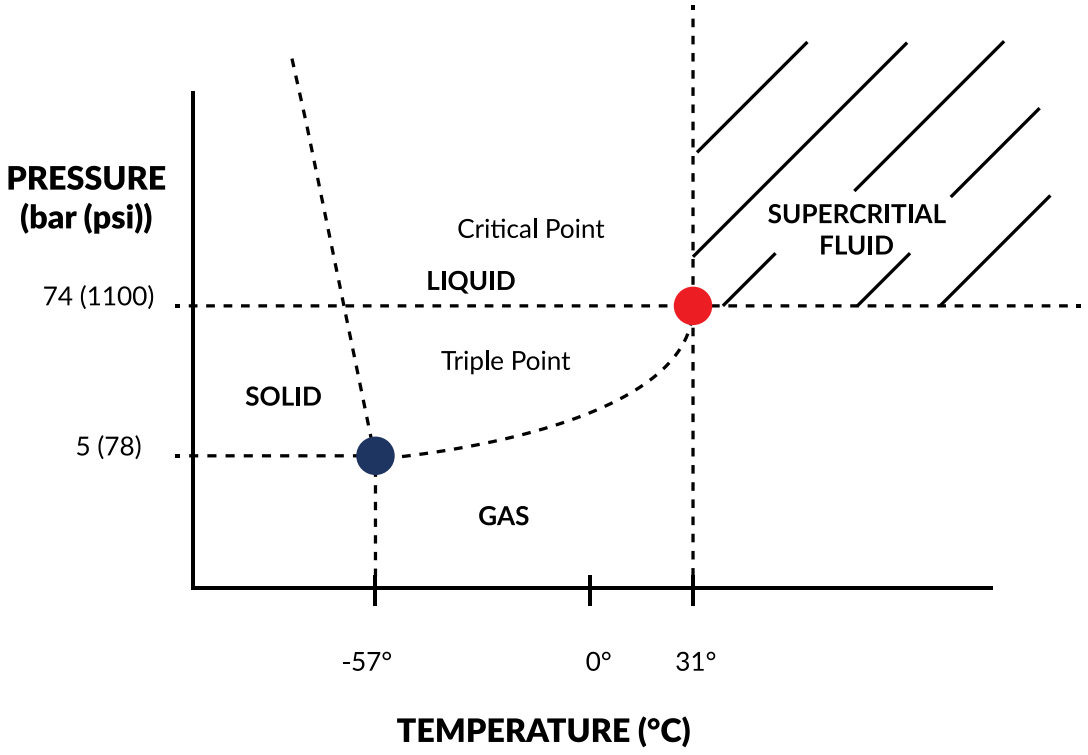
Dr. Maisch

Any Column, Any Size, Any Media



ANALYTICAL & PREP SFC COLUMNS

for achiral, chiral and SEC-applications

MADE BY DR. MAISCH

CONTENT

SFC COLUMNS MADE BY DR. MAISCH

From one of the biggest **H**igh-**P**erformance **L**iquid **C**hromatography (HPLC) column manufacturers in Europe.

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SFC is a chromatographic technique using supercritical carbon dioxide (CO_2) as the mobile phase. Supercritical CO_2 can be mixed with alcohols (despite its low polarity).

The concept of the SFC analytical method development process is basically the same as for analytical conditions in HPLC. SFC can be used to analyze any compound that is compatible with supercritical carbon dioxide and can be dissolved in an organic solvent.

The following resolution equation is also valid for SFC:

$$R_s = \frac{1}{4}\sqrt{N} \times \frac{\alpha-1}{\alpha} \times \frac{k}{1+k}$$

Efficiency · Selectivity · Retention

The selectivity α, capacity factor k, and efficiency N values affect Rs and are all independent factors depending on:

- column
- mobile phase

Separation can be improved by increasing N and α if a minimum of retention exists.

RESOLUTION Optimizing efficiency N

The particle size of a SFC column packing media affects the efficiency N (theoretical plates) of a column. Smaller particle size improves efficiency of a separation.

There is a broad range of particles sizes available for the different product lines that Dr. Maisch offers. In Fig. 1 you can find some of the standard SFC phases.

Increasing efficiency and back pressure

	Material code					
Media	1.7 µm	1.8 µm	2 µm	2.5 µm	3 µm	5 µm
Reprospher 100 Si	rs117.00	rs118.00	rs12.00	rs125.00	rs13.00	rs15.00
Reprospher 100 NH2 not endc					rs13.a0	rs15.a0
Reprospher 100 NH2-DE		rs118.ade	rs12.ade			rs15.ade
Reprospher 100 CN		rs118.c0	rs12.c0	rs125.c0	rs13.c0	rs15.c0
Reprospher 100 CN-DE	rs117.cde	rs118.cde				rs15.cde
Reprospher 100 Diol-DE						rs15.dde
Reprospher 100 Diol					rs13.d0	rs15.d0

Fig. 1 Effect of particle size, efficiency and back pressure for some of the standard modifications of the Reprospher product line.

The limiting factor of the particle size is the back pressure of the SFC system. Scale-up in SFC applications is more complex compared to HPLC conditions due to the compressibility of CO_2 causing density, pressure and temperature variations.

These variations have an impact on mobile phase (retention, selectivity). This makes it more difficult to scale-up from analytical to preparative methods. Most SFC stationary phases are not endcapped. Higher silica surface increases retention. On the other side such non-end-capped columns show a shorter life time.

Another approach to achieve higher efficiencies is to change the design of the silica particle from fully-porous to core shell particles. Core-shell particles exhibit very high efficiency relative to fully porous particles of equivalent diameter. In Fig. 2 you will find some examples of core-shell particles offered by Dr. Maisch.

	Material code	
Media	2.7 µm	5 µm
ReproShell ODS-1	cs27.91	cs15.91
ReproShell ODS-3	cs27.93	cs15.93
ReproShell SI	cs27.00	cs15.00
ReproShell PFP	cs27.pfp	cs15.pfp
ReproShell Phenyl-Hexyl	cs27.ph	cs15.ph
ReproShell C8	cs27.8e	cs15.8e
ReproShell Biphenyl	cs27.bpe	cs15.bpe

Fig. 2 Reproshell product line.

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CO_2 is not polar enough for the elution of polar compounds. The addition of a polar organic co-solvent (modifier) is necessary to allow elution and to have reasonable run times. Supercritical CO_2 is completely miscible with all commonly used organic solvents.

When mixed with an organic modifier, the critical point of CO_2 is changing, bringing the mobile phase in a state that is not necessarily supercritical anymore.

Increasing the modifier proportion in the mobile phase:

- Increases the eluotropic strength

and

- decreases the retention times

The modifier can also be adsorbed at the surface of the stationary phase, leading to a modification of this surface.

The choice of the modifier depends on:

- Eluent strength
- Selectivity
- Efficiency
- Peak shapes achieved in initial test runs

Bad peak shapes can be minimized by the addition of an organic modifier with H-bond donor capacity (MeOH, EtOH, IPA).

List of potential modifier:

- **Alcohols** - MeOH is by far the most used alcohol in SFC because separations

show higher efficiencies and shorter analysis times compared to EtOH and IPA.

- Highest eluotropic strength
- Efficiency: MeOH > EtOH > IPA
- High polarity favors solubility of compounds in the mobile phase
- MS-detection is more sensitive

  (lower surface tension of MeOH gives better ionization compared to other alcohols)

RESOLUTION - OPTIMIZING MOBILE PHASE

- **Acetonitrile**
  - Unique and different selectivity
  - Aprotic solvent
  - Poor chromatographic performance (very low efficiency, bad peak shapes)

- **Mix of Methanol and Acetonitrile**
  - Improves selectivity without altering peak shape

- **Acidic additives** (Formic acid, acetic acid, trifluoroacetic acid (TFA), citric acid)
  - Improves the peak shapes of strong acids

- **Basic additives** (Isopropylamine, diethylamine, ethyldimethylamine or triethylamine)
  - Improves the peak shape of strong bases

For acidic and basic compounds in the sample, it is possible to mix an acidic and a basic additive within the modifier.

- **MS-work**
  - Volatile additives (ammonium hydroxide, ammonium acetate or ammonium formate) improve the peak shape of acidic and basic compounds. These are compatible with MS detection and easier to evaporate in the preparative scale.
  - Water is not fully soluble in CO_2 but it can be mixed in a reasonable proportion (1–5%) to a CO_2–MeOH mobile phase, in addition or replacement of traditional additives to improve peak shape.

