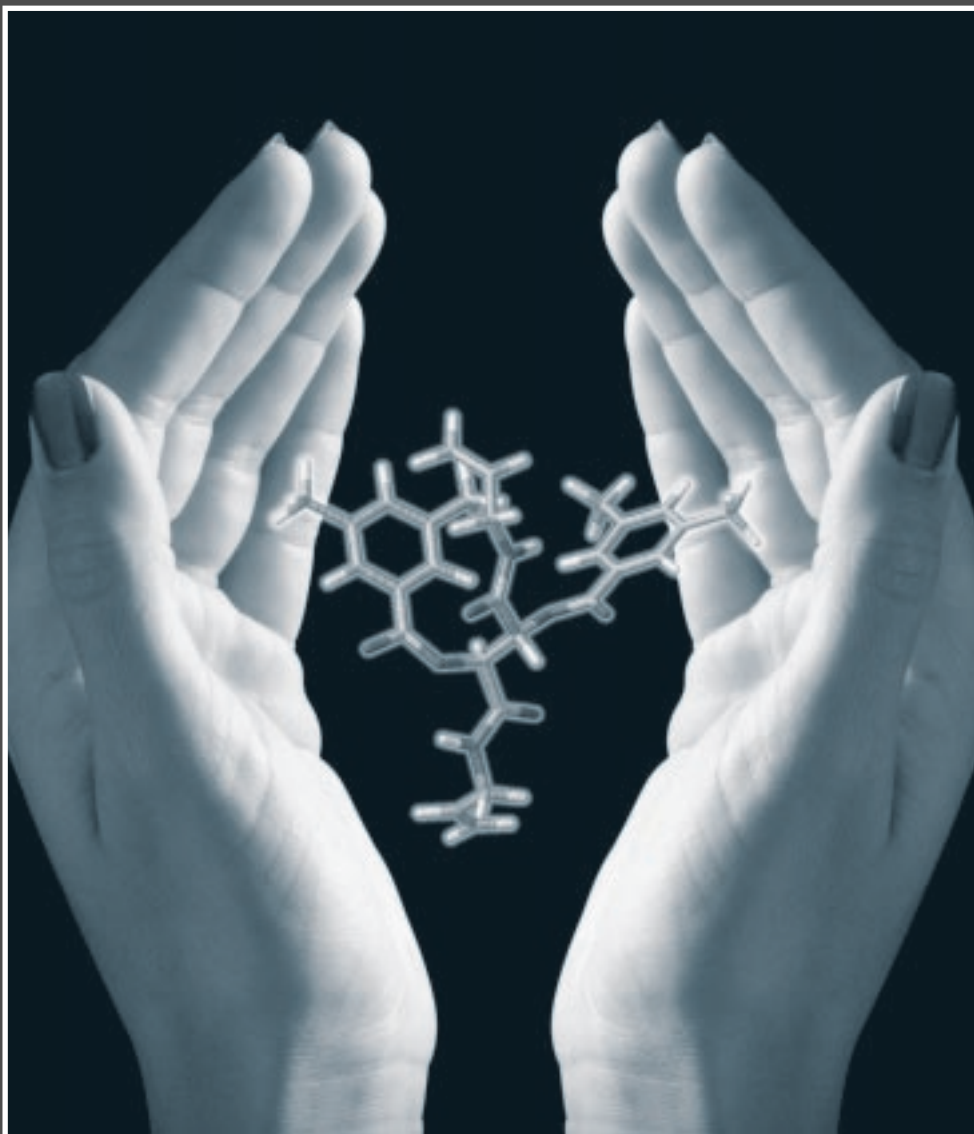


*Kromasil Chiral  
– application guide*



**Kromasil®**

*The way to peak performance  
in liquid chromatography*

## ***Why it is necessary to optimize your chromatographic conditions***

*Since Kromasil Chiral are synthesized using a unique, patented technology, the optimal separation conditions differ from those being applied to other commercial chiral phases.*

*In order to take full advantage of the inherent separation power of Kromasil Chiral it is therefore important that your chromatographic conditions are optimized.*

*This handbook is a guide to your successful optimization.*

## **Content**

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	Interaction mechanisms of Kromasil Chiral	3
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# Guidelines for Kromasil Chiral

## – how to obtain optimum performance

### The structure of Kromasil Chiral

The chiral selectors, based on tartaric acid derivatives, are polymerized, crosslinked (figure 1) and covalently bound to a functionalized Kromasil silica (figure 2). Therefore Kromasil chiral stationary phases are *stable in all organic solvents*.

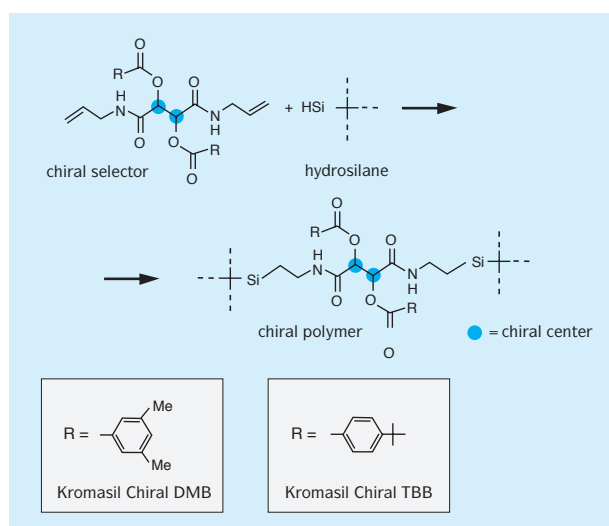


Figure 1 | Chiral polymer synthesis.

