VOLUME 6

Regis Technologies

Chiral Application Guide

OBRNUTAFAZA
www.obrnutafaza.hr
info@obrnutafaza.hr

REGIS® TECHNOLOGIES, INC.

Durable, High Efficiency Chiral Columns

Since 1980, Regis Technologies, Inc. has proven to be a leader in chiral separations and services. Our support system to the analytical and preparative chromatographer is a model other manufacturers of chiral products try to emulate. Our technical expertise, professional staff, and worldwide distribution network is highly respected and praised in the chiral community.

Regis offers four different types of Chiral Stationary Phases (CSP's):

- Covalently bonded Pirkle-Type Concept
- Protein-based
- Covalently bonded 18 Crown-ether

The complete line of Pirkle-Type CSP's are manufactured on-site at our cGMP facility in Morton Grove, Illinois. Columns range from analytical to preparative in size. Since Regis packs their own columns, custom sized columns are easily attainable.

Regis maintains an extended inventory of Protein-based columns manufactured by ***ChromTech*** in the United Kingdom and the covalently bonded 18 Crown-Ether columns manufactured by ***RStech*** in South Korea. Information on these product lines is readily available on our website at www.registech.com.

All Regis Chiral Separations products must meet rigorous manufacturing and quality control specifications before release.

As evidence of our commitment to the scientist in the lab, Regis is pleased to present its **Chiral Application Guide VI**. This new guide contains over 500 specific chiral applications using a variety of chiral column types. We have also included a few new sections in this guide. We added a ***Frequently Asked Question*** section and a ***Quick Scheme Method Development*** section.

For applications not listed in this guide, Regis maintains a dedicated chiral separations lab and chiral separations scientist. This enables Regis to offer a **Free Chiral Screening Service** to the scientific community. For specific column types, services or applications not listed in this guide, please contact Regis directly or visit our website for continuously updated information.

Chiral HPLC Application Guide VI

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Advantages of the Pirkle-Type Chiral Stationary Phases

Universal Solvent Capability
The entire family of Regis' Pirkle-Type Chiral Stationary Phases (CSP's) can be used in ***BOTH*** normal and reversed-phase solvents. Due to the fact that all of the Pirkle-Type CSP's are covalently bonded, the columns can tolerate all commonly used mobile phase combinations.

Column Durability
Another advantage of covalent bonding is column durability. Listed below are a few distinct benefits associated with the Pirkle-Type CSP's:

- Long lasting columns
- Bonded selector will not leach off the silica gel
- Can tolerate sample overload
- Can utilize strong solvents for cleaning
- Columns are fully reversible
- Compatible in SFC and SMB applications

Ability to Invert Elution Order
All of the Pirkle-Type CSP's are available in both enantiomeric forms. This allows the Chromatographer to invert the elution order of the enantiomers by simply switching columns. This advantage is essential when determining enantiomeric purity when the trace enantiomer should elute before the major. Elution order is also important in preparative chromatography because when the desired enantiomer elutes first, purity and production efficiency increases.

Chromatographic Efficiency
Unlike most Chiral columns on the market, Pirkle-Type Chiral HPLC columns show excellent chromatographic efficiency. The high density of binding sites allows larger amounts of sample to be injected without major changes in column performance.

Ease of Scale-up
Pirkle-Type CSP's were designed to allow the Chromatographer to scale-up their separation from analytical to preparative in a linear fashion. Regis uses the highest grade silica gels available on the market today. The 5-micron CSP's are bonded on Exsil®. Our 10-micron and 16-micron CSP's are bonded on Kromasil®. Synthesis of the chiral selectors, bonding of the different CSP's, and column production is all performed by Regis in one facility. This allows Regis total control over the product line. This also allows Regis to perform special requests for the customer, including custom bonding and custom column packing.

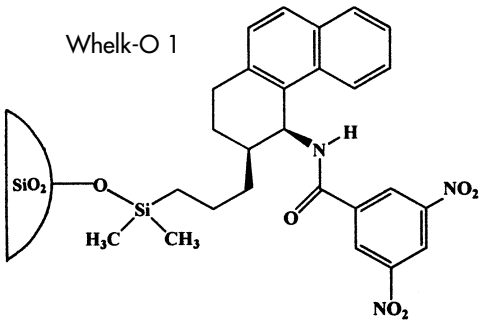
Pirkle Chiral Stationary Phases

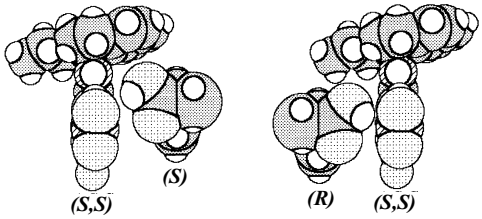
The Pirkle-Concept Chiral Stationary Phases generally fall into three classes: π-electron acceptor/π-electron donors, the π-electron acceptors and the π-electron donors. With Pirkle Phases, chiral recognition occurs at binding sites. Major binding sites are classified as π-basic or π-acidic aromatic rings, acidic sites, basic sites, and steric interaction sites. Aromatic rings are potential sites for π-π interactions. Acidic sites supply hydrogens for potential intermolecular hydrogen bonds-the hydrogen is often an amido proton (N-H) from an amide, carbamate, urea, or amine. Basic sites, such as π-electrons, sulfinyl or phosphinyl oxygens, and hydroxy or ether oxygens, may also be involved in hydrogen bond formation. Steric interactions may also occur between large groups.

π-Electron Acceptor/π-Electron Donor Phases

- WHELK-O 1
- WHELK-O 2
- ULMO

Whelk-O 1





more stable adsorbate

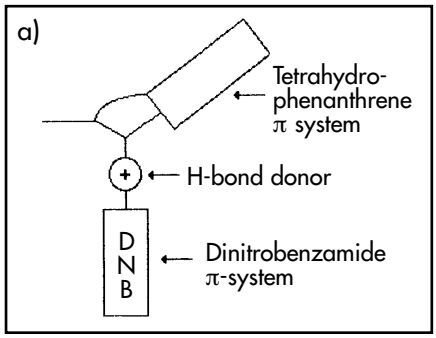
less stable adsorbate

The latest and most revolutionary addition to the Pirkle-Concept series is the π-electron acceptor/π-electron donor phase. This concept is an innovative incorporation of both π-acceptor and π-donor characteristics, resulting in a phase that can be used for a wide variety of compound groups.

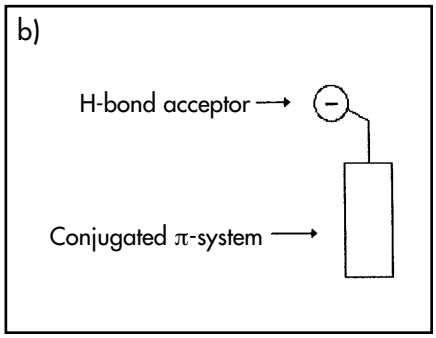
WHELK-O 1

The Whelk-O 1 Chiral Stationary Phase is based on 1-(3,5-Dinitrobenzamido)-1,2,3,4,-tetrahydrophenanthrene. This phase allows separation of underivatized racemates from a number of families including amides, epoxides, esters, ureas, carbamates, ethers, aziridines, phosphonates, aldehydes, ketones, carboxylic acids, and alcohols.

The Whelk-O 1 was originally designed for the separation of underivatized non-steroidal anti-inflammatory drugs (NSAIDs). This π-electron acceptor/π-electron donor phase exhibits an extraordinary degree of generality, allowing resolution of a wide variety of underivatized racemates. This broad versatility observed on the Whelk-O 1 column, compares favorably with polysaccharide-derived chiral stationary phases. In addition, because of the Whelk-O 1's covalent nature, this chiral phase is compatible with all commonly used mobile phases, including aqueous systems-a distinct advantage over polysaccharide-derived chiral stationary phases. Other advantages include column durability, excellent efficiency, elution order inversion allowing availability of both enantiomeric forms, and excellent preparative capacity.



a) Schematic diagram showing key functional groups of the Whelk-O 1 involved in chiral recognition.

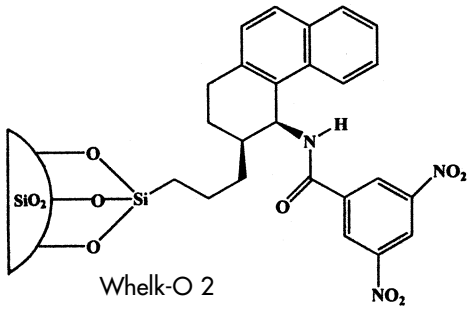


b) Schematic diagram showing generalized structure of analytes which are resolved on the Whelk-O 1.

WHELK-O 2

The Whelk-O 2 is the covalent trifunctional version of the Whelk-O 1. The Whelk-O 2 retains the same chiral selector but modifies the support to silica from a monofunctional linkage to a trifunctional. In most cases, the enantioselectivity remains the same allowing the separation of the analogous family of racemates as does the Whelk-O 1.

Whelk-O 2 was designed to enhance the stability of the stationary phase due to hydrolysis while using strong organic modifiers such as trifluoroacetic acid. The Whelk-O 2 is ideal for preparative separations since the material is bonded on 10 μm 100 Å spherical Kromasil silica. This allows the preparative chromatographer to perform method development on their analytical column and immediately scale-up to larger diameter columns.

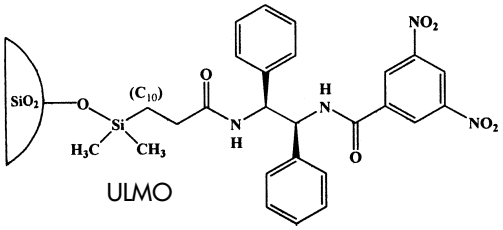


Whelk-O 2

ULMO

The ULMO chiral stationary phase was developed by Austrian Researchers, Uray, Lindner, and Maier. This CSP has a general ability to separate the enantiomers of many racemate classes, and is particularly good at separating the enantiomers of aryl carbinols.

The ULMO CSP is based on a 3,5-Dinitrobenzoyl derivative of diphenylethylene-diamine.



ULMO

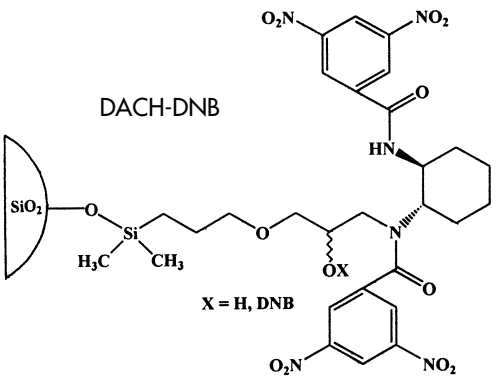
π-Electron Acceptor Phases

- DACH-DNB
- Pirkle 1-J
- α-Burke 2
- β-Gem 1
- Leucine
- Phenylglycine

The π-electron acceptor Pirkle Chiral Stationary Phases can be used to separate a wide range of enantiomers without derivatization, as demonstrated for the following classes of solutes: secondary benzyl alcohols, mandelic acid analogs, α-hydroxy-α-aryl phosphates, α-tetralol analogs, propranolol analogs, β-hydroxy-aryl sulfoxides, alkyl-aryl sulfoxides, diaryl sulfoxides, aryl-substituted cyclic phthalides, aryl-substituted lactams, aryl-substituted succinimides, aryl-substituted hydantoins, bi-β-naphthol and its analogs, and α-aryl acetamides.

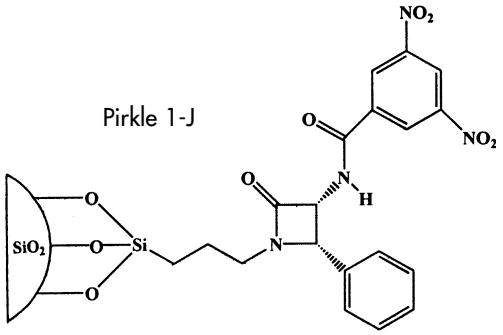
DACH-DNB

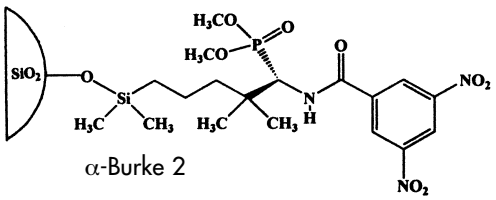
The innovative DACH-DNB CSP was designed by Italian chemists Dr. Francesco Gasparrini, Misiti and Villani at Rome University "La Sapienza." The DACH-DNB CSP; which contains the 3,5-dinitrobenzoyl derivative of 1,2-diaminocyclohexane, has been found to resolve a broad range of racemate classes including amides, alcohols, esters, ketones, acids, sulfoxides, phosphine oxides, selenoxides, phosponates, thiophosphineoxides, phosphineselenides, phosphine-boranes, β-lactams, organo-metallics, atropisomers and heterocycles.



PIRKLE 1-J

The Pirkle 1-J CSP is based on 3-(3,5-Dinitrobenzamido)-4-pheny-β-lactam. This unusual β-lactam structure significantly alters its molecular recognition properties. The Pirkle 1J is useful for the direct separation of underivatized β-blocker enantiomers. It can also be used for the separation of the enantiomers of arylpropionic acid NSAID's as well as other drugs.

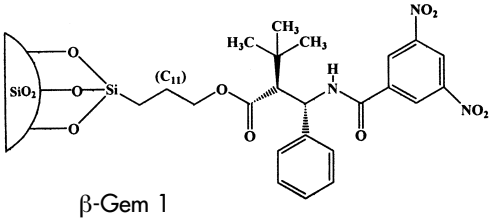




α-Burke 2

α-BURKE 2

The α-Burke 2 phase, first prepared by J. A. Burke III, a graduate student of Dr. Pirkle, is derived from dimethyl N-3,5-dinitro-benzoyl-α-amino-2,2-dimethyl-4-pentenyl phosphonate. The α-Burke 2 has been specifically designed to directly separate the enantiomers of β-blockers without chemical derivatization, but this chiral phase is not limited solely to the separation of β-blocker enantiomers. It also resolves the enantiomers of many compounds separated on π-acceptor Pirkle type chiral stationary phases.

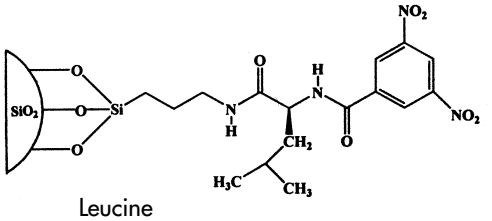


β-Gem 1

β-GEM 1

β-Gem 1 is a π-acceptor chiral stationary phase and is derived from N-3,5-dinitrobenzoyl-3-amino-3-phenyl-2-(1,1-dimethylethyl)-propanoate.

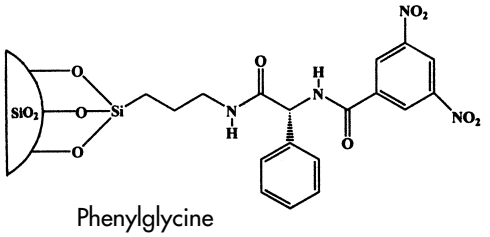
For a great many analytes, this chiral phase considerably outperforms its widely used analog, phenylglycine. It can separate anilide derivatives of a wide variety of chiral carboxylic acids, including nonsteroidal anti-inflammatory agents.



Leucine

LEUCINE

The leucine CSP is based on the 3,5-dinitrobenzoyl derivative of leucine. This π-acceptor phase demonstrates enhanced enantioselectivities for several classes of compounds, including benzodiazapines.



Phenylglycine

PHENYLGLYCINE

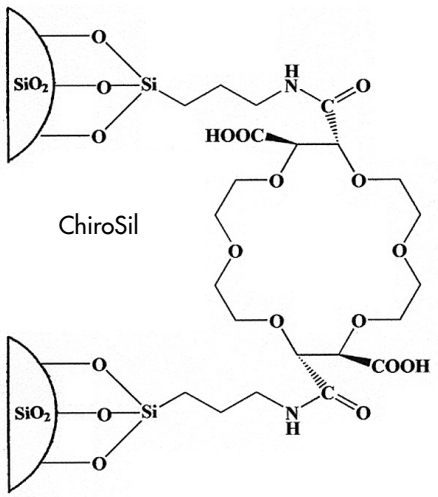
Phenylglycine is based on the 3,5-dinitrobenzoyl derivative of phenylglycine.

This CSP resolves a wide variety of compounds which contain π-basic groups. These include: aryl-substituted cyclic sulfoxides, bi-β-naphthol and its analogs, α-indanol and α-tetralol analogs, and aryl-substituted hydantoins.

Protein-Based Chiral Stationary Phases

Regis Technologies carries a line of protein-based chiral columns manufactured by ChromTech AB, United Kingdom. For additional product information and a Protein-Based Chiral Stationary Phase application guide, please contact Regis directly.

- Chiral AGP (α-glycoprotein)
- Chiral CBH (cellobiohydrolase)
- Chiral HSA (human serum albumin)



ChiroSil

RStech Corporation ChiroSil® RCA(+) and SCA(-) 18Crown-Ether Chiral Stationary Phases

- ChiroSil RCA(+)
- ChiroSil SCA (-)

Developed by RStech Corporation in Daejeon, Korea, the ChiroSil phase is the newest addition to our chiral line of columns. This phase is prepared by a covalent trifunctional bonding of (+) or (-)-(18-Crown-6)-tetracarboxylic acid as the chiral selector.

This phase which is available in analytical as well as preparative columns, is an excellent choice for the separation of amino acids and compounds containing primary amines.

Like our other line of columns, this phase is highly durable, has universal solvent compatibility, and has the ability to invert elution order.

As described above, Regis' Chiral columns can be used to separate a wide variety of enantiomers in numerous compound groups. Please refer to the Product List on page 7 for particular column types, sizes, configurations and product numbers. Consult the application separation data section that begins on page 8 for information regarding specific chiral separations on a wide variety of compounds. See Application Indexes on page 87.

PRODUCT	PARTICLE SIZE	COLUMN DIMENSIONS	PRODUCT#
(R,R)-Whelk-O 1	5 μm, 100 Å	25 cm x 4.6 mm	786201
(R,R)-Whelk-O 1	5 μm, 100 Å	25 cm x 10.0 mm	786202
(R,R)-Whelk-O 1	5 μm, 100 Å	25 cm x 30.0 mm	786205
(S,S)-Whelk-O 1	5 μm, 100 Å	25 cm x 4.6 mm	786101
(S,S)-Whelk-O 1	5 μm, 100 Å	25 cm x 10.0 mm	786102
(S,S)-Whelk-O 1	5 μm, 100 Å	25 cm x 30.0 mm	786105
(R,R)-Whelk-O 1	10 μm, 100 Å	25 cm x 4.6 mm	786515
(R,R)-Whelk-O 1	10 μm, 100 Å	25 cm x 10.0 mm	786525
(R,R)-Whelk-O 1	10 μm, 100 Å	25 cm x 21.1 mm	786535
(R,R)-Whelk-O 1	10 μm, 100 Å	50 cm x 21.1 mm	786545
(R,R)-Whelk-O 1	10 μm, 100 Å	25 cm x 30.0 mm	786708
(R,R)-Whelk-O 1	10 μm, 100 Å	25 cm x 50.0 mm	786709
(R,R)-Whelk-O 1	10 μm, 100 Å	50 cm x 30.0 mm	786713
(R,R)-Whelk-O 1	10 μm, 100 Å	50 cm x 50.0 mm	786710
(S,S)-Whelk-O 1	10 μm, 100 Å	25 cm x 4.6 mm	786615
(S,S)-Whelk-O 1	10 μm, 100 Å	25 cm x 10.0 mm	786625
(S,S)-Whelk-O 1	10 μm, 100 Å	25 cm x 21.1mm	786635
(S,S)-Whelk-O 1	10 μm, 100 Å	50 cm x 21.1 mm	786645
(S,S)-Whelk-O 1	10 μm, 100 Å	25 cm x 30.0 mm	786702
(S,S)-Whelk-O 1	10 μm, 100 Å	25 cm x 50.0 mm	786703
(S,S)-Whelk-O 1	10 μm, 100 Å	50 cm x 30.0 mm	786716
(S,S)-Whelk-O 1	10 μm, 100 Å	50 cm x 50.0 mm	786704
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(S,S)-Whelk-O 2	10 μm, 100 Å	50 cm x 21.1 mm	786445
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(S,S)-Whelk-O 2	10 μm, 100 Å	50 cm x 30.0 mm	786736
(S,S)-Whelk-O 2	10 μm, 100 Å	50 cm x 50.0 mm	786723
(R,R)-ULMO	5 μm, 100 Å	25 cm x 4.6 mm	787200
(R,R)-ULMO	5 μm, 100 Å	25 cm x 10.0 mm	787201
(R,R)-ULMO	5 μm, 100 Å	25 cm x 30.0 mm	787203
(S,S)-ULMO	5 μm, 100 Å	25 cm x 4.6 mm	787100
(S,S)-ULMO	5 μm, 100 Å	25 cm x 10.0 mm	787101
(S,S)-ULMO	5 μm, 100 Å	25 cm x 30.0 mm	787103
(R,R)-ULMO	10 μm, 100 Å	25 cm x 21.1 mm	787202
(R,R)-ULMO	10 μm, 100 Å	25 cm x 30.0 mm	787707
(R,R)-ULMO	10 μm, 100 Å	25 cm x 50.0 mm	787708
(R,R)-ULMO	10 μm, 100 Å	50 cm x 30.0 mm	787712
(R,R)-ULMO	10 μm, 100 Å	50 cm x 50.0 mm	787709
(S,S)-ULMO	10 μm, 100 Å	25 cm x 21.1 mm	787102
(S,S)-ULMO	10 μm, 100 Å	25 cm x 30.0 mm	787701
(S,S)-ULMO	10 μm, 100 Å	25 cm x 50.0 mm	787702
(S,S)-ULMO	10 μm, 100 Å	50 cm x 30.0 mm	787715
(S,S)-ULMO	10 μm, 100 Å	50 cm x 50.0 mm	787703

PRODUCT	PARTICLE SIZE	COLUMN DIMENSIONS	PRODUCT#
(R,R)-DACH-DNB	5 μm, 100 Å	25 cm x 4.6 mm	788101
(R,R)-DACH-DNB	5 μm, 100 Å	25 cm x 10.0 mm	788102
(R,R)-DACH-DNB	5 μm, 100 Å	25 cm x 30.0 mm	788104
(S,S)-DACH-DNB	5 μm, 100 Å	25 cm x 4.6 mm	788201
(S,S)-DACH-DNB	5 μm, 100 Å	25 cm x 10.0 mm	788202
(S,S)-DACH-DNB	5 μm, 100 Å	25 cm x 30.0 mm	788204
(R,R)-DACH-DNB	10 μm, 100 Å	25 cm x 21.1 mm	788103
(R,R)-DACH-DNB	10 μm, 100 Å	25 cm x 30.0 mm	788707
(R,R)-DACH-DNB	10 μm, 100 Å	25 cm x 50.0 mm	788708
(R,R)-DACH-DNB	10 μm, 100 Å	50 cm x 30.0 mm	788712
(R,R)-DACH-DNB	10 μm, 100 Å	50 cm x 50.0 mm	788709
(S,S)-DACH-DNB	10 μm, 100 Å	25 cm x 21.1 mm	788203
(S,S)-DACH-DNB	10 μm, 100 Å	25 cm x 30.0 mm	788701
(S,S)-DACH-DNB	10 μm, 100 Å	25 cm x 50.0 mm	788702
(S,S)-DACH-DNB	10 μm, 100 Å	50 cm x 30.0 mm	788715
(S,S)-DACH-DNB	10 μm, 100 Å	50 cm x 50.0 mm	788705
(3R,4S)-Pirkle 1-J	5 μm, 100 Å	25 cm x 4.6 mm	731044
(3R,4S)-Pirkle 1-J	5 μm, 100 Å	25 cm x 10.0 mm	731244
(3S,4R)-Pirkle 1-J	5 μm, 100 Å	25 cm x 4.6 mm	731045
(3S,4R)-Pirkle 1-J	5 μm, 100 Å	25 cm x 10.0 mm	731245
(R,R)-α-Burke 2	5 μm, 100 Å	25 cm x 4.6 mm	735035
(R,R)-α-Burke 2	5 μm, 100 Å	25 cm x 10.0 mm	735235
(S,S)-α-Burke 2	5 μm, 100 Å	25 cm x 4.6 mm	735037
(S,S)-α-Burke 2	5 μm, 100 Å	25 cm x 10.0 mm	735237
(R,R)-β-Gem 1	5 μm, 100 Å	25 cm x 4.6 mm	731043
(R,R)-β-Gem 1	5 μm, 100 Å	25 cm x 10.0 mm	731243
(S,S)-β-Gem 1	5 μm, 100 Å	25 cm x 4.6 mm	731029
(S,S)-β-Gem 1	5 μm, 100 Å	25 cm x 10.0 mm	731229
D-Leucine	5 μm, 100 Å	25 cm x 4.6 mm	731054
D-Leucine	5 μm, 100 Å	25 cm x 10.0 mm	731254
L-Leucine	5 μm, 100 Å	25 cm x 4.6 mm	731041
L-Leucine	5 μm, 100 Å	25 cm x 10.0 mm	731241
D-Phenylglycine	5 μm, 100 Å	25 cm x 4.6 mm	731021
D-Phenylglycine	5 μm, 100 Å	25 cm x 10.0 mm	731221
L-Phenylglycine	5 μm, 100 Å	25 cm x 4.6 mm	731024
L-Phenylglycine	5 μm, 100 Å	25 cm x 10.0 mm	731224
Chiral AGP	5 μm, 300 Å	10 cm x 4.0 mm	732200
Chiral AGP	5 μm, 300 Å	15 cm x 4.0 mm	732199
Chiral CBH	5 μm, 300 Å	10 cm x 4.0 mm	732350
Chiral CBH	5 μm, 300 Å	15 cm x 4.0 mm	732351
Chiral HSA	5 μm, 300 Å	10 cm x 4.0 mm	732240
Chiral HSA	5 μm, 300 Å	15 cm x 4.0 mm	732239
ChiroSil® RCA(+)	5 μm, 100 Å	15 cm x 4.6 mm	799001
ChiroSil® RCA(+)	5 μm, 100 Å	25 cm x 4.6 mm	799002
ChiroSil® SCA(-)	5 μm, 100 Å	15 cm x 4.6 mm	799101
ChiroSil® SCA(-)	5 μm, 100 Å	25 cm x 4.6 mm	799102

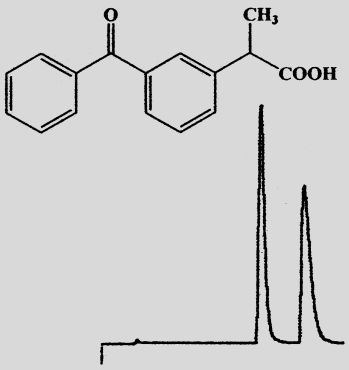
Bulk material is available for all Chiral Stationary Phases

For column dimensions not listed, please contact Regis

NOTE: All columns (except the protein-based columns) listed contain chiral stationary phases that are covalently bound on 5 μm or 10 μm 100 Å spherical silica. A large variety of column dimensions and/or particle sizes are available upon request.

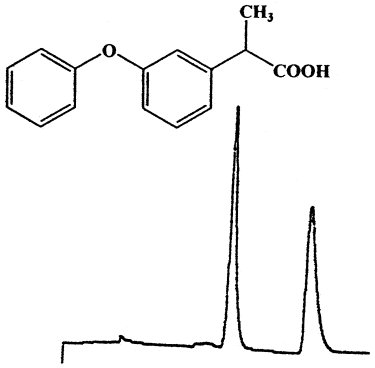
Ketoprofen

Ketoprofen
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (47/47/6)
CH_2Cl_2/Hexane/Ethanol +
0.01 M Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 11.0 min
k'_1 = 3.63
α = 1.35
reference 46



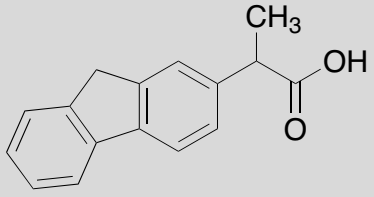
Fenoprofen

Fenoprofen
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (98/2)
Hexane/IPA +
0.1% Acetic Acid
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 14.5 min
k'_1 = 2.62
α = 1.66
reference 46



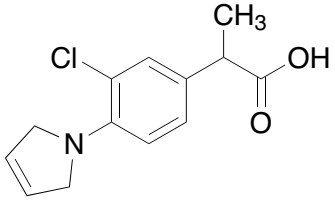
Cicloprofen

Cicloprofen
20% IPA/hex, 1g/L NH_4OAc
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 1.16
α = 2.15
reference 4



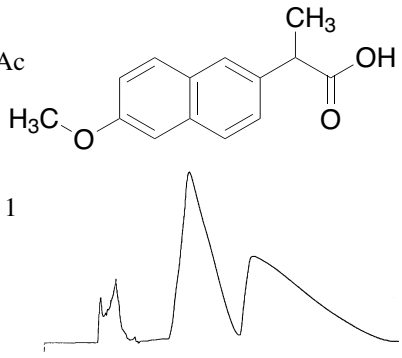
Pirprofen

Pirprofen
20% IPA/hex, 1g/L
NH_4OAc
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 0.85
α = 1.81
reference 4



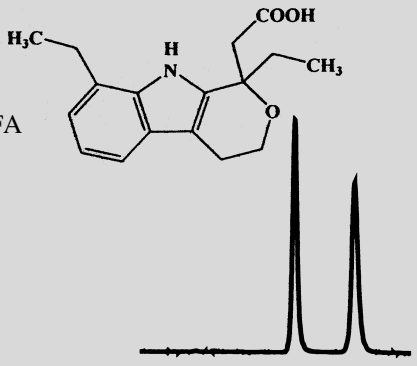
Naproxen (semi prep)

Naproxen (semi prep on
analytical column)
80:20:0.5 hexane/IPA/HOAc
1 ml/min; 300 nm
Run Time = 18 min
inject 400 µl @
31.5 mg/ml = 12.6 mg
4.6 mm x 25 cm Whelk-O 1
reference 6



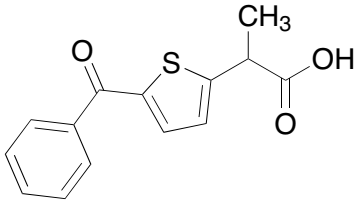
Etodolac

Etodolac
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98/2)
Hexane/IPA + 0.1% TFA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 14.5 min
k'_1 = 2.43
α = 1.50
reference 48



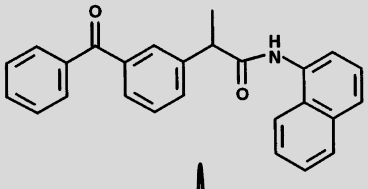
Tiaprofenic Acid

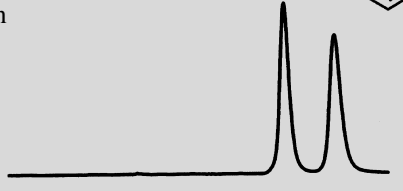
Tiaprofenic Acid
20% IPA/hex, 1g/L NH_4OAc
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 2.02
α = 1.09
reference 4



Ketoprofen as 1-naphthylamide

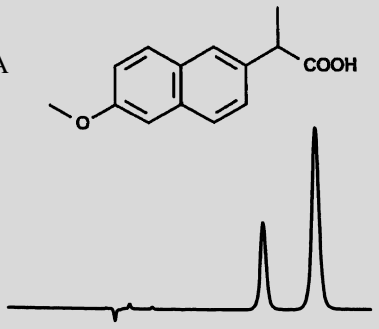
Column: (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (70/30)
Heptane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 230 nm
Run Time = 13 min
k'_1 = 1.51
α = 1.25
reference 48





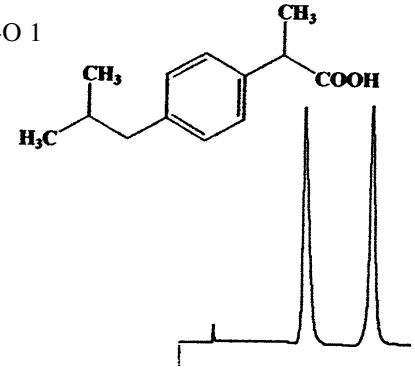
Naproxen (R:S=30:70)

Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase (90/10)
Heptane/IPA + 0.1% TFA
Flow Rate = 1.0 mL/min
Detection = UV 230 nm
Run Time = 8.5 min
k'_1 = 1.54
α = 1.34
reference 48