Most of the additives generate absorption in UV detection which results in a baseline drift on a gradient method. Therefore exists a high interest in column phases giving symmetrical peaks without the addition of additives in the mobile phase.

In the Reversed-phase HPLC world a C18 modified silica-column would typically be the starting point for the LC method development process. In achiral SFC it is theoretically also possible to use C18 columns but in reality the success rate is very low.

Various Achiral columns used for HPLC can also be used for SFC but often completely different silica modifications show superior separations.

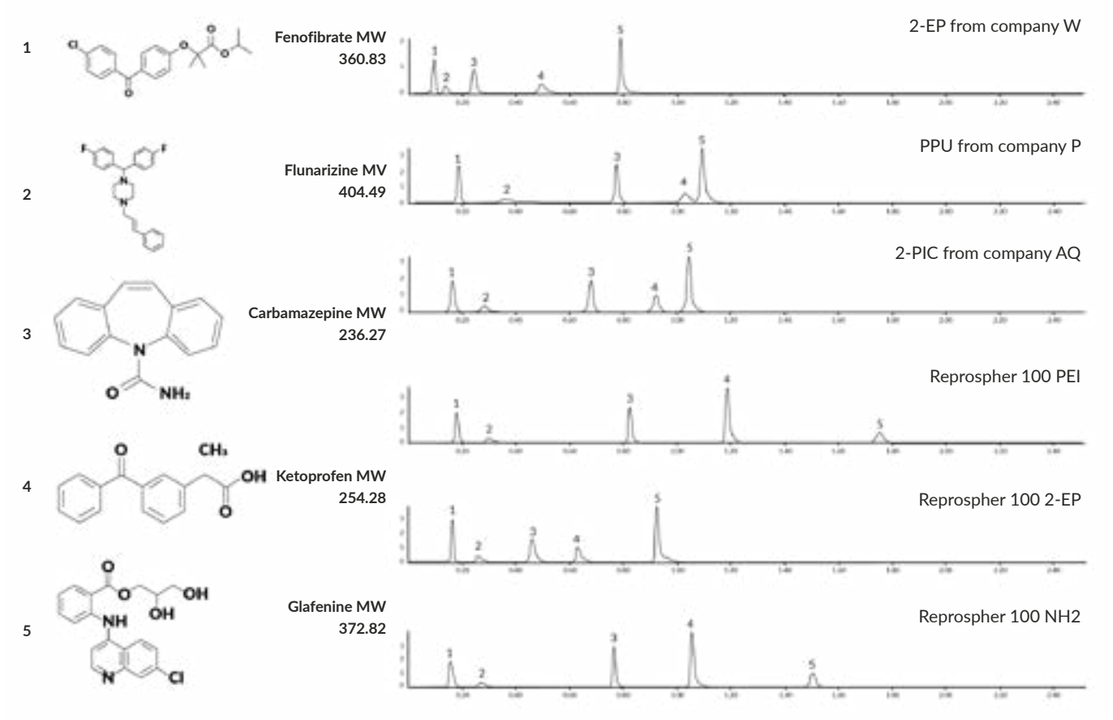


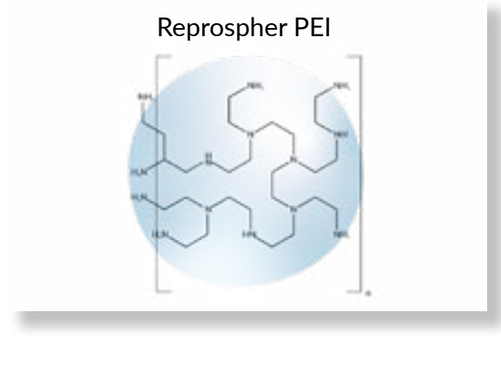
Fig. 3 Testmix of 5 compounds on 6 differents SFC column chemistries. Application courtesy of John Reilly, Norvartis Institut of Biomedical Research NiBr AG Basel, 4002 Basel, Switzerland.

Column:	50 mm x 3 mm SFC analytical
Mobile phase:	Line A: CO2 Line B: Pure MeOH or MeOH (+0.1& basic modifier)
Temperature:	35° C

SFC COLUMNS (ACHIRAL)

Several LC phases from Dr. Maisch also show excellent performance in SFC-mode. The most successful phase is the PEI-phase:

POLYETHYLENIMINE (PEI)



Polyethyleneimine (PEI) phase exhibits a higher density of amino groups compared to traditional Amino phases (factor 3). The polymer skeleton includes primary, secondary and tertiary amine groups.

Product	Modification	Pore Size	3 µm	5 µm	10 µm	30 µm	50 µm
Reprospher 100 PEI	Polyethyleneimine	100 A	rs13.pei	rs15.pei	rs10.pei	rs130.pei	rs150.pei
Reprospher 300 PEI	Polyethyleneimine	300 A	rs33.pei	rs35.pei	rs30.pei		

Fig. 4 Available PEI-modified Reprospher media

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Superior performance of PEI as SFC-phase.

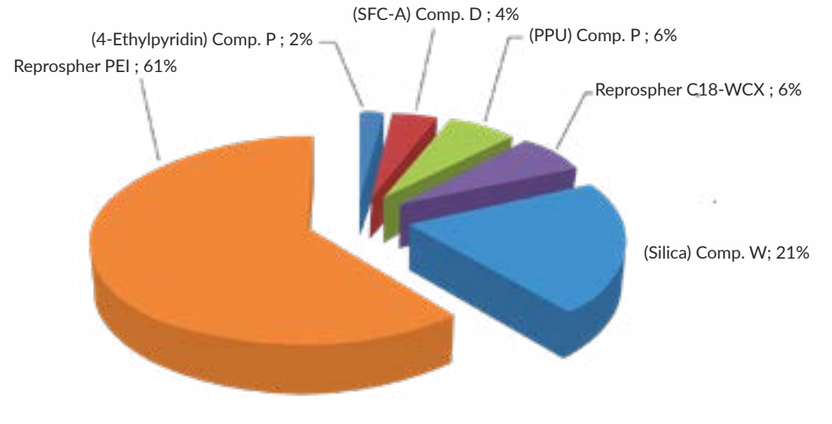
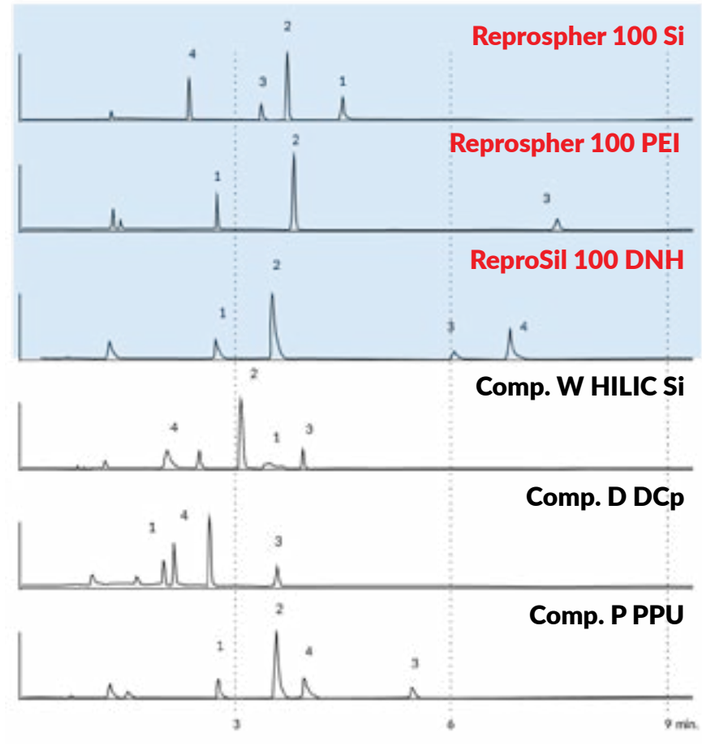


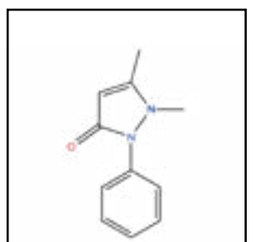
Fig. 5 Superior performance of PEI as SFC phase

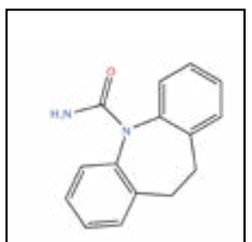
Published by: Thomas Wolf, Alexander Marzlale, Eric Francotte and Trixie Wagner
Achiral SFC-MS Lab: Support of Global Discovery Chemistry Basel 2016

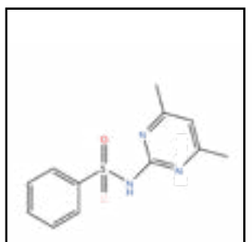
SFC COLUMNS (ACHIRAL)

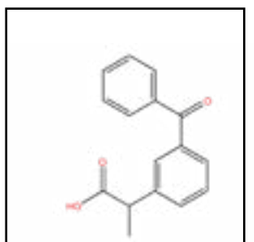


Published by: Eric Francotte (Novartis)
8th International Conference on packed column SFC, Oct 2014, Basel.