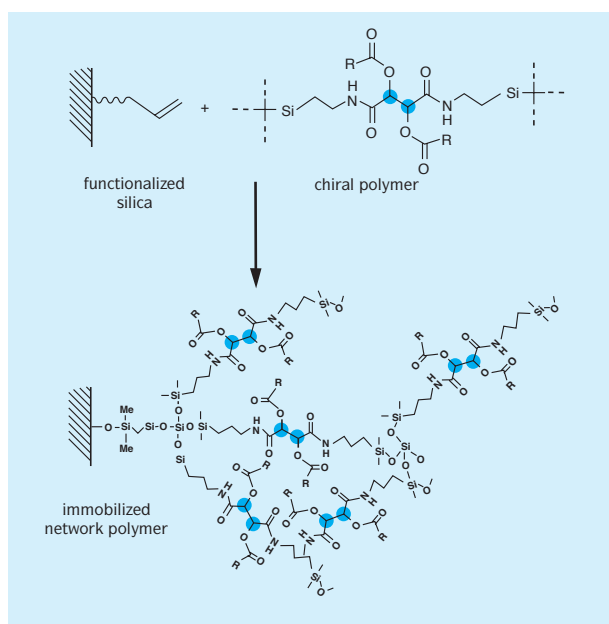


Figure 2 | The binding of the chiral polymer to the Kromasil silica.

### Interaction mechanisms of Kromasil Chiral

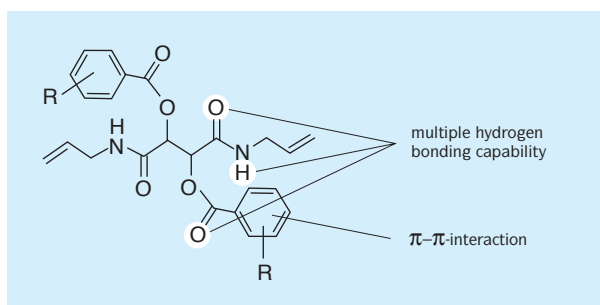


Figure 3 | The retention and selectivity is mainly caused by the hydrogen bonding ability.

The C2-symmetric selector unit operates by differential hydrogen bonding in non-aqueous mobile phase systems. The retention and selectivity is mainly dependent on the hydrogen bonding ability of the analyte (figure 3), which is regulated by mobile phase modifiers like esters, ethers, ketones and alcohols. In addition to hydrogen bonding there are also  $\pi$ - $\pi$ -interactions and steric interactions. Use of alcohols as modifiers in the mobile phase will mask the stereospecific sites due to the hydrogen-donor and acceptor properties of the modifier.

**ETHERS OR ESTERS AS MODIFIERS INSTEAD OF ALCOHOLS FAVOR THE POLAR INTERACTIONS AND GIVE HIGHER ENANTIOSELECTIVITY.**

## Kromasil Chiral TBB or DMB?

The two phases have been developed to complement each other in selectivity. For the separation of acidic racemates we recommend starting with the TBB phase.

A series of structurally widely different racemates – acidic, basic as well as neutral – were evaluated for both phases under identical mobile phase conditions. The result is shown in figure 4.

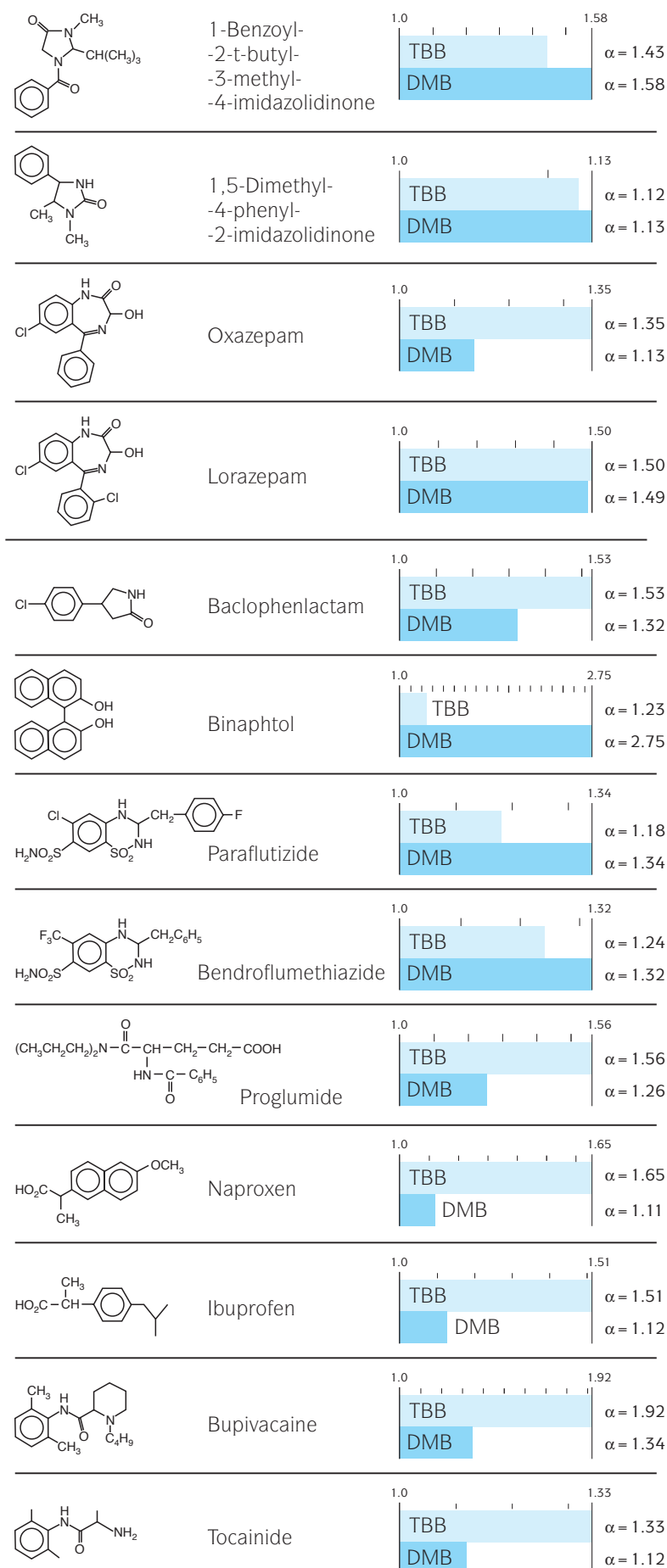


Figure 4 | Optical resolution of chiral compounds on Kromasil Chiral TBB and DMB respectively.

## How to choose the right mobile phase

A base solvent of heptane, hexane or tert-butyl-methyl ether is normally recommended for the separation with Kromasil Chiral. Try to regulate the retention to be in the range of  $k'1 = 0.5 - 5$  by using different types and content of modifiers.

