $\kappa$  plot on the left compares the logarithms of retention factors of 168 achiral species on Chiralcel OD vs. Reposil Chiral-OM. The phases are expected to be similar since they possess the same chiral selector (R<sup>2</sup> = 0.966). They would provide similar non-specific interactions.

## > PERFORMANCE



The  $\alpha$ - $\alpha$  plot below compares the logarithm of separation factors measured for 130 racemates on Reprisil Chiral-OM vs. Chiralcel OD.

The major part of the compounds is located on the dotted line, indicating similar separation behaviour of the two columns.

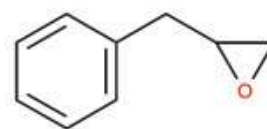
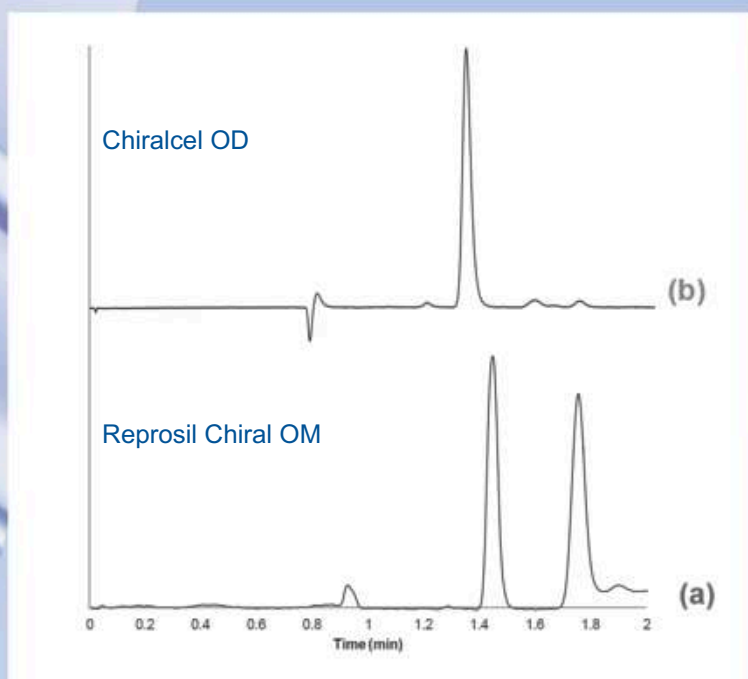
Chiralcel OD provides a higher number of unique hits. Indeed, 81% of the tested chiral species are resolved on Reprisil Chiral-OM against 86% on Chiralcel OD. However, some racemates are well separated on Reprisil chiral-OM with little or no separation on Chiralcel OD.

## > APPLICATIONS

The following chromatograms illustrate the complementarity of the generic phases having cellulose tris-(3,5-dimethylphenyl-carbamate) as chiral selector in the course of method development

a) Focus on Reprisil Chiral-OM versus Chiralcel OD

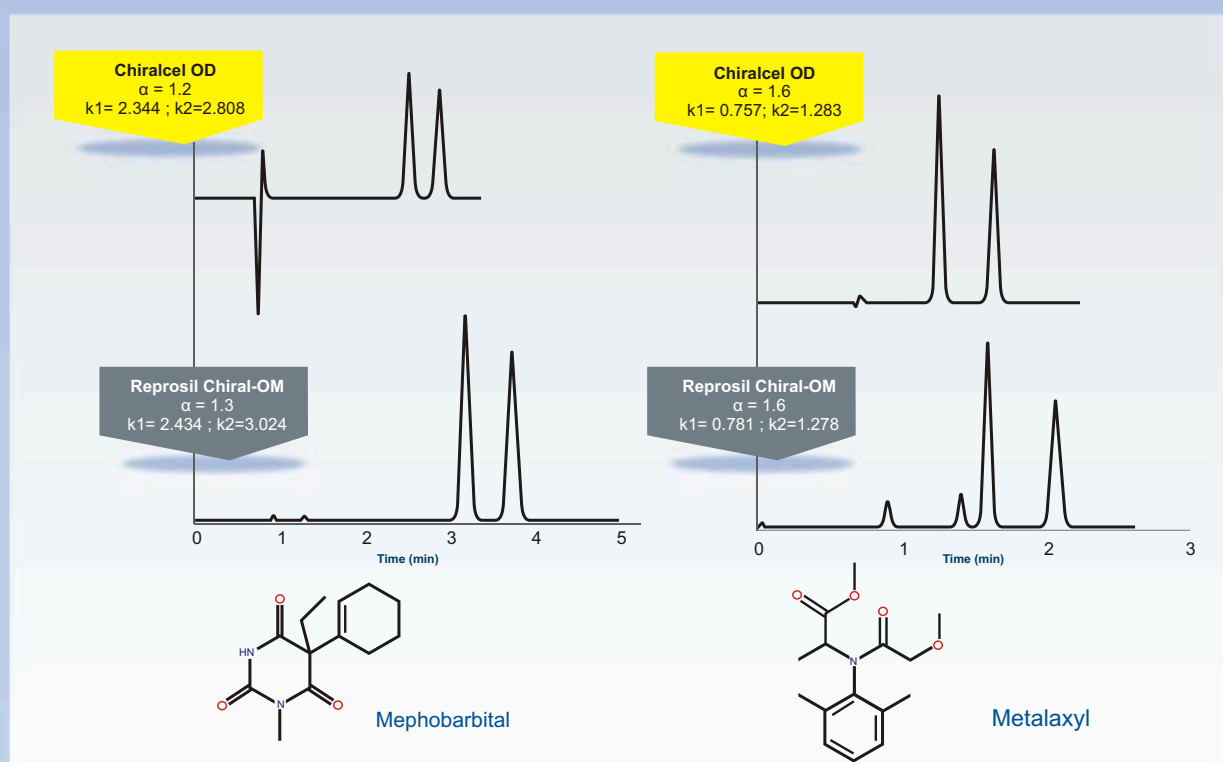
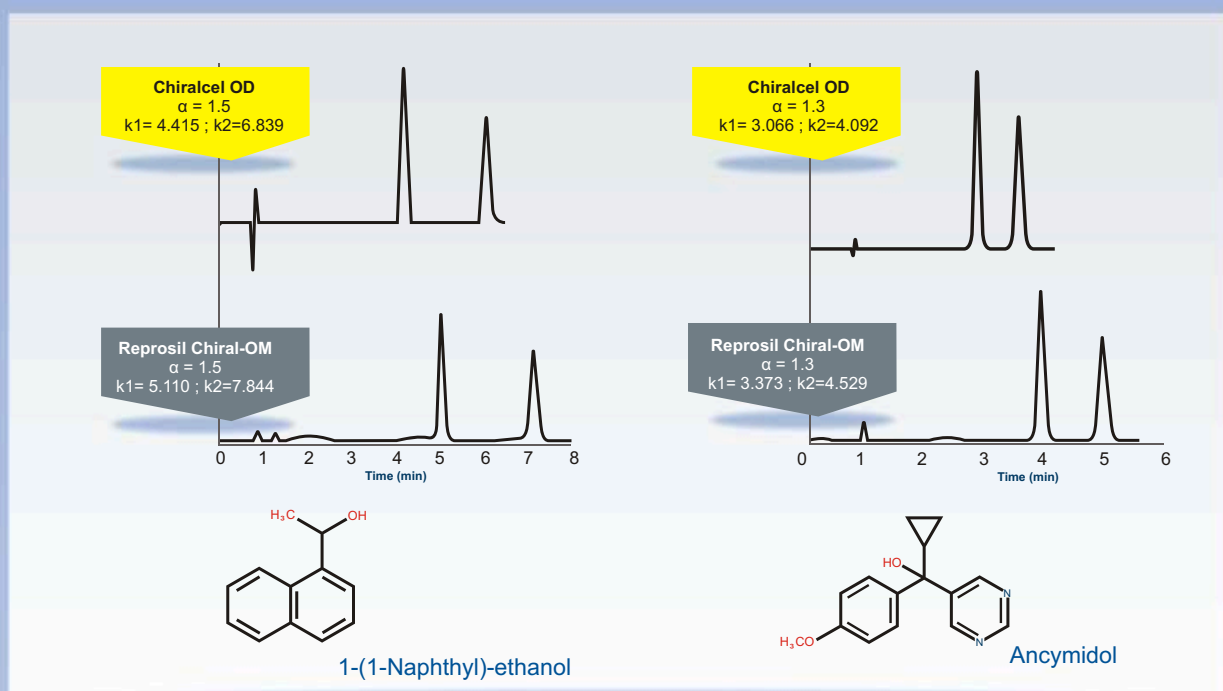
The chromatograms illustrate the chiral compounds that are well resolved on Reprisil Chiral-OM (a) but have no separation on Chiralcel OD.