1. Antipyrine


2. Carbamazepine


3. Sulfamethazine


4. Ketoprofen

Mobile Phase: CO_2 + MeOH (5-50% in 6 min)
Flowrate: 1.0 ml/min
Detector: UV at 254 nm
Dimension: 250 x 4.6 mm

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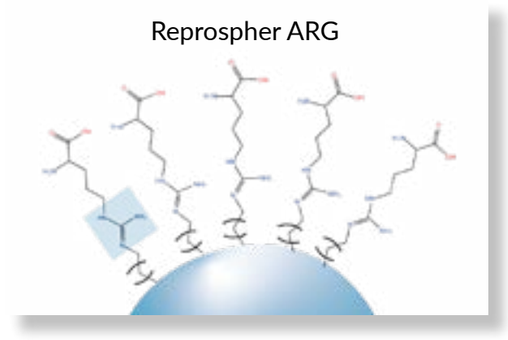
ARG - HILIC



Product	Modification	3 µm	5 µm
Reprospher HILIC-ARG	ARGININE	rs13.ARG	rs15.ARG

Fig. 6 Available HILIC-ARG modified Reprospher media

ARG-HILIC is a silica phase surface modified with arginine and exhibits acidic and basic functionality. The ARG phase has a strong affinity to hydrophilic compounds and offers a very special selectivity compared to other SFC phases.

SFC COLUMNS (ACHIRAL)

REPROSIL CBD

Speciality phase for cannabinoids: CBD purification.

Perfect resolution for Cannabidiol (CBD) and Canabigerol (CBG) isolation from other cannabinoids.

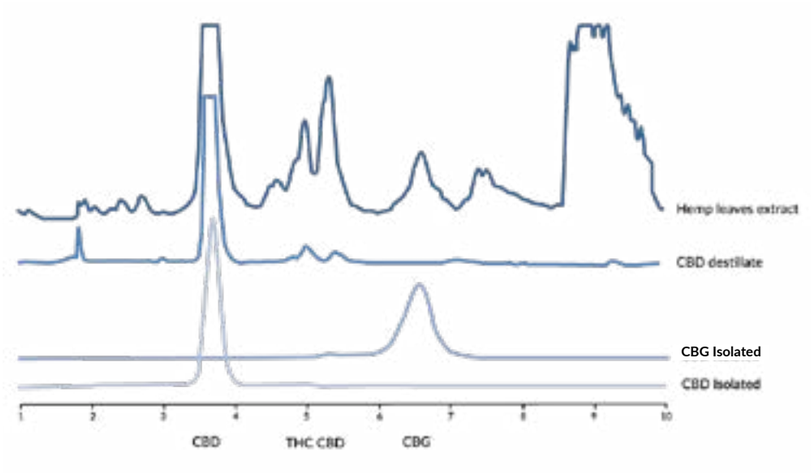
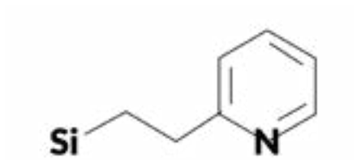


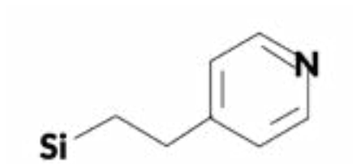
Fig. 7 Different Hemp samples and isolated compounds

ReproSil CBD, 250 x 4.6 mm, 4% methanol, 150 bar BPR, UV 220 nm

ETHYLPYRIDINE



Reprosil 2-Ethylpyridine (2-EP)



Reprosil 4-Ethylpyridine (4-EP)

Product	Modification	3 µm	5 µm	10 µm
Reprospher 100 2-EP	2-Ethylpyridine	rs13.2ep	rs15.2ep	rs10.2ep
Reprospher 100 4-EP	4-Ethylpyridine		rs15.4ep	rs10.4ep

Fig. 8 Available Ethylpyridine modified Reprospher media

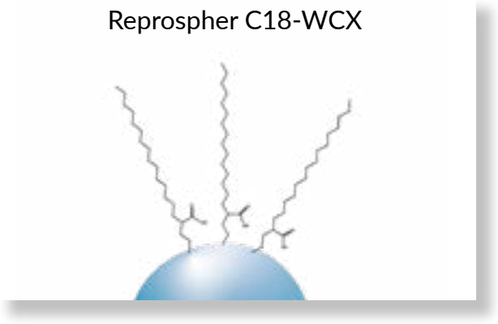
Ethylpyridine (EP) modified silica has been the gold standard for achiral SFC analysis of basic compounds for a long time because these phases generally do not require an addition of amines to the eluent, still giving excellent peak shape and reproducibility.

The pyridine group minimizes interactions with silanol groups by steric shielding. EP-phases are also useful phase for the separation of neutral and acidic polar compounds.

4-EP phase offers alternative selectivity to the 2-EP phase.

C18-WCX

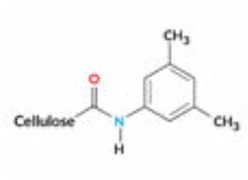
Reprospher C18-WCX



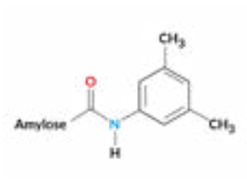
Product	Modification	3 µm	5 µm	10 µm
Reprospher 100 C18/WCX	C18+carboxylic acids	rs13.9ac	rs15.9ac	rs10.9ac

Fig. 9 Available C18/WCX-modified silica

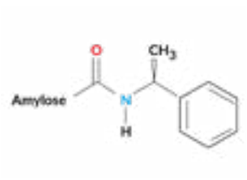
This mixed mode phase combines a carboxylic group directly connected to a hydrophobic C18 chain. This media is non-endcapped and allows multiple interactions which result in special selectivity.



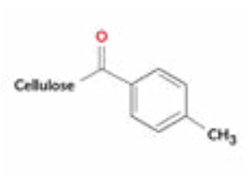
ReproSil Chiral-OM
(ChiralcelOD, Lux Cellulose-1)



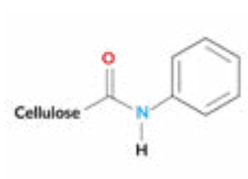
ReproSil Chiral-AM
(Chiralpak AD, Lux Amylose-1)



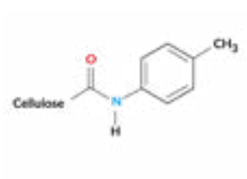
ReproSil Chiral-AMS
(Chiralpak AS)



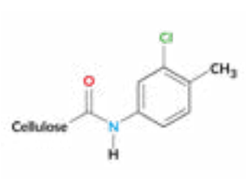
ReproSil Chiral-JM
(Chiralcel OJ, Lux Cellulose-3)



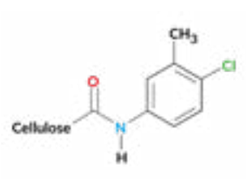
ReproSil Chiral-CM
(Chiralcel OC)



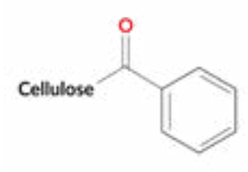
ReproSil Chiral-GM
(Chiralcel OG)



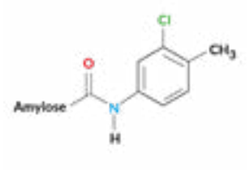
ReproSil Chiral-ZM
(Chiralcel OZ, Lux Cellulose-2)



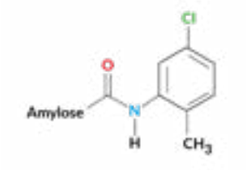
ReproSil Chiral-XM
(Chiralcel OX, Lux Cellulose-4)



ReproSil Chiral-BM
(Chiralcel OB)



ReproSil Chiral-ZA
(Chiralpak AZ)



ReproSil Chiral-YM
(Chiralpak AY, Lux Amylose-2)

Reprosil Chiral OM, CM, JM, ZM, BM, AM, AMS, ZA and YM chiral stationary phase are prepared by coating the silica with a polysaccharide derivative. Therefore, any solvent that can dissolve the polysaccharide derivative, such as those mentioned below, must be avoided even in trace amounts.