Modifiers:		
Strongly polar and basic solutes:	Medium polar solutes:	Hydrophobic solutes:
2-Propanol Ethyl acetate	Ethyl acetate Tetrahydrofuran Dioxan tert-Butylmethylether Acetone	tert-Butylmethylether Toluene Cyclohexane

Figure 5 | Recommended modifiers for different solutes.

Example:

Influence of mobile phase modifier on selectivity

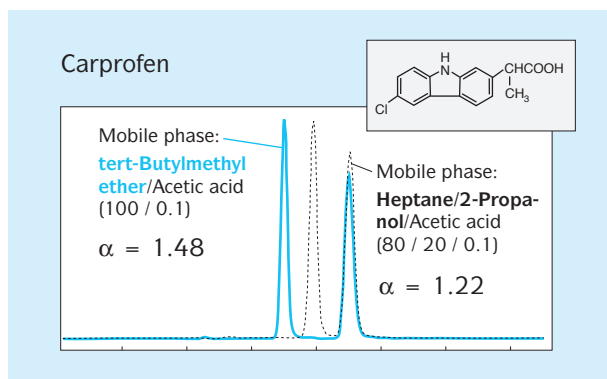


Figure 6 | Influence of the mobile phase modifier on the separation of carprofen.

Conditions:

Phase: Kromasil Chiral TBB, 5  $\mu$ m

Column: 4.6  $\times$  250 mm

Flow rate: 1 ml/min

Detection: UV 300 nm

## How to choose additives to the mobile phase

Acidic and basic additives improve chromatographic separations on Kromasil Chiral. In most cases, small amounts of acetic acid or formic acid (0.01 – 0.1 %) improve peak shape and enantioselectivity for acidic and basic solutes. Sometimes there is a need to combine acetic acid and an organic amine (e.g. triethylamine) for strong basic racemates. An excess of the acid relative to the amine improves the selectivity and peak shape. We do not recommend the use of strong acids like trifluoroacetic acid for a prolonged time, due to the potential risk of hydrolysis of the stationary phase.

Example:

Influence of different additives to the mobile phase

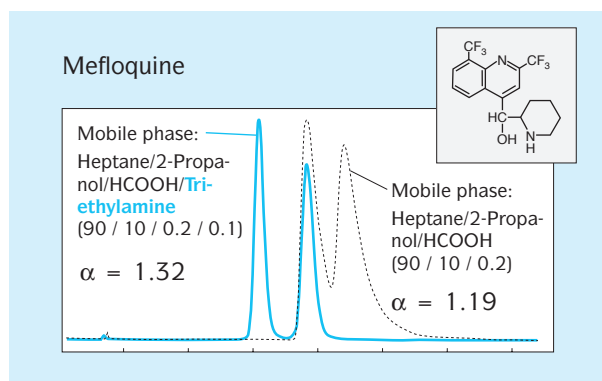


Figure 7 | Influence of the mobile phase additives on the separation of mefloquine.

Conditions:

Phase: Kromasil Chiral DMB, 5  $\mu$ m

Column: 4.6  $\times$  250 mm

Flow rate: 2 ml/min

Detection: UV 280 nm

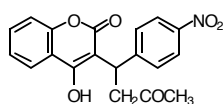
## Test kit

Kromasil Chiral TBB and DMB (5  $\mu$ m) are now also available in 50 mm column lengths (I.D. 4.6 mm) as a test kit to provide you with an inexpensive and rapid way to screen all your chiral separations. With the test kit columns you can quickly and economically explore column utility and separation conditions. For best performance of your optimized separation however, the use of full length columns is recommended.

# Kromasil Chiral – Application Guide

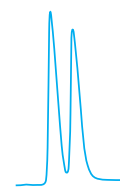
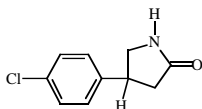
## Compound index

Acenocoumarol	7	Ketoprofen	11
Baclophenlactam	7	Lopirazepam	12
Bendroflumethiazide	7	Lorazepam	12
Benoxaprofen	7	Mefloquine	12
1-Benzoyl-2-tert-butyl-3-methyl- -4-imidazolidinone	7	Mephenytoin	12
Binaphtol	7	$\gamma$ -(P-Methoxyphenyl)- $\gamma$ -butyrolactone	12
BOC-Phenylglycine	7	$\alpha$ -(1-Methylethoxy)-benzeneacetamide	12
Bucetin	8	2-(Methylsulfinyl)benzoic acid	12
Bupivacaine	8	Metolazone	12
2-(Butylsulfinyl)benzoic acid	8	2-Methoxy- $\alpha$ -methoxyphenylacetic acid	13
Camazepam	8	3-(6-Methoxy-2-naphthalenyl)-2-furanone	13
1-(2'-Carbomethoxyphenyl)-3-oxo-benzo[d]isothia (IV)-azole 1-oxide	8	$\alpha$ -Methoxyphenylacetic acid	13
2-(2'-Carbomethoxyphenylsulfinyl)benzoic acid	8	3-(2-Naphthyl)-2-pyrrolidone	13
2-(2'-Carbomethoxyphenylsulfinyl)benzoic acid	8	Naproxen	13
1-(2'-Carboxyphenyl)-3-oxo-benzo[d]isothia (IV)-azole 1-oxide	8	1-Octyl-3-oxo-benzo[d]isothia (IV)-azole 1-oxide	13
Carprofen	9	2-(Octylsulfinyl)benzoic acid	13
Carticaine	9	Omeprazole	13
Chlormezanone	9	Oxamniquine	14
2-(2-Chlorophenoxy) propionic acid	9	Oxazepam	14
2-(3-Chlorophenoxy) propionic acid	9	Paraflutizide	14
2-(4-Chlorophenoxy) propionic acid	9	Penflutizide	14
p-Chlorophenprocoumon	9	2-Phenoxy-propanamide	14
Chlorthalidone	9, 10	Phenprocoumon	14
Clenbuterol	10	trans-2-Phenyl-1-cyclohexanol	14
Diethyl-1-(N-3",5"-dimethylphenyl)-amino- 1-(4'-N, IV-dimethylaminophenyl)- -methane phosphonate	10	trans-2-Phenyl-1-cyclopropane carboxylic acid	14
1,5-Dimethyl-4-phenyl-2-imidazolidione	10	1-Phenyl-1-propanol	15
2-(Dodecylsulfinyl)benzoic acid	10	4-Phenyl-2-pyrrolidone	15
Epithiazide	10	5-Phenyl-2-pyrrolidone	15
trans-2,3-Epoxy-3-(4-methoxy-phenyl) propionic acid methyl ester	10	Pirprofen	15
Etodolac	10	Promethazine	15
Flurbiprofen	11	1,1-Spirobi(3H-2,1-benzoxathiol)-3,3-dione	15
FMOC-Alanine	11	Temazepam	15
FMOC-Methionine	11	3a,4,5,6-Tetrahydrosuccinimido(3,4b)- -acenaphten-10-one	15
Hexobarbital	11	Thalidomide	16
Ibuprofen	11	Trifluoroanthrylethanol	16
Indapamide	11	Trityl-2-naphthalene propionic acid	16
Ketazolam	11	Tropicamide	16