(2,3-epoxypropyl)-benzene

# IDENTICAL SELECTIVITY

## COMPARISON OF REPROSIL CHIRAL OM AND CHIRACEL ODH

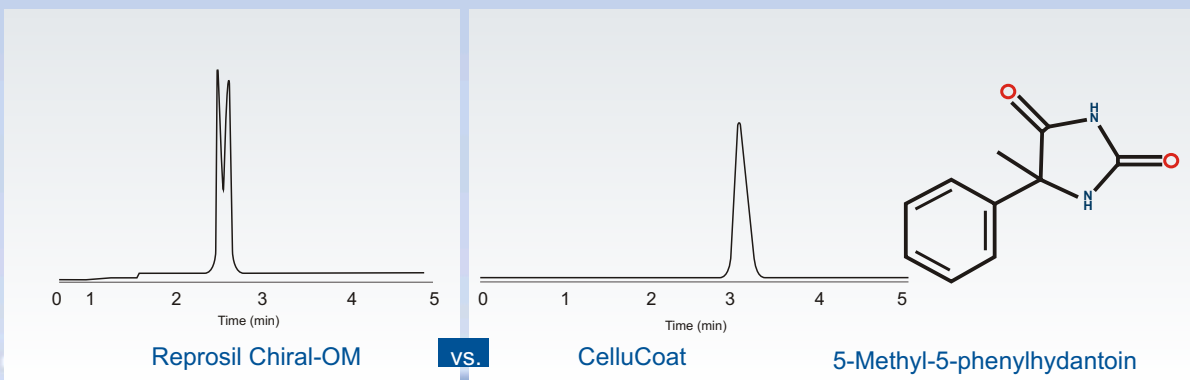
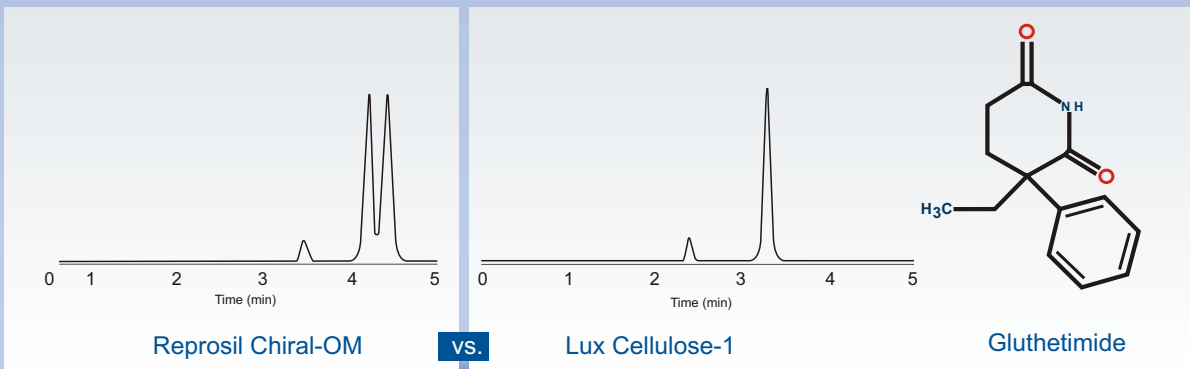
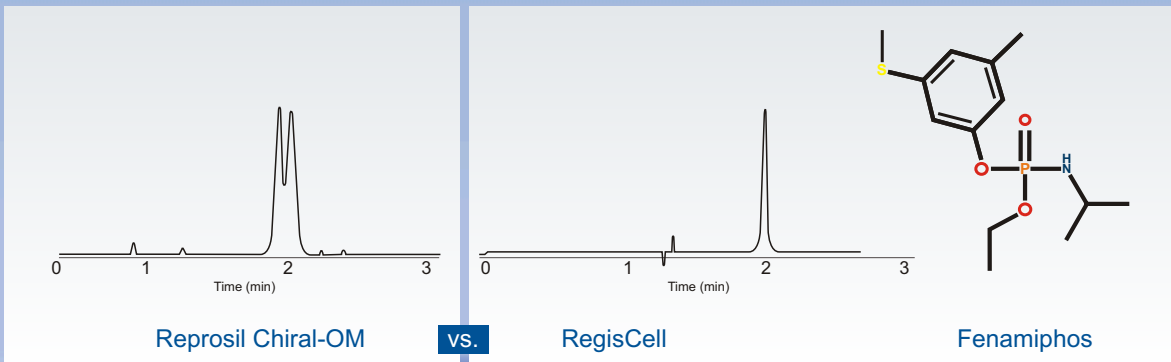


# COMPARISON OF USP-L40 CHIRAL COLUMNS

The analysis of fenamiphos, gluthetimide and 5-methyl-5-phenylhydantoin on Reprisil Chiral-OM (left-hand chromatogram) provide a better starting point for a method development than those on RegisCell, Lux Cellulose-1 or Cellucoat, respectively (right-hand chromatogram).