- Ethers incl. THF, Acetone, Chlorinated solvents, Ethyl acetate, DMSO, DMF, N-methyl formamide, Toluene, Ketones, Dimethylacetamid
- IPA > 50%

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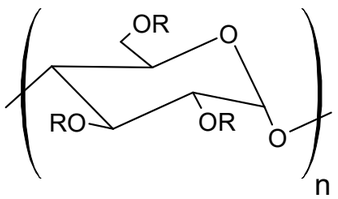
The Dr. Maisch polysaccharide phases are excellent alternatives to existing Daicel phases which was confirmed by many happy Dr. Maisch clients globally and mentioned in several publications in the scientific world. One example:

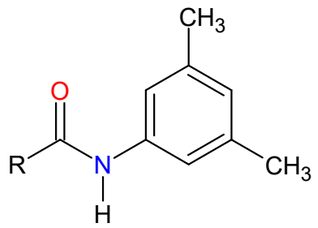
EVALUATION OF REPROSIL CHIRAL OM VS. OD

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

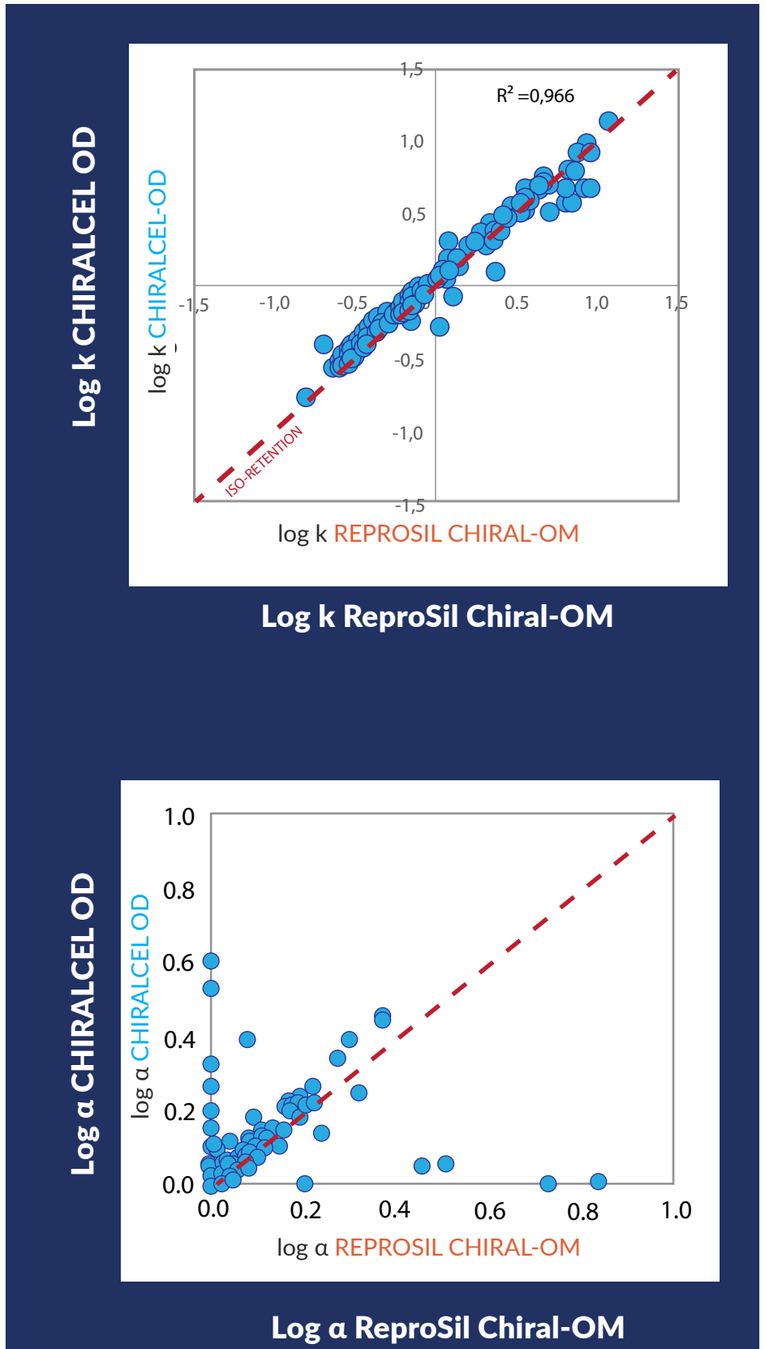
All experiments were performed on a Jasco SFC system and an Acquity UPC² system. ReproSil Chiral-OM is based on silica coated with tris-(3,5-dimethylphenylcarbamate) of cellulose. Two hundred and thirty achiral compounds and one hundred and thirty chiral racemic compounds were screened on different polysaccharide-type chiral stationary phases in SFC in the following operating conditions: CO_2/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 π-π interactions, hydrogen bonding and stereo-induced interactions.



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

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

The α-α plot below compares the logarithm of separation factors measured for 130 racemates on ReproSil 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 ReproSil Chiral-OM against 86% on Chiralcel OD. However, some racemates are well separated on ReproSil Chiral-OM with little or no separation on Chiralcel OD.

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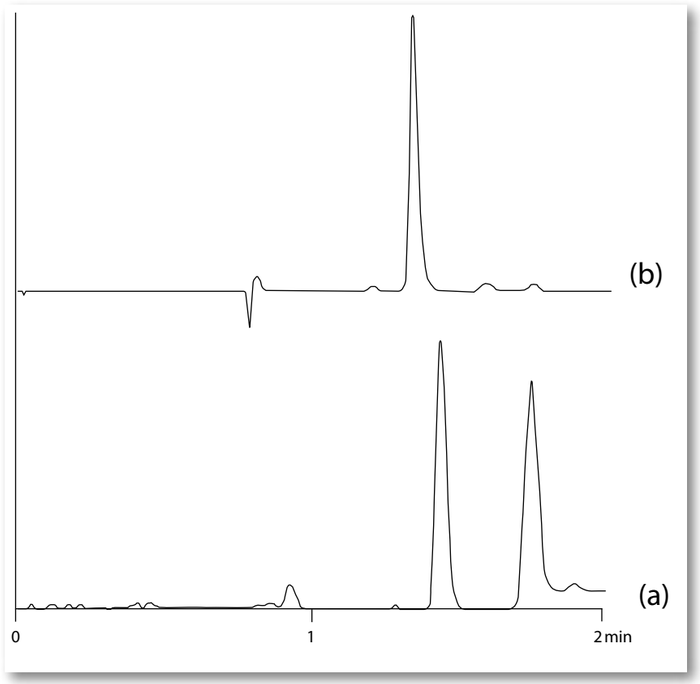
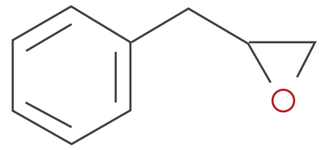
The following chromatograms illustrate the complementary of the generic phases having cellulose tris-(3,5- dimethylphenyl-carbamate) as chiral selector in the course of method development: Focus on ReproSil Chiral-OM versus Chiralcel OD The chromatograms illustrate the chiral compounds that are well resolved on ReproSil Chiral-OM (a) but have no separation on Chiralcel OD (b).