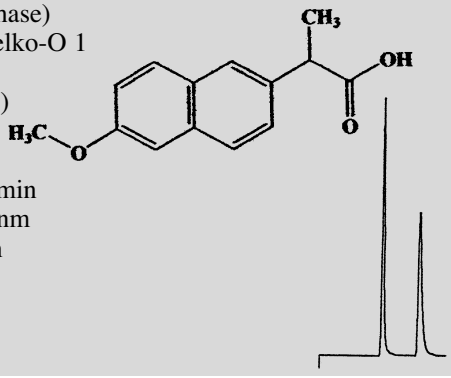
Ibuprofen

Ibuprofen
Column = (R,R)-Whelko-O 1
25 cm x 4.6 mm
Mobile Phase: (90/10)
Hexane/IPA +
0.01 M Ammonium
Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 11.8 min
k'_1 = 3.21
α = 1.72
reference 46



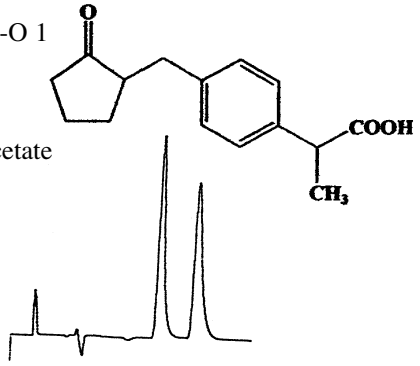
Naproxen (Normal Phase)

Naproxen (Normal Phase)
Column = (R,R)-Whelko-O 1
25 cm x 4.6 mm
Mobile Phase: (60/40)
Hexane/IPA +
0.1% Acetic Acid
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 10.5 min
k'_1 = 1.40
α = 2.03
reference 46



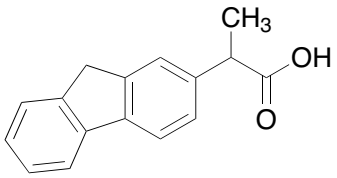
Loxoprofen

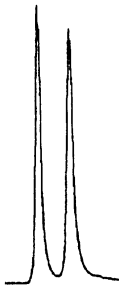
Loxoprofen
Column = (R,R)-Whelko-O 1
25 cm x 4.6 mm
Mobile Phase: (85/15)
Hexane/Ethanol +
0.01 M Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 15.0 min
k'_1 = 5.41
α = 1.30
reference 46



Cicloprofen

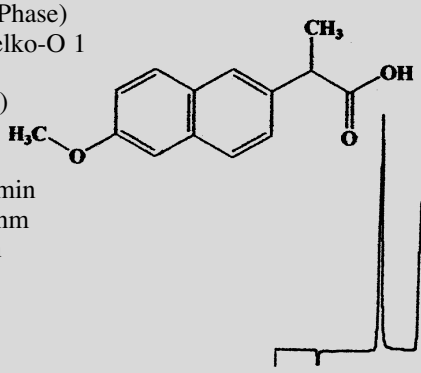
Cicloprofen
70:30:0.5 hexane/IPA/HOAc
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 0.48
α = 1.35
reference 26





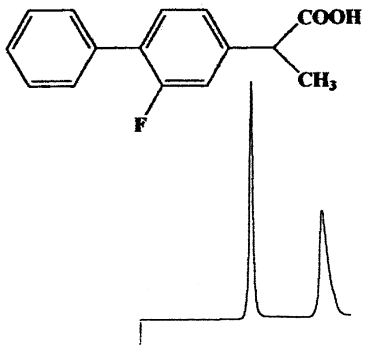
Naproxen (Reversed Phase)

Naproxen (Reversed Phase)
Column = (R,R)-Whelko-O 1
25 cm x 4.6 mm
Mobile Phase: (80/20)
CH_3OH/H_2O +
0.1% Acetic Acid
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 10.0 min
k'_1 = 1.63
α = 1.64
reference 46



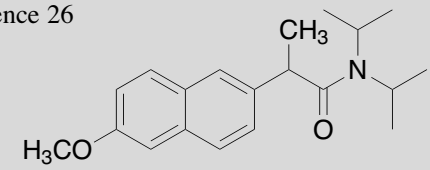
Flurbiprofen

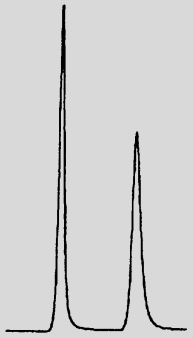
Flurbiprofen
Column = (R,R)-Whelko-O 1
25 cm x 4.6 mm
Mobile Phase: (90/10)
Hexane/IPA +
0.01 M Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 20.5 min
k'_1 = 5.90
α = 1.76
reference 46



Naproxen Diisopropyl Amide

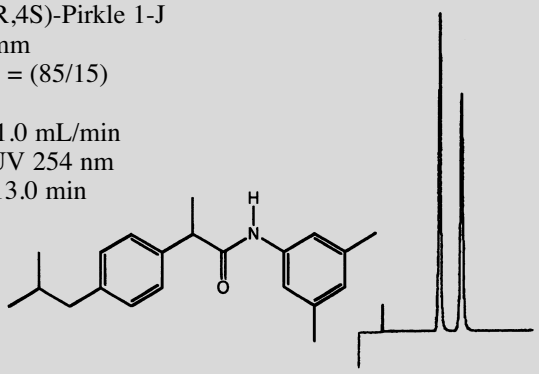
Naproxen Diisopropyl Amide
10%EtOH/hex
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 2.23
α = 1.53
reference 26





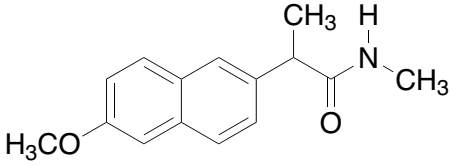
3,5-Dimethylanilide-R,S-Ibuprofen

Column = (3R,4S)-Pirkle 1-J
25 cm x 4.6 mm
Mobile Phase = (85/15)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 13.0 min
k'_1 = 2.91
α = 1.36
reference 46



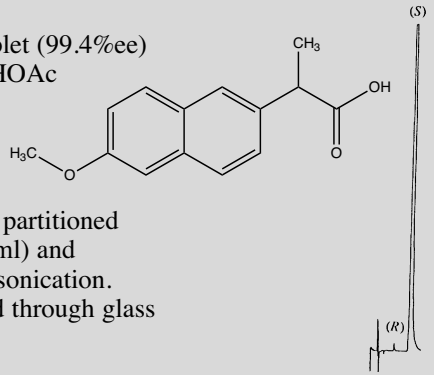
Naproxen Methyl Amide

Naproxen Methyl Amide
20% IPA/hex, 1g/L NH_4OAc
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 18.73
α = 1.41
reference 14



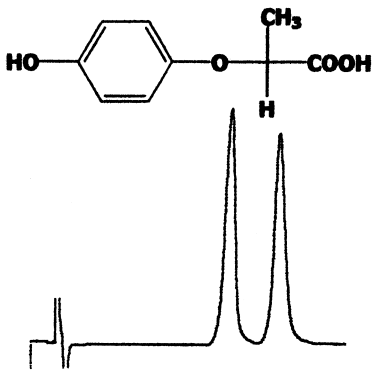
Naproxen

Naproxen
Extract from Aleve® tablet (99.4%ee)
80:20:0.5 hexane/IPA/HOAc
2 ml/min; 254 nm
Run Time = 10 min
4.6 mm x 25 cm (*S,S*)
Whelk-O 1
Sample prep: 1/2 tablet partitioned between 1M HC1 (2 ml) and CH_2C1_2 (5 ml) with sonication. CH_2C1_2 layer filtered through glass wool and injected



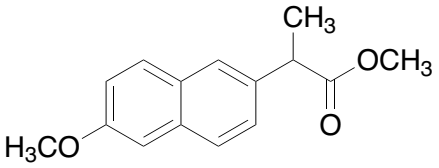
2-(4-Hydroxy-Phenoxy) Propionic Acid

2-(4-Hydroxy-Phenoxy)
Propionic Acid
Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase: (97/3)
Hexane/Ethanol
+ 0.1% TFA
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 22.5 min
k'_1 = 9.02
α = 1.27
reference 46



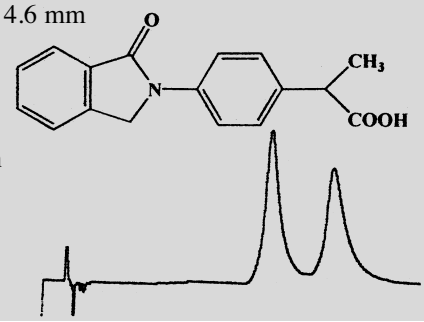
Naproxen Methyl Ester

Naproxen Methyl Ester
20% IPA/hex, 1g/L NH_4OAc
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 3.42
α = 1.42
reference 14



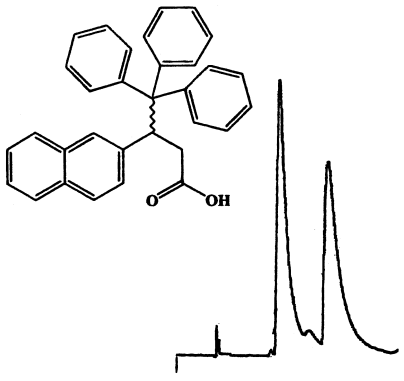
Indoprofen

Indoprofen
Column = (S,S)-Whelk-O 1
10/100 (FEC) 25 cm x 4.6 mm
Mobile Phase = (80/20)
Hexane/Ethanol +
0.01 M Ammonium
Acetate
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
Run Time 17.0 min
k'_1 = 8.93
α = 1.32
reference 46



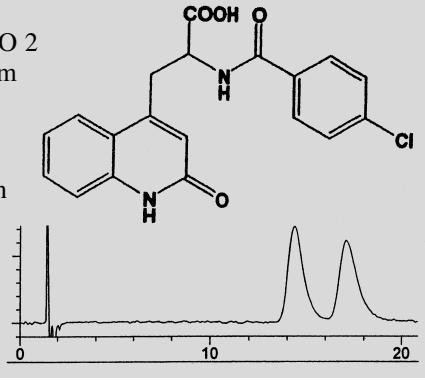
α-Trityl-2-naphthalene Propionic Acid

α-Trityl-2-naphthalene
propionic acid
Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase =
(97/3)Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 10.0 min
k'_1 = 1.57
α = 1.79
reference 46



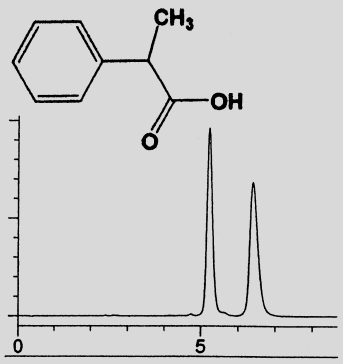
Rebamipide

Rebamipide
Column = (S,S)-Whelk-O 2
10/100 25 cm x 4.6 mm
Mobile Phase: (85/15)
Hexane/Ethanol
+ 0.1% TFA
Flow Rate = 2.0 mL/min
Detection = UV 220 nm
k'_1 = 9.64
α = 1.21
reference 46



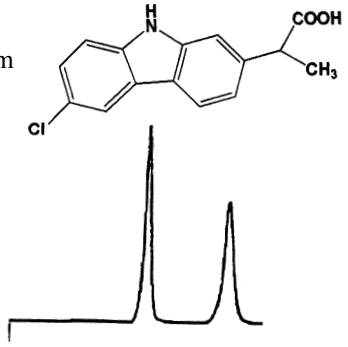
Hydratropic Acid

Hydratropic Acid
Column = (R,R)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase: (98/2)
Hexane/IPA
+ 0.1% Acetic Acid
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
k'_1 = 1.89
α = 1.34
reference 46



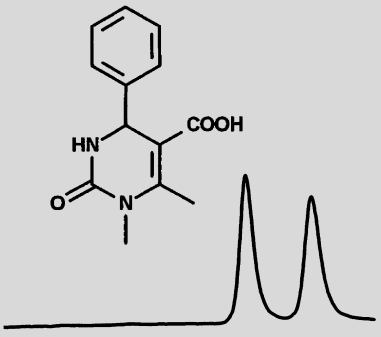
Carprofen

Carprofen
Column = (R,R)-Whelk-O 1
10/100 (FEC) 25 cm x 4.6 mm
Mobile Phase: (85/15)
Hexane/IPA
+ 0.1% Acetic Acid
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
k'_1 = 4.70
α = 1.73
reference 46



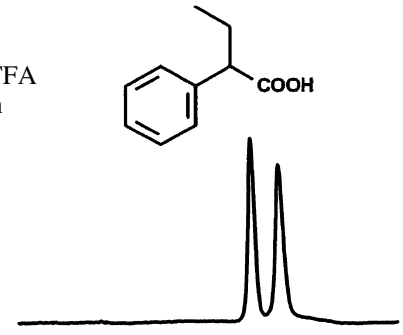
Tetrahydropyrimindine Carboxylic Acid

Column: (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase: (90/10)
Heptane/IPA + 0.1% TFA
Flow Rate: 1.0 mL/min
Detection: UV 215 nm
Run Time: 14 min
k'_1 = 3.38
α = 1.21
reference 48

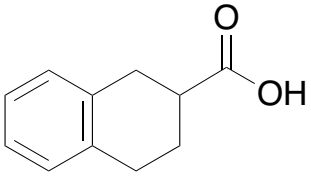


Phenylbutyric acid

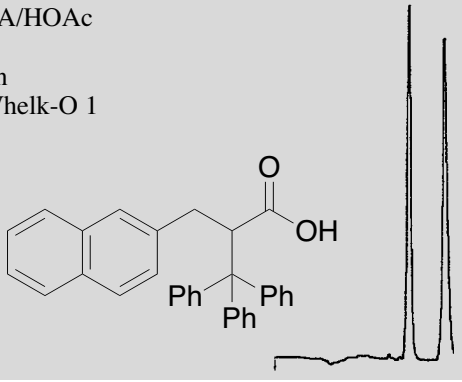
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (99/1)
Heptane/IPA + 0.1% TFA
Flow Rate = 2.0 mL/min
Detection = UV 215 nm
Run Time = 6.5 min
k'_1 = 3.19
α = 1.16
reference 48



99:1:0.1 hexane/IPA/HOAc
1 ml/min; 254 nm
Run Time = 17 min
4.6 mm x 25 cm Whelk-O 1
k'_1 = 4.06
α = 1.28
reference 18

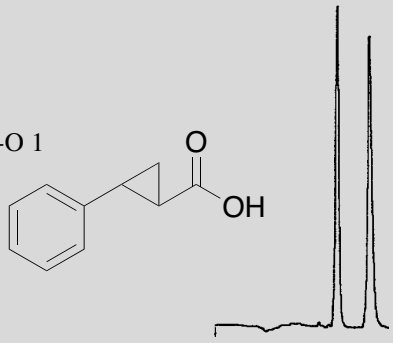


99:1:0.1 hexane/IPA/HOAc
1 ml/min; 254 nm
Run Time = 16 min
4.6 mm x 25 cm Whelk-O 1
k'_1 = 3.45
α = 1.38
reference 18



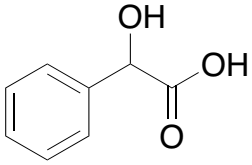
2-Phenylcyclopropane Carboxylate

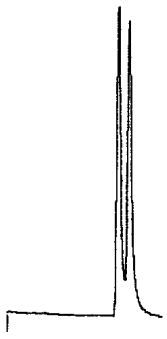
2-Phenylcyclopropane
Carboxylate
99:1 hexane/IPA
1 ml/min; 220 nm
Run Time = 18 min
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 4.19$
$\alpha = 1.34$
reference 18



Mandelic Acid

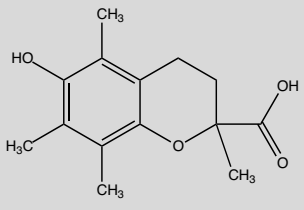
Mandelic Acid
0.1% HOAc in water
1 ml/min; 254 nm
Run Time = 13 min
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 3.08$
$\alpha = 1.13$
reference 18

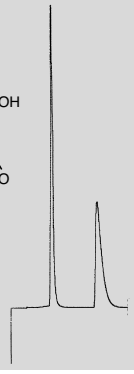




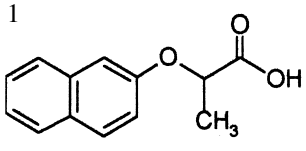
Trolox

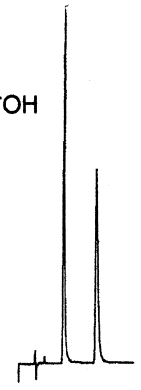
Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase = (95/5)
Hexane/IPA +
0.1% Acetic acid
Flow Rate = 1.5 mL/min
Detection = UV 280 nm
Run Time = 12.5 min
$k'_1 = 2.18$
$\alpha = 2.68$
reference 46





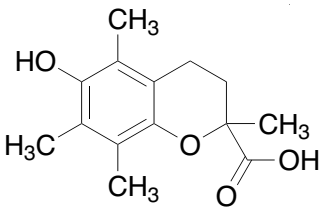
Column = (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (95/5)
Hexane/IPA + 0.1%
Trifluoroacetic Acid
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
Run Time = 8.5 min
$k'_1 = 2.03$
$\alpha = 2.10$
reference 49

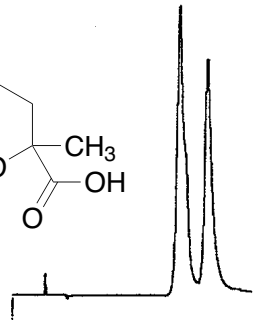




Trolox

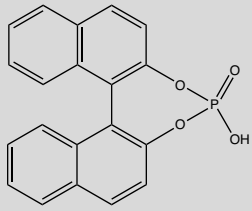
Trolox
95:5:0.1 hexane/IPA/HOAc
1 ml/min; 254 nm
Run Time = 19 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 5.09$
$\alpha = 1.21$
reference 18

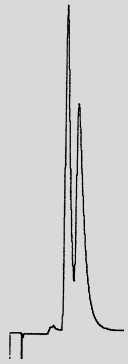




1,1'-binaphthyl-2,2'-diylhydrogen phosphate

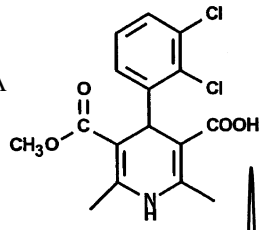
56:44 H_2O/MeOH, 0.1%
HOAc
1 ml/min; 254 nm
Run Time = 18 min
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 4.46$
$\alpha = 1.27$

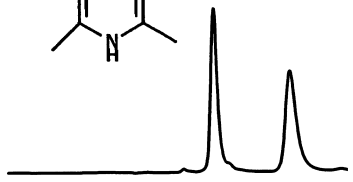




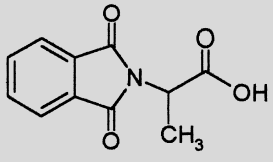
Calcium Channel Blocker

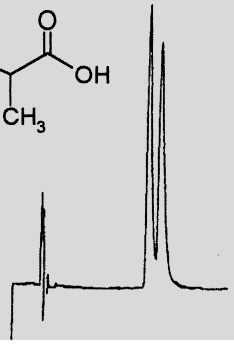
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (99/1)
Heptane/IPA + 0.1% TFA
Flow Rate = 1.0 mL/min
Detection = UV 230 nm
Run Time = 6 min
$k'_1 = 0.55$
$\alpha = 2.06$
reference 48



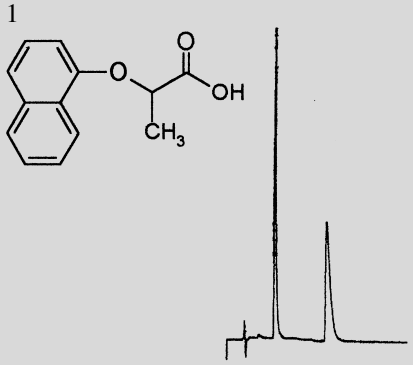


Column = (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (95/5)
Hexane/IPA + 0.1%
Trifluoroacetic Acid
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
Run Time = 8.5 min
$k'_1 = 4.20$
$\alpha = 1.11$
reference 50

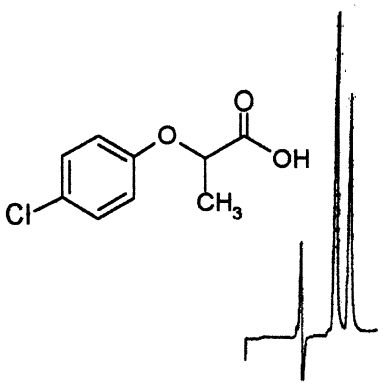




Column = (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (95/5)
Hexane/IPA + 0.1%
Trifluoroacetic Acid
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
Run Time = 10.0 min
k'_1 = 2.07
α = 2.62
reference 49

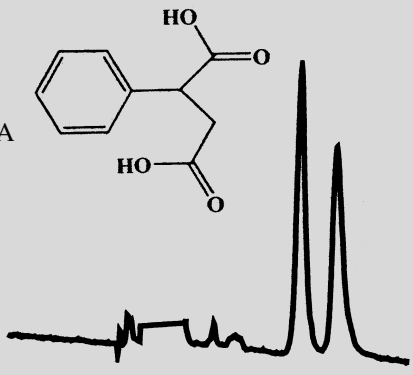


Column = (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase: (95/5)
Hexane/IPA + 0.1%
Trifluoroacetic Acid
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
Run Time = 3.5 min
k'_1 = 0.84
α = 1.36
reference 49



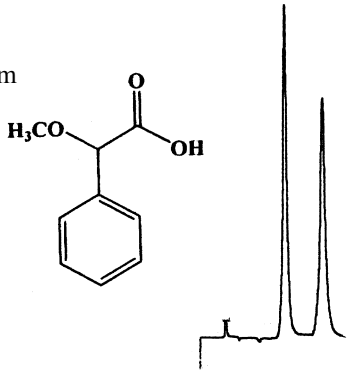
Phenylsuccinic Acid

Phenylsuccinic Acid
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (95/5)
Hexane/IPA + 0.1% TFA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 8.5 min
k'_1 = 1.71
α = 1.22
reference 48

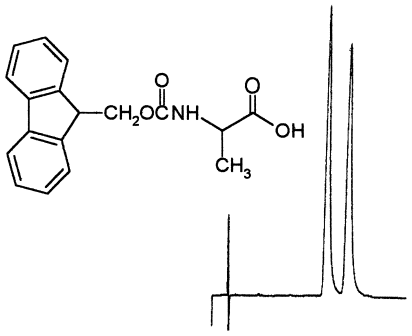


α-Methoxyphenyl Acetic Acid

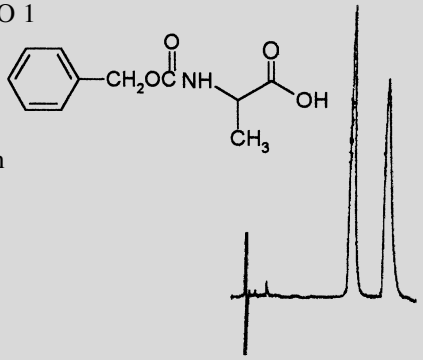
α-Methoxyphenyl Acetic Acid
Column = (S,S)-Whelk-O 1
10/100 (FEC) 25 cm x 4.6 mm
Mobile Phase = (90/10)
Hexane/Ethanol +
0.01 M Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 220 nm
Run Time = 10.0 min
k'_1 = 2.96
α = 1.61
reference 46



Column = (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (95/5)
Hexane/IPA + 0.1%
Trifluoroacetic Acid
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
Run Time = 14.5 min
k'_1 = 7.24
α = 1.22
reference 50

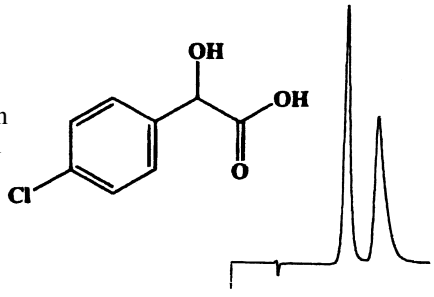


Column = (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (95/5)
Hexane/IPA + 0.1%
Trifluoroacetic Acid
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
Run Time = 11.5 min
k'_1 = 5.44
α = 1.34
reference 50



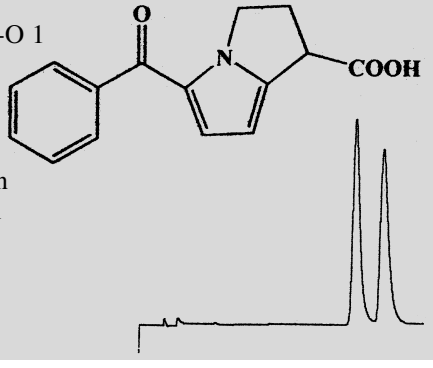
4-Chloromandelic Acid

4-Chloromandelic Acid
Column = (R,R)-Whelk-O 2
25 cm x 4.6 mm
Mobile Phase = (70/30)
H_2O/CH_3OH
+ 0.1% Acetic Acid
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 10.0 min
k'_1 = 1.95
α = 1.43
reference 46



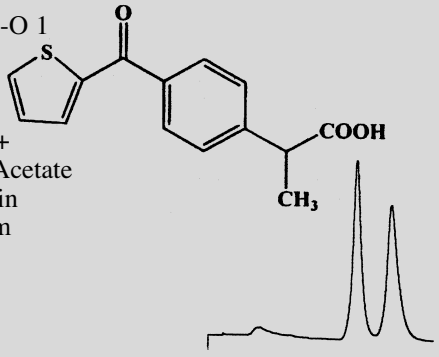
Ketorolac

Ketorolac
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (98/2)
Hexane/IPA +
0.1% TFA
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 20.0 min
k'_1 = 8.87
α = 1.15
reference 46



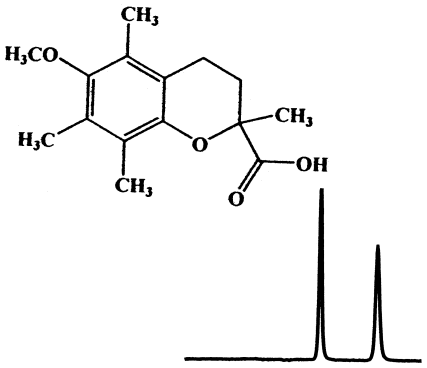
Suprofen

Suprofen
Column = (S,S)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase =
(80/20) Hexane/IPA +
0.01 M Ammonium Acetate
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
Run Time = 18.0 min
k'_1 = 9.76
α = 1.27
reference 46



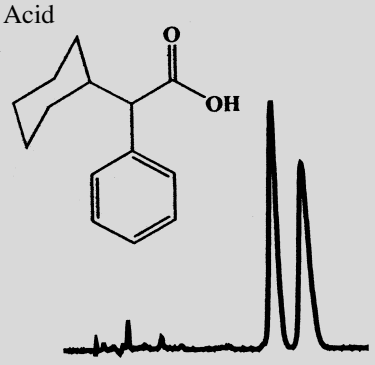
Trolox-methylether

Trolox-methylether
Column: (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase: (90/10)
Hexane/IPA
+ 0.1% TFA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time = 6.0 min
k'_1 = 0.32
α = 2.50
reference 48



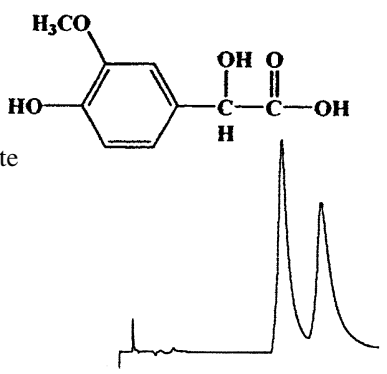
1-Cyclohexyl-1-phenylacetic Acid

1-Cyclohexyl-1-phenylacetic Acid
Column: (S,S)-ULMO 25 cm
x 4.6 mm
Mobile Phase: (99/1)
Hexane/IPA + 0.1% TFA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time = 13.0 min
k'_1 = 2.53
α = 1.18
reference 48



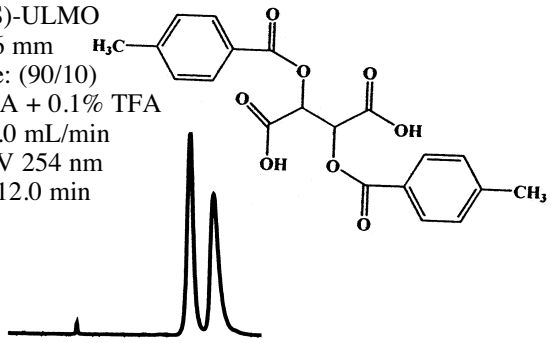
Vanilmandelic Acid

Vanilmandelic Acid
Column: (S,S)-Whelk-O 1
10/100 (FEC) 25 cm x 4.6
Moblie Phase: (85/15)
Hexane/Ethanol +
0.01 M Ammonium Acetate
Flow Rate: 2.0 mL/min
Detection: UV 254 nm
Run Time: 22.0 min
k'_1 = 12.34
α = 1.27
reference 46



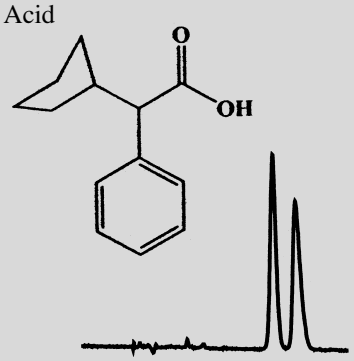
Ditoluoyltartaric Acid

Ditoluoyltartaric Acid
Column: (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase: (90/10)
Hexane/IPA + 0.1% TFA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time = 12.0 min
k'_1 = 2.47
α = 1.19
reference 48



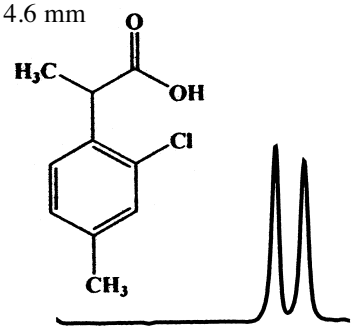
1-Cyclopentyl-1-phenylacetic Acid

1-Cyclopentyl-1-phenylacetic Acid
Column: (S,S)-ULMO 25 cm
x 4.6 mm
Mobile Phase: (99/1)
Hexane/IPA + 0.1% TFA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time = 12.0 min
k'_1 = 2.46
α = 1.19
reference 48



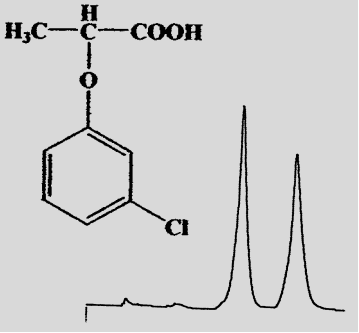
2-(2-Chloro-4-methylphenoxy)propionic Acid

2-(2-Chloro-4-methylphenoxy)propionic Acid
Column: (S,S)-ULMO 25 cm x 4.6 mm
Mobile Phase: (99/1)
Hexane/IPA + 0.1% TFA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time = 11.0 min
k'_1 = 2.22
α = 1.11
reference 48



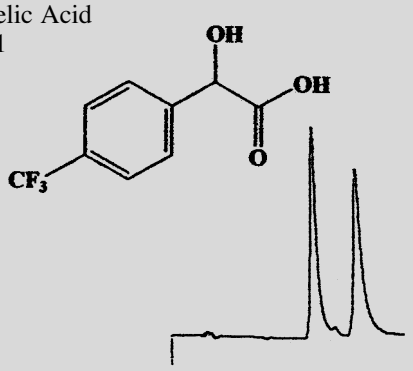
2-(3-Chlorophenoxy) Propionic Acid

2-(3-Chlorophenoxy) Propionic Acid
Column: (R,R)-Whelk-O 1
10/100 (FEC) 25 cm x 4.6
Moblie Phase: (99/1)
Hexane/IPA
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
Run Time: 17.0 min
k'_1 = 6.09
α = 1.42
reference 46



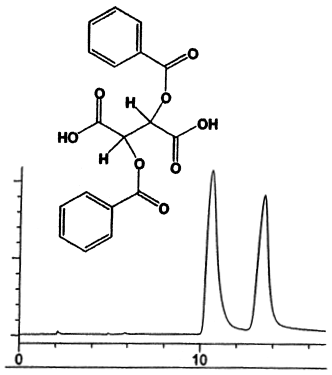
4-(Trifluoromethyl)mandelic Acid

4-(Trifluoromethyl)mandelic Acid
Column: (S,S)-Whelk-O 1
25 cm x 4.6
Moblie Phase: (92/8)
Hexane/Ethanol +
0.01 M Ammonium
Acetate
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
Run Time: 11.0 min
k'_1 = 3.59
α = 1.40
reference 46