## > SEPARATION

## > NO SEPARATION



# (USP-L51) REPROSIL CHIRAL-AM (USP-L51)

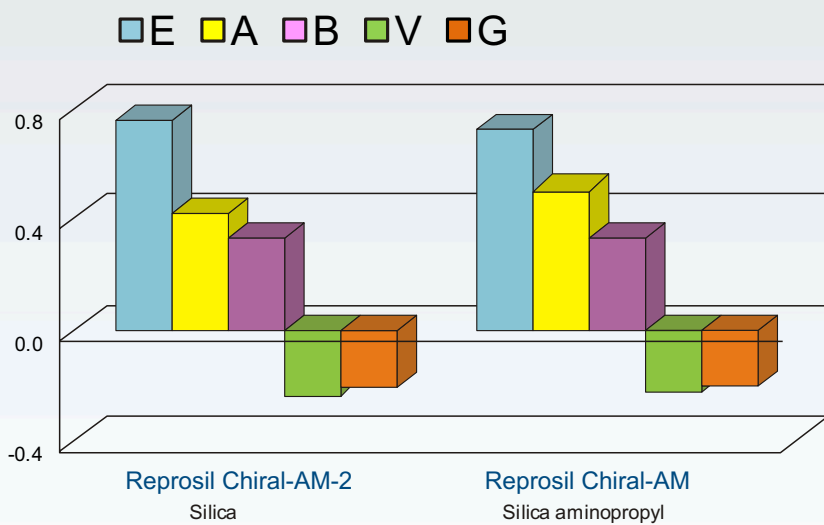
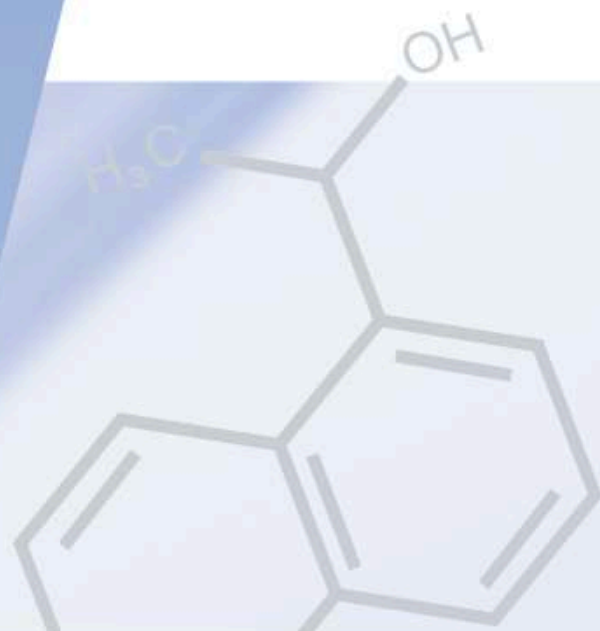
## > QUESTION:

Does the nature of silica treatment affect the retention ability?

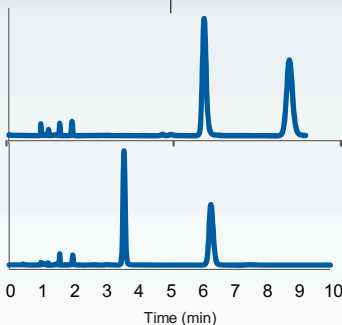
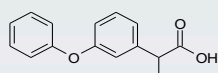
## > ANSWER:

The interactions with hydrogen donor (a coefficient in yellow) are significantly lower on AM-2. Interactions with acids are thus lower.

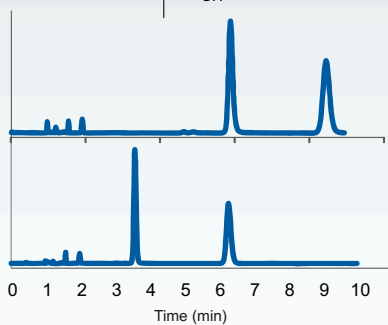
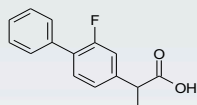
The analysis of 3 nonsteroidal anti-inflammatory drugs (Fenoprofen, Flurbiprofen and Ibuprofen) on AM (upper chromatograms) thus provides higher retention than that on AM-2 (bottom chromatograms)



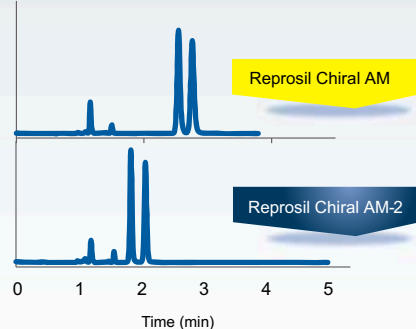
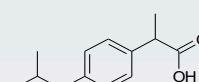
Fenoprofen



Flurbiprofen

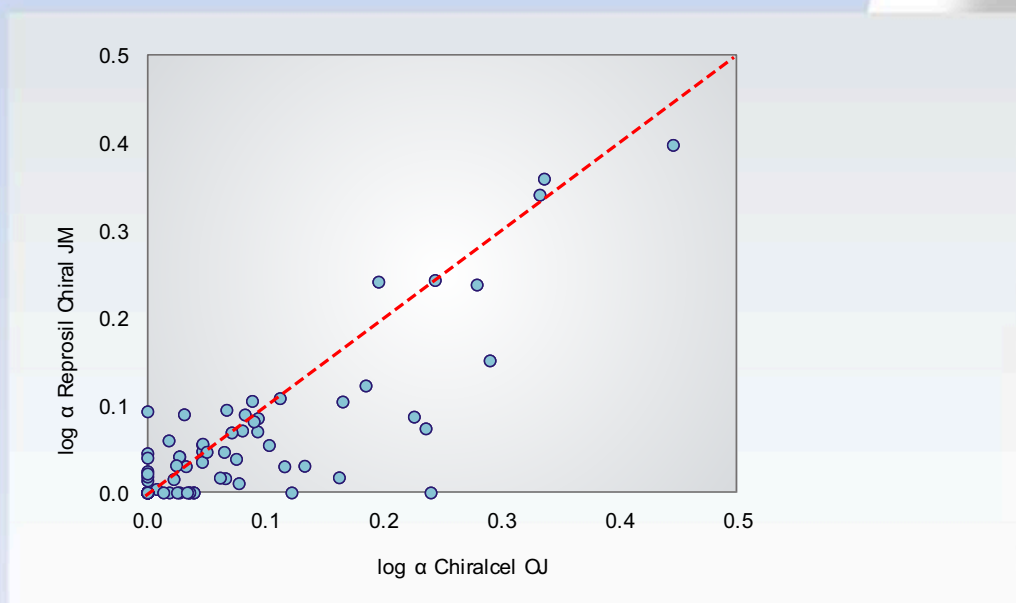
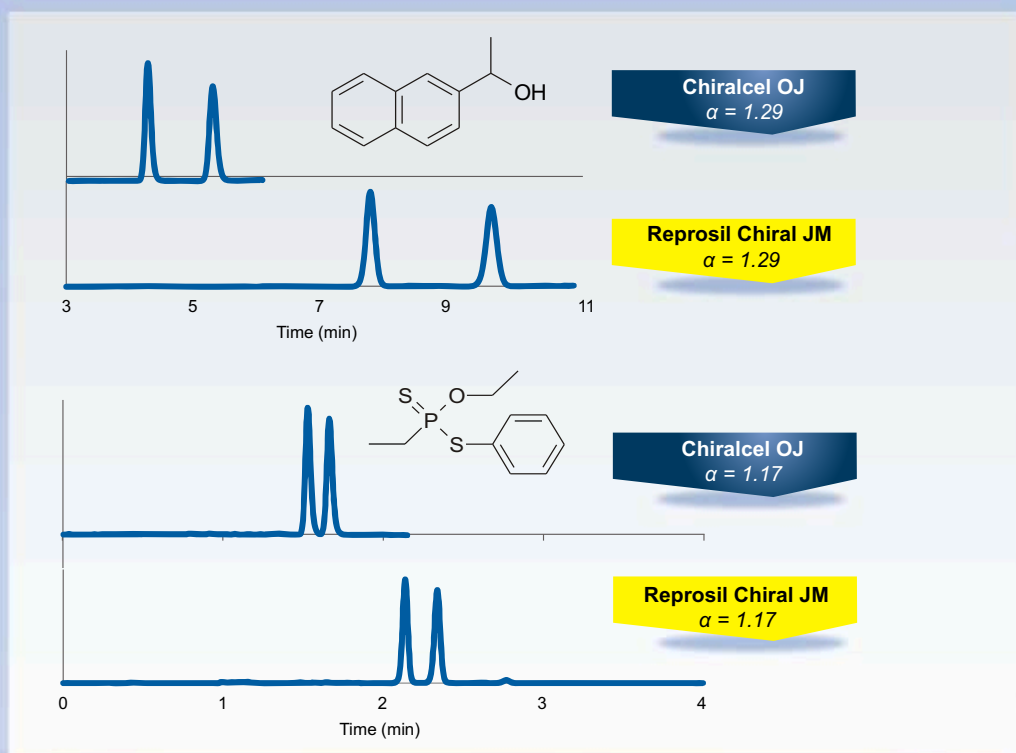