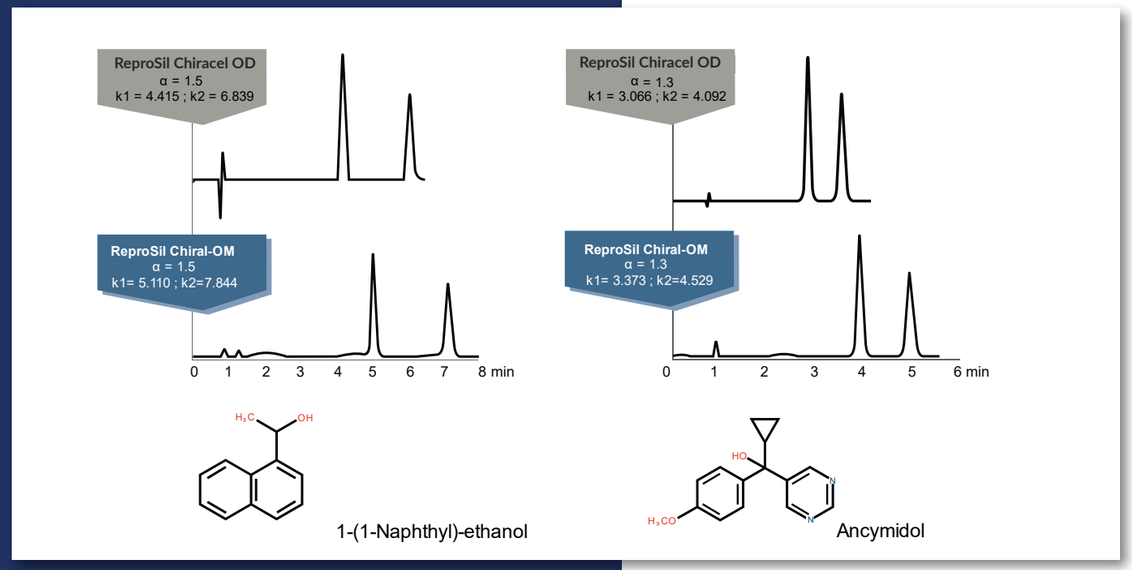


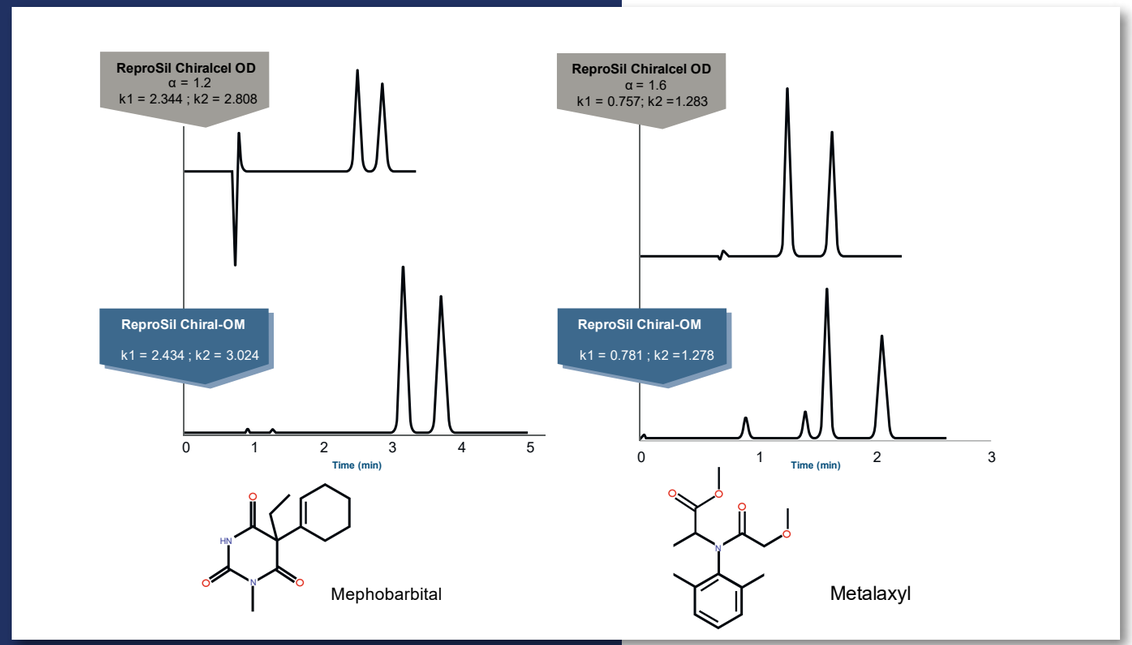


(2,3-epoxypropyl)-benzene

SFC COLUMNS (CHIRAL)

COMPARISON OF REPROSIL CHIRAL OM AND CHIRALCEL OD





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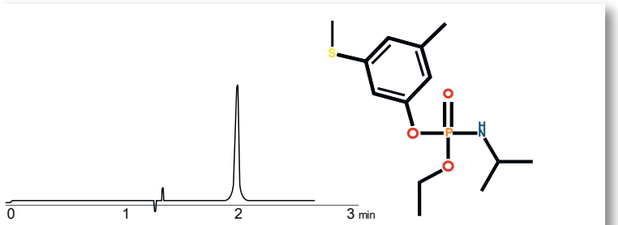
SFC COLUMNS (CHIRAL)

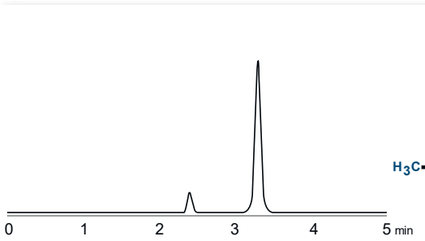
The analysis of fenamiphos, gluthetimide and 5-methyl-5-phenylhydantoin on ReproSil Chiral-OM provide a better starting point for a method development than those on RegisCell, Lux Cellulose-1 or Cellucoat, respectively.

NO SEPARATION

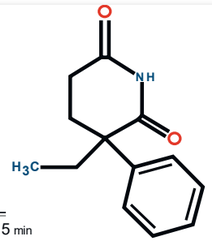


RegisCell

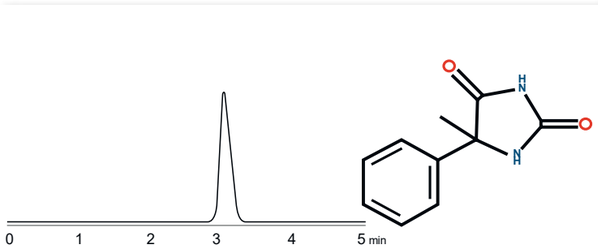
Fenamiphos



Lux Cellulose-1



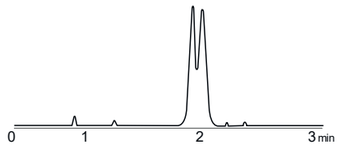
Gluthetimide



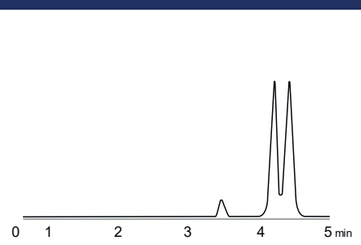
CelluCoat

5-Methyl-5-phenylhydantoin

SEPARATION



ReproSil Chiral-OM



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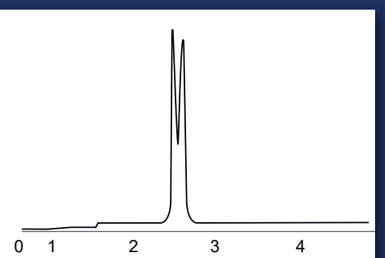
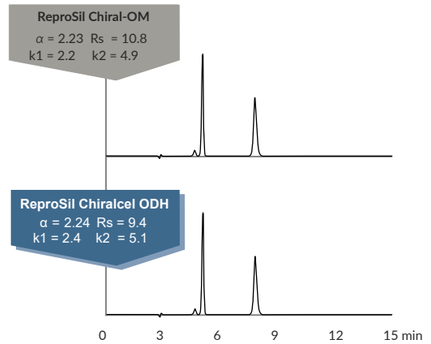
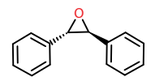


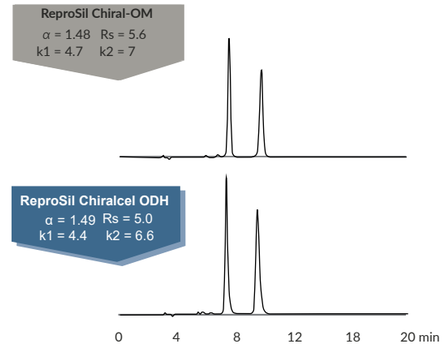
ReproSil Chiral-OM

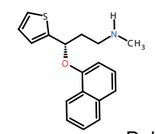
REPROSIL CHIRAL OM & CHIRALCEL ODH



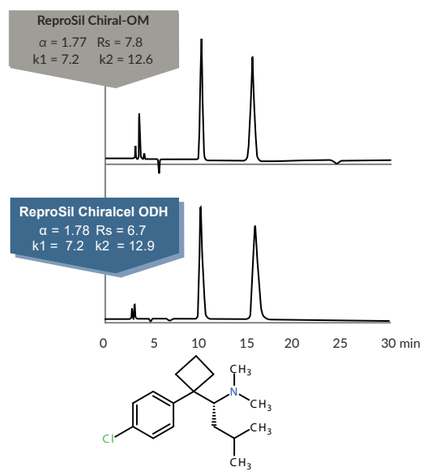


trans-Stilbeneoxide

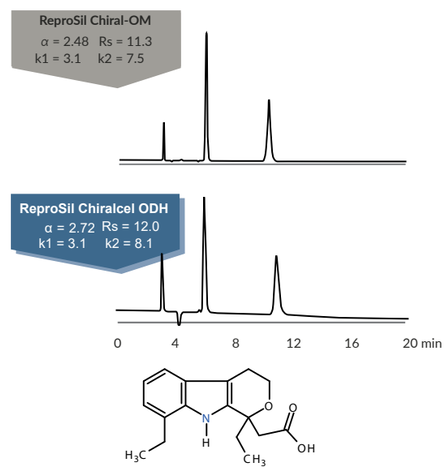




Duloxitine



Sibutramine



Etodolac

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CONCLUSION

ReproSil Chiral-OM is a guaranteed replacement for Chiralcel ODH HPLC columns.