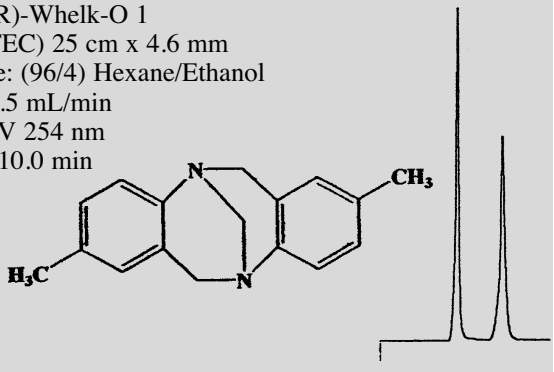
2,3-Dibenzoyl-Tartaric Acid

2,3-Dibenzoyl-Tartaric Acid
Column: (R,R)-ULMO
10/100 25 cm x 4.6 mm
Mobile Phase: (90/10)
Hexane/Ethanol +
10 mM Ammonium Acetate
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
k'_1 = 4.87
α = 1.33
reference 46

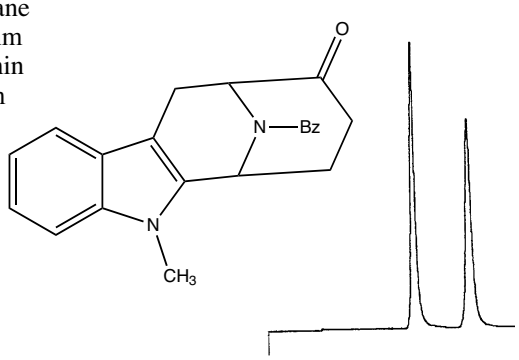


Troger's Base

Column: (R,R)-Whelk-O 1
(10/100) (FEC) 25 cm x 4.6 mm
Mobile Phase: (96/4) Hexane/Ethanol
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
Run Time = 10.0 min
k'_1 = 2.52
α = 1.80
reference 46

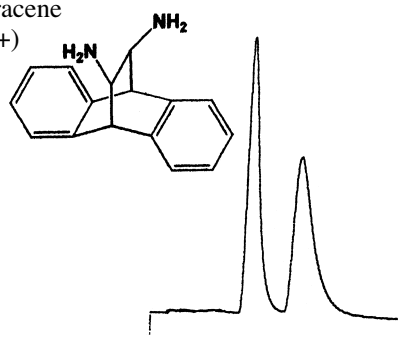


30% EtOH/hexane
1 ml/min; 254 nm
run time = 18 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 2.46
α = 2.09
reference 18



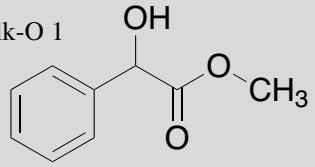
trans-11,12-Diamino-9,10-dihydro-9,10-ethanoanthracene

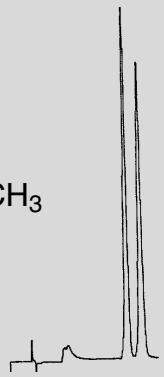
trans-11,12-Diamino-9,10-
dihydro-9,10-ethanoanthracene
Column = ChiroSil® RCA(+)
15 cm x 4.6 mm
Mobile Phase = (80/20)
CH_2OH/H_2O
+ 0.1% Phosphoric acid
Flow Rate = 1.0 mL/min
Detection = UV 220 nm
Run Time = 10.7 min
k'_1 = 3.22
α = 1.65
reference 46



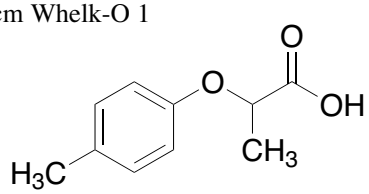
Methyl Mandelate

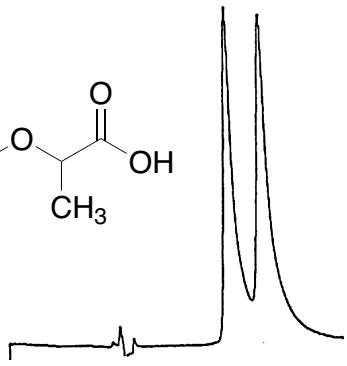
Methyl Mandelate
73:27:0.1 H_2O/CH_3CN/HOAc
1 ml/min; 254 nm
Run Time = 20 min
4.6 mm x 25 cm Whelk-O 1
k'_1 = 5.27
α = 1.15
reference 18



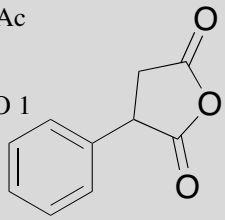


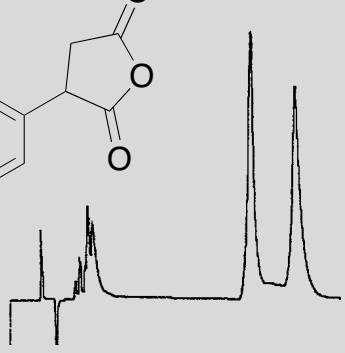
95:5:0.5 hexane/IPA/HOAc
1 ml/min; 280 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 1.27
α = 1.28
reference 26



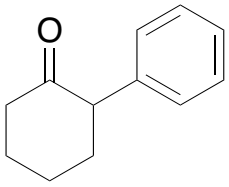


93:7:0.1 hexane/IPA/HOAc
1 ml/min; 254 nm
run time = 30 min
4.6 mm x 25 cm Whelk-O 1
k'_1 = 8.10
α = 1.21
reference 18



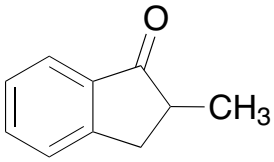


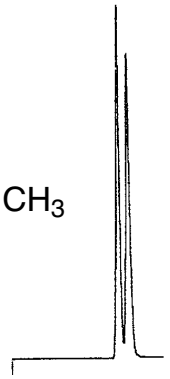
90:10 hexane/IPA
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 3.41
α = 1.81
reference 7



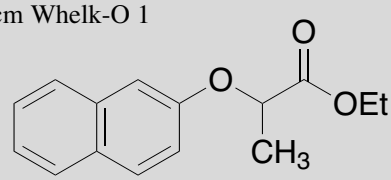
2-Methyl-1-Indanone

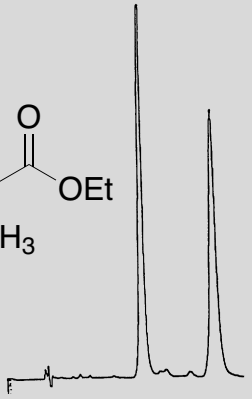
2-Methyl-1-Indanone
99:1 hexane/IPA
1 ml/min; 254 nm
Run Time = 15 min
4.6 mm x 25 cm Whelk-O 1
k'_1 = 4.00
α = 1.12
reference 18



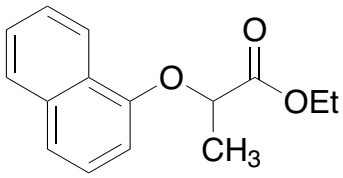


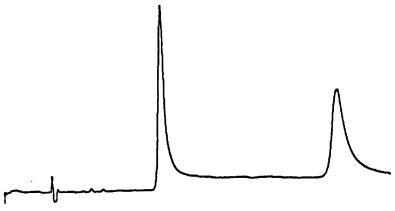
95:5:0.5 hexane/IPA/HOAc
1 ml/min; 280 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 2.85
α = 1.70
reference 26



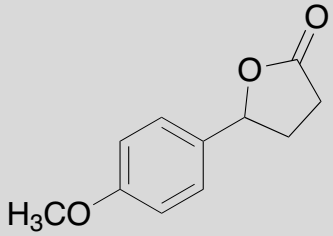


95:5:0.5 hexane/IPA/HOAc
1 ml/min; 280 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 2.75
α = 2.53
reference 26



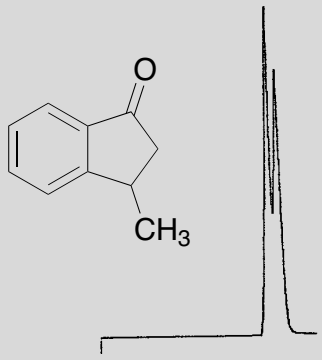


20% IPA/hex
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 5.66
α = 1.29
reference 7

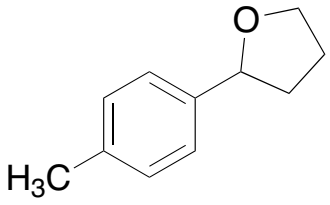


3-Methyl-1-Indanone

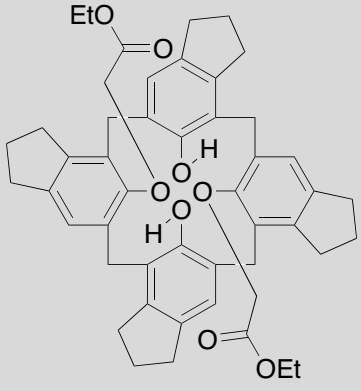
3-Methyl-1-Indanone
$k'_1 = 6.11$
$\alpha = 1.18$
99:1 hexane/IPA
1 ml/min; 254 nm
Run Time = 20 min
4.6 mm x 25 cm Whelk-O 1
reference 18



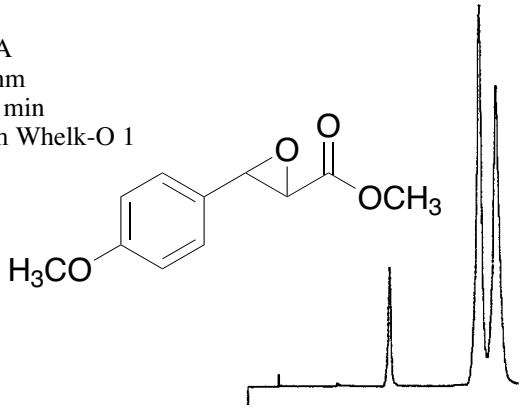
20% IPA/hex
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 1.17$
$\alpha = 1.66$
reference 7



MeOH/IPA/hexane
1 ml/min; 254 nm
Run Time = 17 min
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 12.73$
$\alpha = 1.16$
reference 19

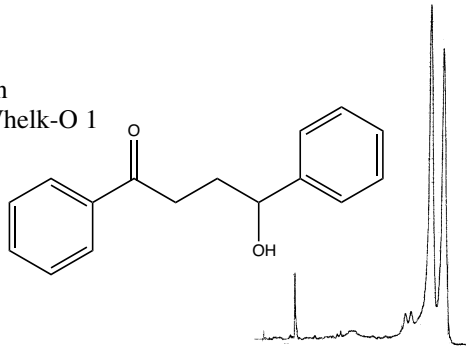


97:3 hexane/IPA
1 ml/min; 254 nm
Run Time = 27 min
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 8.46$
$\alpha = 1.08$
reference 18

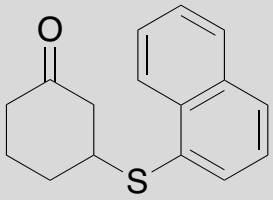


DPHB

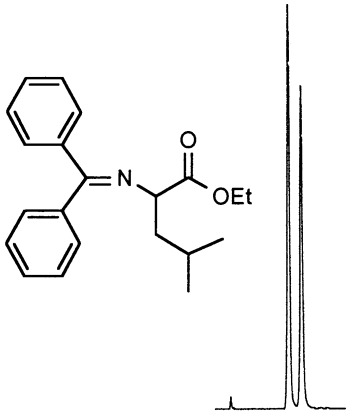
DPHB
6% EtOH/hexane
1 ml/min; 254 nm
Run Time = 41 min
4.6 mm x 25 cm Whelk-O 1
reference 29



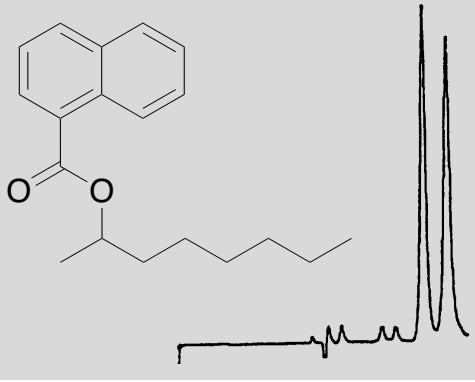
98:2 hexane/IPA
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 7.82$
$\alpha = 1.12$
reference 7



Column = L-Leucine
25 cm x 4.6 mm
Mobile Phase = (99.5/0.5)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 11.5 min
$k'_1 = 2.42$
$\alpha = 1.21$
reference 57

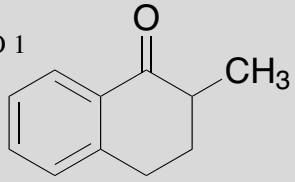


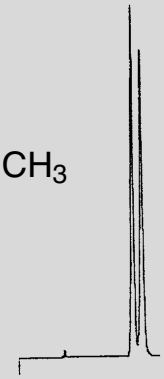
10% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 2.27$
$\alpha = 1.11$
reference 26



2-Methyl-1-Tetralone

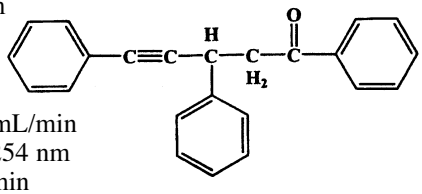
2-Methyl-1-Tetralone
99:1 hexane/IPA
1 ml/min; 254 nm
Run Time = 12 min
4.6 mm x 25 cm Whelk-O 1
k'_1 = 2.76
α = 1.11
reference 18

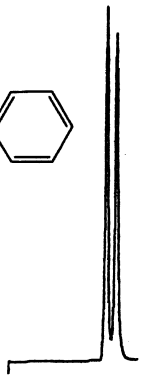




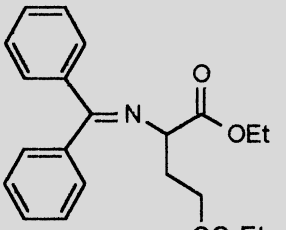
1,3,5-Triphenylpent-4-yn-1-one

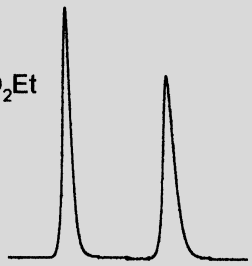
1,3,5-Triphenylpent-4-yn-1-one
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase =
Hexane +
0.5% IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 6.5 min
k'_1 = 1.19
α = 1.19
reference 46



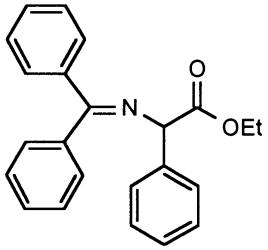


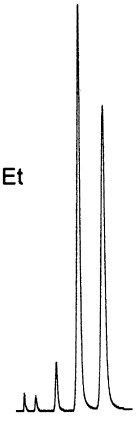
Column = (S,S)-
Whelk-O 1
25 cm x 4.6 mm
Mobile Phase =
(98/2)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 34.0 min
k'_1 = 8.00
α = 1.44
reference 51





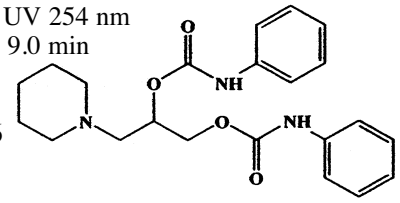
Column = (S,S)-β-Gem 1
25 cm x 4.6 mm
Mobile Phase = (99.5/0.5)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 14.5 min
k'_1 = 2.67
α = 1.43
reference 57



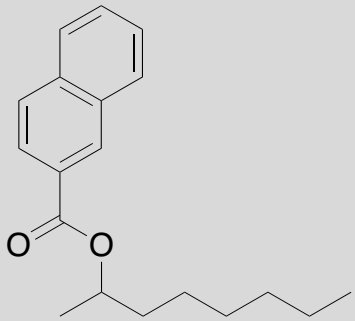


Diperodon

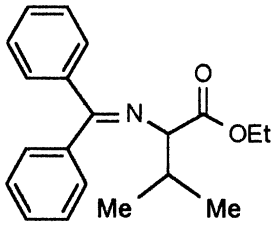
Diperodon
Column = (R)-α-Burke 2 25 cm x 4.6 mm
Mobile Phase = (48/48/4) CH_2Cl_2/Hexane/Ethanol
+ 1.5 mM Ammonium Acetate
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 9.0 min
k'_1 = 1.7
α = 1.25
reference 46

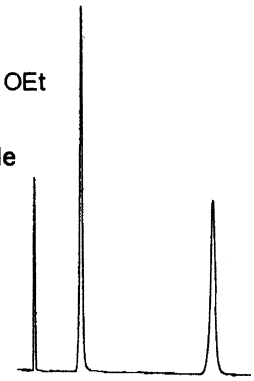


10% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 0.67
α = 1.16
reference 26

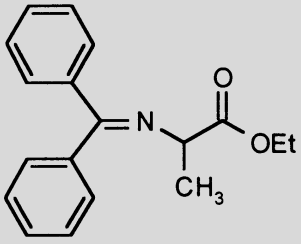


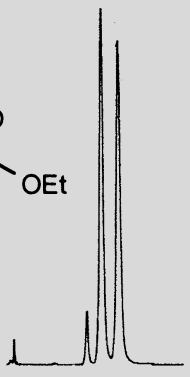
Column = (S,S)-
Whelk-O 1
25 cm x 4.6 mm
Mobile Phase =
(98/2)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection =
UV 254 nm
Run Time = 20.5 min
k'_1 = 1.62
α = 4.18
reference 51





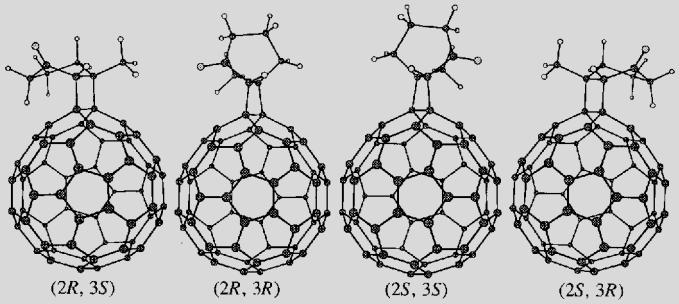
Column = D-Phenylglycine
25 cm x 4.6 mm
Mobile Phase = 99/1)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 13.5 min
k'_1 = 3.10
α = 1.18
reference 57

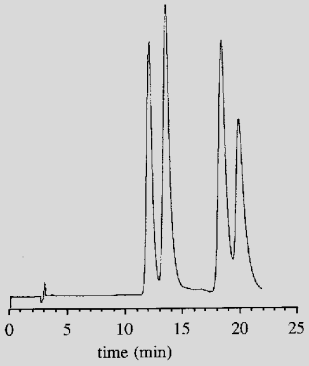




Buckminsterfullerene-Enone [2+2] Photoadducts

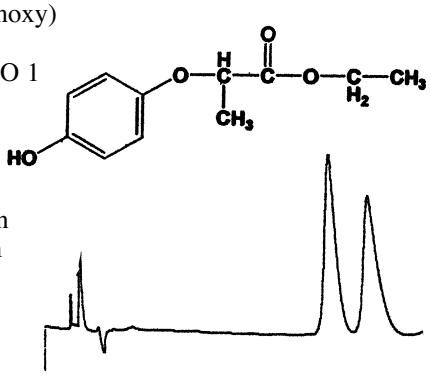
Semi-prep separation on
analytical column
2:1 toluene/hexane
1 ml/min; 400 nm
Run Time = 22 min
Sample: 100µl of
5 mg/ml solution (0.5 mg)
4.6 mm x 25 cm Whelk-O 1
reference 8





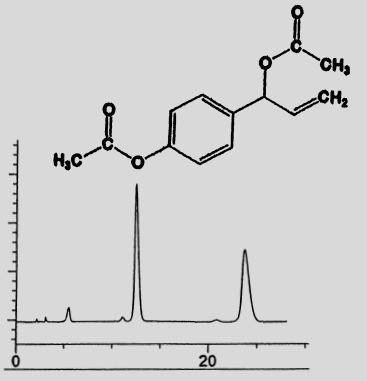
Ethyl-2-(p-Hydroxyphenoxy) Propionate

Ethyl-2-(p-Hydroxyphenoxy)
Propionate
Column = (S,S)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase = (98/2)
Hexane/Ethanol
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
Run Time = 21.1 min
k'_1 = 12.72
α = 1.15
reference 46



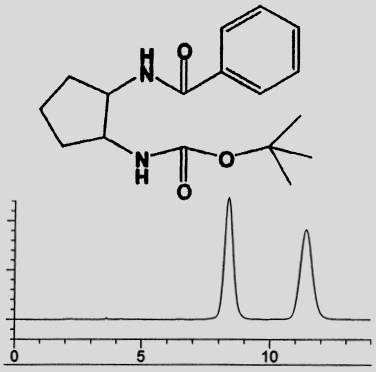
1'-Acetoxychavicol Acetate

1'-Acetoxychavicol Acetate
Column = (R,R)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase = (90/10)
Hexane/IPA
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
k'_1 = 5.94
α = 2.05
reference 46



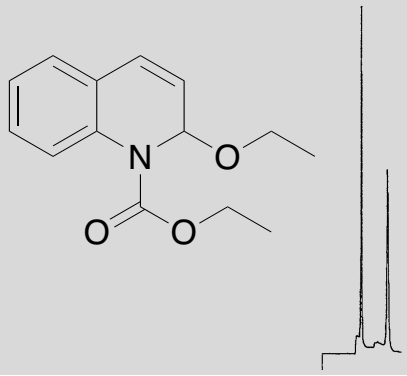
Tert-butyl-2-(benzamido) cyclopentyl carbamate

Tert-butyl-2-(benzamido)
cyclopentyl carbamate
Column = (S,S)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase = (95/5)
Hexane/IPA
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
k'_1 = 3.65
α = 1.46
reference 46



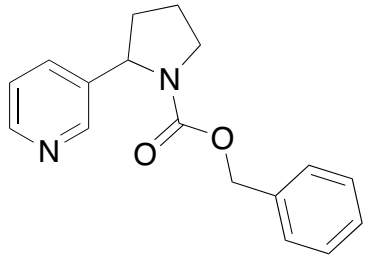
EEDQ

EEDQ
90:10 hexane/IPA
1 ml/min; 254 nm
Run Time = 25 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 1.53
α = 2.13
reference 18



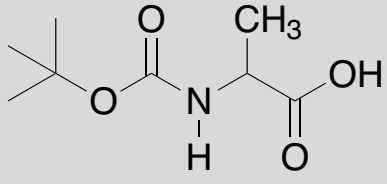
CBZ nornicotine

CBZ nornicotine
1:3 MeOH/dichloromethane
1 ml/min; 254 nm
Run Time = 5 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 0.37
α = 1.38
reference 7

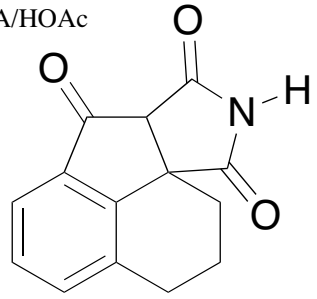


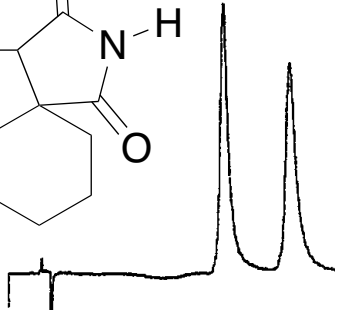
BOC-Ala

BOC-Ala
98:2:0.2 hexane/IPA/HOAc
1 ml/min; 220 nm
Run Time = 17 min
4.6 mm x 25 cm Whelk-O 1
k'_1 = 4.43
α = 1.09
reference 18

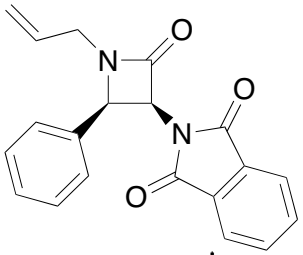


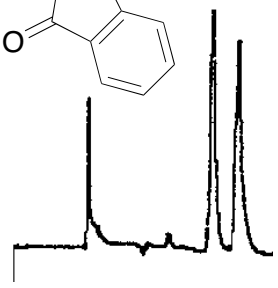
80:20:0.1 hexane/IPA/HOAc
1 ml/min; 254 nm
Run Time = 25 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 5.97
α = 1.36
reference 18





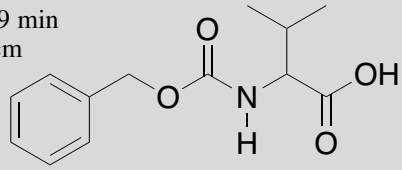
methanol
2 ml/min; 254 nm
Run Time = 6 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 1.75
α = 1.20
reference 7

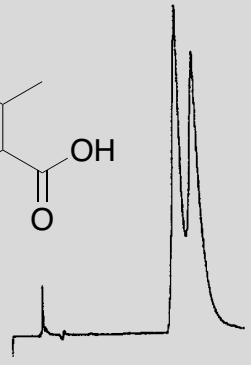




CBZ-Val

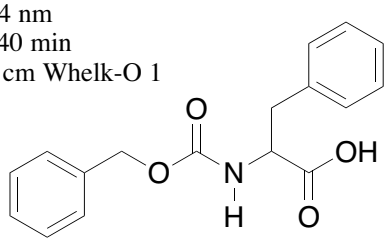
CBZ-Val
95:5:0.1 hexane/IPA/HOAc
1 ml/min; 254 nm
Run Time = 19 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 5.49
α = 1.13
reference 18

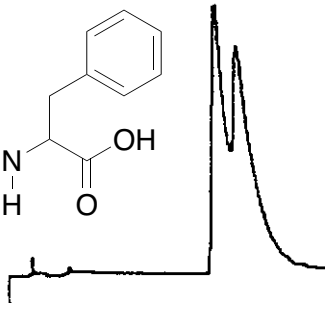




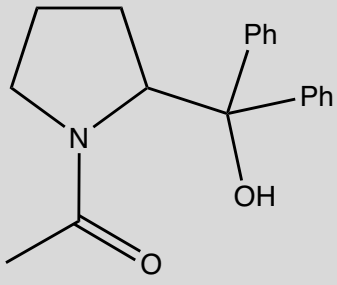
CBZ-Phe

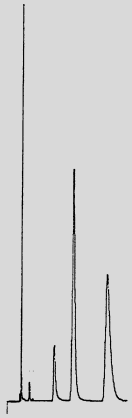
CBZ-Phe
95:5:0.1 hexane/IPA/HOAc
1 ml/min; 254 nm
Run Time = 40 min
4.6 mm x 25 cm Whelk-O 1
k'_1 = 10.2
α = 1.20
reference 18



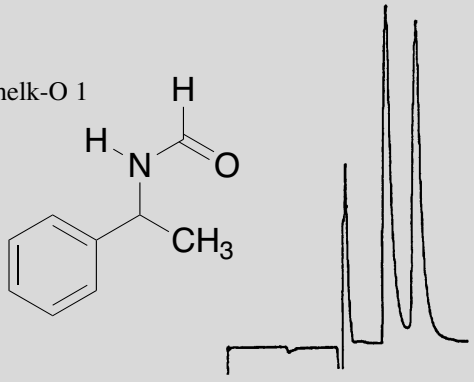


15% EtOH/hexane
1 ml/min; 254 nm
Run Time = 16 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 3.79
α = 1.66
reference 18

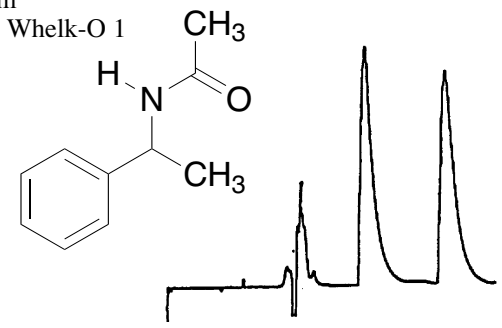




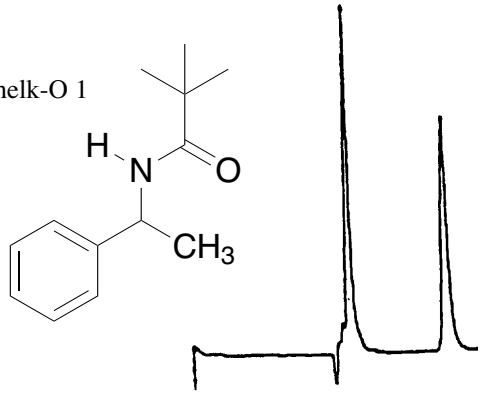
ethyl acetate
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 0.50$
$\alpha = 1.56$
reference 7



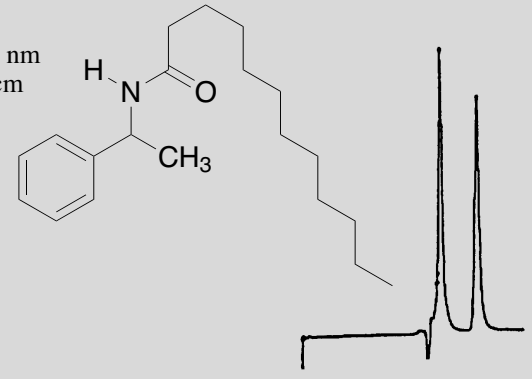
ethyl acetate
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 0.64$
$\alpha = 2.06$
reference 26



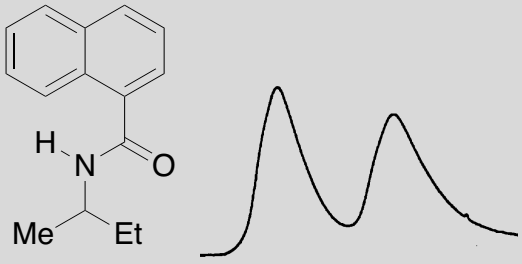
ethyl acetate
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 0.16$
$\alpha = 5.56$
reference 7



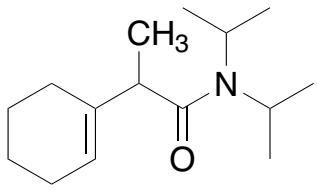
ethyl acetate
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 0.14$
$\alpha = 3.21$
reference 26

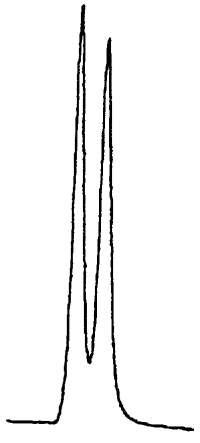


95:5:0.5 hexane/IPA/HOAc
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 14.97$
$\alpha = 1.12$
reference 7

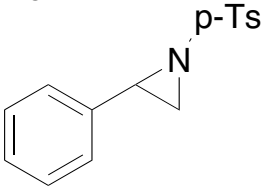


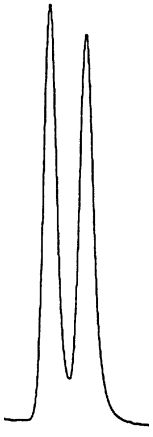
2%EtOH/hex
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 5.13$
$\alpha = 1.03$
reference 26



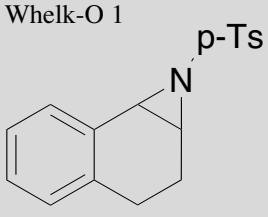


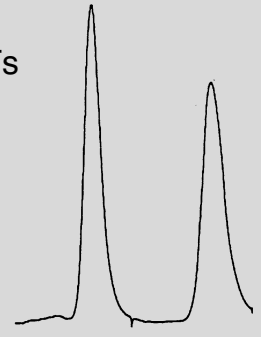
10% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 3.64$
$\alpha = 1.11$
reference 26



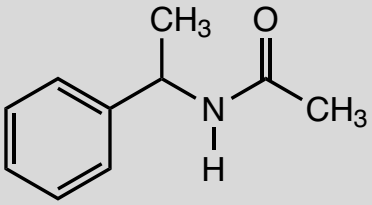


20% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 4.45$
$\alpha = 1.34$
reference 26

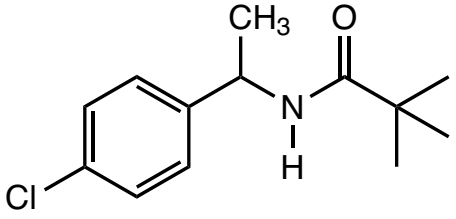




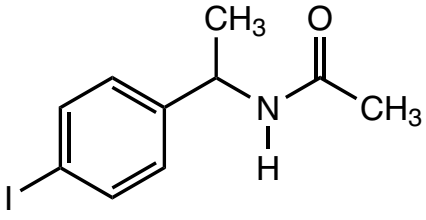
20% IPA/hexane
2 ml/min; 254 nm
Run Time = 4 min
(*S,S*) Whelk-O 1
$k'_1 = 3.72$
$\alpha = 3.17$
reference 38



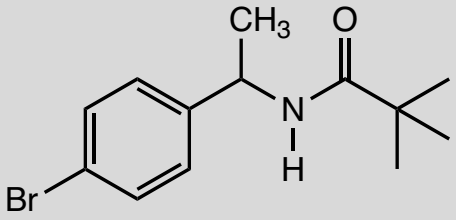
20% IPA/hexane
2 ml/min; 254 nm
Run Time = 4 min
(*S,S*) Whelk-O 1
$k'_1 = 1.48$
$\alpha = 11.6$
reference 38