Ibuprofen



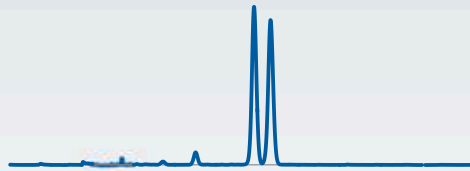
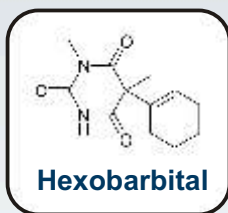
## SEPARATION ABILITY OF JM AND OJ (USP-L80)

The log  $\alpha$  - log  $\alpha$  plot compares the separation ability of JM and OJ. The data points located on the first bisector (red dotted line) show similar separation profiles. The chromatograms of 1-(2-Naphthyl)-ethanol and Fonofos illustrate chiral compounds with identical separation factors on both columns.

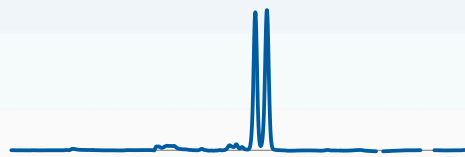
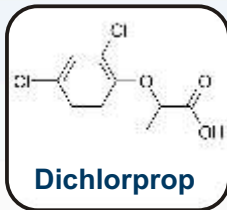




The analysis of Hexobarbital on **Reprosil Chiral-JM** provides a better starting point for a method development than those on **Chiral-AM** or **Chiral-OM**.

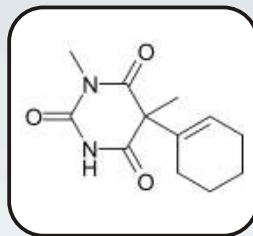


**Reprosil Chiral JM**



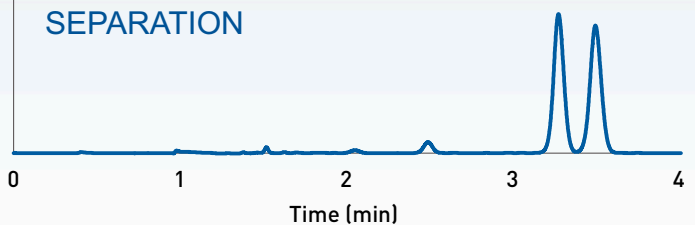
**Reprosil Chiral JM**

NO SEPARATION



**Chiralcel OJ**  
 $\alpha = 1.0$

SEPARATION



**Reprosil Chiral JM**  
 $\alpha = 1.09$

## COMPARISON OF REPOSIL CHIRAL-AM / OM / NR WITH HPLC

### Reposil Chiral-AM and Reposil Chiral-OM

are new polysaccharide Chiral Stationary Phases. The chiral selectors are Amylose-tris-(3,5-dimethylphenyl-carbamate) for Chiral-AM or Cellulose-tris-(3,5-dimethylphenyl-carbamate) for Chiral-OM. Both selectors are coated with an ultra pure silica with 1000 Å pores.

Reposil Chiral-AM is equivalent to Chiralpak AD, and Reposil Chiral-OM is equivalent to Chiralcel OD from Daicel. Dr. Maisch's company offers them in 2 different CPS versions: Reposil Chiral-AM and Chiral-OM are designed for separations in normal phase mode, Reposil Chiral-AM-RP and Chiral-OM-RP for separations in reversed phase mode. Both Reposil Chiral-AM and Chiral-OM columns are able to separate neutral, acidic and basic racemates.

### Reposil Chiral-NR

is an immobilized brush-type phase with very broad generality and complementary selectivity to Reposil Chiral-AM and OM. In many cases it is similar to Reposil Chiral-AM or Chiral-OM, but much more stable. The Chiral-NR selector is covalently bound, so that you can use all HPLC-eluent. This is similar to the immobilized IA, IB and IC columns. It is a perfect column for preparative separations.

### Eluents:

In Normal Phase mode typical eluents are hexane / IPA or heptane / IPA mixtures.

Basic samples: To prevent peak tailing of basic compounds please add 0.1 – 0.5 % Diethylamine or Triethylamine.

Acidic samples: To prevent peak tailing of acidic compounds please add 0.1 – 0.5 % TFA or acetic acid.

In Reversed phase mode typical eluents are Acetonitrile / Water mixtures. You can use also MeOH or Ethanol instead of Acetonitrile. The water content must be below 85 %.

For basic compounds please use 0,5 – 1 N Perchlorate or 0.1 % TFA. For acidic compounds please use HClO<sub>4</sub> / NaClO<sub>4</sub> buffers together with ACN

### Sample preparation / Temperature / Pressure / Guard:

Please dissolve the samples in the eluent. The samples should be filtered. For a longer life span a guard column is recommended. Best temperature range: 0-40 C°. Max. pressure is 150 bar.

### Attention:

**Please never use** with coated (not immobilized) chiral phases the following eluents, which may destroy the columns: Ethers, THF, Dioxane, Dichlormethane, Chloroform, Ketones, Ethylacetate, DMSO, Dimethylformamide (DMF), Dimethylacetamide and 50-100 % IPA.