OBSERVATION

01.

The selectivity is equivalent either the columns used in basic, neutral or acidic conditions.

02.

Resolution between isomer is higher for ReproSil Chiral-OM column when used in basic & neutral conditions where as in acidic condition Chiralcel ODH is showing slightly higher resolution.

03.

The peak symmetry is better for ReproSil Chiral-OM column in all three conditions (i.e.
acidic, basic or neutral).

04.

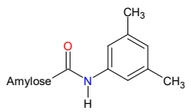
With all the conditions ReproSil Chiral-OM is showing higher number of theoretical plate.

SFC COLUMNS (CHIRAL)

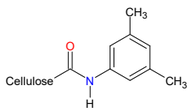
OVERVIEW OF "COATED" CSP AVAILABLE FROM DR. MAISCH HPLC

Product	Chiral Selector	Daicel Chiralpak	Phenomenex Lux	3 µm	5 µm	10 µm	20 µm
ReproSil Chiral-AMS	Amylose Tris-(S)-a-Methylbenzyl.carbamate	AS		r63.ams	r65.ams	r60.ams	
ReproSil Chiral-AM	Amylose Tris-(3,5-dimethylphenyl) carbamate	AD	Amylose-1	r63.am	r65.am	r60.am	r620.am
ReproSil Chiral-YM	Amylose Tris-(5-Chlor-2-Methylphenyl) carbamate	AY	Amylose-2	r63.ym	r65.ym		
ReproSil Chiral-ZA	Amylose Tris-3-(Chlor-4-Methylphenyl) carbamte	AZ		r63.za	r65.za		
Product	**Chiral Selector**	**Daicel Chiralpak**	**Phenomenex Lux**	**3 µm**	**5 µm**	**10 µm**	**20 µm**
ReproSil Chiral-BM	Cellulose (Tris-Benzoyl)	OB			r65.bm		
ReproSil Chiral-JM	Cellulose Tris-(4-Methylbenzoyl)	OJ	Cellulose-3	r63.jm	r65.jm	r60.jm	r620.jm
ReproSil Chiral-GM	Cellulose Tris-(4-Methyl-Phenylcarbamate)	OG			r65.gm		
ReproSil Chiral-OM	Cellulose Tris-(3.5-dimethylphenyl) carbamate	OD	Cellulose-1	r63.om	r65.om	r60.om	r620.om
ReproSil Chiral-ZM	Cellulose Tris-(3-Chlor-4-Methylphenyl) carbamate	OZ	Cellulose-2	r63.zm	r65.zm		
ReproSil Chiral-XM	Cellulose Tris-(4-Chlor-3-Methylphenyl) carbamate	OX	Cellulose-4	r63.xm	r65.xm		
ReproSil Chiral-CM	Cellulose Tris-(Phenylcarbamate)	OC		r63.cm	r65.cm	r60.cm	

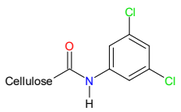
„IMMOBILISED“ REPROSIL CHIRAL POLYSACCHARIDE PHASES



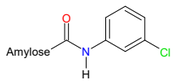
ReproSil Chiral-MIA
(Chiralpak IA)



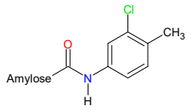
ReproSil Chiral-MIB
(Chiralpak IB)



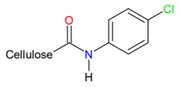
ReproSil Chiral-MIC
(Chiralpak IC)



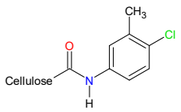
ReproSil Chiral-MID
(Chiralpak ID)



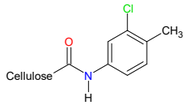
ReproSil Chiral-MIF
(Chiralpak IF)



ReproSil Chiral-MOF

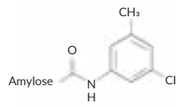


ReproSil Chiral-MIX



ReproSil Chiral-MIZ

CSPs first introduced to the market by Dr. Maisch HPLC



ReproSil Chiral-MIG
(Chiralpak IG)

The immobilized stationary phases ReproSil Chiral MIA, MIF, MID, MIB, MIC, MIG MIX, MIZ and MOF with greatly increased column robustness tolerate strong organic solvents such as DMSO, DCM, Ethyl Acetate, MtBE and THF to be injected onto the column both as an injection solvent or part of the eluent.

IMMOBILISED CSP AVAILABLE FROM DR. MAISCH HPLC

Product	Chiral Selector	Daicel Chiralpak	Phenomenex Lux	3 µm	5 µm	10 µm	20 µm
ReproSil Chiral-MIA	Amylose Tris-(3,5-dimethylphenyl) carbamat	IA	i-Amylose-1		r65.mia		r620.mia
Reprosil Chiral-MIG	Amylose tris(3-chloro-5-methylphenylcarbamate)	IG			r65.mig		
ReproSil Chiral-MIF	Amylose Tris-(3-Chloro-4-Methylphenyl) carbamat	IF			r65.mif		
ReproSil Chiral-MID	Amylose Tris-(3-Chlorphenyl) carbamat	ID			r65.mid		

Product	Chiral Selector	Daicel Chiralpak	Phenomenex Lux	3 µm	5 µm	10 µm	20 µm
ReproSil Chiral-MIC	Cellulose Tris-(3,5-Dichlorphenyl) carbamat	IC	i-Cellulose-5	r63.mic	r65.mic		
ReproSil Chiral-MIB	Cellulose tris-(3.5-dimethylphenyl) carbamat	IB			r65.mib		
ReproSil Chiral-MIX	Cellulose tris-(4-Chlor-3-Methylphenyl) carbamat				r65.mix		
ReproSil Chiral-MIZ	Cellulose tris-(3-Chlor-4-methylphenyl) carbamat			r63.miz	r65.miz		
ReproSil Chiral-MOF	Cellulose tris-(4-Chlorphenyl) carbamat				r65.mof		

e.g. part-number ReproSil Chiral-MOF 5µm 250 x 4.6 mm: r65.mof.s2546

Other particle sizes are available on request.

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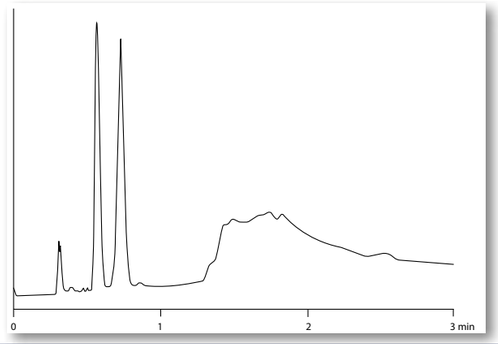
SFC Columns (Chiral)

SAMPLES

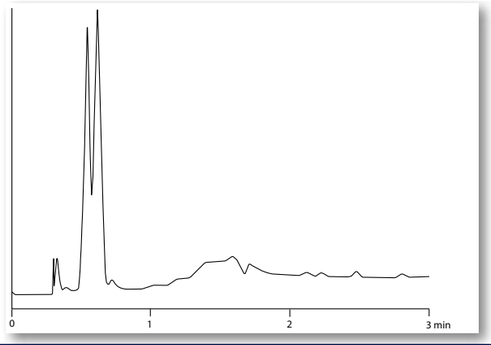
Sample: Customer sample
Eluent: CO_2 /0 - 20% MeOH (0.1% DEA) in 2 min.