**Acenocoumarol**

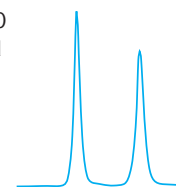
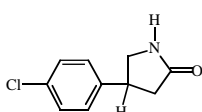
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/Acetic acid (93 / 7 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 7.80$   
 $\alpha = 1.14$

**Baclophenlactam**

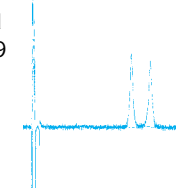
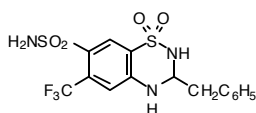
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/ 2-Propanol (95 / 5)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 4.50$   
 $\alpha = 1.51$

**Baclophenlactam**

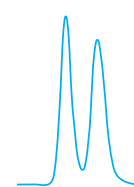
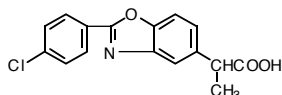
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: CO<sub>2</sub> + 2-propanol (10%), 40  $^{\circ}$ C, 150 bar (SFC)  
 Flow Rate: 2 ml/min  
 Detection: UV 240, 272 nm

$k'_1 = 3.31$   
 $\alpha = 1.19$

**Bendroflumethiazide**

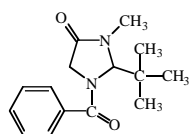
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/tert-Butylmethyl ether (60 / 10 / 30)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 3.47$   
 $\alpha = 1.18$

**Benoxaprofen**

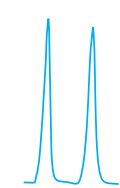
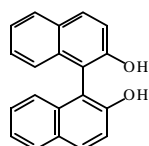
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/Acetic acid (60 / 40 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 310 nm

$k'_1 = 2.04$   
 $\alpha = 1.72$

**1-Benzoyl-2-tert-butyl-3-methyl-4-imidazolidinone**

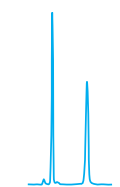
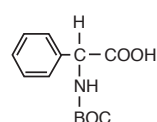
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/Acetic acid (60 / 40 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 310 nm

$k'_1 = 2.54$   
 $\alpha = 1.57$

**Binaphtol**

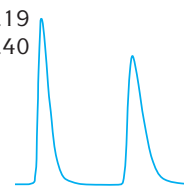
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (95 / 5)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

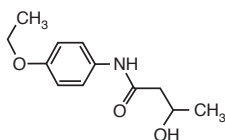
$k'_1 = 2.06$   
 $\alpha = 1.99$

**BOC-Phenylglycine**

Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Heptane/tert-Butylmethyl ether/Acetic acid (70 / 30 / 0.1)  
 Flow Rate: 1 ml/min  
 Detection: UV 220 nm

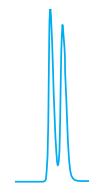
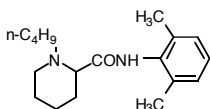
$k'_1 = 2.19$   
 $\alpha = 1.40$



**Bucetin**

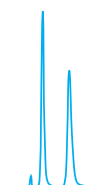
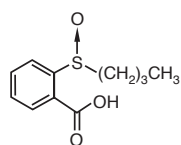
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (97 / 3)  
 Flow Rate: 0.5 ml/min  
 Detection: UV 254 nm

$k'_1 = 1.48$   
 $\alpha = 1.16$

**Bupivacaine**

Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/Acetic acid/Triethylamine (99 / 1 / 0.3 / 0.05)  
 Flow Rate: 2 ml/min  
 Detection: UV 240 nm

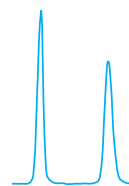
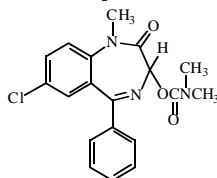
$k'_1 = 2.58$   
 $\alpha = 1.60$

**2-(Butylsulfinyl)benzoic acid**

Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/Formic acid (95 / 5 / 0.05)  
 Flow Rate: 1.2 ml/min  
 Detection: UV 230 nm

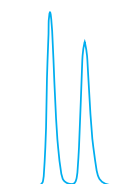
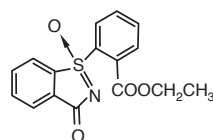
Reproduced with permission from Prof. Stig Allenmark, Dept. of Organic Chemistry, University of Gothenburg.

$k'_1 = 3.77$   
 $\alpha = 1.48$

**Camazepam**

Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/2-Propanol (80 / 20 / 1)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

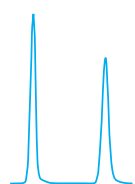
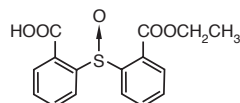
$k'_1 = 4.34$   
 $\alpha = 1.25$

**1-(2'-Carbethoxyphenyl)-3-oxo-benzo[d]-isothia (IV)-azole 1-oxide**

Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (85 / 15)  
 Flow Rate: 1.2 ml/min  
 Detection: UV 230 nm

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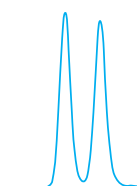
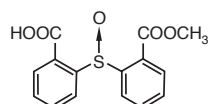
$k'_1 = 4.32$   
 $\alpha = 1.43$

**2-(2'-Carbethoxyphenylsulfinyl)benzoic acid**

Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/Formic acid (98 / 2 / 0.05)  
 Flow Rate: 1.2 ml/min  
 Detection: UV 230 nm