### Comparison of 3 most important chiral columns by Dr. Maisch:

Table 1. Chromatographic properties of the neutral racemates.  
Eluent: Heptane / IPA (90/10), Flow: 1 ml/min, Column dimension: 250 x 4.6 mm

Column	ReproSil Chiral-NR	Reposil Chiral-OM	Reposil Chiral-AM
Benzoin	a = 2,6 k'1 = 2,4 N = 7500	a = 1,5 k'1 = 2,7 N = 6800	a = 1,4 k'1 = 5,5 N = 14000
1,1-Binaphthol	a = n.s. k'1 = 1,2	a = 1,2 k'1 = 3,7 N = 2600	a = 1,3 k'1 = 10,0 N = 6200
Trans-Stilbenoxide	a = 3,3 k'1 = 0,78 N = 8900	a = 2,1 k'1 = 0,81 N = 11000	a = 3,0 k'1 = 0,79 N = 12000
1,1-Binaphthol	a = n.s. k'1 = 1,2	a = 1,2 k'1 = 3,7 N = 2600	a = 1,3 k'1 = 10,0 N = 6200

Table 2. Chromatographic properties of the basic racemates.

Eluent: Heptane / IPA (90/10) + 0,1 DEA, Flow: 1 ml/min, Column dimension: 250 x 4.6 mm

Column	ReproSil Chiral-NR	Reprosil Chiral-OM	Reprosil Chiral-AM
Bupivacine	a = 1,5 k'1 = 5,7 N = 5800	a = 1,15 k'1 = 0,6 N = 4600	
Carbinoxamine	a = 1,2 k'1 = 5.0 N = 400	a = 1,4 k'1 = 0,7 N = 7500	a = 1,4 k'1 = 1,3 N = 10000
Clenbuterol	a = 1,4 k'1 = 2,1 N = 3800	a = no separation k'1 = 0,7	a = no separation k'1 = 1,9
Ketamine	a = 1,1 k'1 = 2.0 N = 6200	a = 1,2 k'1 = 1,1 N = 6500	a = 1,0 k'1 = 1,2
Oxamniquine	a = 1,1 k'1 = 10,6 N = 3100	a = 1,1 k'1 = 3,8 N = 3100	a = 1,2 k'1 = 5,6 N = 10400
Oxprenolol	a = 1,3 k'1 = 2,3 N = 3000	a = 6,3 k'1 = 1,9 N = 3200	a = 1,7 k'1 = 1,1 N = 9000
1-(1-Phenyl)-ethylamine	a = no separation k'1 = 2,2	a = 1,3 k'1 = 1,1 N = 7500	a = no separation k'1 = 0,5
Troeger's base	a = 1,9 k'1 = 1,1 N = 5900	a = 1,3 k'1 = 1,0 N = 6000	a = 1,8 k'1 = 0,8 N = 9000

Table 3. Chromatographic properties of the acidic racemates.

Eluent: Heptane / IPA (90/10) + 0,1 TFA, Flow: 1 ml/min, Column dimension: 250 x 4.6 mm

Column	ReproSil Chiral-NR	Reprosil Chiral-OM	Reprosil Chiral-AM
CBZ-Alanine (210 nm)	a = 1,3 k'1 = 3,2 N = 5700	a = 2,9 k'1 = 2,0 N = 3100	a = 2,1 k'1 = 3,7 N = 9200
Flurbiprofen	a = 1,3 k'1 = 1.0 N = 6900	a = 1,1 k'1 = 0,7 N = 6000	a = 1,7 k'1 = 1,2 N = 11600
Sulindac	a = no separation k'1 = 3,0		a = 1,4 k'1 = 1,9 N = 10200
Proglumide Eluent: Heptane/EtOH (9/1)+ 0,1 TFA	a = 1,6 k'1 = 4,3 N = 5900	a = 2,2 k'1 = 0,7 N = 3800	a = 1,8 k'1 = 2,4 N = 5000

## Rules of thumb for chiral separation

### Reprosil Chiral-NR:

- Sample needs an oxygen at or near the chiral centre + an aromatic ring.
- More predictable.
- Inversion of elution order possible.
- Very high prep. capacity
- Stable in all HPLC-eluents.

### Reprosil Chiral-OM:

- High versatile chiral phase.
- No aromatic ring necessary.
- No inversion of elution order possible
- Scale up possible
- Caution: Not stable in all eluents.

### Reprosil Chiral-AM:

- Highest generality of all chiral phases.
- No aromatic ring necessary.
- No inversion of elution order possible
- Scale up possible
- Caution: Not stable in all eluents.

# PRICES FOR CHIRAL COLUMNS

(Same prices for 4.6 mm, 4.0 mm, 3.0 mm and 2.0 mm id columns)

## Reposil Chiral-NR

Immobilized brush-type phases, Dinitro-compounds.

$\pi$ -electron acceptor /  $\pi$ -electron donor phase. Particularly for aromatic compounds with O or N near chiral-centre.  
Chiral separations in NP and RP-Modus

with: <b>5 <math>\mu</math>m</b> (PN:r15.nr)	250 x 4.6 mm	1525,- Euro
	150 x 4.6 mm	1425,- Euro
	100 x 4.6 mm	1225,- Euro
with: <b>8 <math>\mu</math>m</b> (PN:r18.nr), <b>12 <math>\mu</math>m</b> (PN:r112.nr), <b>15 <math>\mu</math>m</b> (PN:r115.nr)	250 x 4.6 mm	1075,- Euro
	150 x 4.6 mm	925,- Euro
	100 x 4.6 mm	825,- Euro
	250 x 10 mm	2950,- Euro
	250 x 20 mm	6500,- Euro

## Reposil Chiral-NR-R Reversed Elution order compared to Reposil Chiral-NR / Antipode of Chiral-NR

with: <b>8 <math>\mu</math>m</b> (PN:r18.nr), <b>12 <math>\mu</math>m</b> , (PN:r112.nr),	250 x 4.6 mm	1125,- Euro
	150 x 4.6 mm	1025,- Euro
	100 x 4.6 mm	925,- Euro
	250 x 10 mm	3350,- Euro
	250 x 20 mm	7500,- Euro

## Reposil Chiral-OM (USP-L40, Cellulose tris-(3,5-dimethylphenyl-carbamate) mod. Silica)

Reposil Chiral-OM, 3 $\mu$ m / Reposil Chiral-OM-R, 3 $\mu$ m Alternatives to Daicel OD-3 / OD-3R	250 x 4.6 mm: 1450,- Euro,	150 x 4.6 mm: 1075,- Euro,	125 x 4.6 mm: 925,- Euro
	100 x 4.6 mm: 825,- Euro,	50 x 4.6 mm: 725,- Euro,	33 x 4.6 mm: 550,- Euro
Reposil Chiral-OM, 5 $\mu$ m / Reposil Chiral-OM-R, 5 $\mu$ m Alternative to Daicel OD-H / OD-RH	250 x 4.6 mm: 1075,- Euro,	150 x 4.6 mm: 925,- Euro,	100 x 4.6 mm: 825,- Euro
	250 x 10 mm: 2950,- Euro	250 x 20 mm: 6500,- Euro	
Reposil Chiral-OM, 10 $\mu$ m / Reposil Chiral-OM-R, 10 $\mu$ m Alternatives to Daicel OD / OD-R	250 x 4.6 mm: 1075,- Euro,	150 x 4.6 mm: 925,- Euro,	100 x 4.6 mm: 825,- Euro
	250 x 10 mm: 2550,- Euro	250 x 20 mm: 5500,- Euro	
Reposil Chiral-OM, 20 $\mu$ m / Reposil Chiral-OM-R, 20 $\mu$ m Alternative to Daicel OD / OD-R	250 x 4.6 mm: 1075,- Euro,	150 x 4.6 mm: 925,- Euro,	100 x 4.6 mm: 825,- Euro
	250 x 10 mm: 2350,- Euro,	250 x 20 mm: 4500,- Euro	