ReproSil Chiral-MIX
5 µm, 100 x 3.0 mm



	RT	Areas	%Areas	Resolutions	USP Tailing
1	0,564	220320	39,72		1,20
2	0,726	334417	60,28	2,26	1,04

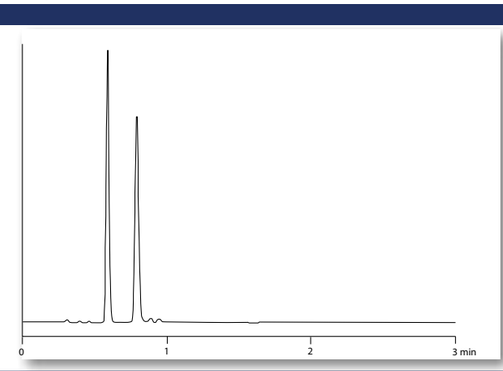
Lux Cellulose-4
3 µm, 100 x 4.6 mm



	RT	Areas	%Areas	Resolutions	USP Tailing
1	0,547	647055	44,58		
2	0,626	804384	55,42	0,97	

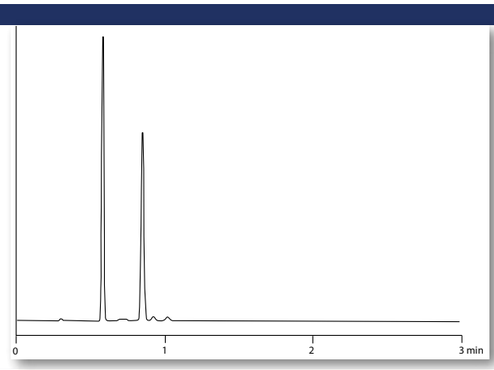
Sample: TSO
Eluent: CO_2/ 10% MeOH (0.1% DEA)

ReproSil Chiral-MIX
5 µm, 100 x 3.0 mm



	RT	Areas	%Areas	Resolutions	USP Tailing
1	0,588	1970619	49,64		1,13
2	0,789	1999432	50,36	4,97	1,11

Lux Cellulose-4
3 µm, 100 x 4.6 mm



	RT	Areas	%Areas	Resolutions	USP Tailing
1	0,583	1038369	49,91		1,05
2	0,851	1041945	50,09	8,89	1,04

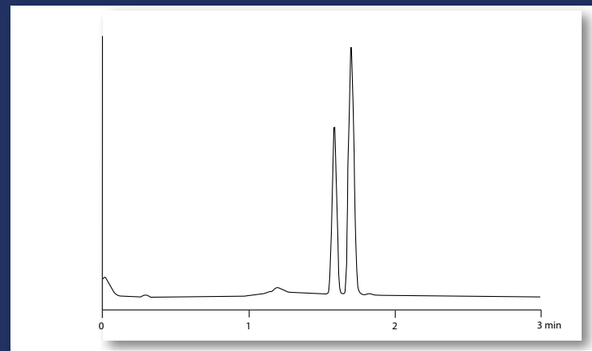
SFC COLUMNS (CHIRAL)

ReproSil Chiral – unique immobilised phases

SAMPLES

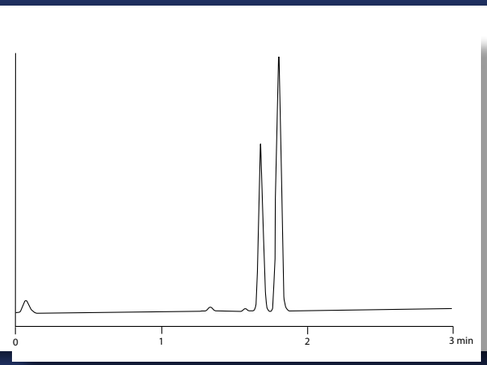
Sample: customer sample
Eluent: CO_2/ 10-50% MeOH (0.1% DEA) in 2 min, hold until 5 min

ReproSil Chiral-MIZ
3 µm, 100 x 3.0 mm



	RT	Areas	%Areas	Resolutions	USP Tailing
1	1,585	1872263	36,75		1,06
2	1,699	3221889	36,25	1,77	1,09

Lux Cellulose-2
3 µm, 50 x 4.6 mm



	RT	Areas	%Areas	Resolutions	USP Tailing
1	1,678	1757077	36,89		1,05
2	1,801	3005764	63,11	2,00	1,06

CHIRAL SFC COLUMN - BRUSH-TYPE PHASE

Immobilised brush-type phase with electron acceptor and donor functionality. Particularly useful for aromatic compounds with O or N near chiral centre.

This phase shows a very broad versatility and complementary selectivity to ReproSil Chiral Polysaccharide phases. The phase is compatible with all commonly used mobile phases, including aqueous systems.

Both antipodes of the chiral selector are available – allowing to reverse the elution order of the enantiomers of a given racemate.

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ReproSil Chiral-NR showed excellent hit rates in many Chiral purification department of Global Pharma companies. One example you find in Fig. 4.

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

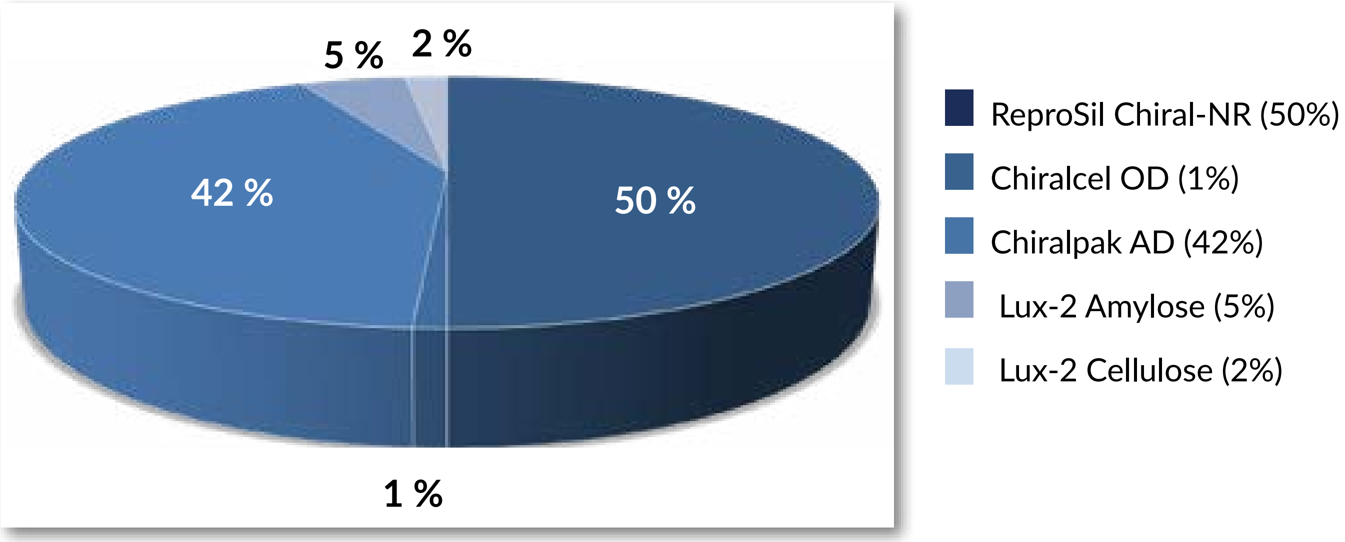


Fig. 9 Statistical evaluation of Chiral SFC screening of Pharmaceutical compounds from Hoffman La-Roche, Basel

ReproSil Chiral-NR is available in different particle size and many options exist for the scale-up from analytical to prep dimensions.