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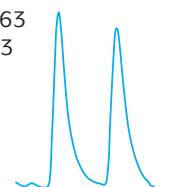
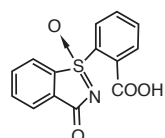
$k'_1 = 11.28$   
 $\alpha = 1.10$

**2-(2'-Carbomethoxyphenylsulfinyl)benzoic acid**

Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/Formic acid (50 / 50 / 0.05)  
 Flow Rate: 1.2 ml/min  
 Detection: UV 230 nm

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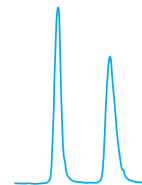
$k'_1 = 10.63$   
 $\alpha = 1.23$

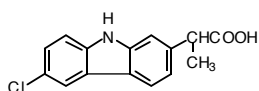
**1-(2'-Carboxyphenyl)-3-oxo-benzo[d]-isothia (IV)-azole 1-oxide**

Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/Formic acid (85 / 15 / 0.05)  
 Flow Rate: 1.2 ml/min  
 Detection: UV 230 nm

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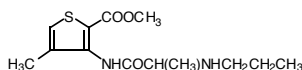
$k'_1 = 5.87$   
 $\alpha = 1.34$



**Carprofen**

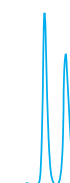
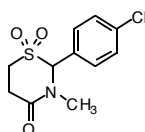
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: tert-Butylmethyl ether/Acetic acid (100 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 300 nm

$k'_1 = 1.56$   
 $\alpha = 1.63$

**Carticaine**

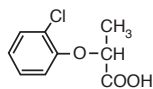
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/Acetic acid/Triethylamine (98 / 1 / 0.3 / 0.05)  
 Flow Rate: 2 ml/min  
 Detection: UV 280 nm

$k'_1 = 4.98$   
 $\alpha = 1.24$

**Chlormezanone**

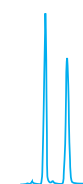
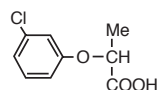
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (85 / 15)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 3.03$   
 $\alpha = 1.17$

**2-(2-Chlorophenoxy) propionic acid**

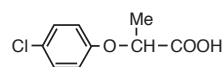
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Heptane/tert-Butylmethyl ether/Formic acid (70 / 30 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 2.82$   
 $\alpha = 1.42$

**2-(3-Chlorophenoxy) propionic acid**

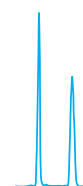
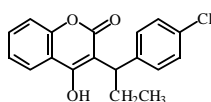
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Heptane/tert-Butylmethyl ether/Formic acid (70 / 30 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 2.25$   
 $\alpha = 1.48$

**2-(4-Chlorophenoxy) propionic acid**

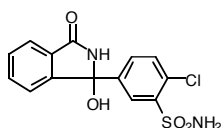
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Heptane/tert-Butylmethyl ether/Formic acid (70 / 30 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 2.58$   
 $\alpha = 1.68$

**p-Chlorophenprocoumon**

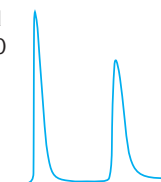
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/tert-Butylmethyl ether / Acetic acid (65 / 5 / 30 / 0.3)  
 Flow Rate: 2 ml/min  
 Detection: UV 310 nm

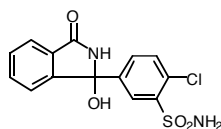
$k'_1 = 5.59$   
 $\alpha = 1.24$

**Chlorthalidone**

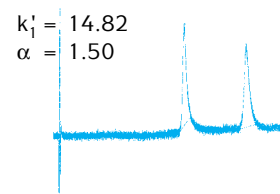
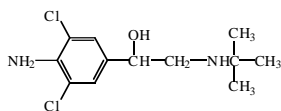
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (95 / 5)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 3.41$   
 $\alpha = 1.60$

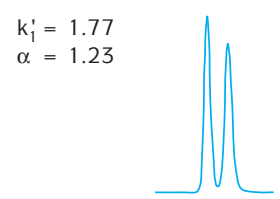
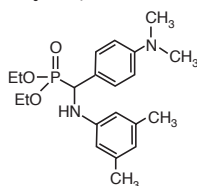


**Chlorthalidon**

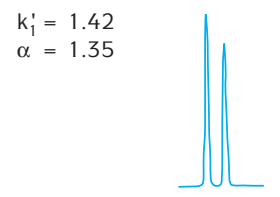
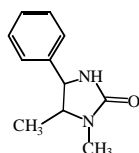
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: CO<sub>2</sub> + 2-propanol (10%), 40 °C, 150 bar (SFC)  
 Flow Rate: 2 ml/min  
 Detection: UV 240, 272 nm

**Clenbuterol**

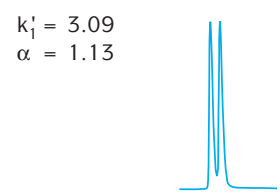
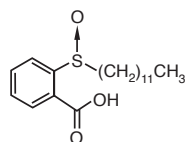
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/Acetic acid/Triethylamine (95 / 5 / 0.2 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 300 nm

**Diethyl-1-(N-3",5"-dimethylphenyl)-amino-1-(4'-N, IV-dimethylaminophenyl)-methane phosphonate**

Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (98 / 2)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

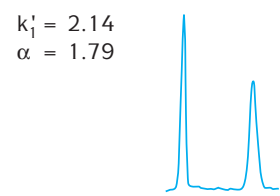
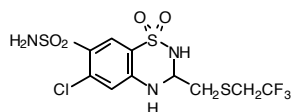
**1,5-Dimethyl-4-phenyl-2-imidazolidione**

Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (98 / 2)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

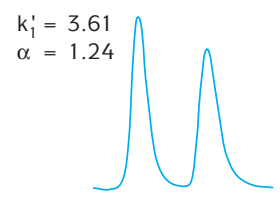
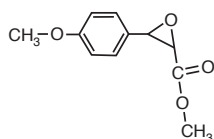
**2-(Dodecylsulfinyl)benzoic acid**

Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/Formic acid (95 / 5 / 0.05)  
 Flow Rate: 1.2 ml/min  
 Detection: UV 230 nm