## Reposil Chiral-AM (USP-L51, Amylose tris-3,5-dimethylphenylcarbamate mod. Silica)

Reposil Chiral-AM, 3 $\mu$ m / Reposil Chiral-AM-R, 3 $\mu$ m Alternative to Daicel AD-3 / AD-3R	250 x 4.6 mm: 1450,- Euro,	150 x 4.6 mm: 1075,- Euro,	125 x 4.6 mm: 925,- Euro
	100 x 4.6 mm: 825,- Euro,	50 x 4.6 mm: 725,- Euro,	33 x 4.6 mm: 550,- Euro
Reposil Chiral-AM, 5 $\mu$ m / Reposil Chiral-AM-R, 5 $\mu$ m Alternatives to Daicel AD-H / AD-RH	250 x 4.6 mm: 1075,- Euro,	150 x 4.6 mm: 925,- Euro,	100 x 4.6 mm: 825,- Euro
	250 x 10 mm: 2950,- Euro,	250 x 20 mm: 6500,- Euro	
Reposil Chiral-AM, 10 $\mu$ m / Reposil Chiral-AM-R, 10 $\mu$ m Alternatives to Daicel AD / AD-R	250 x 4.6 mm: 1075,- Euro,	150 x 4.6 mm: 925,- Euro,	100 x 4.6 mm: 725,- Euro
	250 x 10 mm: 2550,- Euro,	250 x 20 mm: 6000,- Euro	
Reposil Chiral-AM, 20 $\mu$ m / Reposil Chiral-AM-R, 20 $\mu$ m Alternatives to Daicel AD / AD-R	250 x 4.6 mm: 1075,- Euro,	150 x 4.6 mm: 925,- Euro,	100 x 4.6 mm: 725,- Euro
	250 x 10 mm: 2350,- Euro,	250 x 20 mm: 4500,- Euro	

<b>Reprosil Chiral-AMS</b>		<b>(Amylose tris-(S)-<math>\alpha</math>-Methylbenzyl-Carbamate mod. Silica)</b>	
Reprosil Chiral-AMS, 3 $\mu$ m / Reprosil Chiral-AMS-R, 3 $\mu$ m	Alternatives to Daicel AS-3 / AS-3R	250 x 4.6 mm: 1450,- Euro, 150 x 4.6 mm: 1075,- Euro, 125 x 4.6 mm: 925,- Euro	100 x 4.6 mm: 825,- Euro, 50 x 4.6 mm: 725,- Euro, 33 x 4.6 mm: 550,- Euro
Reprosil Chiral-AMS, 5 $\mu$ m / Reprosil Chiral-AMS-R, 5 $\mu$ m	Alternatives to Daicel AS-H / AS-RH	250 x 4.6 mm: 1075,- Euro, 150 x 4.6 mm: 925,- Euro, 100 x 4.6 mm: 825,- Euro	250 x 10 mm: 2950,- Euro
Reprosil Chiral-AMS, 10 $\mu$ m / Reprosil Chiral-AMS-R, 10 $\mu$ m	Alternatives to Daicel AS / AS-R	250 x 4.6 mm: 1075,- Euro, 150 x 4.6 mm: 925,- Euro, 100 x 4.6 mm: 825,- Euro	250 x 10 mm: 2950,- Euro
<b>Reprosil Chiral-CM</b>		<b>USP-L70 (Tris-(Phenylcarbamate)-Cellulose mod. Silica)</b>	
Reprosil Chiral-CM, 3 $\mu$ m,	(Alternative to Daicel OC-3)	(PN:r63.cm)	250 x 4.6 mm: 1475,- Euro, 150 x 4.6 mm: 1075,- Euro, 100 x 4.6 mm: 825,- Euro
Reprosil Chiral-CM, 5 $\mu$ m,	Alternative to Daicel OC-H	(PN:r65.cm)	250 x 4.6 mm: 1075,- Euro, 150 x 4.6 mm: 925,- Euro, 100 x 4.6 mm: 825,- Euro
Reprosil Chiral-CM, 10 $\mu$ m,	(Alternative to Daicel OC)	(PN:r60.cm)	250 x 4.6 mm: 1075,- Euro, 150 x 4.6 mm: 925,- Euro, 100 x 4.6 mm: 825,-Euro
250 x 10 mm: 2950,- Euro			
<b>Reprosil Chiral-JM</b>		<b>USP-L80 (Tris-(4-Methylbenzoyl)-Cellulose mod. Silica)</b>	
Reprosil Chiral-JM, 3 $\mu$ m, (or Reprosil Chiral-JM-R)	Alternative to Daicel OJ-3 / OJ-3R	(PN:r63.jm)	250 x 4.6 mm: 1450,- Euro, 150 x 4.6 mm: 1075,- Euro, 100 x 4.6 mm: 925,- Euro
Reprosil Chiral-JM, 5 $\mu$ m, (or Reprosil Chiral-JM-R)	Alternative to Daicel OJ-H / OJ-HR	(PN:r65.jm)	250 x 4.6 mm: 1075,- Euro, 150 x 4.6 mm: 925,- Euro, 100 x 4.6 mm: 825,- Euro
Reprosil Chiral-JM, 10 $\mu$ m, (or Reprosil Chiral-JM-R)	Alternative to Daicel OJ / OJR	(PN:r60.jm)	250 x 4.6 mm: 1075,- Euro, 150 x 4.6 mm: 925,- Euro, 100 x 4.6 mm: 825,- Euro
250 x 10 mm: 2950,- Euro			
<b>Reprosil Chiral-ZM</b>		<b>(Cellulose tris-3-Chloro-4-Methylphenylcarbamate mod. Silica)</b>	
Reprosil Chiral-ZM, 3 $\mu$ m, (or Reprosil Chiral-ZM-R)	Alternative to Daicel OZ-3 / OZ-3H	(PN:r63.zm)	250 x 4.6 mm: 1450,- Euro, 150 x 4.6 mm: 1075,- Euro, 125 x 4.6 mm: 925,- Euro
Reprosil Chiral-ZM, 5 $\mu$ m, (or Reprosil Chiral-ZM-R)	Alternative to Daicel OZ-H	(PN:r65.zm)	100 x 4.6 mm: 825,- Euro, 50 x 4.6 mm: 725,- Euro, 33 x 4.6 mm: 550,- Euro
250 x 4.6 mm: 1075,- Euro, 150 x 4.6 mm: 925,- Euro, 100 x 4.6 mm: 725,- Euro			250 x 10 mm: 2950,- Euro, 250 x 20 mm: 6500,- Euro
<b>Reprosil Chiral-ZA</b>		<b>(Amylose tris-3-Chloro-4-Methylphenylcarbamate mod. Silica)</b>	
Reprosil Chiral-ZA, 3 $\mu$ m, (or Reprosil Chiral-ZA-R)	Alternative to Daicel AZ-3 / AZ-3R	(PN:r63.za)	250 x 4.6 mm: 1450,- Euro, 150 x 4.6 mm: 1075,- Euro, 125 x 4.6 mm: 925,- Euro
Reprosil Chiral-ZA, 5 $\mu$ m, (or Reprosil Chiral-ZA-R)	Alternative to Daicel AZ-H /AZ-HR	(PN:r65.za)	100 x 4.6 mm: 825,- Euro, 50 x 4.6 mm: 725,- Euro, 33 x 4.6 mm: 550,- Euro
250 x 4.6 mm: 1075,- Euro, 150 x 4.6 mm: 925,- Euro, 100 x 4.6 mm: 725,- Euro			250 x 10 mm: 2950,- Euro, 250 x 20 mm: 6500,- Euro
<b>Reprosil Chiral-YM</b>		<b>(Amylose tris-5-Chloro-2-Methylphenylcarbamate mod. Silica)</b>	
Reprosil Chiral-YM, 3 $\mu$ m, (or Reprosil Chiral-YM-R)	Alternatives to Daicel AY-3 / AY-3R	(PN:r63.ym)	250 x 4.6 mm: 1450,- Euro, 150 x 4.6 mm: 1075,- Euro, 125 x 4.6 mm: 925,- Euro
100 x 4.6 mm: 825,- Euro, 50 x 4.6 mm: 725,- Euro, 33 x 4.6 mm: 550,- Euro			