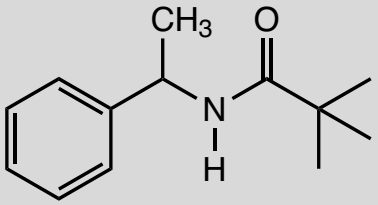
20% IPA/hexane
2 ml/min; 254 nm
Run Time = 4 min
(*S,S*) Whelk-O 1
$k'_1 = 4.10$
$\alpha = 5.12$
reference 38



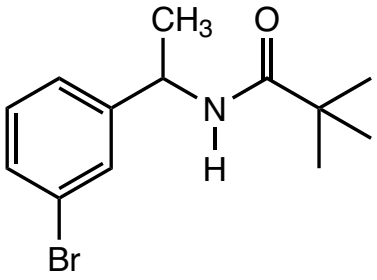
20% IPA/hexane
2 ml/min; 254 nm
Run Time = 4 min
(*S,S*) Whelk-O 1
$k'_1 = 1.61$
$\alpha = 12.8$
reference 38



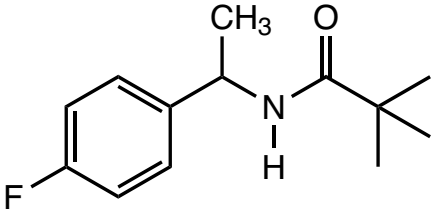
20% IPA/hexane
2 ml/min; 254 nm
Run Time = 4 min
(*S,S*) Whelk-O 1
$k'_1 = 1.39$
$\alpha = 6.74$
reference 38



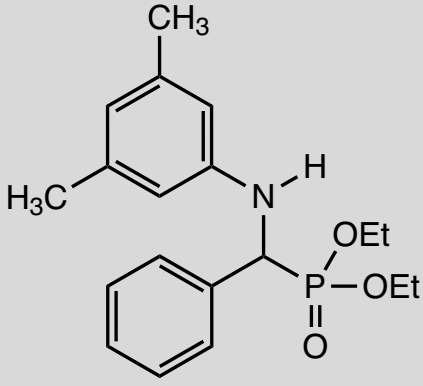
20% IPA/hexane
2 ml/min; 254 nm
Run Time = 4 min
(*S,S*) Whelk-O 1
$k'_1 = 1.75$
$\alpha = 13.7$
reference 38



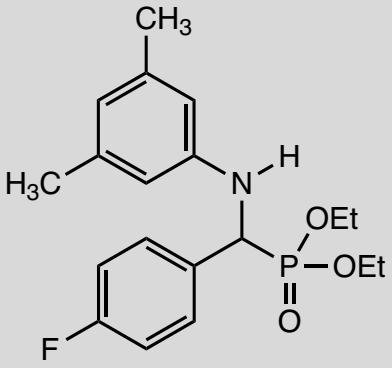
20% IPA/hexane
2 ml/min; 254 nm
Run Time = 4 min
(*S,S*) Whelk-O 1
$k'_1 = 1.17$
$\alpha = 7.29$
reference 38



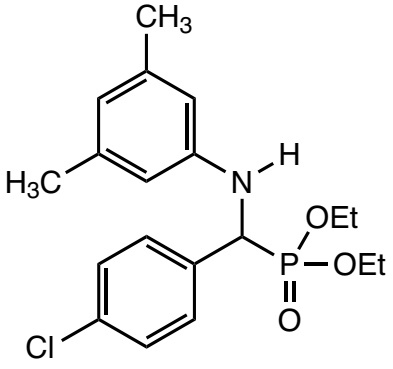
20% IPA/hexane
2 ml/min; 254 nm
Run Time = 4 min
(*S,S*) Whelk-O 1
$k'_1 = 10.87$
$\alpha = 1.29$
reference 38



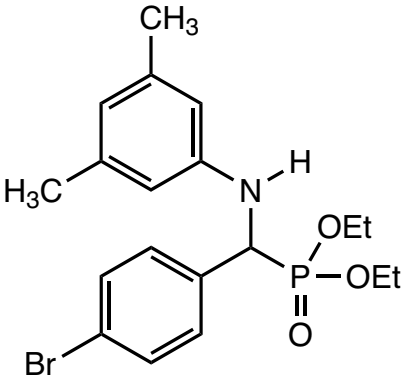
20% IPA/hexane
2 ml/min; 254 nm
Run Time = 4 min
(*S,S*) Whelk-O 1
$k'_1 = 0.83$
$\alpha = 1.39$
reference 38



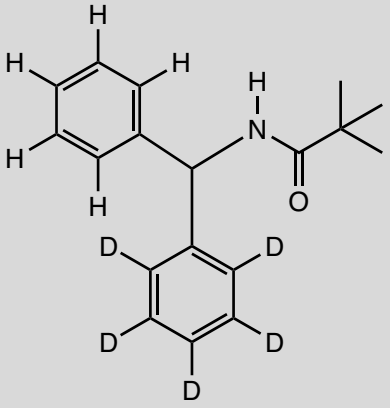
20% IPA/hexane
2 ml/min; 254 nm
Run Time = 4 min
(*S,S*) Whelk-O 1
$k'_1 = 0.84$
$\alpha = 1.55$
reference 38



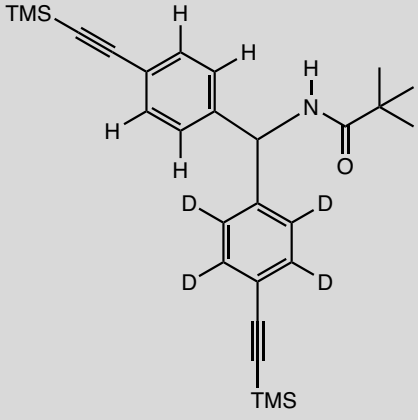
20% IPA/hexane
2 ml/min; 254 nm
Run Time = 4 min
(*S,S*) Whelk-O 1
$k'_1 = 0.86$
$\alpha = 1.66$
reference 38



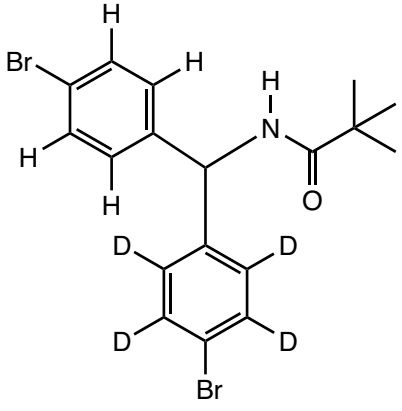
10% acetonitrile
in CO_2
(*S,S*) Whelk-O 1
$k'_1 = 8.5$
$\alpha = 1.025$
reference 39



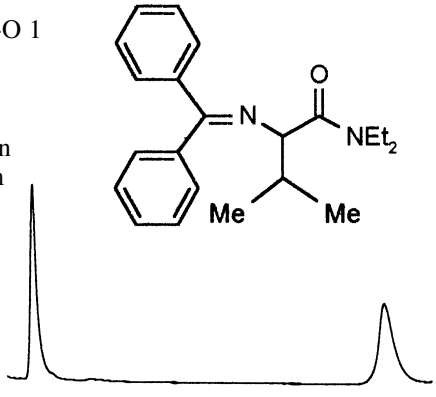
10% acetonitrile
in CO_2
(*S,S*) Whelk-O 1
$k'_1 = 25$
$\alpha = 1.025$
reference 39



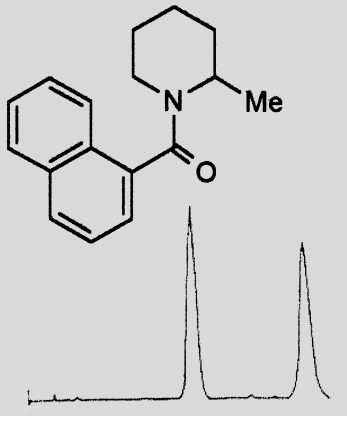
10% acetonitrile
in CO_2
(*S,S*) Whelk-O 1
$k'_1 = 19.7$
$\alpha = 1.025$
reference 39



Column = (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (90/10)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 46.0 min
$k'_1 = 2.70$
$\alpha = 6.02$
reference 51



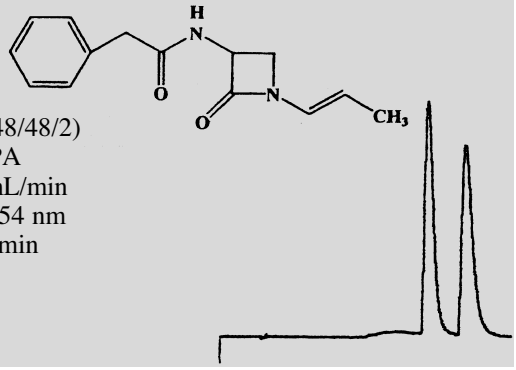
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (80/20)
Hexane/IPA
Flow Rate = 2.0
mL/min
Detection = UV 254
nm
Run Time = 19.0 min
$k'_1 = 7.53$
$\alpha = 1.77$
reference 52



REGIS Amides, Imides, Carbamates, etc.

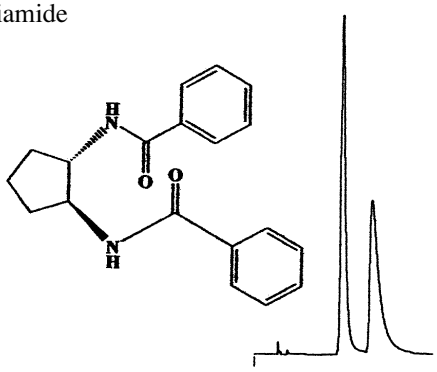
β-Lactam

β-Lactam
Column: (S,S)-
DACH-DNB
25 cm x 4.6 mm
Mobile Phase: (48/48/2)
Hex/CH_2Cl_2/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 14.0 min
k'_1: 3.40
α: 1.33
reference 59



Cyclopentyl Benzoyl-Diamide

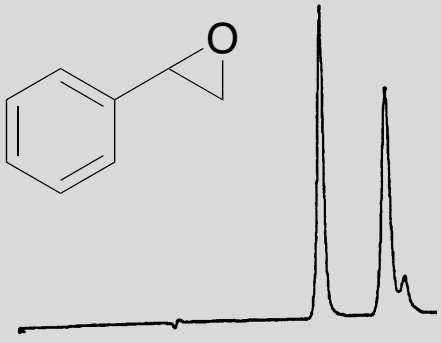
Cyclopentyl Benzoyl-Diamide
Column: (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase: (90/10)
Hexane/IPA
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
Run Time: 8.7 min
k'_1: 2.62
α: 1.47
reference 46



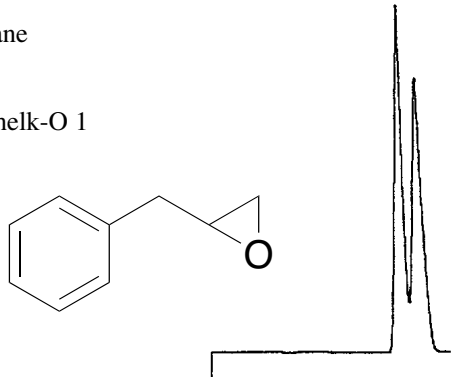
REGIS Epoxides

Styrene Oxide

Styrene Oxide
1% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 1.37
α = 1.37
reference 18

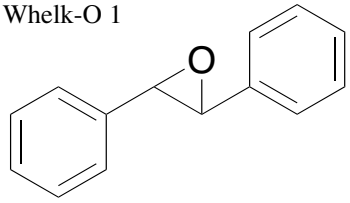


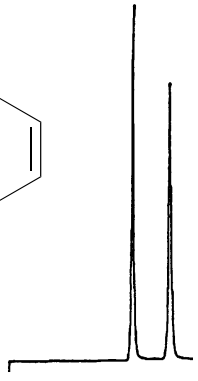
0.1% HOAc in hexane
1 ml/min; 254 nm
Run Time = 20 min
4.6 mm x 25 cm Whelk-O 1
k'_1 = 5.92
α = 1.12
reference 18



Stilbene Oxide

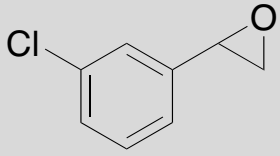
Stilbene Oxide
10% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 0.45
α = 2.00
reference 18

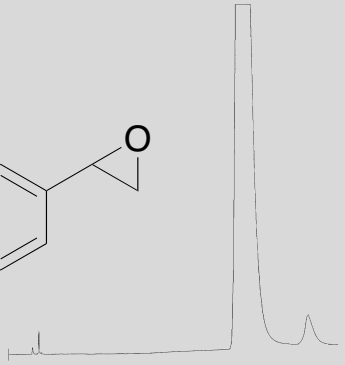




m-Cl Styrene Oxide

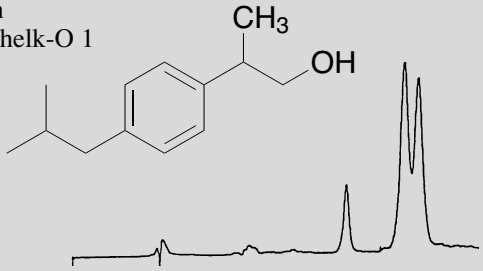
m-Cl Styrene Oxide
hexane
1 ml/min; 220 nm
4.6 mm x 25 cm
Whelk-O 1
reference 30





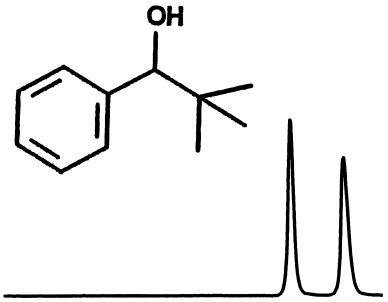
Ibuprofenol

Ibuprofenol
99:1 hexane/IPA
1 ml/min; 254 nm
Run Time = 14 min
4.6 mm x 25 cm Whelk-O 1
k'_1 = 3.38
α = 1.05
reference 26



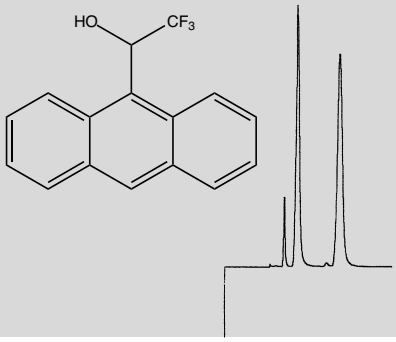
Tert Butyl Phenyl Carbinol

Tert Butyl Phenyl Carbinol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (99/1)
Heptane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 215 nm
Run Time = 6.0 min
k'_1 = 4.60
α = 1.46
reference 46

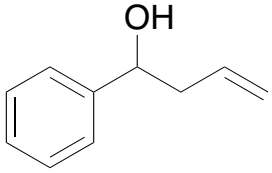


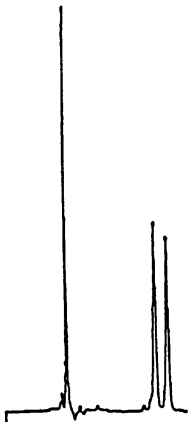
9-Anthryl Trifluoromethyl Carbinol

9-Anthryl Trifluoromethyl
Carbinol
Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase = (95/5)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 10 min
k'_1 = 1.36
α = 2.02
reference 46



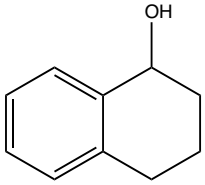
2% IPA/hexane
1 ml/min; 220 nm
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 1.76
α = 1.13
reference 18

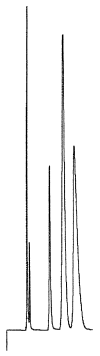




1,2,3,4-Tetrahydro-1-Naphtol

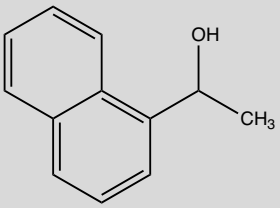
1,2,3,4-Tetrahydro-1-Naphtol
Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase = (99/1)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 10.5 min
k'_1 = 2.17
α = 1.30
reference 46

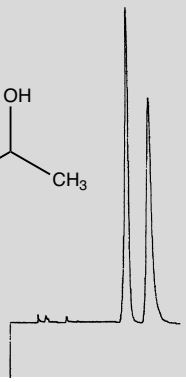




α-Naphthyl Methyl Carbinol

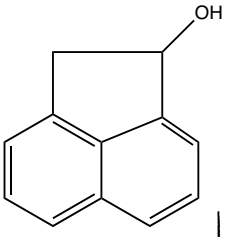
α-Naphthyl Methyl Carbinol
Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase = (99/1)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 14.5 min
k'_1 = 3.49
α = 1.25
reference 46

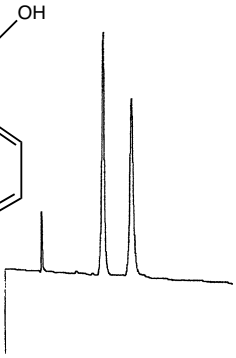




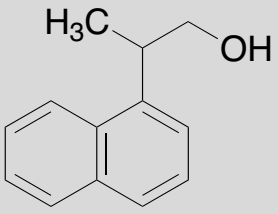
Acenaphthenol

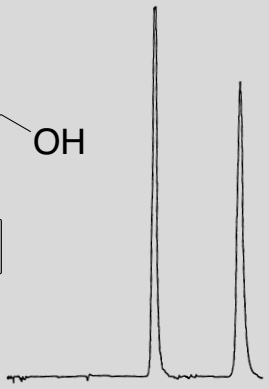
Acenaphthenol
Column: (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase: (95/5)
Hexane/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 10 min
k'_1: 1.68
α: 1.46
reference 46





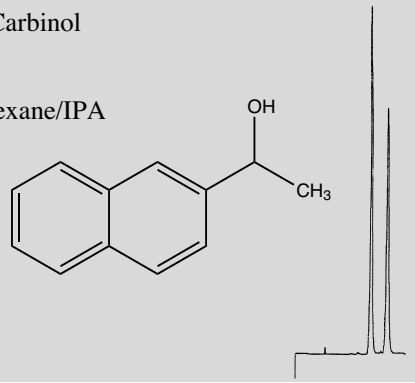
80:20 hexane/IPA
1 ml/min; 254 nm
run time = 10 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 1.22
α = 2.08
reference 26





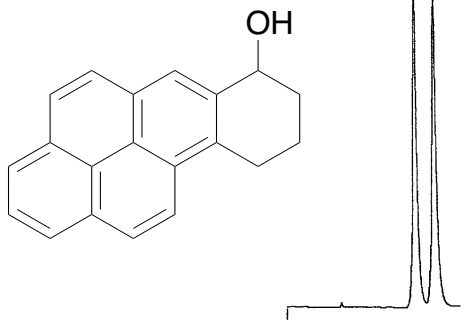
Beta Naphthyl Methyl Carbinol

Beta Naphthyl Methyl Carbinol
Column: (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase: (97/3) Hexane/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 9 min
k'_1: 1.64
α: 1.34
reference 46



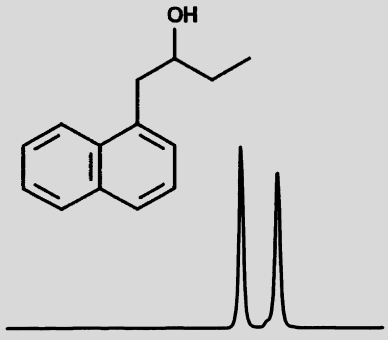
Tetrahydrobenzopyrene-7-ol

Tetrahydrobenzopyrene-7-ol
80:20 hexane/IPA
1 ml/min; 254 nm
run time = 22 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 6.10
α = 1.18
reference 18

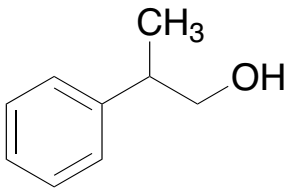


1-Naphthyl-2-butanol

1-Naphthyl-2-butanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (95/5)
Heptane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 215 nm
Run Time = 6 min
k'_1 = 0.80
α = 1.35
reference 48

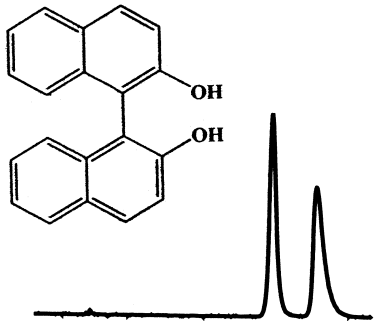


1% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 3.38
α = 1.05
reference 7



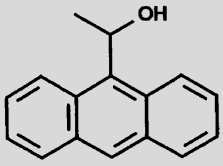
1,1'-Bi-2-Naphthol

1,1'-Bi-2-Naphthol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98/2)
Hexane/IPA + 0.1% TFA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 18.0 min
k'_1 = 4.84
α = 1.24
reference 48



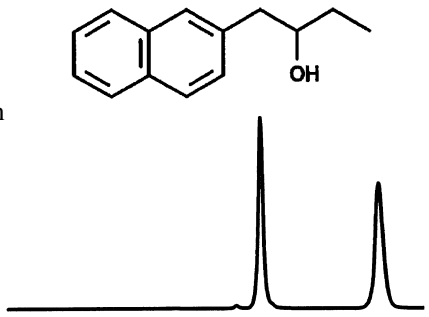
9-Anthrylethanol

9-Anthrylethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (95/5) Heptane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 215 nm
Run Time = 12 min
k'_1 = 1.82
α = 1.74
reference 48

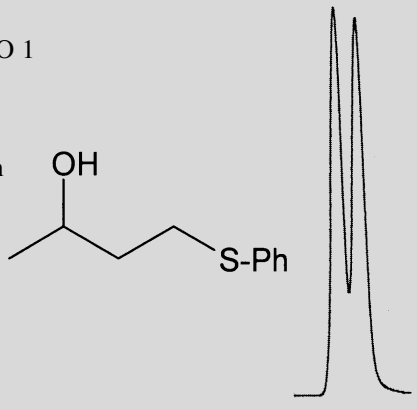


2-Naphthyl-2-butanol

2-Naphthyl-2-butanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (95/5)
Heptane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 215 nm
Run Time = 8 min
k'_1 = 1.00
α = 1.93
reference 48

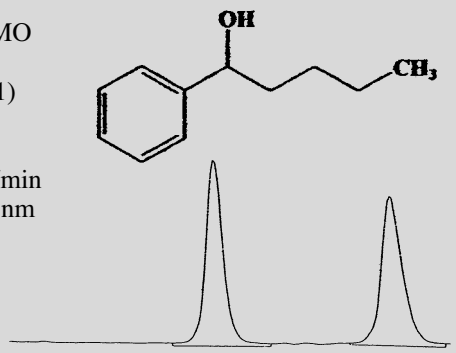


Column = (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (99/1)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 18.5 min
k'_1 = 5.59
α = 1.09
reference 55



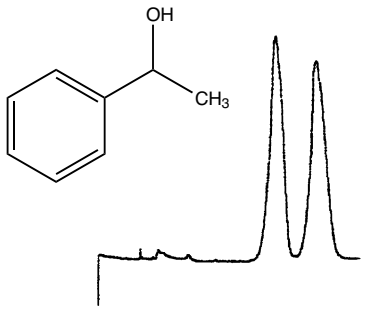
1-Phenylpentanol

1-Phenylpentanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (99/1)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 7.0 min
k'_1 = 1.65
α = 1.45
reference 60



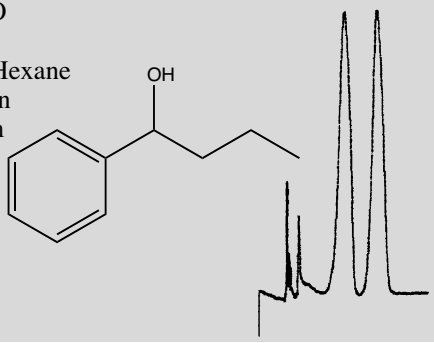
Phenyl Methyl Carbinol

Phenyl Methyl Carbinol
Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase = 100%
Hexane
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 14 min
k'_1 = 3.11
α = 1.30
reference 46

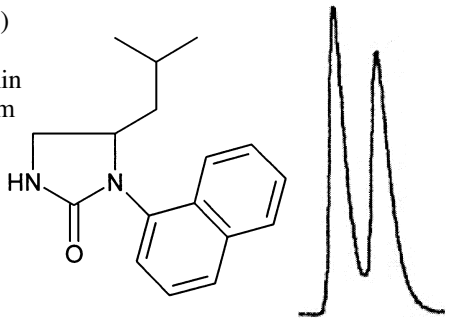


Phenyl Propyl Carbinol

Phenyl Propyl Carbinol
Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase = 100% Hexane
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 12 min
k'_1 = 2.25
α = 1.56
reference 46

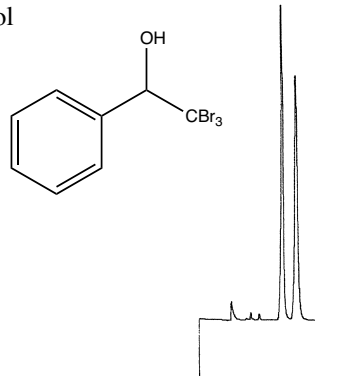


Column = (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (80/20)
Hexane/IPA
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
Run Time = 24.0 min
k'_1 = 13.30
α = 1.11
reference 55



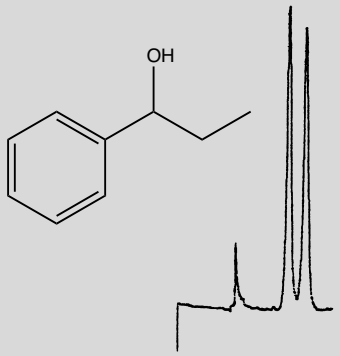
Phenyl Tribromomethyl Carbinol

Phenyl Tribromomethyl Carbinol
Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase = (99/1)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 9 min
k'_1 = 1.87
α = 1.25
reference 46



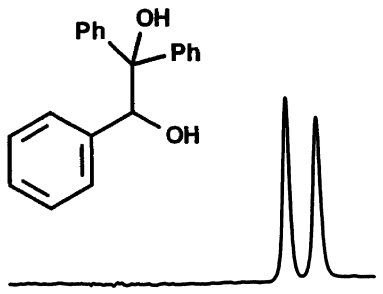
Phenyl Ethyl Carbinol

Phenyl Ethyl Carbinol
Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase = (99/1)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 6.5 min
k'_1 = 1.06
α = 1.30
reference 46

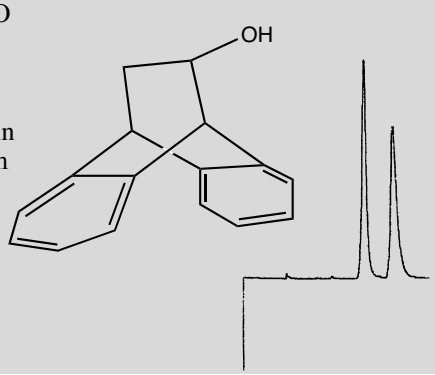


1,1,2,-Triphenyl-1,2-Ethanediol

1,1,2,-Triphenyl-1,2-Ethanediol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (99/1)
Heptane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 215 nm
Run Time = 13 min
k'_1 = 2.59
α = 1.14
reference 48

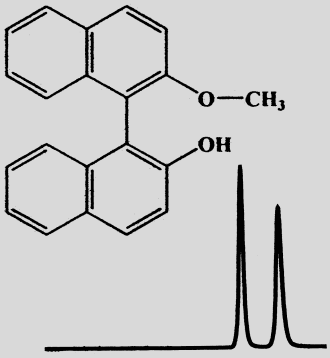


Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase = (99/1)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 10 min
k'_1 = 1.97
α = 1.37
reference 48



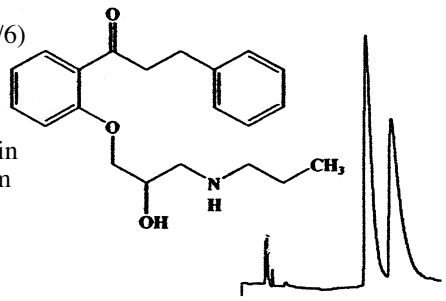
1,1′-Binaphthol Monomethylether

1,1'-Binaphthol
Monomethylether
Column: (S,S)-ULMO 25 cm
x 4.6 mm
Mobile Phase: (98/2)
Hexane/IPA + 0.1% TFA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time = 11.0 min
k'_1 = 2.23
α = 1.28
reference 48



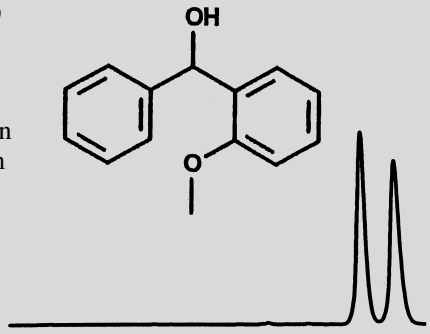
Propafenone

Propafenone
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (47/47/6)
CH_2Cl_2/Hexane/
Ethanol + 0.01 M
Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 11.0 min
k'_1 = 3.99
α = 1.25
reference 46



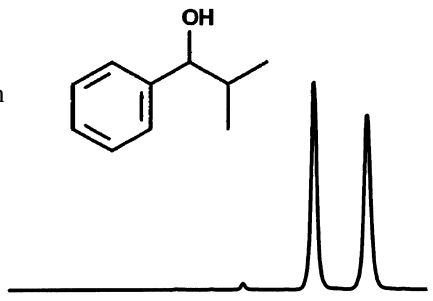
2-Methoxyphenyl Phenyl Carbinol

2-Methoxyphenyl Phenyl Carbinol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (99/1)
Heptane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 215 nm
Run Time = 12.0 min
k'_1 = 2.92
α = 1.13
reference 48



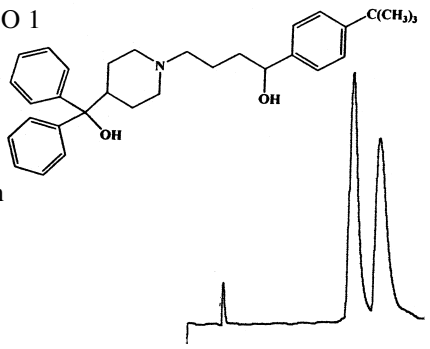
Phenyl isopropyl carbinol

Phenyl isopropyl carbinol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (99/1)
Heptane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 215 nm
Run Time: 6 min
k'_1 = 0.86
α = 1.38
reference 48



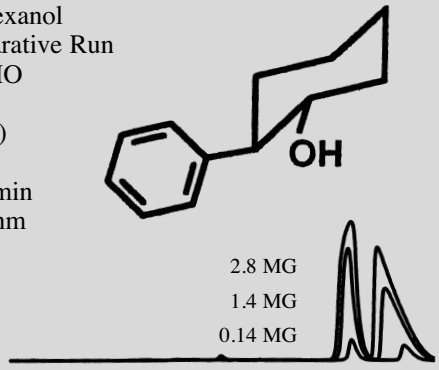
Terfenadine

Terfenadine
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (97/3)
Hexane/Ethanol +
0.01 M Ammonium
Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 15.0 min
k'_1 = 5.91
α = 1.20
reference 46



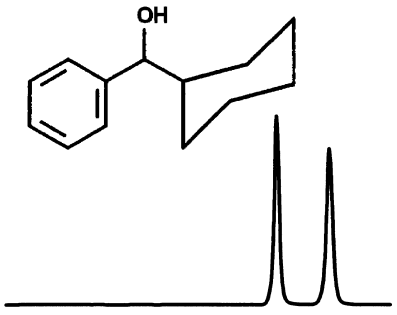
Trans Phenyl Cyclohexanol Analytical vs. Preparative Run

Trans Phenyl Cyclohexanol
Analytical vs. Preparative Run
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (99/1)
Heptane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 270 nm
Run Time = 7.0 min
reference 48



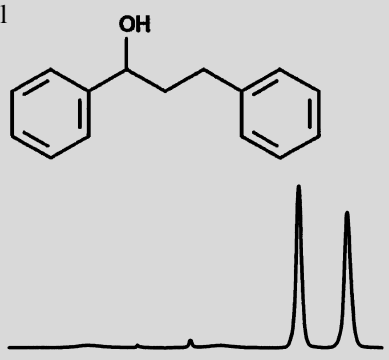
Phenyl cyclohexyl carbinol

Phenyl cyclohexyl carbinol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase: (99/1)
Heptane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 215 nm
Run Time = 6.5 min
k'_1 = 0.97
α = 1.39
reference 48



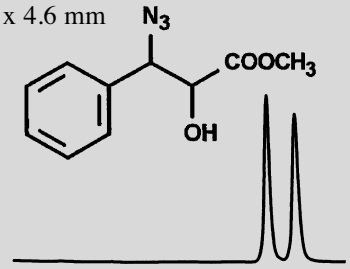
Phenyl phenylethyl carbinol

Phenyl phenylethyl carbinol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (99/1)
Heptane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 215 nm
Run Time = 9.5 min
k'_1 = 1.81
α = 1.30
reference 48