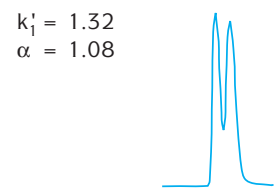
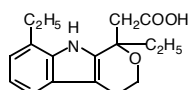
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**Epithiazide**

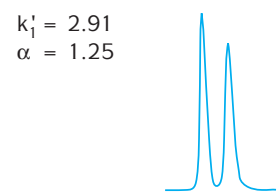
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/tert-Butylmethyl ether (60 / 10 / 30)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

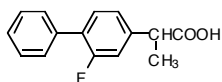
**trans-2,3-Epoxy-3-(4-methoxy-phenyl) propionic acid methyl ester**

Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether (80 / 20)  
 Flow Rate: 0.5 ml/min  
 Detection: UV 220 nm

**Etodolac**

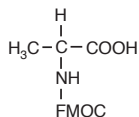
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/Acetic acid (75 / 25 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 270 nm



**Flurbiprofen**

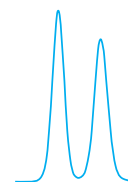
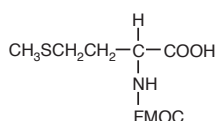
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/Acetic acid (60 / 40 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 270 nm

$k'_1 = 1.50$   
 $\alpha = 1.73$

**FMOC-Alanine**

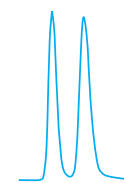
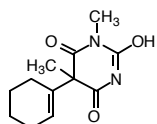
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Heptane/2-Propanol/Acetic acid (96 / 4 / 0.1)  
 Flow Rate: 1 ml/min  
 Detection: UV 254 nm

$k'_1 = 4.72$   
 $\alpha = 1.16$

**FMOC-Methionine**

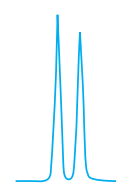
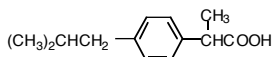
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Heptane/2-Propanol/Acetic acid (92 / 8 / 0.1)  
 Flow Rate: 1 ml/min  
 Detection: UV 254 nm

$k'_1 = 2.99$   
 $\alpha = 1.19$

**Hexobarbital**

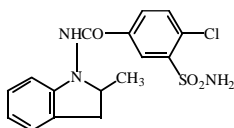
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (95 / 5)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 1.80$   
 $\alpha = 1.19$

**Ibuprofen**

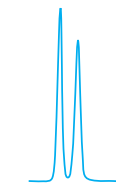
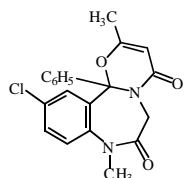
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/Acetic acid (75 / 25 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 220 nm

$k'_1 = 1.54$   
 $\alpha = 1.76$

**Indapamide**

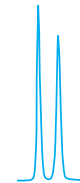
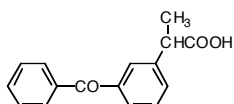
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/Acetic acid (80 / 20 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 2.98$   
 $\alpha = 1.25$

**Ketazolam**

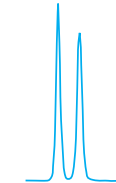
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (90 / 10)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

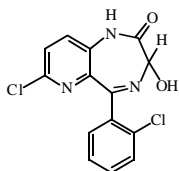
$k'_1 = 2.82$   
 $\alpha = 1.27$

**Ketoprofen**

Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/Acetic acid (60 / 40 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 250 nm

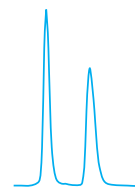
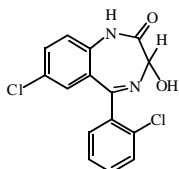
$k'_1 = 2.53$   
 $\alpha = 1.25$



**Lopirazepam**

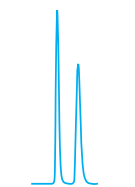
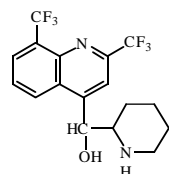
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/2-Propanol  
 (50 / 40 / 10)  
 Flow Rate: 2 ml/min  
 Detection: UV 240 nm

$k'_1 = 3.23$   
 $\alpha = 1.57$

**Lorazepam**

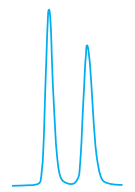
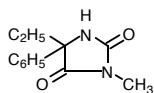
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/2-Propanol  
 (50 / 40 / 10)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 1.88$   
 $\alpha = 1.60$

**Mefloquine**

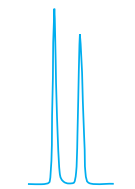
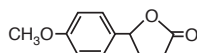
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Heptane/2-Propanol/Formic acid/Triethylamine  
 (90 / 10 / 0.2 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 280 nm

$k'_1 = 3.42$   
 $\alpha = 1.32$

**Mephentoin**

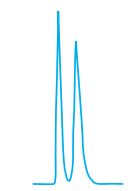
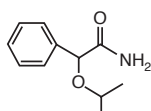
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (95 / 5)  
 Flow Rate: 2 ml/min  
 Detection: UV 230 nm

$k'_1 = 1.93$   
 $\alpha = 1.33$

 **$\gamma$ -(P-Methoxyphenyl)- $\gamma$ -butyrolactone**

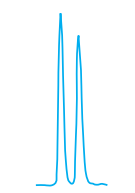
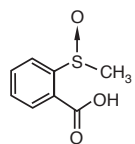
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether (90 / 10)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 5.29$   
 $\alpha = 1.10$

 **$\alpha$ -(1-methylethoxy)-benzeneacetamide**

Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (98 / 2)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

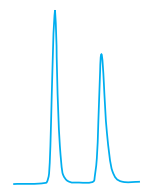
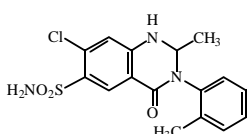
$k'_1 = 2.94$   
 $\alpha = 1.23$

**2-(Methylsulfinyl)benzoic acid**

Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/Formic acid  
 (95 / 5 / 0.05)  
 Flow Rate: 1.2 ml/min  
 Detection: UV 230 nm

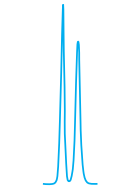
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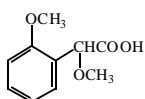
$k'_1 = 6.03$   
 $\alpha = 1.33$