# REPROSIL-CHIRAL

## Reprosil Chiral-BM (Tris-(Benzoyl)-Cellulose mod. Silica)

Reprosil Chiral-BM, 5 µm / Reprosil Chiral-BM-R Alternatives to Daicel OB-H / OB-RH  
 250 x 4.6 mm: 1075,- Euro, 150 x 4.6 mm: 925,- Euro, 100 x 4.6 mm: 825,- Euro  
 250 x 10 mm: 2950,- Euro

Reprosil Chiral-BM, 10 µm / Reprosil Chiral-BM-R Alternatives to Daicel OB / OB-R  
 250 x 4.6 mm: 1075,- Euro, 150 x 4.6 mm: 925,- Euro, 100 x 4.6 mm: 825,- Euro  
 250 x 10 mm: 2950,- Euro

## Other Chiral Phases

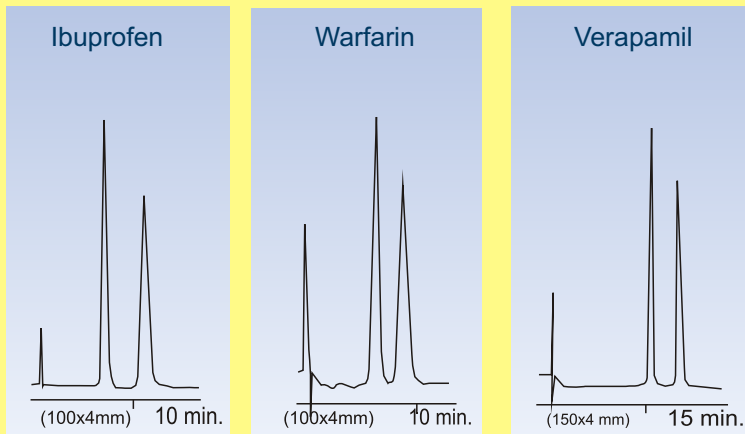
Reprosil Chiral-PS, 8 µm, Chiral separations in NP and RP-Modus (for aromatic compounds with S or P, for example: Sulfoxides, Phosphine Oxides, Phosphonates, Thiophosphine Oxides, Phosphine Selenides, Phosphine Boranes) (PN:r18.ps)	250 x 4.0 mm	1075,- Euro
Reprosil Chiral-OH, 8 µm, Chiral separations in NP-Modus (Aromatic Alcohols with OH near chiral centre, Aryl Carbinols) (PN:r18.oh)	250 x 4.0 mm	1075,- Euro
Reprosil Chiral-AA, 8 µm, Chiral separations in NP and RP-Modus (for all amino acids, L-form elutes first) (PN:r18.aa)	250 x 4.0 mm	1075,- Euro
Reprosil Chiral-TAG, 8 µm Chiral separations in NP and RP-Modus (Teicoplanin Aglycon: for Aminoalkohols, N-blocked amino acids, α-Hydroxy Acids, Oxazolidinons, Hydantoins, Imides, Amino Acids) USP-L63 (PN:r18.tag)	250 x 4.0 mm	1525,- Euro
Reprosil Chiral-Beta-CD, 5 µm USP-L45 (Dansyl-Aminoacids, Barbiturates, Propranolol Sulfonamide, Prostaglandines) (r15.bcd.s2504) (PN:r15.bcd.s2504)	250 x 4 mm	625,- Euro
Reprosil Chiral-Gamma-CD, 5 µm (PN:r15.gcd.s2504)	250 x 4 mm	625,- Euro
Reprosil Chiral-D-PhenylGlycin, 5µm USP-L36, N-(3,5-Dinitrobenzoyl)-D-Phenylglycin. (Herbicides + Pharmaca (Alcohols, Carbon. acids , Esters, Sulfoxides) Fenoprop-Methyl, Mecoprop-Methyl, Supidimid) (PN:r15.DPG.s2504)	250 x 4 mm: 250 x 10 mm: 250 x 20 mm:	625,- Euro 1750,- Euro 4950,- Euro
Reprosil Chiral-L-PhenylGlycin, 5µm USP-L36, N-(3,5-Dinitrobenzoyl)-L-Phenylglycin. Antipode to D-PhenylGlycin (Herbicides + Pharmaca (Alkohols, Carbon. Acids , Esters, Sulfoxides) Fenoprop-Methyl, Mecoprop-Methyl, Supidimid) (PN:r15.LPG.s2504)	250 x 4 mm	625,- Euro
Reprosil Chiral-L-Leucin, 5 µm N-(3,5-Dinitrobenzoyl)-L-Leucin, (PN:r15.LL.s2546)	250 x 4.6 mm	625,- Euro
Reprosil Chiral-L-Prolin, 5 µm Davankov-Ligand exchange, Aminoacids, Hydantoine, Succinimide, Gluthetimide, Barbiturate, Sulfoxide (PN:r15.pr.s2504)	250 x 4 mm	625,- Euro