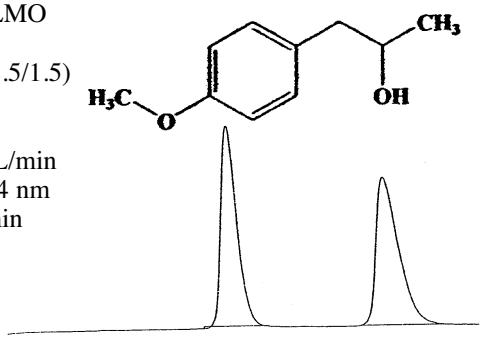
Methyl 3-phenyl-3azido-2hydroxypropanoate (Erythro-diastereomer)

Methyl 3-phenyl-3azido-2hydroxypropanoate
(Erythro-diastereomer)
Column = (S,S)-ULMO 25 cm x 4.6 mm
Mobile Phase = (97/3)
Heptane/Glyme
Flow Rate = 1.0 mL/min
Detection = UV 215 nm
Run Tim = 10.5 min
k'_1 = 2.34
α = 1.16
reference 48



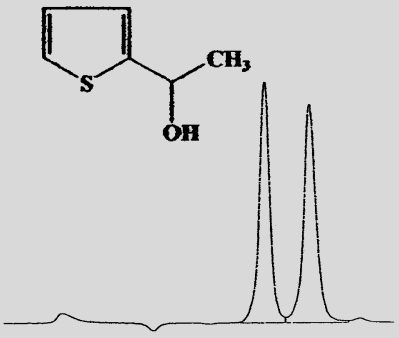
1-(4-Methoxyphenyl)-2-propanol

1-(4-Methoxyphenyl)-2-propanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 17.5 min
k'_1 = 5.33
α = 1.28
reference 60



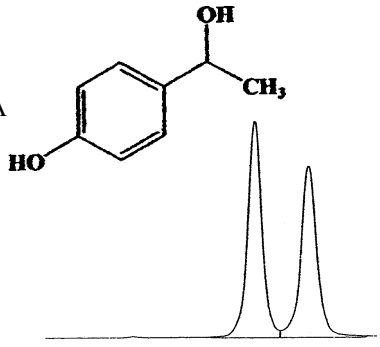
2-Thiopheneethanol

2-Thiopheneethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 10.5 min
k'_1 = 2.21
α = 1.12
reference 60



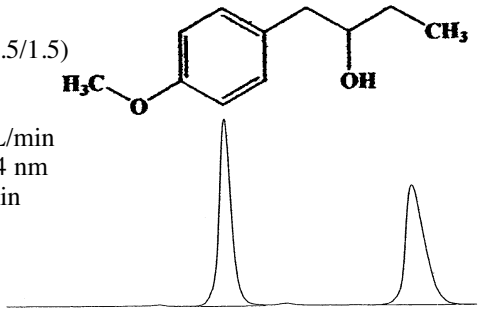
1-(4-Hydroxyphenyl) Ethanol

1-(4-Hydroxyphenyl) Ethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (95/5)
n-Heptane/IPA + 0.1% TFA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 8.5 min
k'_1 = 1.491
α = 1.16
reference 60



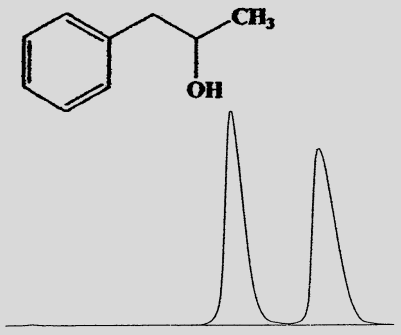
1-(4-Methoxyphenyl)-2-butanol

1-(4-Methoxyphenyl)-2-butanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 12.0 min
k'_1 = 2.04
α = 1.49
reference 60



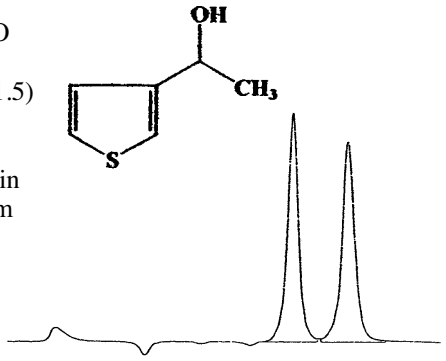
1-Phenyl-2-propanol

1-Phenyl-2-propanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 6.5 min
k'_1 = 1.72
α = 1.19
reference 60



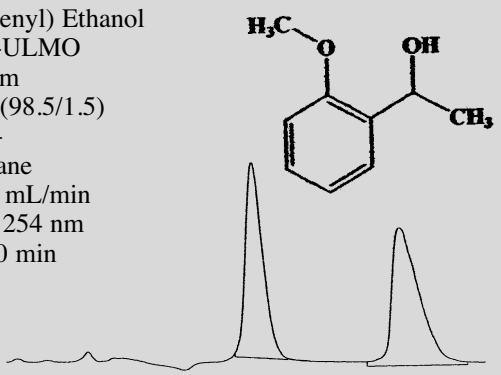
3-Thiopheneethanol

3-Thiopheneethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 11.5 min
k'_1 = 2.42
α = 1.13
reference 60



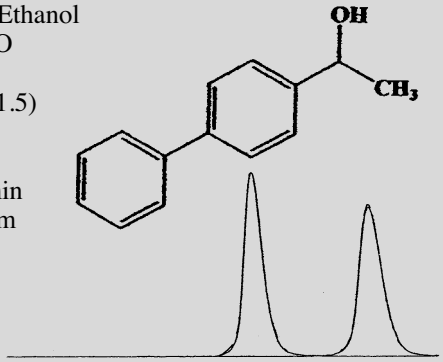
1-(o-Methoxyphenyl) Ethanol

1-(o-Methoxyphenyl) Ethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 11.0 min
k'_1 = 3.27
α = 1.29
reference 60



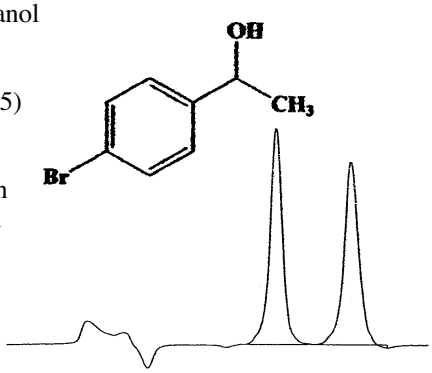
1-[(4-Phenyl) phenyl] Ethanol

1-[(4-Phenyl) phenyl] Ethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
Run Time = 8.5 min
k'_1 = 3.76
α = 1.21
reference 60



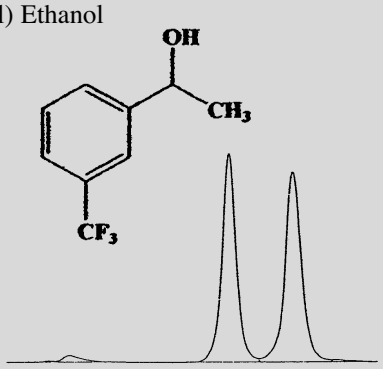
1-(p-Bromophenyl) Ethanol

1-(p-Bromophenyl) Ethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 11.5 min
k'_1 = 2.39
α = 1.17
reference 60



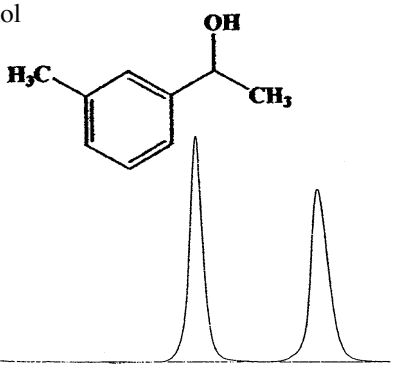
1-(m-Trifluoromethylphenyl) Ethanol

1-(m-Trifluoromethylphenyl) Ethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 9.0 min
k'_1 = 1.66
α = 1.14
reference 60



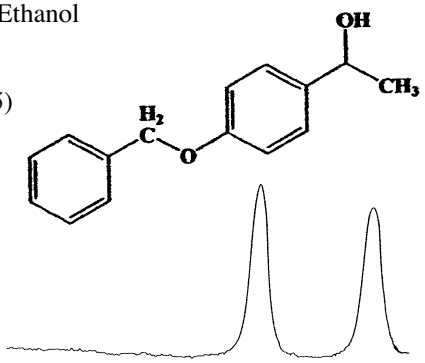
1-(m-Methylphenyl) Ethanol

1-(m-Methylphenyl) Ethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 10.5 min
k'_1 = 1.94
α = 1.26
reference 60



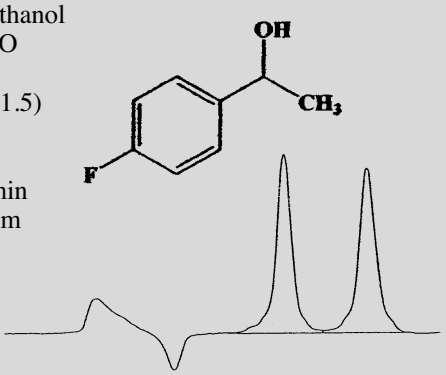
1-(4-Benzyloxy) phenyl Ethanol

1-(4-Benzyloxy) phenyl Ethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
Run Time = 11.0 min
k'_1 = 5.21
α = 1.21
reference 60



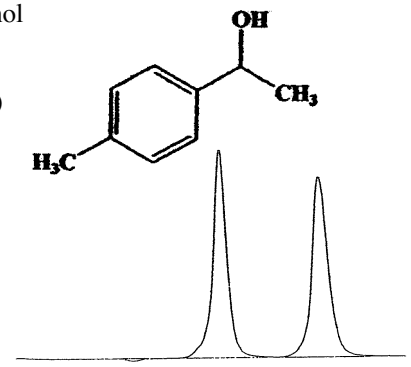
1-(p-Flurorophenyl) Ethanol

1-(p-Flurorophenyl) Ethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 10.5 min
k'_1 = 2.13
α = 1.16
reference 60



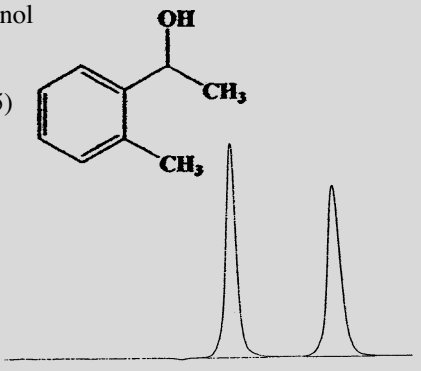
1-(p-Methylphenyl) Ethanol

1-(p-Methylphenyl) Ethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 10.5 min
k'_1 = 2.06
α = 1.21
reference 60



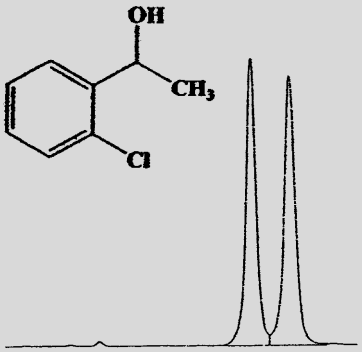
1-(o-Methylphenyl) Ethanol

1-(o-Methylphenyl) Ethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 10.5 min
k'_1 = 1.88
α = 1.29
reference 60



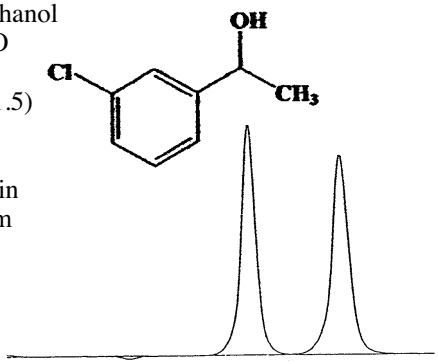
1-(o-Chlorophenyl) Ethanol

1-(o-Chlorophenyl) Ethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 8.5 min
k'_1 = 1.58
α = 1.12
reference 60



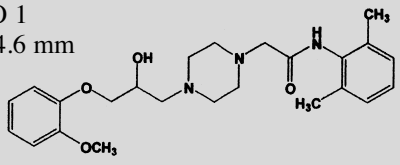
1-(m-Chlorophenyl) Ethanol

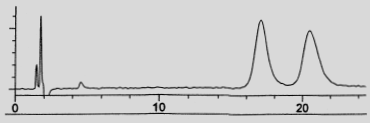
1-(m-Chlorophenyl) Ethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 10.5 min
k'_1 = 2.13
α = 1.17
reference 60



Ranolazine

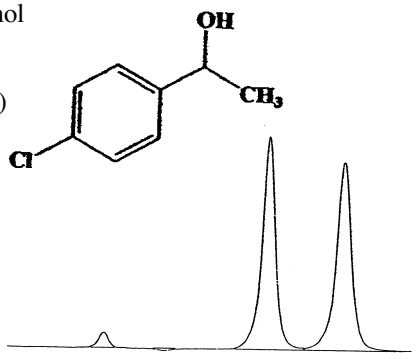
Ranolazine
Column = (R,R)-Whelk-O 1
10/100 (FEC) 25 cm x 4.6 mm
Mobile Phase = (65/35)
Hexane/IPA + 35 mM
Ammonium Acetate
Flow Rate = 2.0 mL/min
Detection = UV 220 nm
k'_1 = 11.51
α = 1.23
reference 46





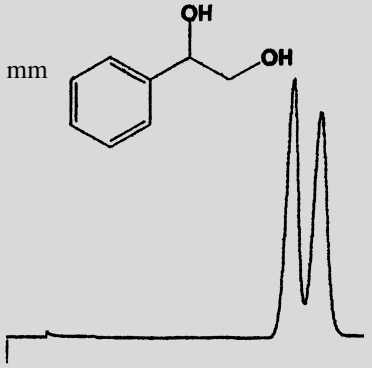
1-(p-Chlorophenyl) Ethanol

1-(p-Chlorophenyl) Ethanol
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (98.5/1.5)
n-Heptane/1,2-
Dimethoxyethane
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 10.5 min
k'_1 = 2.18
α = 1.15
reference 60



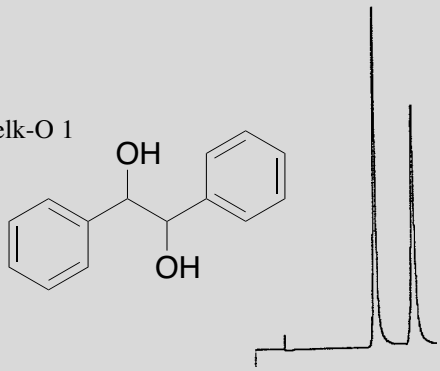
Phenylethylene Glycol

Phenylethylene Glycol
Column = (S,S)-Whelk-O 1
10/100 (FEC) 25 cm x 4.6 mm
Mobile Phase = (99/1)
Hexane/Ethanol
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
Run Time = 18.7 min
k'_1 = 11.62
α = 1.11
reference 46

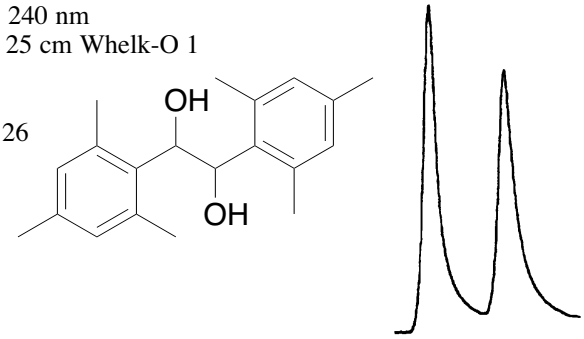


Hydrobenzoin

Hydrobenzoin
95:5 hexane/IPA
1 ml/min; 254 nm
Run Time = 18 min
4.6 mm x 25 cm Whelk-O 1
k'_1 = 1.14
α = 1.40
reference 18

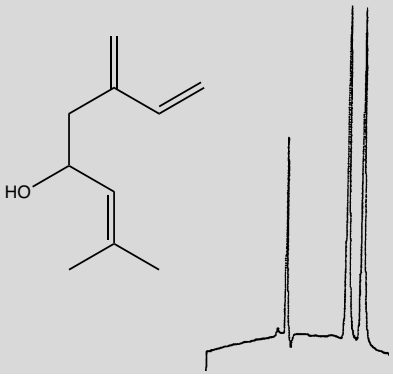


98:2:0.5 hexane/EtOH/HOAc
1 ml/min; 240 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 4.20
α = 1.28
reference 26

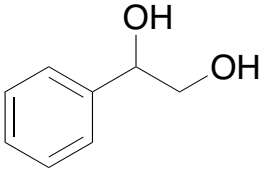


Ipsdienol

Ipsdienol
2% IPA/hexane
1 ml/min; 254 nm
Run Time = 8 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 0.95
α = 1.21
reference 18

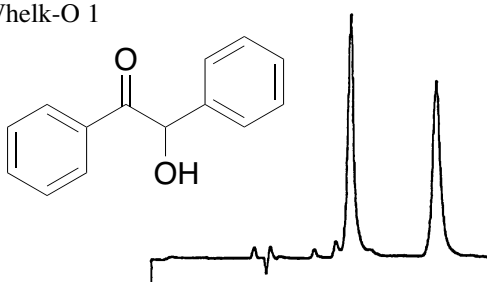


98:2:0.5 hexane/IPA/HOAc
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 7.54
α = 1.08
reference 7



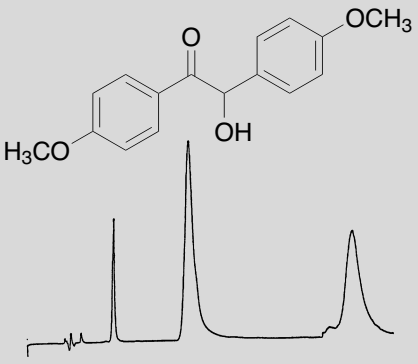
Benzoin

Benzoin
80:20:0.5 hexane/IPA/HOAc
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 0.86
α = 1.97
reference 7

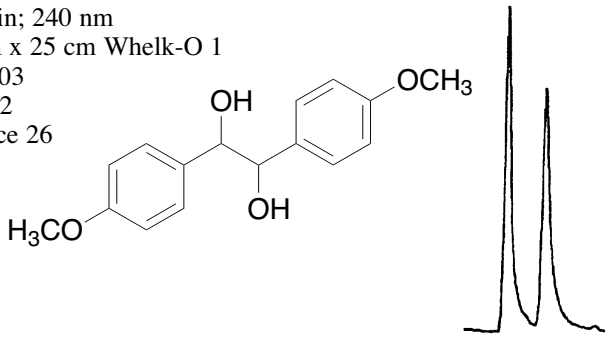


Anisoin

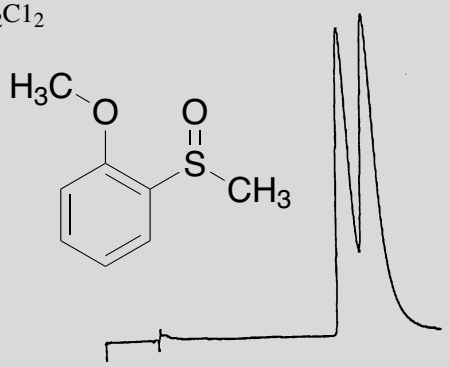
Anisoin
80:20:0.5
hexane/IPA/HOAc
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 3.07
α = 2.34
reference 26



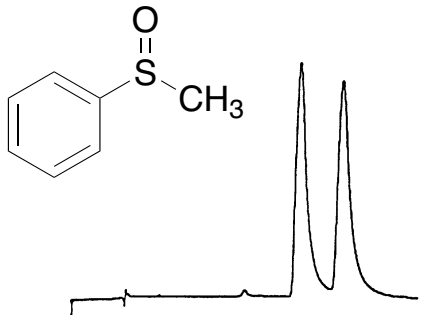
60:40 hexane/EtOH
1 ml/min; 240 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 2.03
α = 1.32
reference 26



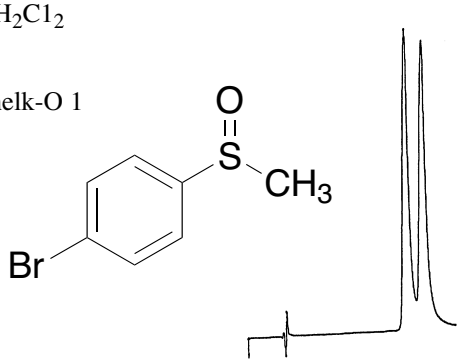
7:2:1 hexane/IPA/CH_2C1_2
2 ml/min; 254 nm
Run Time = 9 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 4.10
α = 1.13
reference 18



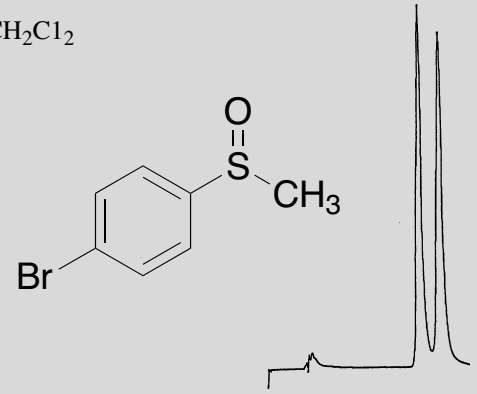
7:2:1 hexane/IPA/CH_2C1_2
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 3.83
α = 1.24
reference 7



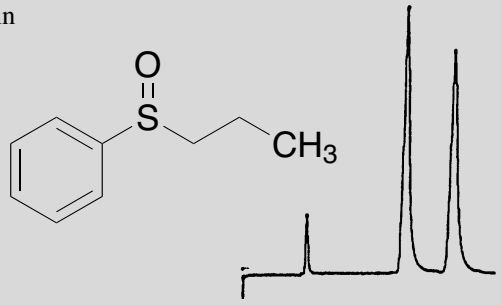
7:2:1 hexane/IPA/CH_2C1_2
2 ml/min; 254 nm
Run Time = 8 min
4.6 mm x 25 cm Whelk-O 1
k'_1 = 3.75
α = 1.13
reference 18



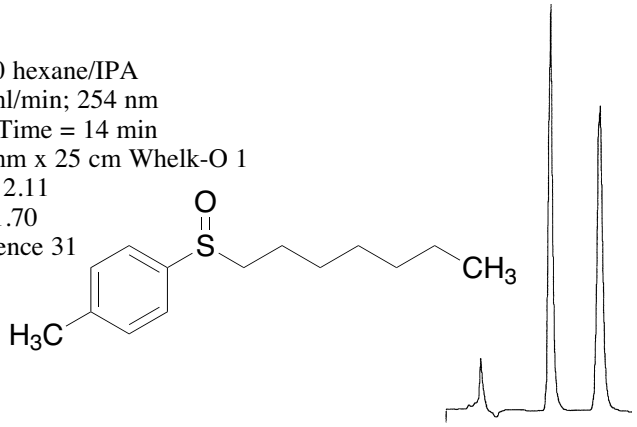
7:2:1 hexane/IPA/CH_2C1_2
2 ml/min; 254 nm
Run Time = 8 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 3.75
α = 1.13
reference 18



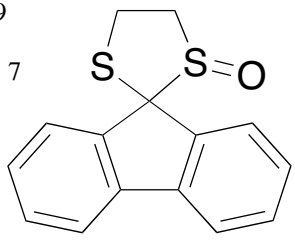
7:2:1 hexane/IPA/CH_2C1_2
2 ml/min; 254 nm
Run Time = 6 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 1.90
α = 1.46
reference 18

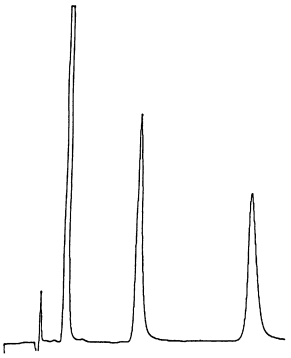


80:20 hexane/IPA
1.5 ml/min; 254 nm
Run Time = 14 min
4.6 mm x 25 cm Whelk-O 1
k'_1 = 2.11
α = 1.70
reference 31

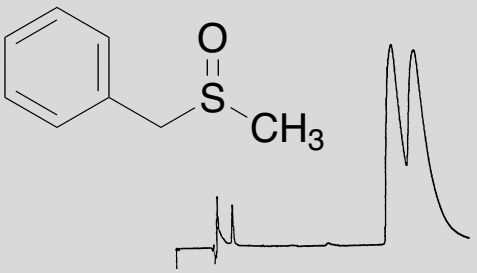


7:2:1 hexane/IPA/CH_2C1_2
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 3.29
α = 2.14
reference 7

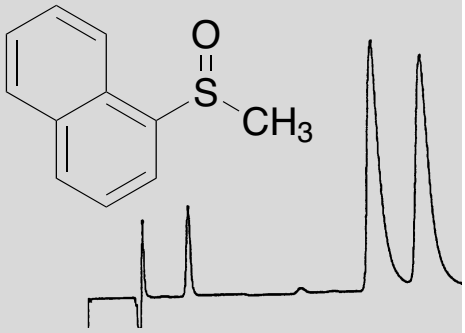




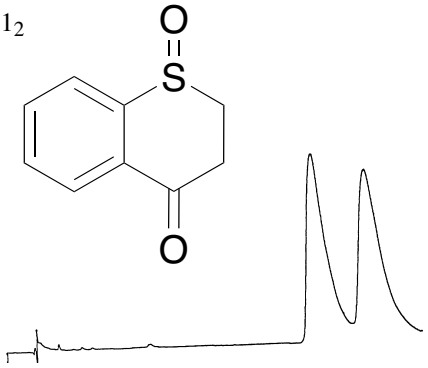
7:2:1 hexane/IPA/CH_2C1_2
2 ml/min; 254 nm
Run Time = 11 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 5.04
α = 1.12
reference 18



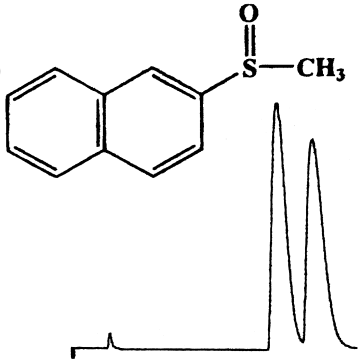
7:2:1 hexane/IPA/CH_2C1_2
2 ml/min; 254 nm
run time = 11 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 5.02
α = 1.21
reference 18



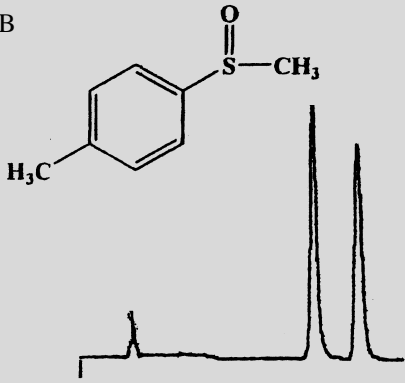
7:2:1 hexane/IPA/CH_2C1_2
2 ml/min; 254 nm
run time = 6 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 10.72
α = 1.19
reference 18



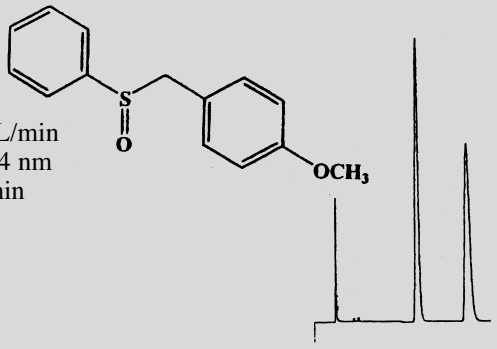
Column: (S,S)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase: (27.5/27.5/45)
CH_2Cl_2/Dioxane/Hex
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 35.0 min
k'_1: 10.30
α: 1.15
reference 59



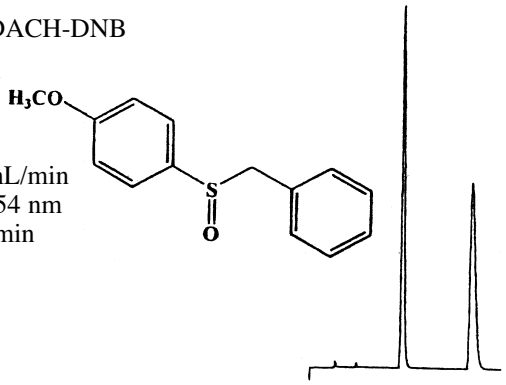
Column: (S,S)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase: (98/2)
CH_2Cl_2/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 13.0 min
k'_1: 3.08
α: 1.26
reference 59



Column: (S,S)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase:
(98/2)
CH_2Cl_2/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 17.0 min
k'_1: 3.33
α: 1.63
reference 59

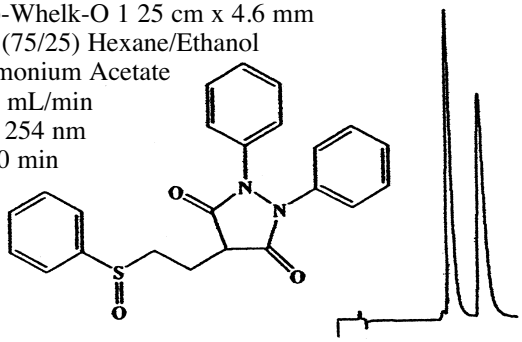


Column: (R,R)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase:
(98/2)
CH_2Cl_2/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 16.0 min
k'_1: 2.34
α: 2.07
reference 59



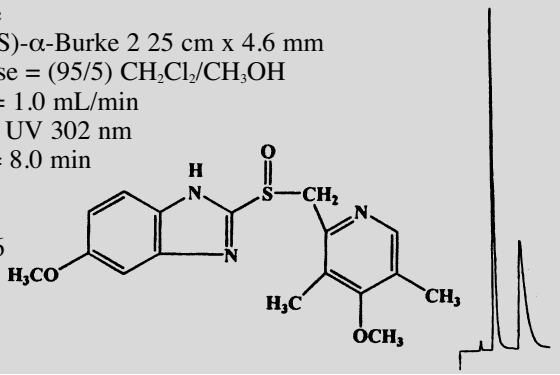
Sulfinpyrazone

Sulfinpyrazone
Column = (R,R)-Whelk-O 1 25 cm x 4.6 mm
Mobile Phase = (75/25) Hexane/Ethanol
+ 15 mM Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 11.0 min
k'_1 = 3.74
α = 1.35
reference 46

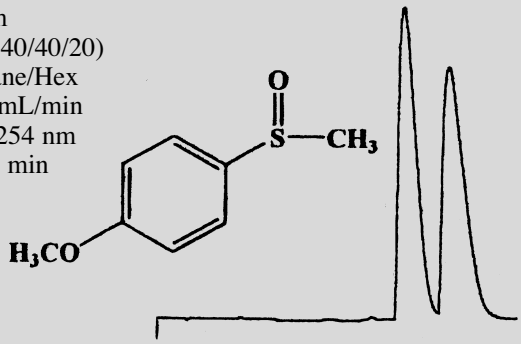


Omeprazole

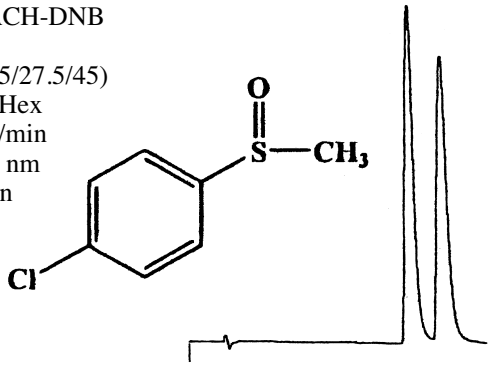
Omeprazole
Column = (S)-α-Burke 2 25 cm x 4.6 mm
Mobile Phase = (95/5) CH_2Cl_2/CH_3OH
Flow Rate = 1.0 mL/min
Detection = UV 302 nm
Run Time = 8.0 min
k'_1 = 0.64
α = 3.04
reference 46



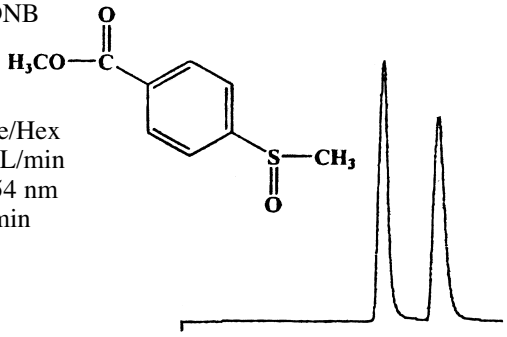
Column: (S,S)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase: (40/40/20)
CH_2Cl_2/Dioxane/Hex
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 27.0 min
k'_1: 7.51
α: 1.21
reference 59