**Metolazone**

Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (80 / 20)  
 Flow Rate: 2 ml/min  
 Detection: UV 230 nm

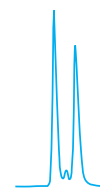
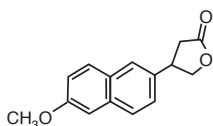
$k'_1 = 6.59$   
 $\alpha = 1.24$



**2-Methoxy- $\alpha$ -methoxyphenylacetic acid**

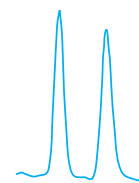
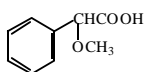
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/Acetic acid  
 (65 / 35 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 220 nm

$k'_1 = 2.45$   
 $\alpha = 1.26$

**3-(6-Methoxy-2-naphthalenyl)-2-furanone**

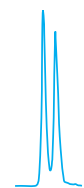
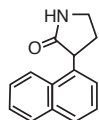
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether (90 / 10)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 9.33$   
 $\alpha = 1.12$

 **$\alpha$ -Methoxyphenylacetic acid**

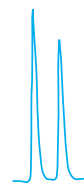
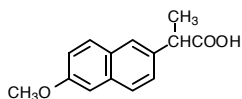
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/Acetic acid  
 (85 / 15 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 215 nm

$k'_1 = 5.69$   
 $\alpha = 1.12$

**3-(2-Naphthyl)-2-pyrrolidone**

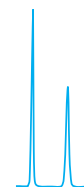
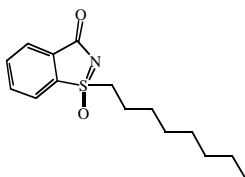
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (96 / 4)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 4.43$   
 $\alpha = 1.25$

**Naproxen**

Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/Acetic acid  
 (60 / 40 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 270 nm

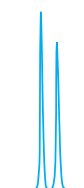
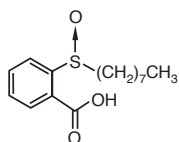
$k'_1 = 1.96$   
 $\alpha = 2.04$

**1-Octyl-3-oxo-benzo[d]isothiazol-1-oxide**

Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (90 / 10)  
 Flow Rate: 2 ml/min  
 Detection: UV 220 nm

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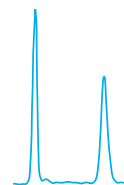
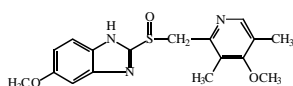
$k'_1 = 5.35$   
 $\alpha = 1.23$

**2-(Octylsulfinyl)benzoic acid**

Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/Formic acid  
 (95 / 5 / 0.05)  
 Flow Rate: 1.2 ml/min  
 Detection: UV 230 nm

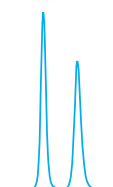
Reproduced with permission from Prof. Stig Allenmark, Dept. of Organic Chemistry, University of Gothenburg.

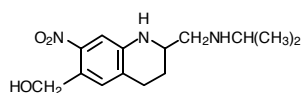
$k'_1 = 2.79$   
 $\alpha = 1.73$

**Omeprazole**

Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/Triethylamine//Acetic acid  
 (92 / 8 / 0.15 / 0.05)  
 Flow Rate: 2 ml/min  
 Detection: UV 300 nm

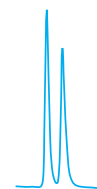
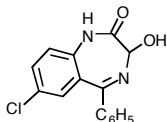
$k'_1 = 4.76$   
 $\alpha = 1.40$



**Oxamniquine**

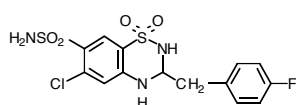
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/Acetic acid /Triethylamine  
 (85 / 15 / 0.1 / 0.05)  
 Flow Rate: 2 ml/min  
 Detection: UV 270 nm

$k'_1 = 3.48$   
 $\alpha = 1.26$

**Oxazepam**

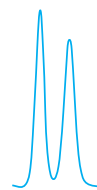
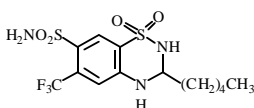
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (85 / 15)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 3.09$   
 $\alpha = 1.35$

**Paraflutizide**

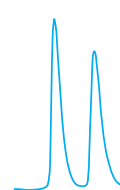
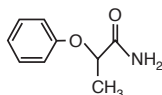
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/tert-Butylmethyl ether  
 (45 / 15 / 40)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 5.04$   
 $\alpha = 1.21$

**Penflutizide**

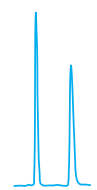
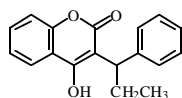
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/tert-Butylmethyl ether  
 (60 / 5 / 35)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 3.55$   
 $\alpha = 1.23$

**2-Phenoxy-propanamide**

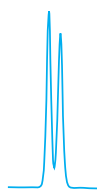
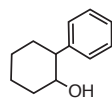
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (98 / 2)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 3.76$   
 $\alpha = 1.66$

**Phenprocoumon**

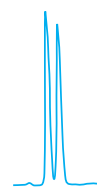
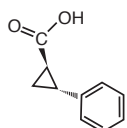
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/tert-Butylmethyl ether/Acetic acid  
 (65 / 5 / 30 / 0.3)  
 Flow Rate: 2 ml/min  
 Detection: UV 310 nm

$k'_1 = 4.77$   
 $\alpha = 1.15$

**trans-2-Phenyl-1-cyclohexanol**

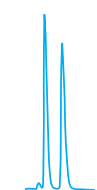
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Heptane/tert-Butylmethyl ether (90 / 10)  
 Flow Rate: 1 ml/min  
 Detection: UV 254 nm

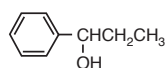
$k'_1 = 1.36$   
 $\alpha = 1.09$

**trans-2-Phenyl-1-cyclopropane carboxylic acid**

Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/Acetic acid  
 (60 / 40 / 0.1)  
 Flow Rate: 1 ml/min  
 Detection: UV 220 nm

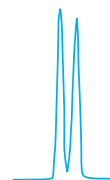
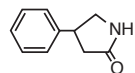
$k'_1 = 1.25$   
 $\alpha = 1.33$