Reprosil L-Hydroxy-Prolin, 5 µm Alternative to Nucleosil Chiral-1, USP-L32  
 Ligand exchange, Eluent: 2-10 mM Coppersulfate , 20-60 C°  
 (For DL-Atrolactinacid, DL-Mandelic acids, DL-Lactic acid,  
 DL-Asparagin, DL-Serin, DL-Phenylalanin, DL-Threonin,  
 DL-Prolin, DL-Histidin, DL-Valin, DL-Tyrosin, DL-Tryptophan),  
 (PN:r15.hp.s2504) 250 x 4mm 625,- Euro

**Reprosil Chiral-AGP, 5 µm (300 A° Silicagel with chiral AGP-Protein, USP-L41 )**

100 x 4 mm (PN: r35.agp.s1004)	1190,- Euro,	100 x 3 mm (PN: r35.agp.s1003)	1090,- Euro
150 x 3 mm (PN: r35.agp.s1503)	1470,- Euro,	50 x 3 mm (PN: r35.agp.s0503)	840,- Euro
Guards: 5 x 3 mm: 2 pieces (PN:r35.agp.v0003)			100,- Euro
Guard-holder, direct (PN:81.00)			60,- Euro
150 x 2 mm (PN:r35.agp.s1502)	1620,- Euro,	100 x 2 mm (PN:r35.agp.s1002)	1210,- Euro
50 x 2 mm (PN:r35.agp.s0502)	930,- Euro		
Guards: 5 x 2 mm: 2 pieces (PN:r35.agp.v0002)			100,- Euro
Guard-holder, direct (PN:91.00)			80,- Euro

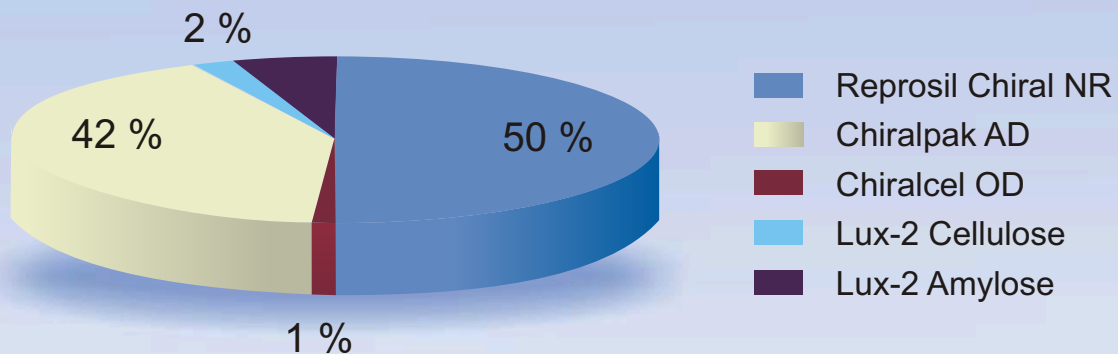
**Chiral separation of Ibuprofen, Warfarin and Verapamil**



**Reprosil Chiral-AGP, 5 µm**

Eluents:  
**Ibuprofen**  
 100 mM Na-phosphate buffer, pH7  
**Warfarin**  
 10% -Propanol in 10 mM Na-phosphate buffer, pH7  
**Verapamil**  
 12% ACN in 10 mM Na-phosphate buffer, pH7

**CHIRAL PREPARATIVE SEPARATIONS WITH HPLC  
 BY HOFFMANN-LA ROCHE, BASEL IN 2014.**



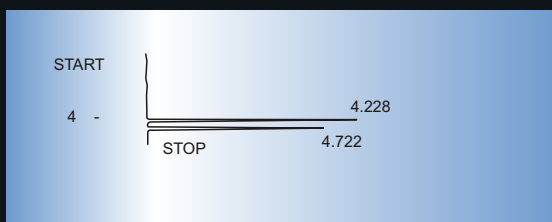
## Comparison of chiral phases:

Column dimensions: 250 x 4.6 mm, Flow: 1 ml / min, Temperature: ambient, Eluent: n-Heptane / Isopropanol (85/15),  
Sample: Trans-Stilbene-Oxide

### Reprosil Chiral-AMS, 5 µm

Alfa-value: 1.35

Typ. N/m: 70 – 80 000



### Reprosil Chiral-ZA, 5 µm

Alfa-value: 1.5

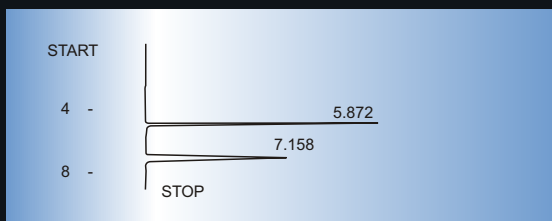
Typ. N/m: 70 - 80 000



### Reprosil Chiral-OM, 5 µm

Alfa-value: 2.0

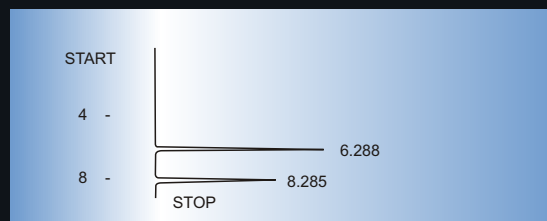
Typ. N/m: 60 -80 000



### Reprosil Chiral-JM, 5 µm

Alfa-value: 1.6

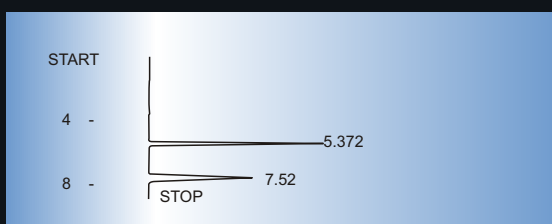
Typ. N/m: 70 -80 000



### Reprosil Chiral-YM, 5 µm

Alfa-value: 1.8

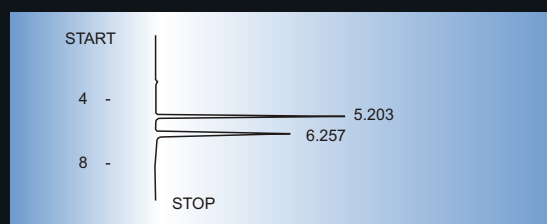
Typ. N/m: 40 - 55 000



### Reprosil Chiral-CM, 5 µm

Alfa-value: 1.4

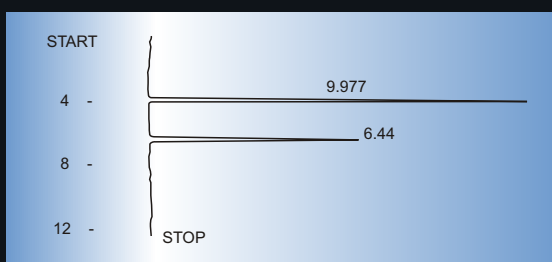
Typ. N/m: 40 – 55 000



### Reprosil Chiral-ZM, 5 µm

Alfa-value: 3.0

Typ. N/m: 50 - 70 000



### Reprosil Chiral-NR, 8 µm

Alfa-value: 3.3

Typ. N/m: 25 - 35 000