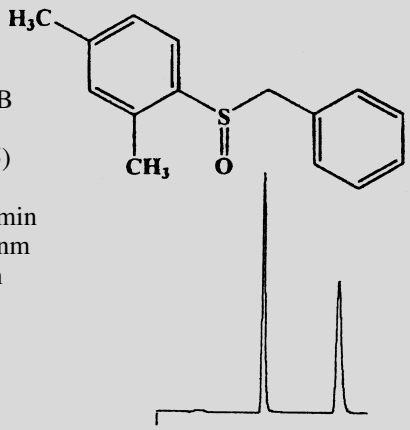
Column: (R,R)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase: (27.5/27.5/45)
CH_2Cl_2/Dioxane/Hex
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 18.0 min
k'_1: 4.77
α: 1.18
reference 59



Column:
(R,R)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase:
(27.5/27.5/45)
CH_2Cl_2/Dioxane/Hex
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 20.0 min
k'_1: 5.16
α: 1.26
reference 59

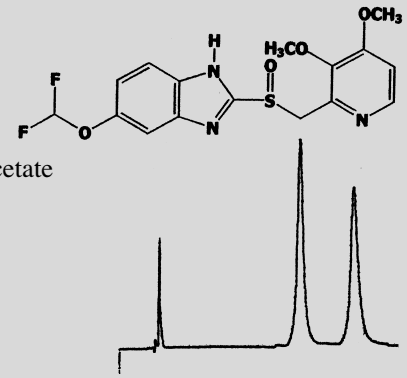


Column:
(R,R)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase: (95/5)
CH_2Cl_2/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 15.0 min
k'_1: 2.15
α: 2.05
reference 59

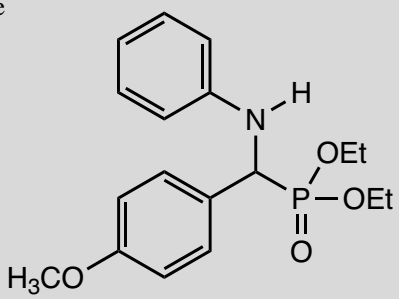


Pantoprazole

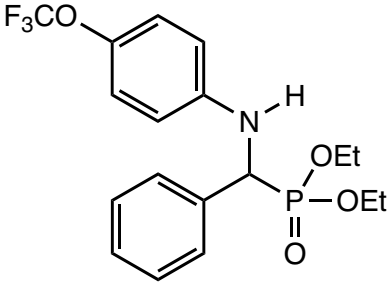
Pantoprazole
Column = (R)-α-Burke 2
25 cm x 4.6 mm
Mobile Phase = (48/48/4)
CH_2Cl_2/Hexane/Ethanol
+ 4 mM Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 280 nm
Run Time = 12.0 min
k'_1 = 4.07
α = 1.38
reference 46



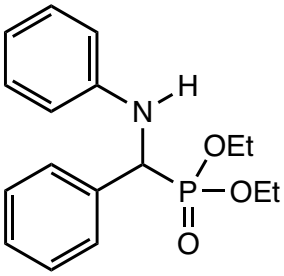
5% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.26$
$\alpha = 1.50$
reference 40



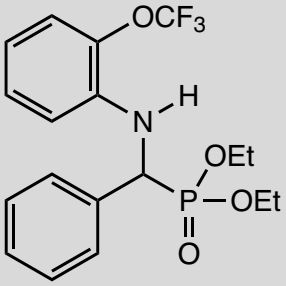
5% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 4.72$
$\alpha = 1.26$
reference 40



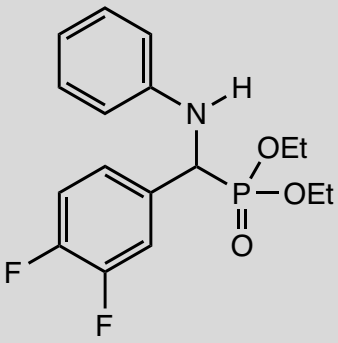
5% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 4.26$
$\alpha = 1.26$
reference 40



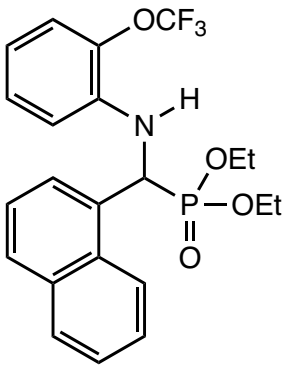
5% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 4.10$
$\alpha = 2.08$
reference 40



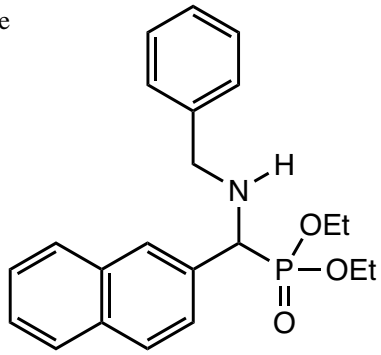
5% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 4.09$
$\alpha = 1.31$
reference 40



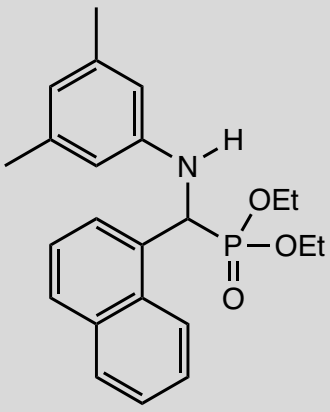
5% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 6.05$
$\alpha = 1.63$
reference 40



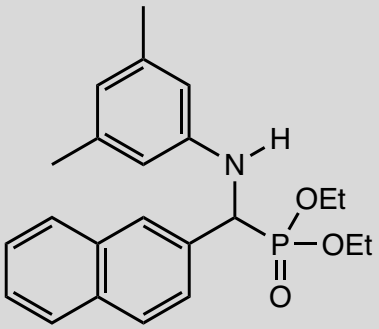
5% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 9.61$
$\alpha = 1.75$
reference 40



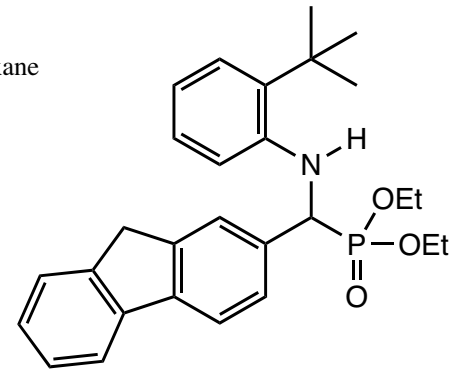
5% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 4.58$
$\alpha = 1.23$
reference 40



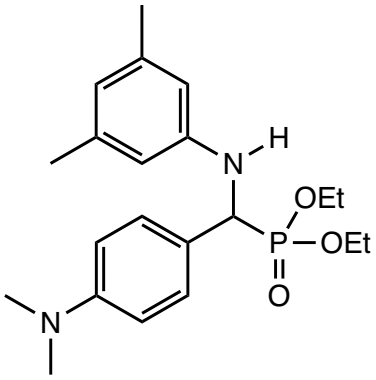
5% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
k'_1 = 7.35
α = 2.54
reference 40



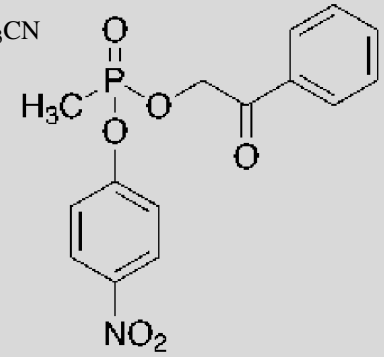
5% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
k'_1 = 5.87
α = 5.12
reference 40



5% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
k'_1 = 12.30
α = 2.00
reference 40

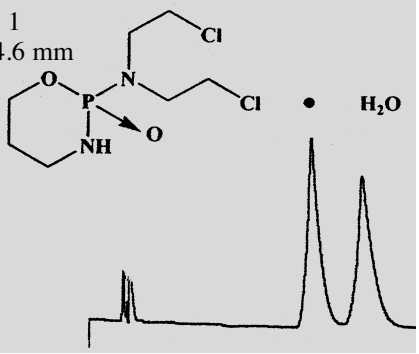


5:4:1 hexane/CH_2C1_2/CH_3CN
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 1.11
α = 1.15
reference 7



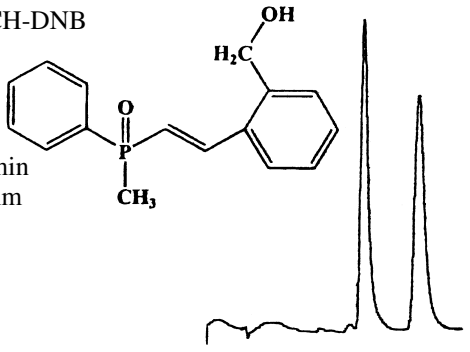
Cyclophosphamide

Cyclophosphamide
Column = (S,S)-Whelk-O 1
10/100 (FEC) 25 cm x 4.6 mm
Mobile Phase = (95/5)
Hexane/Ethanol
Flow Rate = 1.5 mL/min
Detection = UV 195 nm
Run Time = 16.0 min
k'_1 = 6.31
α = 1.27
reference 46



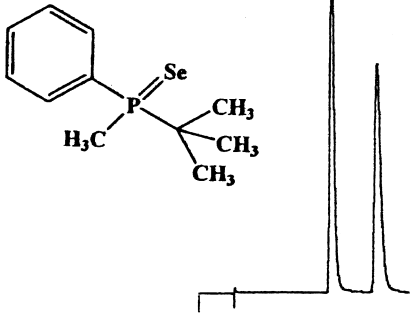
Tertiary Phosphine Oxide

Tertiary Phosphine Oxide
Column: (R,R)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase:
(37.5/37.5/25)
Hex/Dioxane/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 14.0 min
k'_1: 2.19
α: 1.48
reference 59



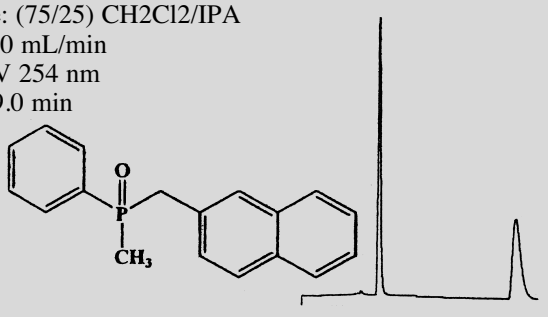
Phosphine Selenium Oxide

Phosphine Selenium Oxide
Column: (S,S)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase: (70/30)
Hex/CH2Cl2
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 13.0 min
k'_1: 2.49
α: 1.48
reference 59



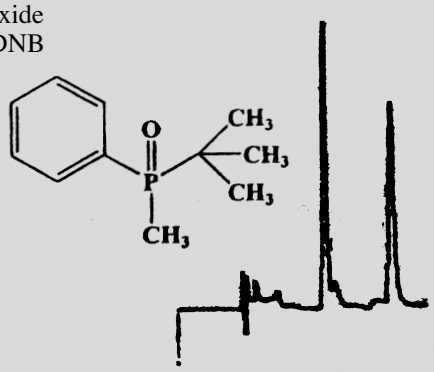
Secondary Phosphine Oxide

Secondary Phosphine Oxide
Column: (S,S)-DACH-DNB 25 cm x 4.6 mm
Mobile Phase: (75/25) CH2Cl2/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 19.0 min
k'_1: 1.49
α: 4.11
reference 59



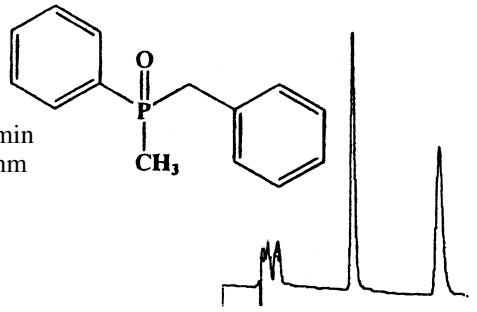
Secondary Phosphine Oxide

Secondary Phosphine Oxide
Column: (S,S)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase: (90/10)
CH2Cl2/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 8.0 min
k'_1: 1.23
α: 1.81
reference 59

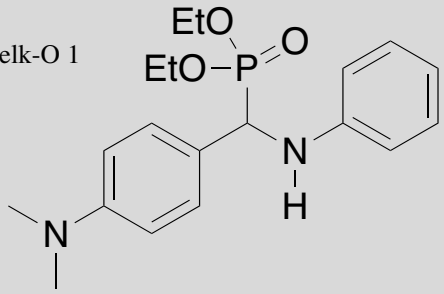


Secondary Phosphine Oxide

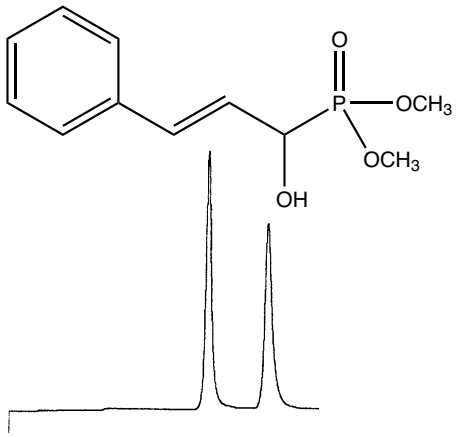
Secondary Phosphine Oxide
Column: (S,S)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase:
(90/10)
CH2Cl2/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 14.5 min
k'_1: 2.20
α: 1.97
reference 59



10% IPA/hex
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 1.35
α = 3.53
reference 7

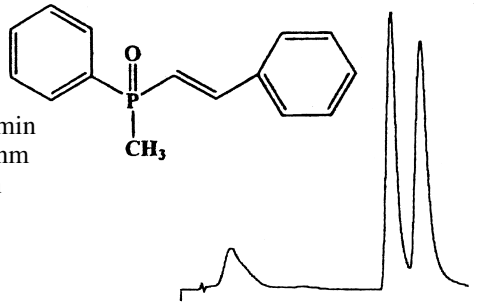


10% EtOH/hexane
1 ml/min; 254 nm
run time = 18 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 3.75
α = 1.38
reference 18



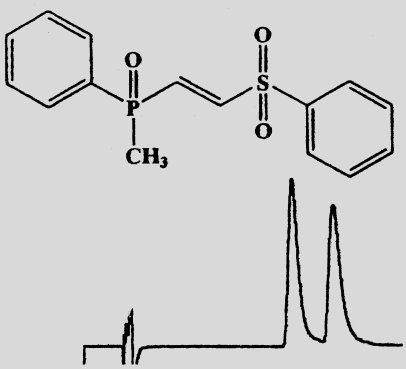
Tertiary Phosphine Oxide

Tertiary Phosphine Oxide
Column: (R,R)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase:
(42.5/42.5/15)
Hex/Dioxane/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 28.0 min
k'_1: 8.11
α: 1.17
reference 59

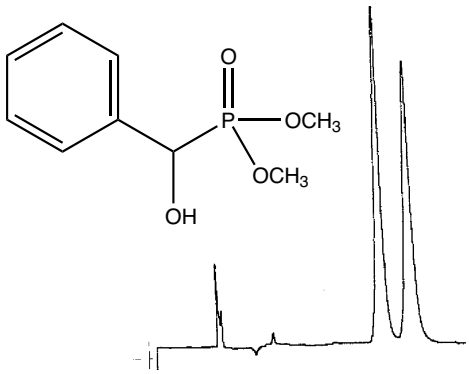


Tertiary Phosphine Oxide

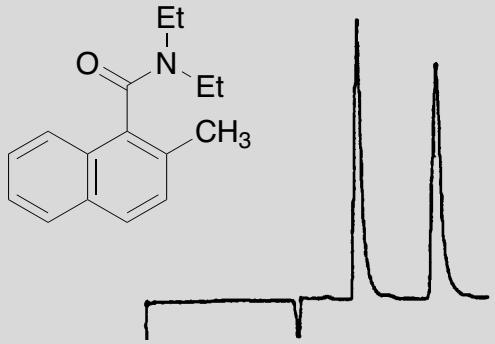
Tertiary Phosphine Oxide
Column:
(R,R)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase: (40/40/20)
Hex/Dioxane/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 14.0 min
k'_1: 4.19
α: 1.25
reference 59



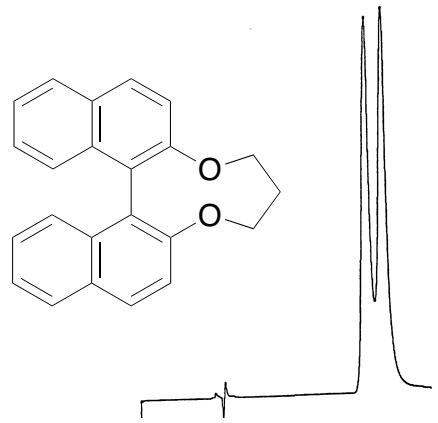
10% EtOH/hexane
1 ml/min; 254 nm
run time = 13 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 3.07
α = 1.17
reference 18



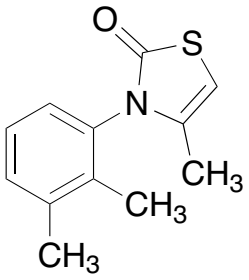
EtOAc
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 0.46$
$\alpha = 2.17$
reference 7



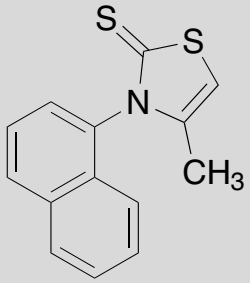
10% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 2.26$
$\alpha = 1.11$
reference 7



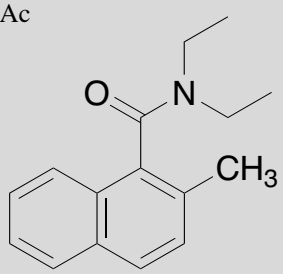
30% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 1.73$
$\alpha = 1.64$
reference 7



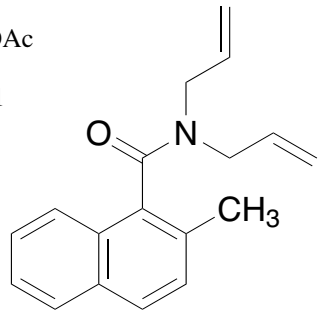
30% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 1.91$
$\alpha = 2.13$
reference 7



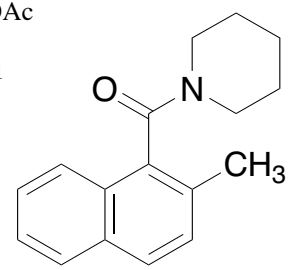
80:20:0.1% hexane/IPA/HOAc
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 3.29$
$\alpha = 2.46$
reference 10



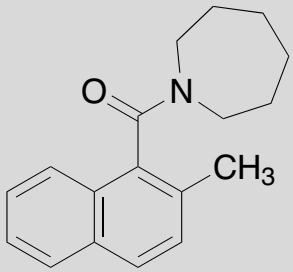
80:20:0.1% hexane/IPA/HOAc
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O-1
$k'_1 = 3.23$
$\alpha = 2.66$
reference 10



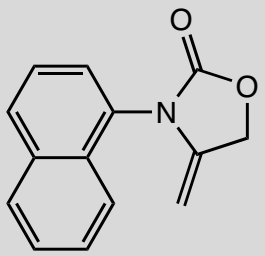
80:20:0.1% hexane/IPA/HOAc
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O-1
$k'_1 = 6.24$
$\alpha = 2.63$
reference 10



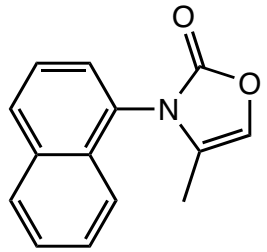
80:20:0.1%
hexane/IPA/HOAc
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O-1
$k'_1 = 4.46$
$\alpha = 2.08$
reference 10



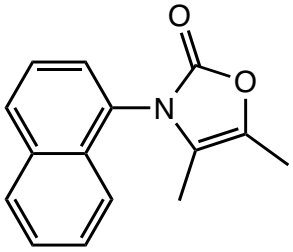
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
k'_1 = 10.06
α = 2.37
reference 41



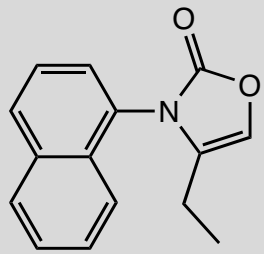
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
k'_1 = 13.00
α = 2.57
reference 41



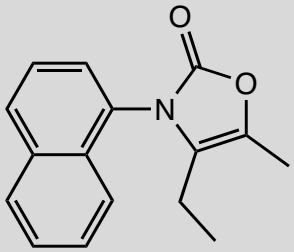
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
k'_1 = 14.18
α = 2.78
reference 41



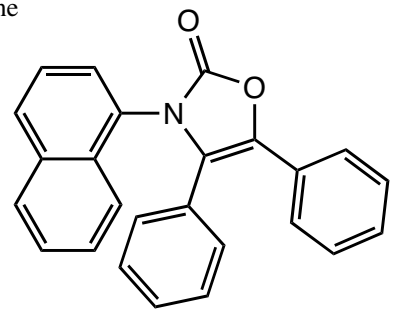
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
k'_1 = 12.41
α = 2.74
reference 41



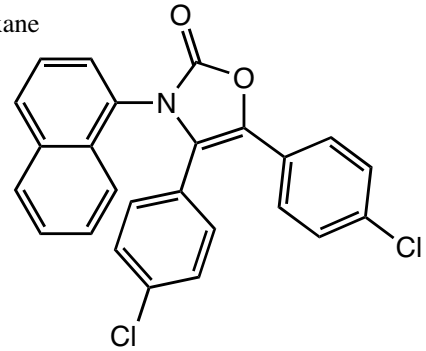
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
k'_1 = 16.29
α = 3.15
reference 41



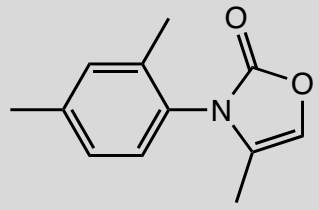
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
k'_1 = 15.59
α = 3.74
reference 41



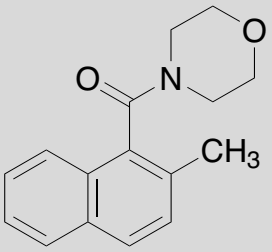
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
k'_1 = 4.06
α = 2.22
reference 41



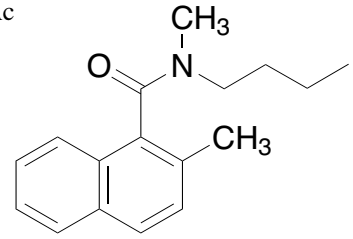
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
k'_1 = 6.29
α = 2.25
reference 41



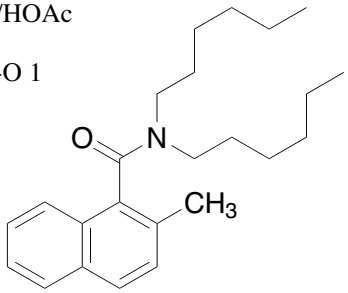
80:20:0.1% hexane/IPA/HOAc
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 7.95$
$\alpha = 2.43$
reference 10



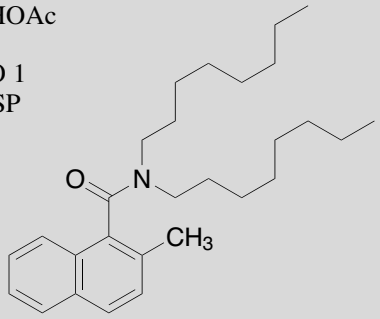
mixture of stereoisomers
80:20:0.1% hexane/IPA/HOAc
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
reference 10



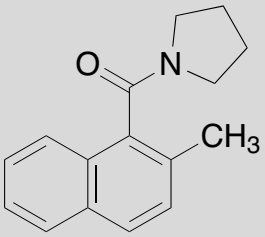
80:20:0.1% hexane/IPA/HOAc
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 2.05$
$\alpha = 3.00$
reference 10



80:20:0.1% hexane/IPA/HOAc
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
(*S*)(-) retained on (*S,S*) CSP
$k'_1 = 1.71$
$\alpha = 3.09$
reference 10

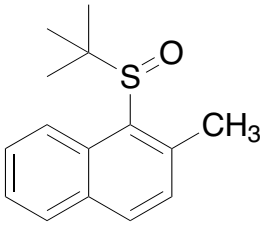


80:20:0.1% hexane/IPA/HOAc
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 5.11$
$\alpha = 2.04$
reference 10



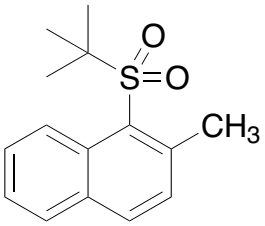
sulfoxide atropisomer

sulfoxide atropisomer
Z diastereomer
2% MeOH in CH_2Cl_2
2 ml/min; 300 nm, -40° C
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 1.32$
$\alpha = 4.06$
reference 21



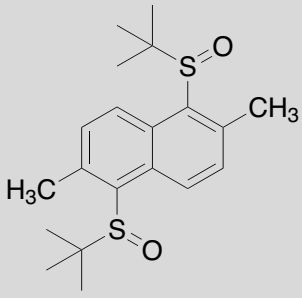
sulfone atropisomer

sulfone atropisomer
2% MeOH in CH_2Cl_2
2 ml/min; 300 nm, -80°C
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 0.54$
$\alpha = 5.79$
reference 21

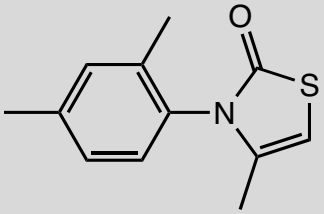


sulfone atropisomer

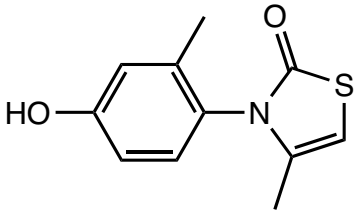
sulfone atropisomer
-80°C
reference 22



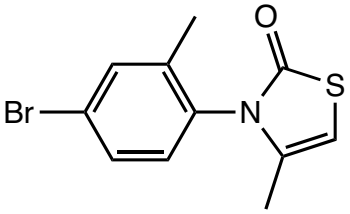
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 3.06$
$\alpha = 2.48$
reference 41



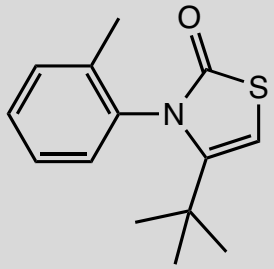
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 3.00$
$\alpha = 3.43$
reference 41



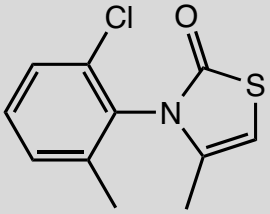
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 3.25$
$\alpha = 3.20$
reference 41



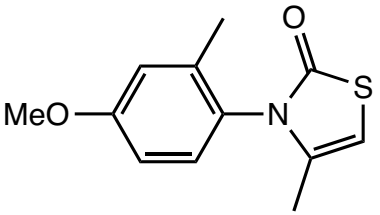
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.06$
$\alpha = 4.34$
reference 41



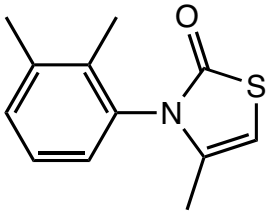
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 1.94$
$\alpha = 1.12$
reference 41



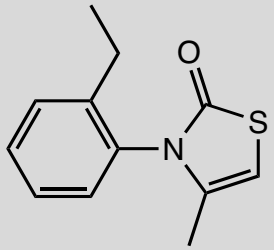
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 5.65$
$\alpha = 3.63$
reference 41



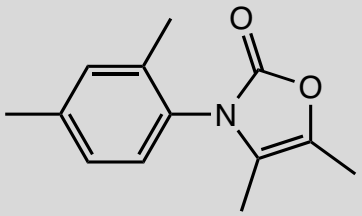
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.41$
$\alpha = 1.80$
reference 41



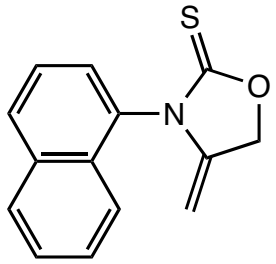
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.78$
$\alpha = 1.90$
reference 41



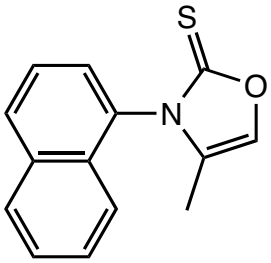
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 7.12$
$\alpha = 2.40$
reference 41



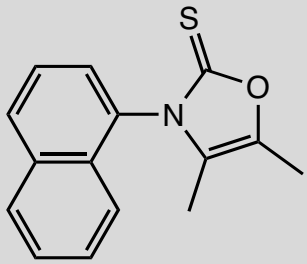
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O CSP
$k'_1 = 6.94$
$\alpha = 1.36$
reference 41



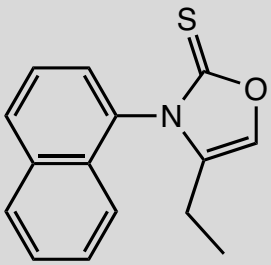
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 6.65$
$\alpha = 1.35$
reference 41



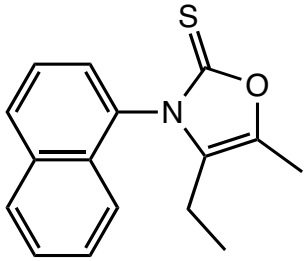
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 7.41$
$\alpha = 1.48$
reference 41



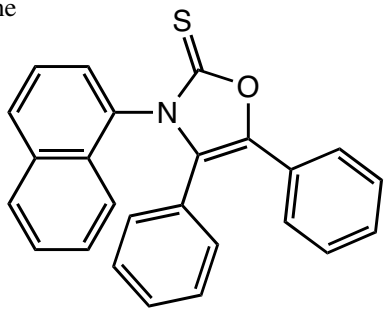
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 7.12$
$\alpha = 1.36$
reference 41



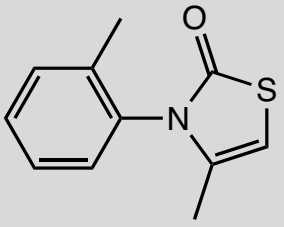
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 6.65$
$\alpha = 1.50$
reference 41



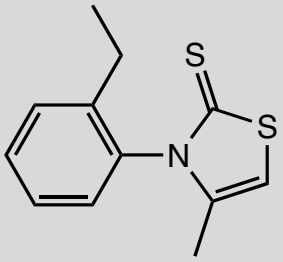
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 5.65$
$\alpha = 1.64$
reference 41



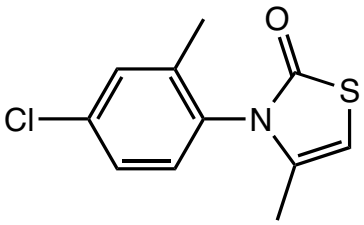
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 3.06$
$\alpha = 2.21$
reference 41



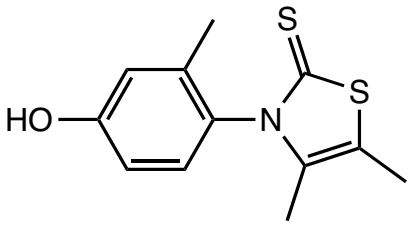
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 1.94$
$\alpha = 1.85$
reference 41



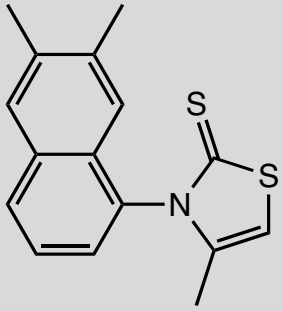
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.24$
$\alpha = 1.45$
reference 41



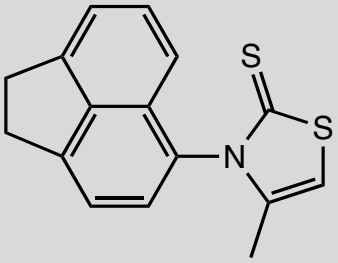
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.59$
$\alpha = 1.70$
reference 41



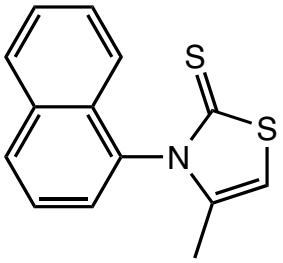
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 3.12$
$\alpha = 2.39$
reference 41



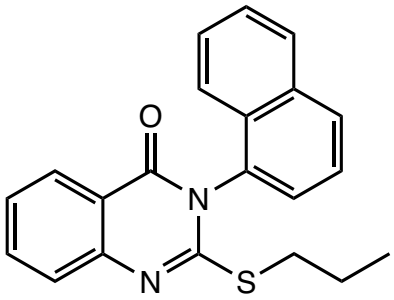
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 4.12$
$\alpha = 1.62$
reference 41