Product	Chiral Selector	3µm	5µm	8µm	12µm
ReproSil Chiral-NR	Immobilized brush-type, π-electron acceptor / πelectron donor phase	r13.nr	r15.nr	r18.nr	r112.nr
Inverse Elution order to ReproSil Chiral-NR					
ReproSil Chiral-NR-R	Immobilized brush-type, π-electron donor phase	r13.nrr	r15.nrr	r18.nrr	r112.nrr

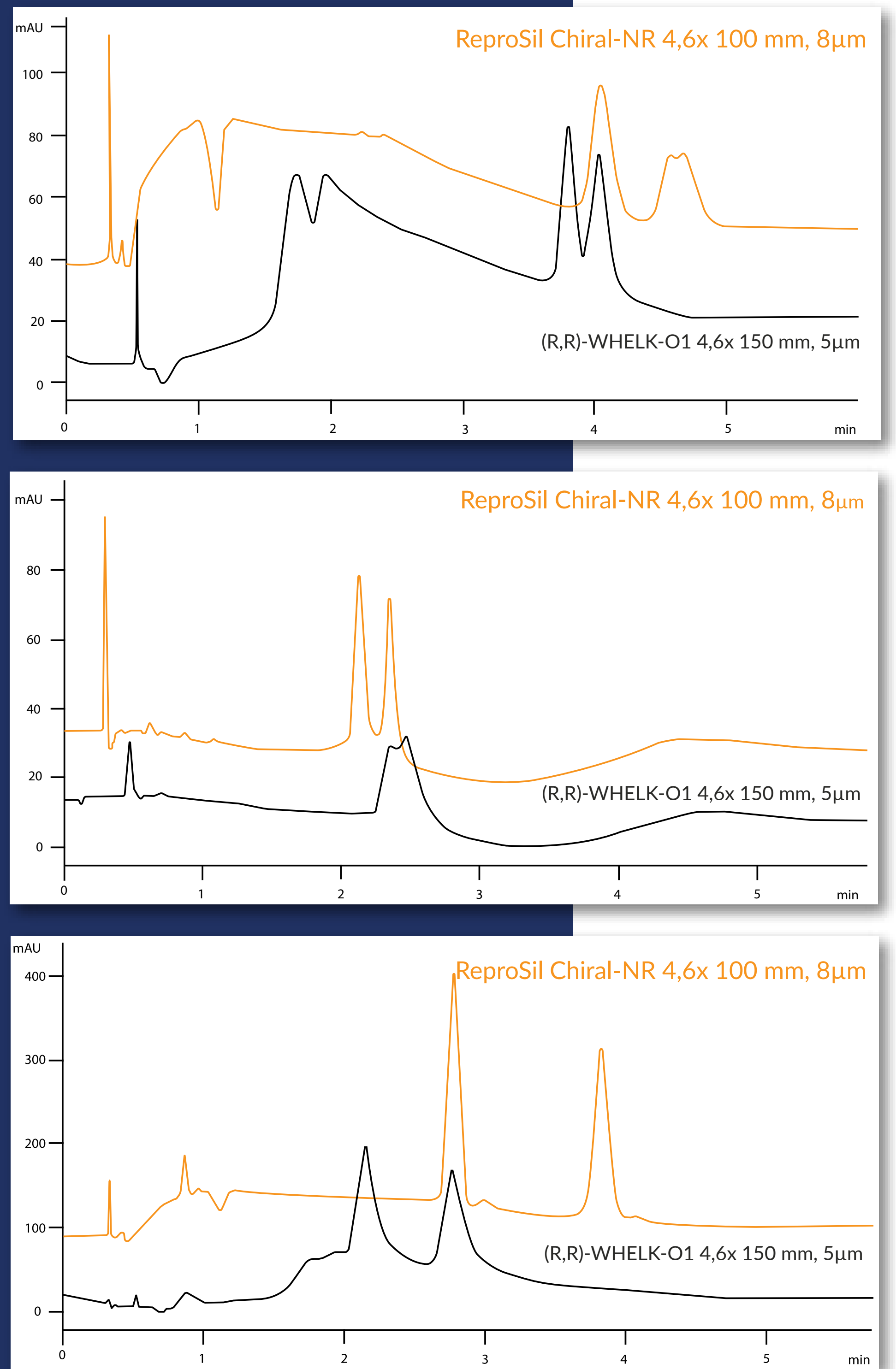
e.g, part-number ReproSil Chiral-NR 5µm, 250 x 4.6 mm: r15.nr.s2546.

Other particle sizes are available on request.

SFC COLUMNS (CHIRAL)

ReproSil Chiral-NR vs. Whelk-O1

COMPARISON



Co-Solvent:
MeOH(0.1%DEA)

Gradient (B%):
10% to 50% in 2.0 min.
hold 1.0 min at 50%

Temperature: 35°C

Flow (ml/min): 4

Back Pressure(psi):
1500.00

Detector: 220nm

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SEC- APPLICATIONS IN SFC-MODE

There exist 3 modes for the analysis of polymers:

1. Size-exclusion chromatography (SEC).
2. Liquid adsorption chromatography (LAC).
3. Liquid adsorption chromatography at critical conditions (LACCC).

All 3 modes can be run with SFC-conditions and are an excellent approach for the analysis of PEG in analytical and prep scale. More details you can find in Dr. Maisch application 7.

Media	Pore size	MG-range	Surface modification	1.9 µm	3 µm	5 µm	10 µm
ReproSil 50 SEC	50 A	500 - 10 000 Da				r05.sec	
ReproSil 125 SEC	125 A	5000 - 100 000 Da			r13.sec	r15.sec	r10.sec
ReproSil 200 SEC	200 A	10 000 - 500 000 Da	PEG	r219.sec		r25.sec	
ReproSil 200 SEC-2	200 A	10 000 - 500 000 Da	DIOL	r219.sec2	r23.sec2	r25.sec2	r20.sec2
ReproSil 300 SEC	300 A	10 000 - 1 000 000 Da			r33.sec	r35.sec	
ReproSil 4000 SEC	600 A	20 000 - 500 000 Da				r45.sec	
ReproSil 5000 SEC	800 A	150 000 - 1 250 000 Da				r55.sec	

PREP

SFC is especially interesting in preparative scale because the CO_2 in the mobile phase is removed very easily at depressurization and can potentially be recycled. Only a small amount of co-solvent is left. The time savings are a significant advantage compared to NP- or RP Prep purifications.

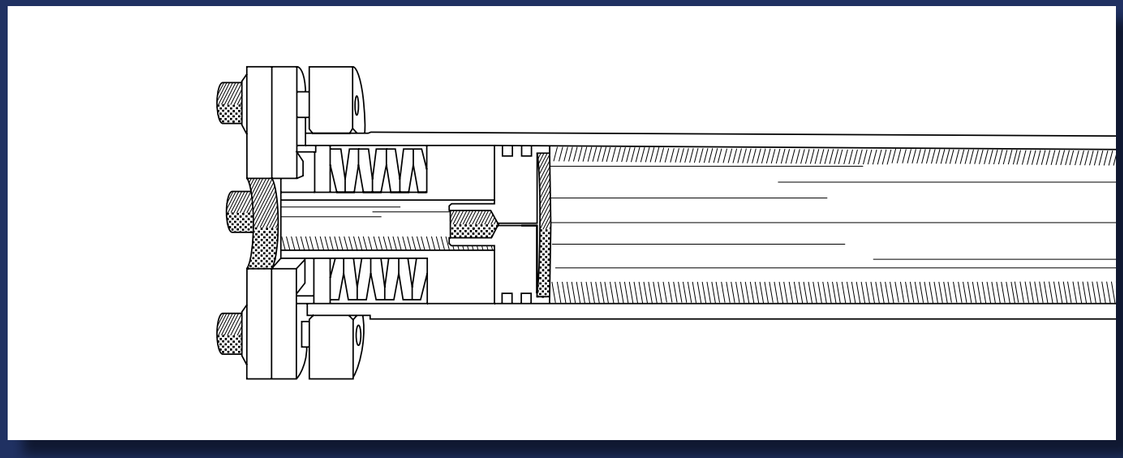
Dr. Maisch offers all Dr. Maisch media in standard slurry-packed prep-column dimensions.

The superior hardware type for prep column hardware would be the LONGLIFE columns.

Benefits of the SFC- LONGLIFE hardware:

- Packed by piston
- Flexible bed length
- Static Axial Compression (SAC) mechanism
- Packing and repacking service
- Available column ID - 25, 30, 40, 50, 70 mm
- Scalability to > 150 mm ID - Using ModCol column / Multipacker

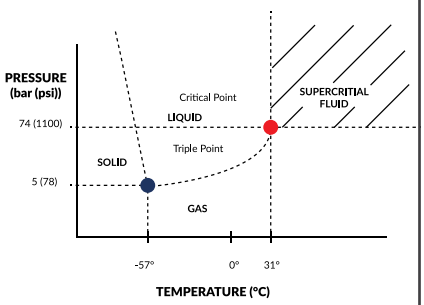
The SFC-LONGLIFE hardware even allows to pack 3µm particles in prep dimension which results in an extremely high efficiency.



Dr. Maisch

Any Column, Any Size, Any Media

Distributor:



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