**1-Phenyl-1-propanol**

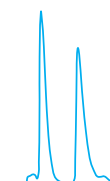
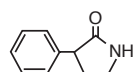
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Heptane/tert-Butylmethyl ether (95 / 5)  
 Flow Rate: 2 ml/min  
 Detection: UV 220 nm

$k'_1 = 2.60$   
 $\alpha = 1.09$

**4-Phenyl-2-pyrrolidone**

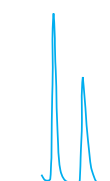
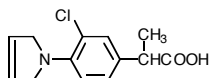
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (96 / 4)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 3.80$   
 $\alpha = 1.28$

**5-Phenyl-2-pyrrolidone**

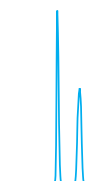
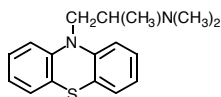
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (96 / 4)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 3.36$   
 $\alpha = 1.35$

**Pirprofen**

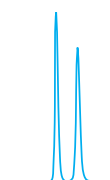
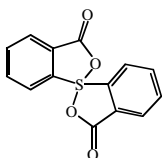
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/Acetic acid (60 / 40 / 0.1)  
 Flow Rate: 2 ml/min  
 Detection: UV 270 nm

$k'_1 = 1.74$   
 $\alpha = 1.73$

**Promethazine**

Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol/Acetic acid/Triethylamine (98 / 1 / 0.3 / 0.05)  
 Flow Rate: 2 ml/min  
 Detection: UV 260 nm

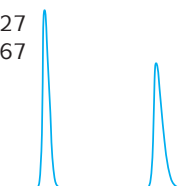
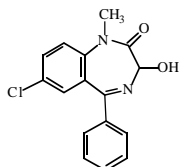
$k'_1 = 4.03$   
 $\alpha = 1.32$

**1,1-Spiro(3H-2,1-benzoxathiol)-3,3-dione**

Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (95 / 5)  
 Flow Rate: 2 ml/min  
 Detection: UV 240 nm

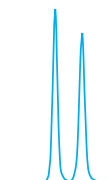
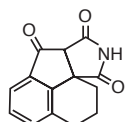
Reproduced with permission from Prof. Stig Allenmark, Dept. of Organic Chemistry, University of Gothenburg.

$k'_1 = 9.27$   
 $\alpha = 1.67$

**Temazepam**

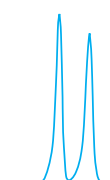
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/2-Propanol (85 / 15 / 1)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

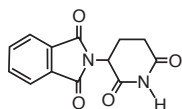
$k'_1 = 5.43$   
 $\alpha = 1.19$

**3a,4,5,6-Tetrahydrosuccinimido(3,4b)acenaphten-10-one**

Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Heptane/Ethanol (96 / 4)  
 Flow Rate: 2 ml/min  
 Detection: UV 220 nm

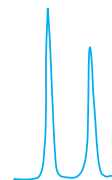
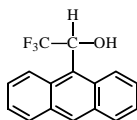
$k'_1 = 5.33$   
 $\alpha = 1.16$



**Thalidomide**

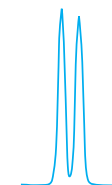
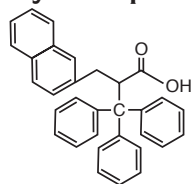
Phase: Kromasil Chiral DMB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/2-Propanol (90 / 10)  
 Flow Rate: 2 ml/min  
 Detection: UV 220 nm

$k'_1 = 8.17$   
 $\alpha = 1.34$

**Trifluoroanthrylethanol**

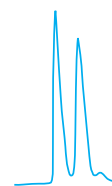
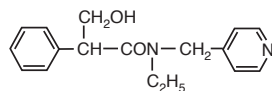
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether (70 / 30)  
 Flow Rate: 2 ml/min  
 Detection: UV 254 nm

$k'_1 = 2.04$   
 $\alpha = 1.17$

**Trityl-2-naphthalene propionic acid**

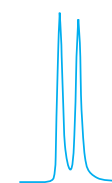
Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/tert-Butylmethyl ether/Acetic acid (60 / 40 / 0.1)  
 Flow Rate: 0.5 ml/min  
 Detection: UV 220 nm

$k'_1 = 0.76$   
 $\alpha = 1.23$

**Tropicamide**

Phase: Kromasil Chiral TBB, 5  $\mu$ m  
 Column: 4.6  $\times$  250 mm  
 Eluent: Hexane/Tetrahydrofuran (80 / 20)  
 Flow Rate: 1 ml/min  
 Detection: UV 220 nm

$k'_1 = 3.62$   
 $\alpha = 1.12$



# Kromasil Chiral – Availability

## Bulk

(both Kromasil Chiral DMB and TBB)  
5  $\mu\text{m}$ , 10  $\mu\text{m}$  and 16  $\mu\text{m}$

## Columns

(both Kromasil Chiral DMB and TBB)

Analytical column 4,6  $\times$  250 mm:

5  $\mu\text{m}$  and 10  $\mu\text{m}$

Preparative column 10  $\times$  250 and 20  $\times$  250 mm:

5  $\mu\text{m}$  and 10  $\mu\text{m}$

Upon request, column 50,8 (2")  $\times$  250 mm:

10  $\mu\text{m}$

## Test kit

Two columns (DMB and TBB) 4,6  $\times$  50 mm: 5  $\mu\text{m}$

Kromasil chiral stationary phases are patented by Eka Chemicals AB and manufactured according to ISO 9001.

Notes:

Notes:

The moment you adopt our Kromasil High Performance Concept, you join thousands of chromatographers who share a common goal: to achieve better separations when analyzing or isolating pharmaceuticals or other substances.

Not only will you benefit from our patented silica technology, but you gain a strong partner with a reliable track record in the field of silica products. For the past 60 years, Eka Chemicals has pioneered new types of silica. Our long experience in the field of silica chemistry is the secret behind the development of Kromasil, and the success of our Separation Products Group.

Kromasil is available in bulk, or in high-pressure slurry-packed columns. The development, production and marketing of Kromasil are ISO 9001 certified.

Eka Chemicals is a global company with 3,000 people in 30 countries. It is a business unit within Akzo Nobel, one of the world's largest chemical groups, with more than 67,000 employees in 80 countries.

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