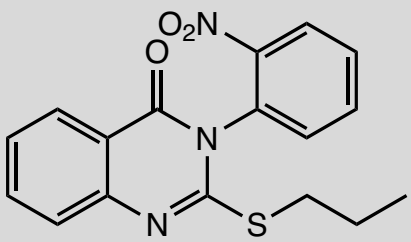
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 3.82$
$\alpha = 1.62$
reference 41



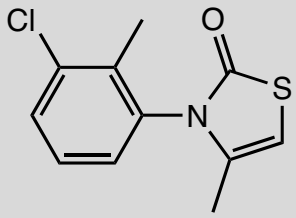
15% IPA/hexane
1 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.14$
$\alpha = 5.56$
reference 42



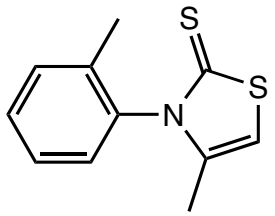
15% IPA/hexane
1 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.86$
$\alpha = 1.86$
reference 42



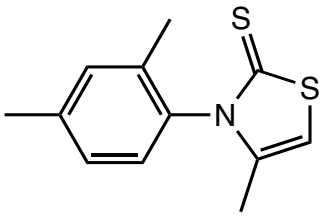
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 3.12$
$\alpha = 2.21$
reference 41



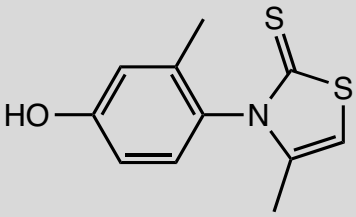
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.41$
$\alpha = 1.66$
reference 41



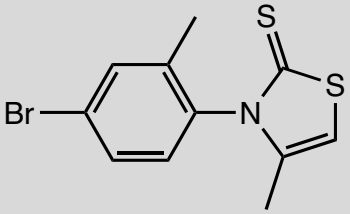
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 1.82$
$\alpha = 1.75$
reference 41



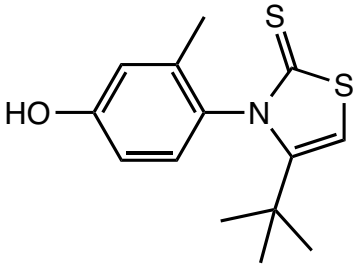
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.41$
$\alpha = 2.61$
reference 41



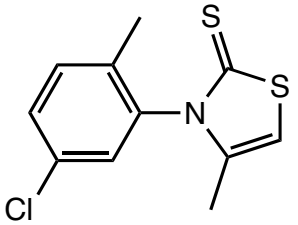
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.24$
$\alpha = 2.02$
reference 41



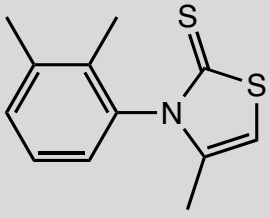
20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 1.53$
$\alpha = 1.84$
reference 41



20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.18$
$\alpha = 1.46$
reference 41

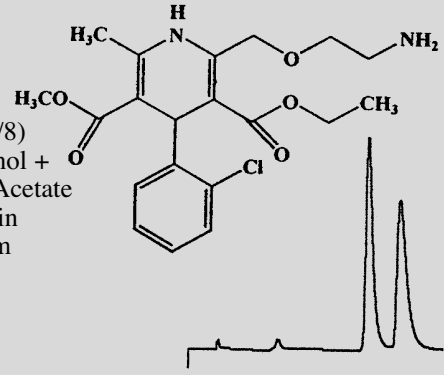


20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.29$
$\alpha = 1.80$
reference 41



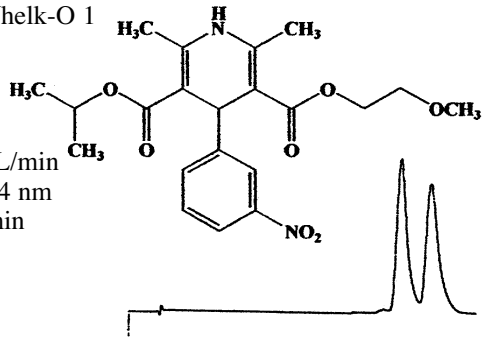
Amlodipine

Amlodipine
Column = (R,R)-
Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (46/46/8)
CH_2Cl_2/Hexane/Ethanol +
0.01 M Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 13.0 min
k'_1 = 5.13
α = 1.22
reference 46

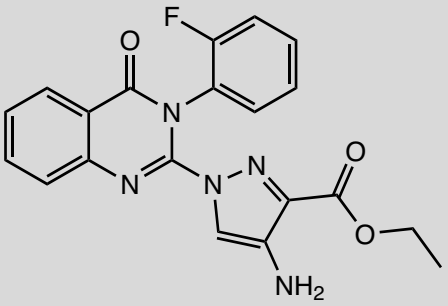


Nimodipine

Nimodipine
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase =
(65/35)
Methanol/H_2O
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 31.0 min
k'_1 = 9.25
α = 1.13
reference 46

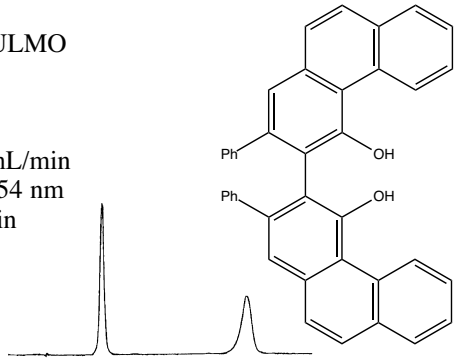


15% IPA/hexane
1 ml/min; 254 nm
(*S,S*) Whelk-O 1
k'_1 = 11.8
α = 1.58
reference 42



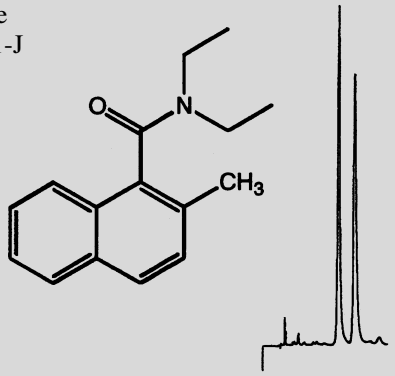
Vapol

Vapol
Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase =
100% Methanol
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 13 min
k'_1 = 1.74
α = 3.37
reference 48

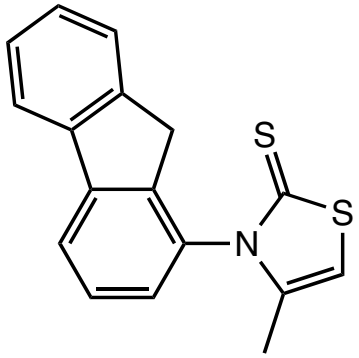


Adam's Acid Diethylamide

Adam's Acid Diethylamide
Column = (3R,4S)-Pirkle 1-J
25 cm x 4.6 mm
Mobile Phase = (70/30)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 17.0 min
k'_1 = 4.11
α = 1.27
reference 46

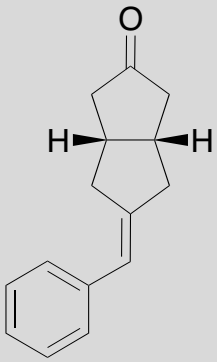


20% 2-propanol in hexane
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
k'_1 = 4.00
α = 2.25
reference 41



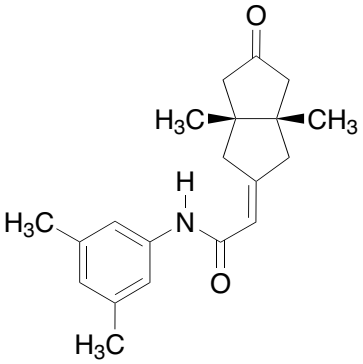
Phototrigger 1

Phototrigger 1
8% IPA in hexane
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
reference 24



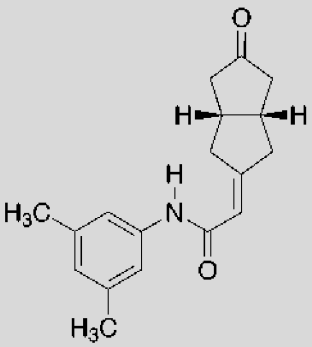
Phototrigger 4

Phototrigger 4
40% IPA in hexane
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
reference 24



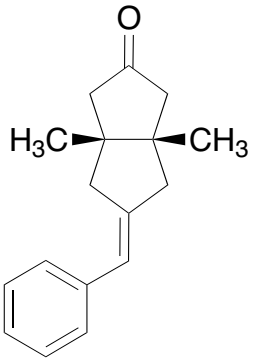
Phototrigger 3

Phototrigger 3
40% IPA in hexane
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
reference 24



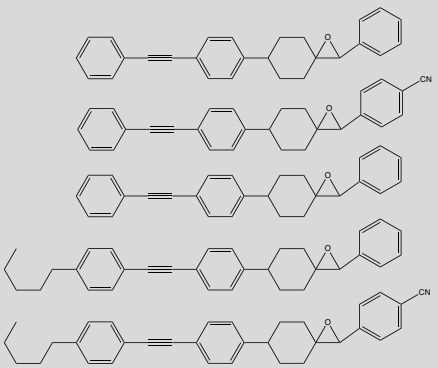
Phototrigger 2

Phototrigger 2
8% IPA in hexane
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
reference 24

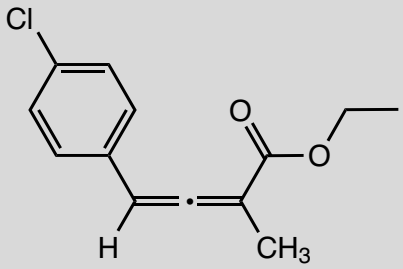


Mesogens

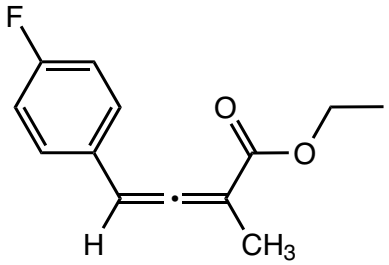
Mesogens
Schuster's candidate
photoresolvable
mesogensepoxide
derivatives
reference 13



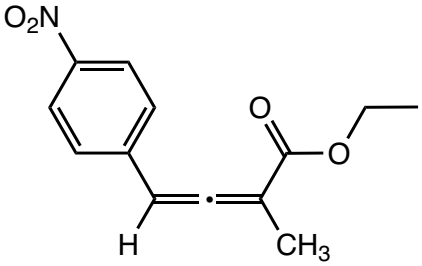
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 0.74$
$\alpha = 2.38$
reference 42



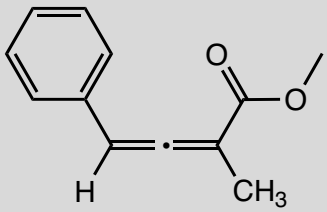
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 0.72$
$\alpha = 2.33$
reference 42



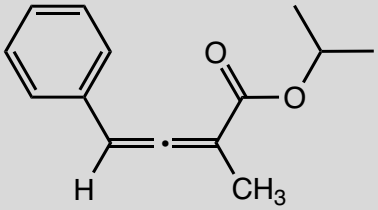
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.20$
$\alpha = 1.59$
reference 42



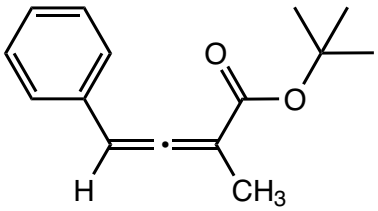
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 0.87$
$\alpha = 2.90$
reference 42



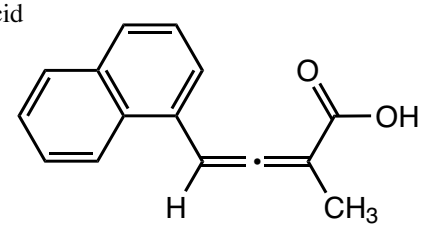
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 0.69$
$\alpha = 3.70$
reference 42



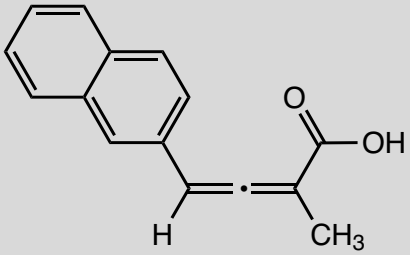
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 0.43$
$\alpha = 3.23$
reference 42



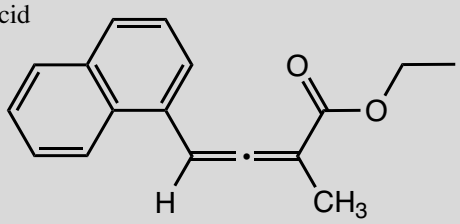
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 1.99$
$\alpha = 7.49$
reference 42



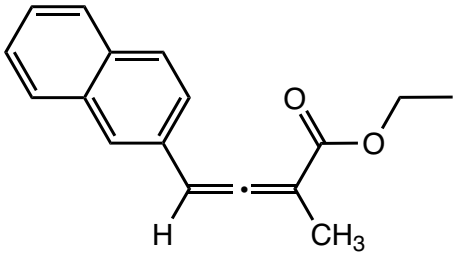
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 1.95$
$\alpha = 4.19$
reference 42



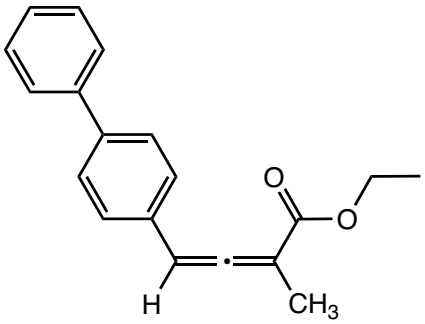
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 1.84$
$\alpha = 5.68$
reference 42



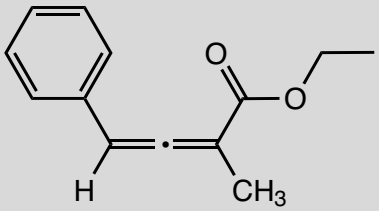
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 1.84$
$\alpha = 3.46$
reference 42



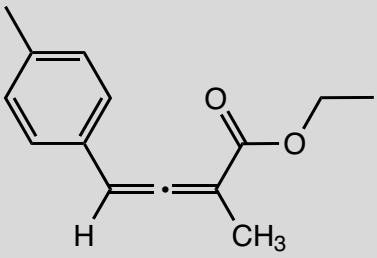
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 1.33$
$\alpha = 3.13$
reference 42



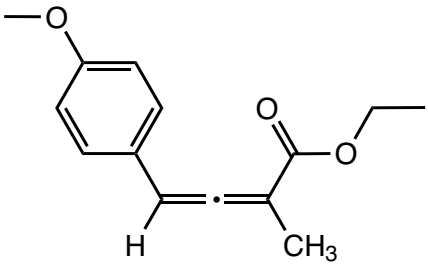
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 0.79$
$\alpha = 3.23$
reference 42



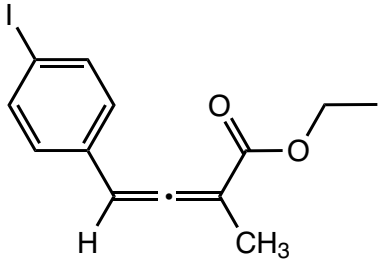
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 0.93$
$\alpha = 3.85$
reference 42



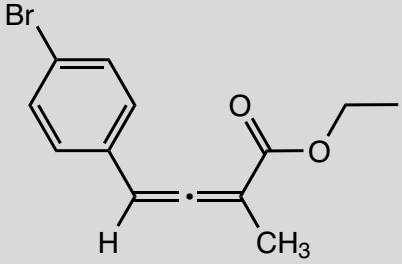
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 1.64$
$\alpha = 3.29$
reference 42



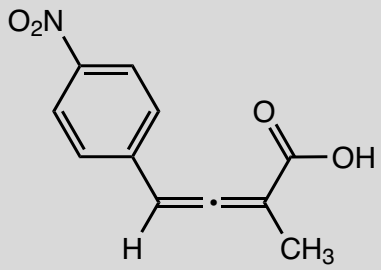
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 0.85$
$\alpha = 2.48$
reference 42



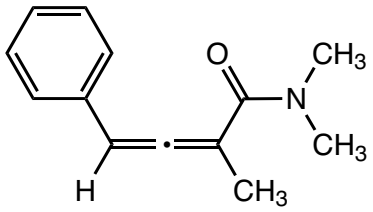
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 0.79$
$\alpha = 2.41$
reference 42



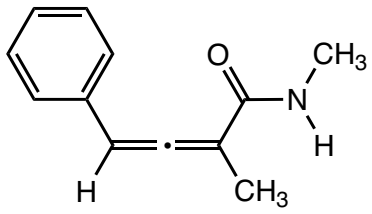
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.94$
$\alpha = 1.74$
reference 42



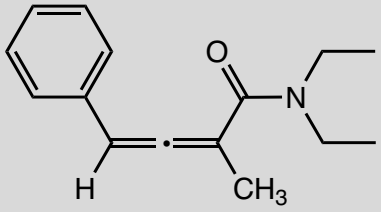
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 7.96$
$\alpha = 1.03$
reference 42



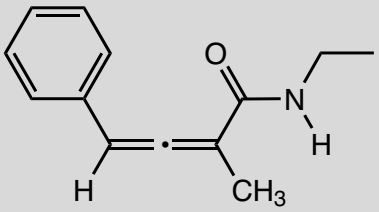
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 10.07$
$\alpha = 1.45$
reference 42



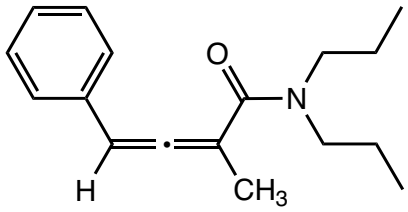
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 5.00$
$\alpha = 1.14$
reference 42



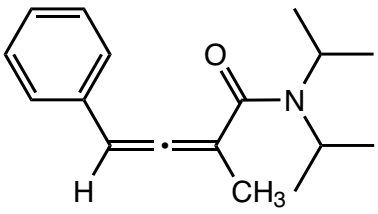
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 7.10$
$\alpha = 1.44$
reference 42



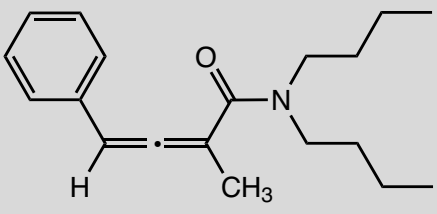
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 4.47$
$\alpha = 0.09$
reference 42



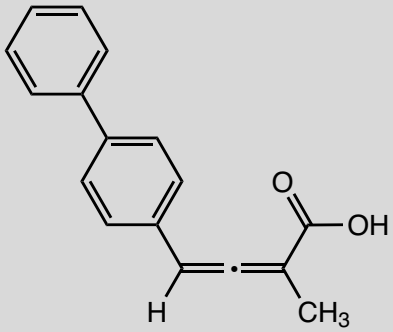
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 2.76$
$\alpha = 1.13$
reference 42



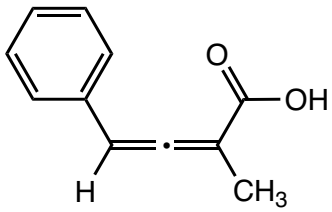
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 4.14$
$\alpha = 1.08$
reference 42



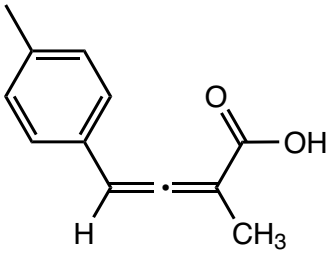
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 1.53$
$\alpha = 3.56$
reference 42



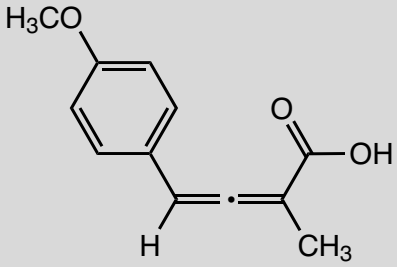
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 0.90$
$\alpha = 3.92$
reference 42



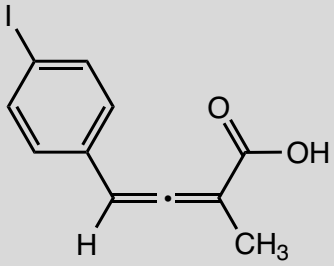
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 1.04$
$\alpha = 4.28$
reference 42



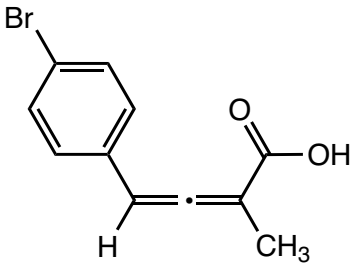
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 1.88$
$\alpha = 3.62$
reference 42



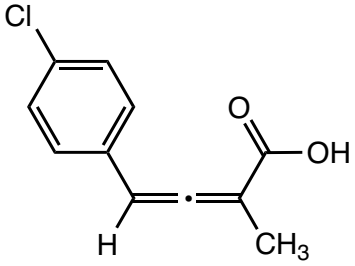
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 1.07$
$\alpha = 2.84$
reference 42



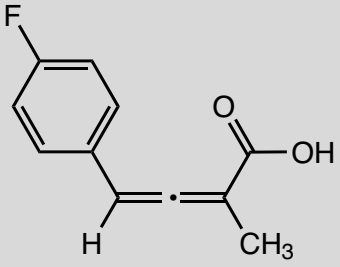
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 1.01$
$\alpha = 2.67$
reference 42



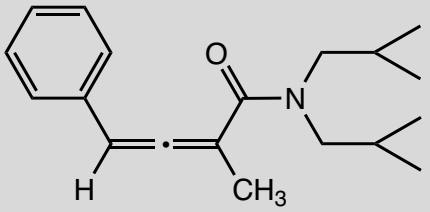
$k'_1 = 0.92$
$\alpha = 2.67$
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
reference 42



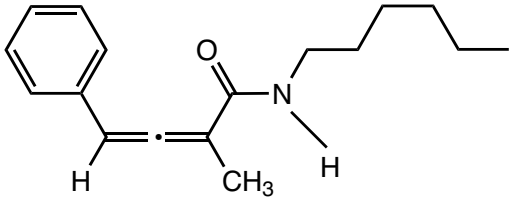
$k'_1 = 0.90$
$\alpha = 2.57$
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
reference 42



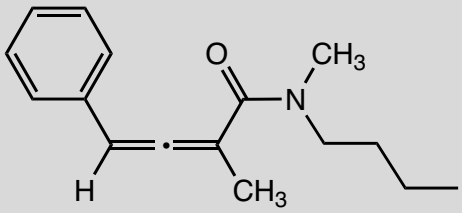
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 3.10$
$\alpha = 1.18$
reference 42



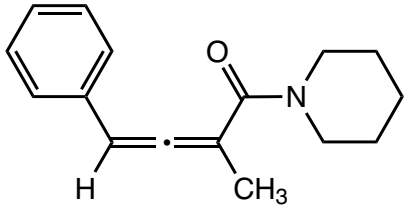
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 5.21$
$\alpha = 1.33$
reference 42



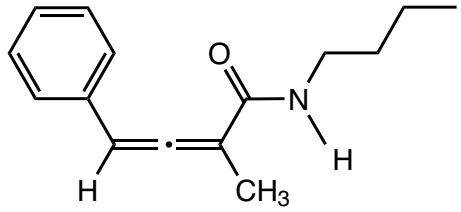
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 5.30$
$\alpha = 1.06$
reference 42



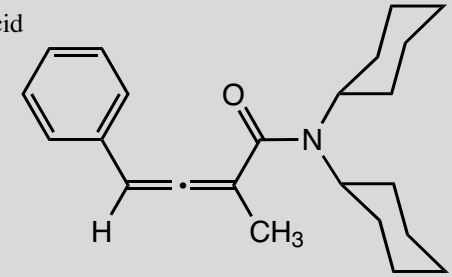
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 6.07$
$\alpha = 1.12$
reference 42



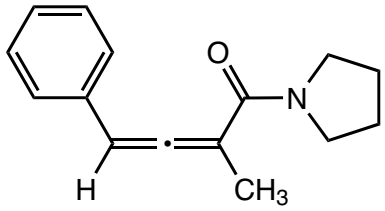
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 5.46$
$\alpha = 1.34$
reference 42



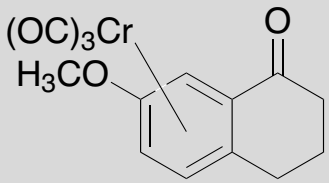
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 3.47$
$\alpha = 1.14$
reference 42



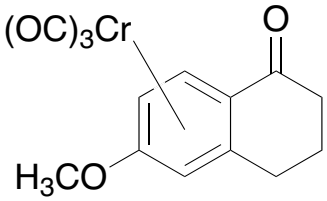
95:5:1 hexane
2-propanol, acetic acid
2 ml/min; 254 nm
(*S,S*) Whelk-O 1
$k'_1 = 10.30$
$\alpha = 1.11$
reference 42



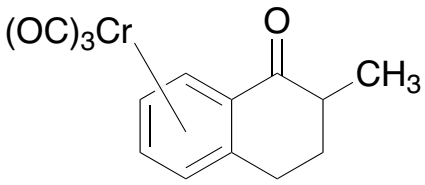
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 3.82$
$\alpha = 1.07$
reference 20



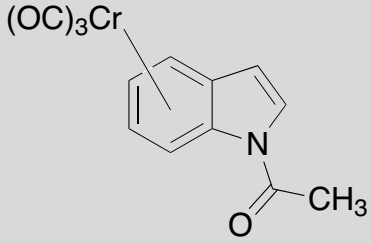
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 5.93$
$\alpha = 1.18$
reference 20



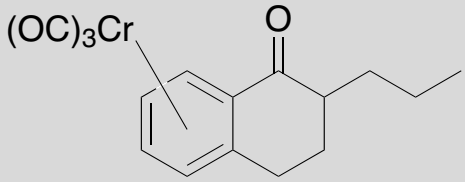
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 2.25$
$\alpha = 1.19$
reference 20



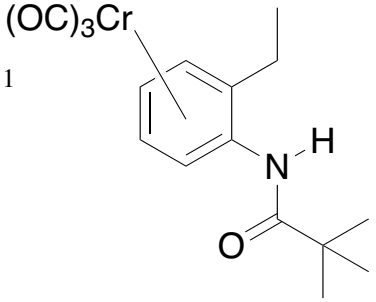
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 6.79$
$\alpha = 1.04$
reference 20



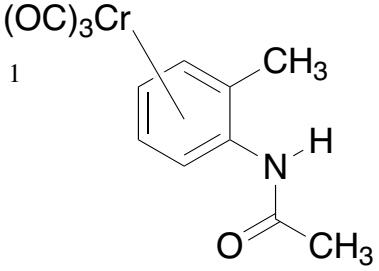
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 1.48$
$\alpha = 1.23$
reference 20



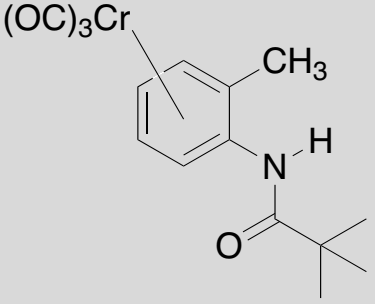
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 1.71$
$\alpha = 1.75$
reference 20



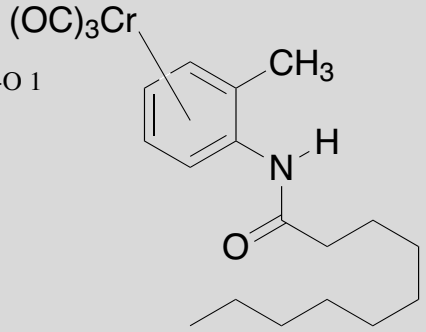
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 4.93$
$\alpha = 1.62$
reference 20



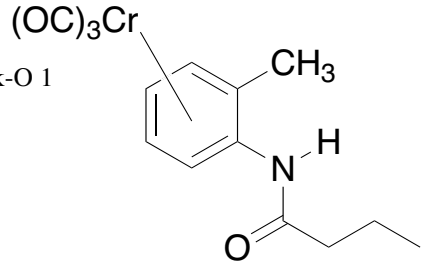
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
$k'_1 = 2.44$
$\alpha = 1.75$
reference 20



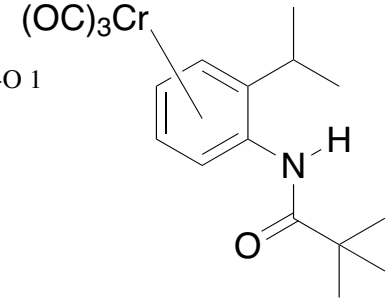
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 1.79
α = 1.99
reference 20



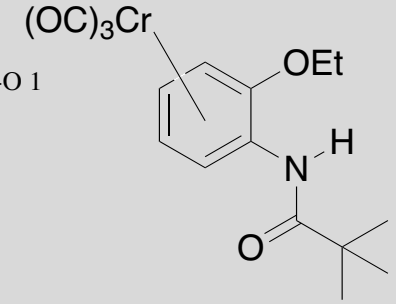
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 3.14
α = 1.86
reference 20



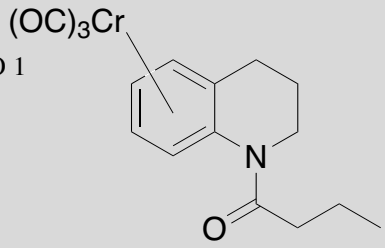
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 1.14
α = 1.75
reference 20



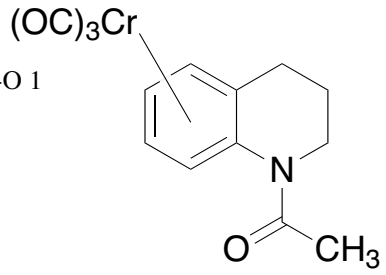
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 1.86
α = 1.69
reference 20



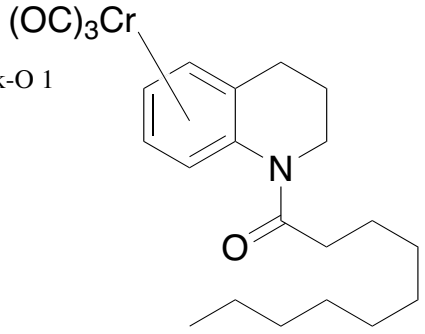
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 3.71
α = 2.50
reference 20



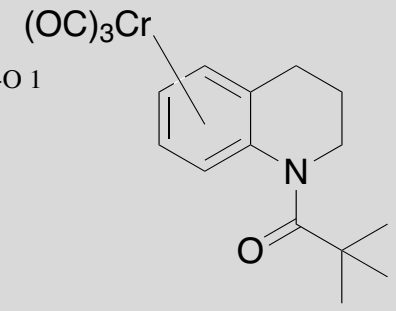
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 11.86
α = 2.08
reference 20



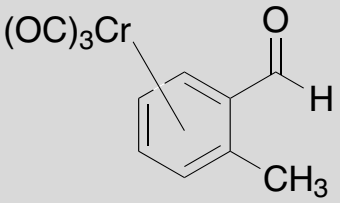
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 3.71
α = 2.50
reference 20



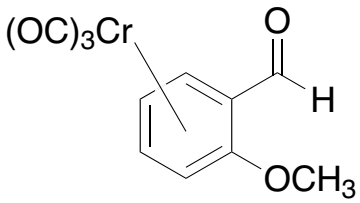
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 2.29
α = 2.46
reference 20



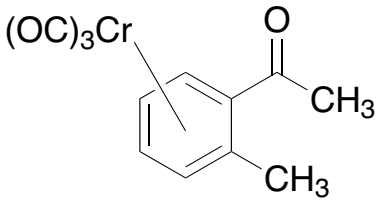
30% CH_2Cl_2 in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 4.28
α = 1.07
reference 20



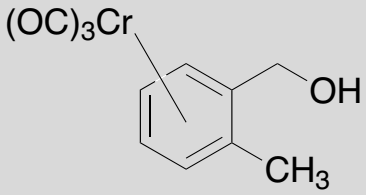
30% CH_2Cl_2 in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 7.57
α = 1.09
reference 20



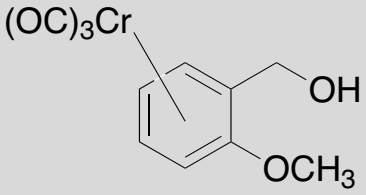
30% CH_2Cl_2 in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 3.57
α = 1.06
reference 20



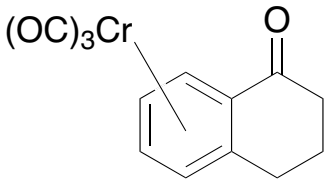
20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 1.77
α = 1.11
reference 20



20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 3.22
α = 1.15
reference 20

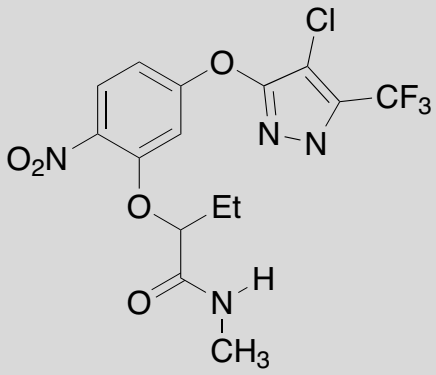


20% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 4.48
α = 1.08
reference 20



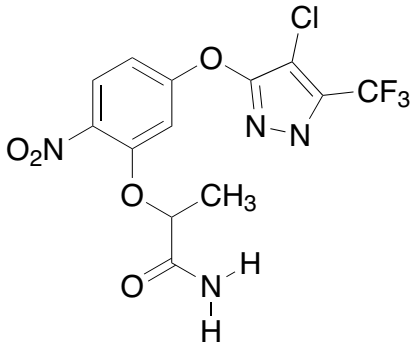
PPO Inhibitor

PPO inhibitor
10% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 5.2$
$\alpha = 1.32$
reference 23



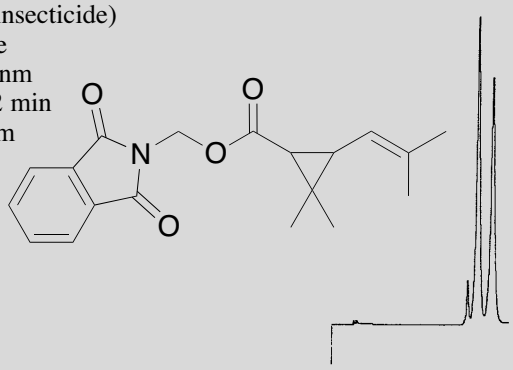
PPO Inhibitor

PPO inhibitor
10% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 8.0$
$\alpha = 1.22$
reference 23



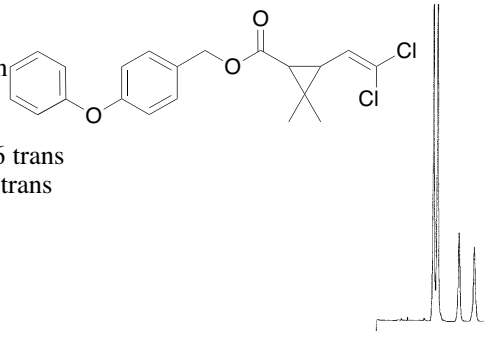
Tetramethrin

Tetramethrin (insecticide)
2% IPA/hexane
1 ml/min; 254 nm
Run Time = 22 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 11.77$
$\alpha = 1.12$
reference 43



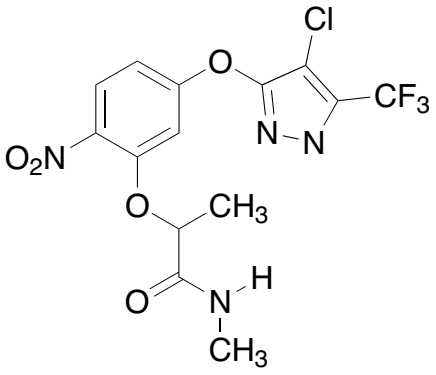
Permethrin

Permethrin (insecticide)
0.2% IPA/hexane
1 ml/min; 254 nm
Run Time = 16 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 4.83$ cis; 7.46 trans
$\alpha = 1.11$ cis; 1.24 trans
reference 43



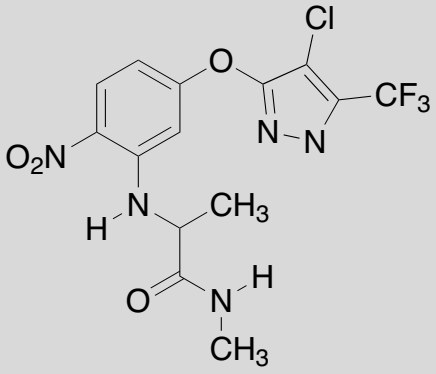
PPO Inhibitor

PPO inhibitor
10% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 7.5$
$\alpha = 1.29$
reference 23



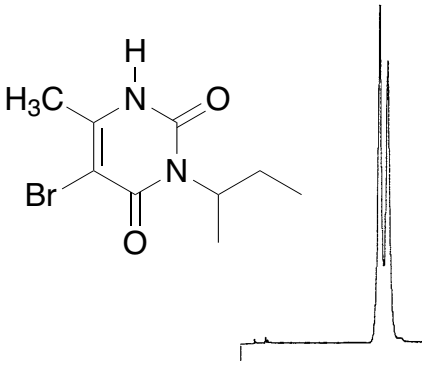
PPO Inhibitor

PPO inhibitor
10% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 15.1$
$\alpha = 1.04$
reference 23



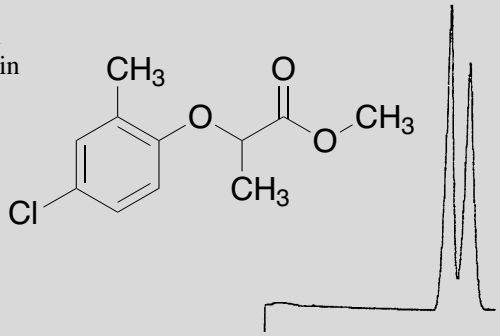
Bromacil

Bromacil (insecticide)
2% IPA/hexane
1 ml/min; 254 nm
Run Time = 38 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 21.43$
$\alpha = 1.07$
reference 43



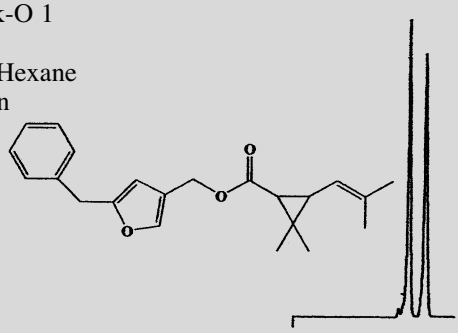
Mecoprop Methyl

Mecoprop Methyl (insecticide)
hexane
1 ml/min; 254 nm
Run Time = 15 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 6.92$
$\alpha = 1.15$
reference 43



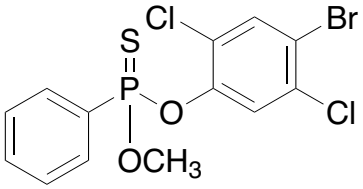
Resmethrin

Resmethrin
Column: (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase: 100% Hexane
Flow Rate:1.0 mL/min
Dection: UV 254 nm
Run Time: 15.0 min
k'_1 = 6.30
α = 1.19
reference 46



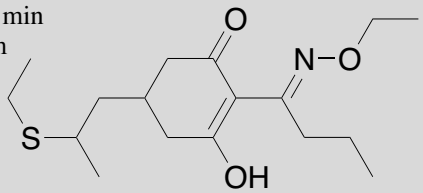
Leptophos, Phosvel

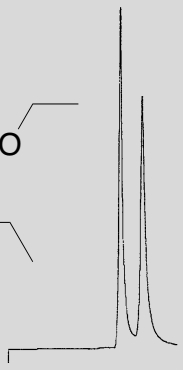
Leptophos, Phosvel
(insecticide)
hexane
1 ml/min; 254 nm
Run Time = 10 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 4.11
α = 1.18
reference 43



Sethoxydim

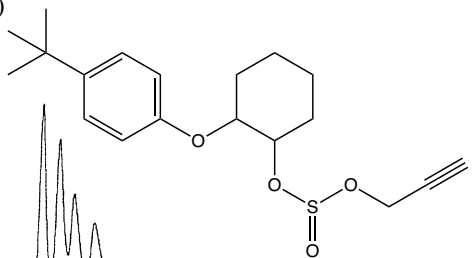
Sethoxydim (herbicide)
2% IPA/hexane
1 ml/min; 254 nm
Run Time = 15 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 6.77
α = 1.26
reference 43

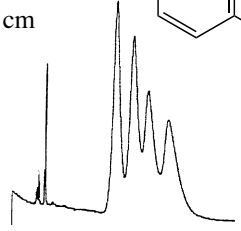




Omite

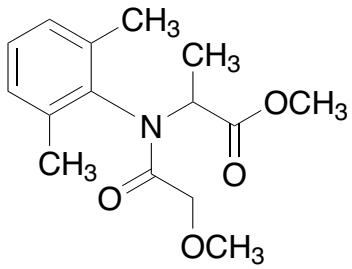
Omite (acaricide)
(mixture of isomers)
hexane
1 ml/min; 254 nm
Run Time = 25 min
4.6 mm x 24 cm
Whelk-O 1
reference 43

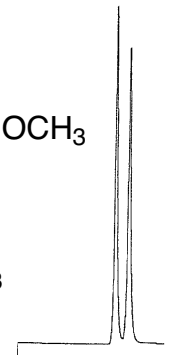




Metalaxyl

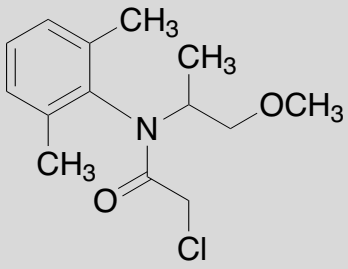
Metalaxyl (herbicide)
70:30 hexane/IPA
1 ml/min; 254 nm
Run Time = 13 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 6.54
α = 1.13
reference 43

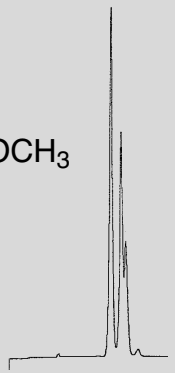




Metolachlor

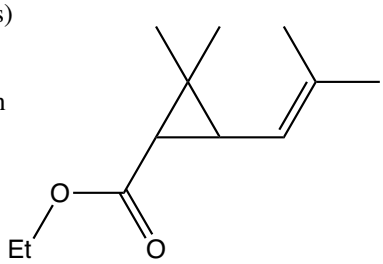
Metolachlor (herbicide)
2% IPA/hexane
1 ml/min; 254 nm
Run Time = 25 min
4.6 mm x 25 cm
Whelk-O 1
reference 43

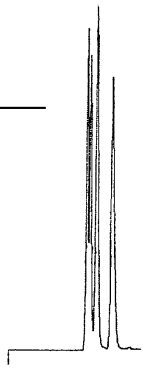




Chrysanthemic Acid-Ethyl Ester

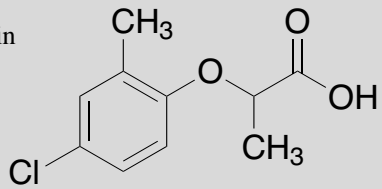
Chrysanthemic acid ethyl ester
(mixture of isomers)
hexane
1 ml/min; 254 nm
Run Time = 10 min
4.6 mm x 24 cm
Whelk-O 1
reference 43

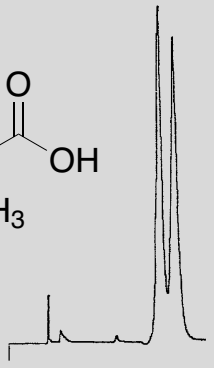




Mecoprop

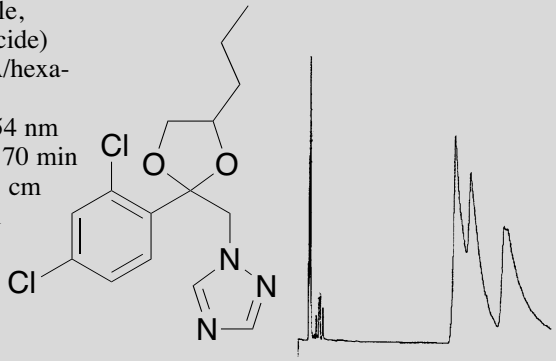
Mecoprop (herbicide)
99:1:0.1 HEX/IPA/HOAc
1 ml/min; 254 nm
Run Time = 15 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 6.54
α = 1.13
reference 43





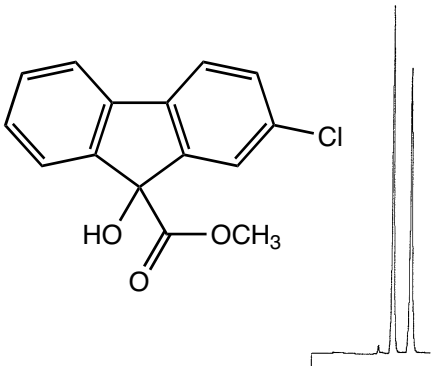
Propiconazole, Tilt

Propiconazole,
Tilt (fungicide)
99:1:0.1 IPA/hexane/HOAc
1 ml/min; 254 nm
Run Time = 70 min
4.6 mm x 25 cm
Whelk-O 1
reference 43



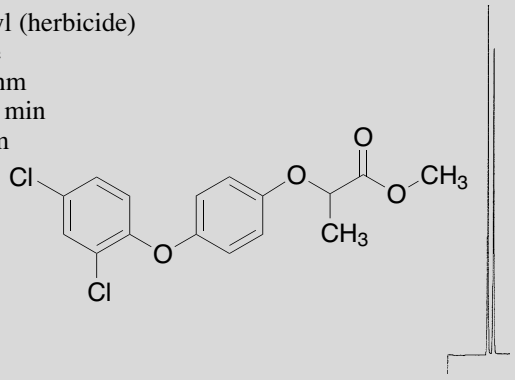
Chlorflurecol Methlyl

Chlorflurecol Methyl
(herbicide)
2% IPA/hexane
1ml/min; 254 nm
Run Time 16 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 3.96$
$\alpha = 1.28$
reference 43



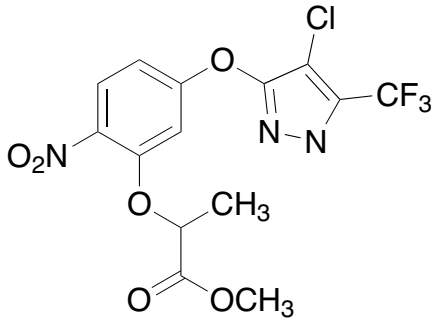
Diclofop Methyl

Diclofop Methyl (herbicide)
1% IPA/hexane
1 ml/min; 254 nm
Run Time = 30 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 4.29$
$\alpha = 1.21$
reference 43



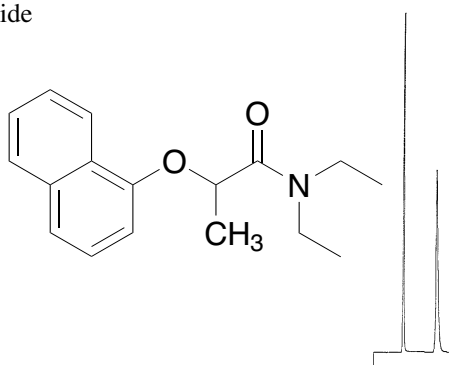
PPO Inhibitor

PPO inhibitor
10% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 3.9$
$\alpha = 1.11$
reference 23



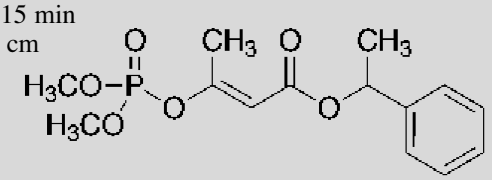
Devrinol, Napropamide

Devrinol, Napropamide
(herbicide)
1:1 IPA/hexane
1 ml/min; 254 nm
Run Time = 15 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 3.17$
$\alpha = 3.00$
reference 43



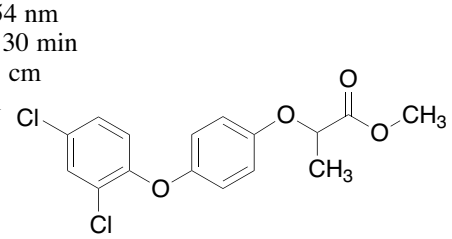
Crotoxyphos

Crotoxyphos
70:30 hexane/IPA
1 ml/min; 254 nm
Run Time = 15 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 4.37$
$\alpha = 1.93$
reference 43



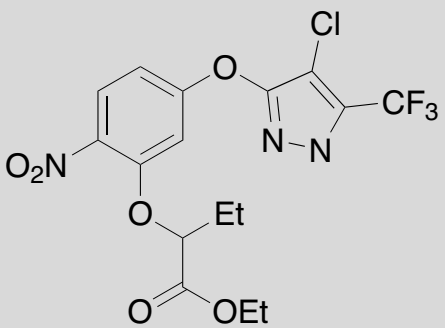
Diclofop Methyl

Diclofop Methyl (herbicide)
hexane
1 ml/min; 254 nm
Run Time = 30 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 14.19$
$\alpha = 1.30$
reference 43



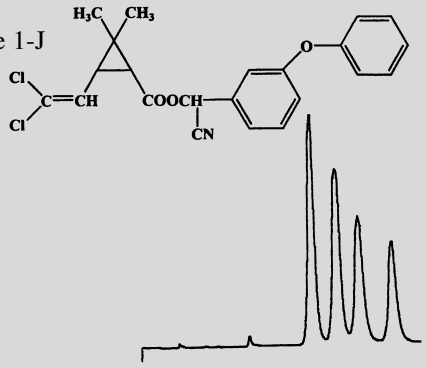
PPO Inhibitor

PPO inhibitor
10% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 2.4$
$\alpha = 1.12$
reference 23



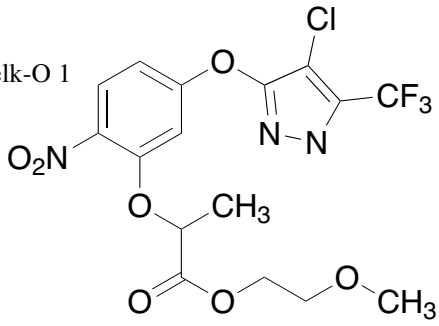
cis:trans Cypermethrin

cis:trans Cypermethrin
Column = (3R,4S)-Pirkle 1-J
25 cm x 4.6 mm
Mobile Phase = (98/2)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 22.0 min
k'_1 (trans) = 4.59
α (trans) = 1.19
k'_1 (cis) = 6.19
α (cis) = 1.18
reference 46



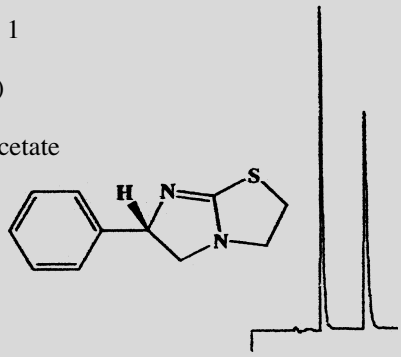
PPO Inhibitor

PPO inhibitor
10% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 6.1
α = 1.08
reference 23

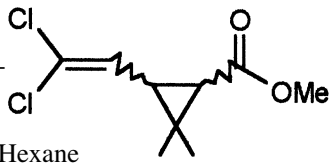


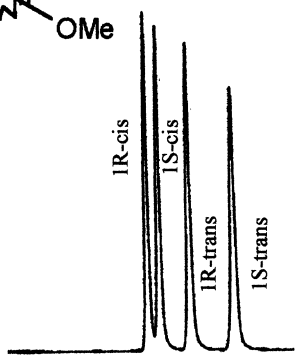
Tetramisole

Ttetramisole
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (40/40/20)
CH_2Cl_2/Hexane/Ethanol
+ 0.01 M Ammonium Acetate
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 7.0 min
k'_1 = 0.52
α = 2.84
reference 46



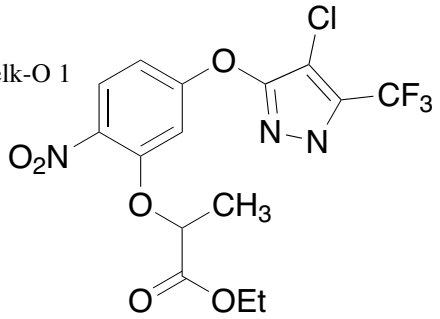
Column = (R,R)-
Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = Hexane
Flow Rate = 0.5 mL/min
Detection = UV 254 nm
Run Time = 15.5 min
reference 54





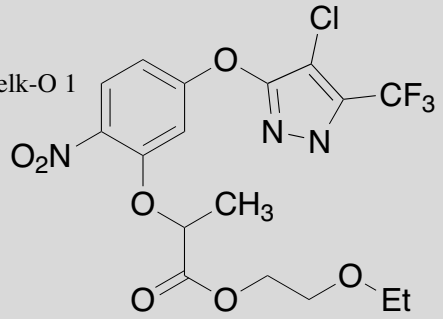
PPO Inhibitor

PPO inhibitor
10% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 3.2
α = 1.08
reference 23



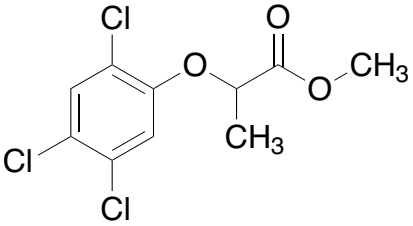
PPO Inhibitor

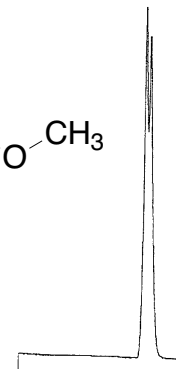
PPO inhibitor
10% IPA in hexane
2 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 4.2
α = 1.10
reference 23



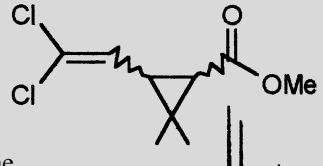
Silvex Methyl

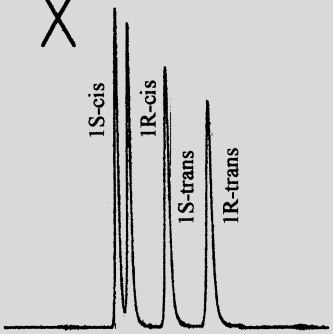
Silvex Methyl
(herbicide)
hexane
1 ml/min; 254 nm
run time = 15 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 6.47
α = 1.05
reference 43





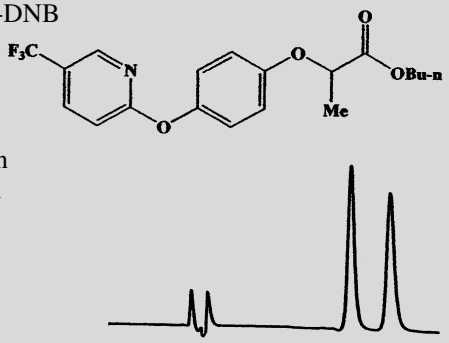
Column = (S,S)-
Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = Hexane
Flow Rate = 0.5 mL/min
Detection = UV 254 nm
Run Time = 18.5 min
reference 54





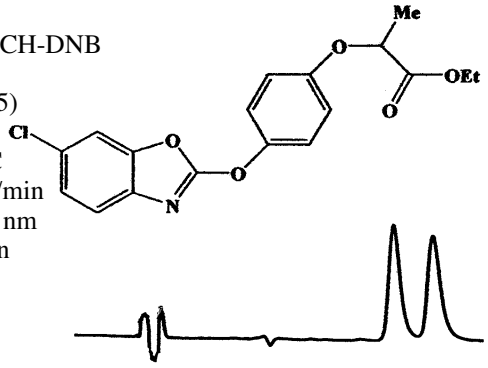
Fluazifop-butyl

Fluazifop-butyl
Column: (S,S)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase: (95/5)
Hexane/IPA
Temperature: 20° C
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 11.5 min
k'_1 = 2.65
α = 1.22
reference: 59



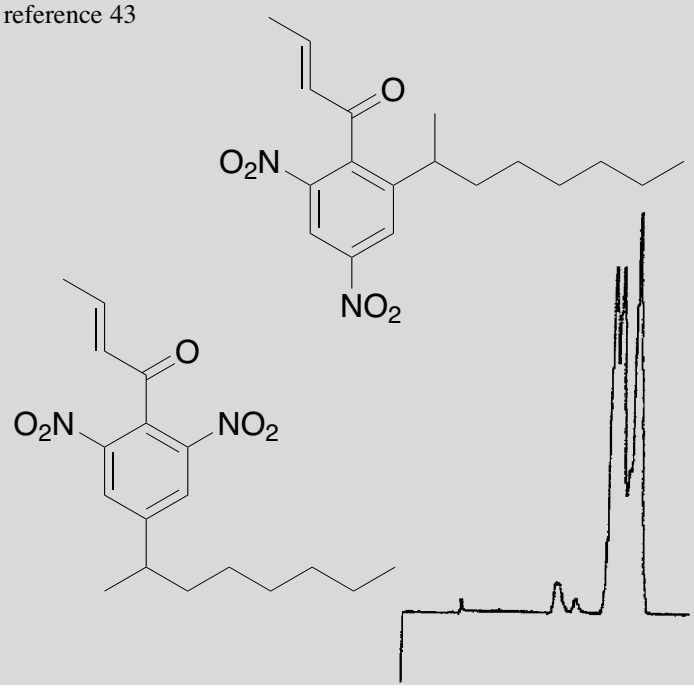
Fenoxaprop-ethyl

Fenoxaprop-ethyl
Column: (R,R)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase: (95/5)
Hexane/IPA
Temperature: 20° C
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 18.0 min
k'_1 = 4.70
α = 1.15
reference: 59



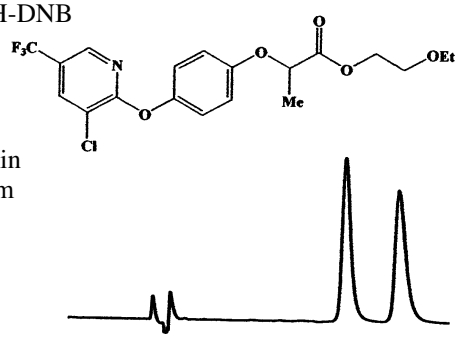
Dinocap

Dinocap (fungicide) - mixture of isomers
hexane
1 ml/min; 254 nm
Run Time = 15 min
4.6 mm x 25 cm Whelk-O 1
reference 43



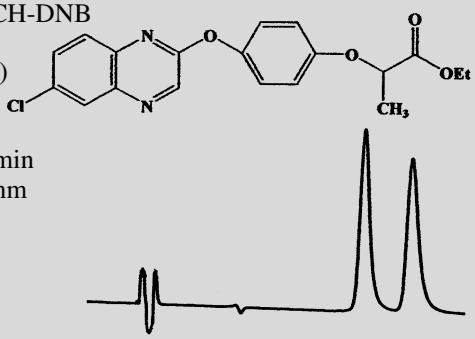
Haloxyfop-ethoxyethyl

Haloxyfop-ethoxyethyl
Column: (S,S)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase: (95/5)
Hexane/IPA
Temperature: 20° C
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 13.0 min
k'_1 = 3.13
α = 1.25
reference: 59



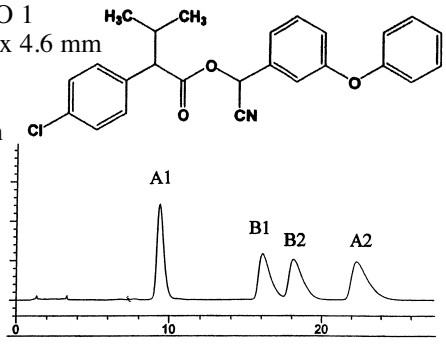
Quizalofop-ethyl

Quizalofop-ethyl
Column: (R,R)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase: (95/5)
Hexane/IPA
Temperature: 20° C
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 20.0 min
k'_1 = 5.22
α = 1.21
reference: 59



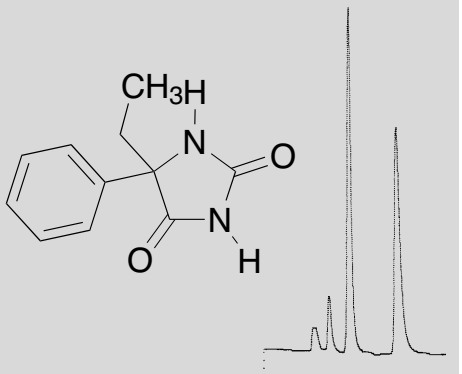
Fenvalerate

Fenvalerate
Column: (S,S)-Whelk-O 1
10/100 (FEC) 25 cm x 4.6 mm
Mobile Phase: (99/1)
Hexane/IPA
Flow Rate: 3.0 mL/min
Detection: UV 254 nm
k'_{A1}= 9.36
$\alpha_{(A1,A2)}$= 2.54
k'_{B1}= 16.79
$\alpha_{(B1,B2)}$= 1.14
reference 46



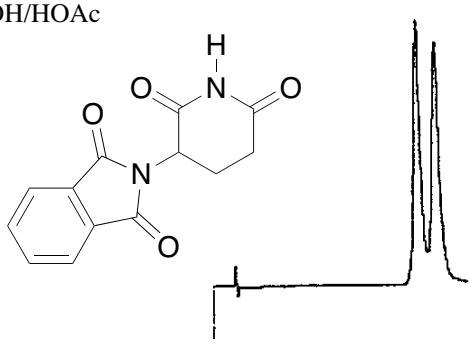
Nirvanol

Nirvanol
20% IPA/hexane
1 ml/min; 254 nm
Run Time = 8 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 1.50
α = 2.57
reference 31



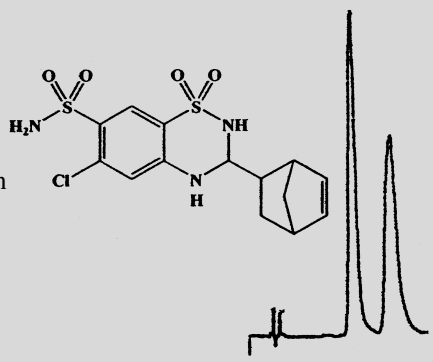
Thalidomide

Thalidomide
63:37:0.1 H_2O/MeOH/HOAc
1 ml/min; 254 nm
Run Time = 33 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 10.19
α = 1.10
reference 18

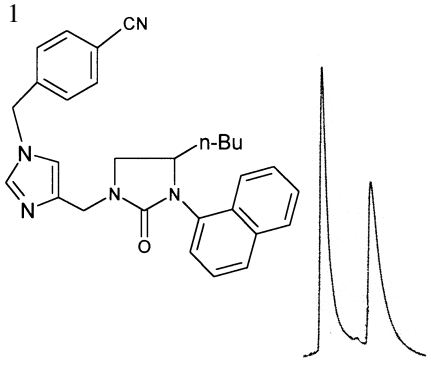


Cyclothiazide

Cyclothiazide
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (75/25)
Hexane/IPA + 0.1%
Acetic Acid
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 12.0 min
k'_1 = 3.71
α = 1.47
reference 46

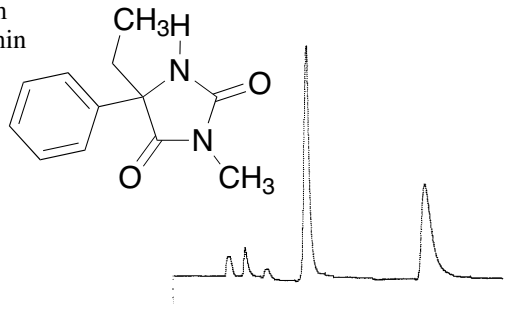


Column: (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase: (60/40)
Ethanol/Hexane + 0.1%
Triethylamine
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
Run Time: 32.0 min
k'_1 = 3.78
α = 1.66
reference 55



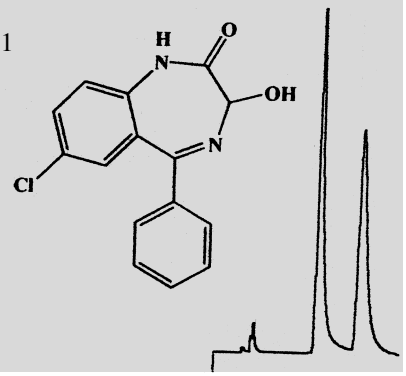
Mephenytoin

Mephenytoin
20% IPA/hexane
1 ml/min; 254 nm
Run Time = 14 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 1.57
α = 2.46
reference 31



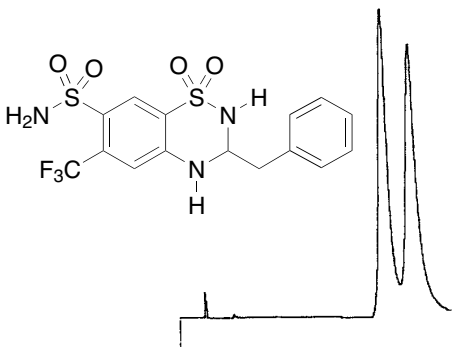
Oxazepam

Oxazepam
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (75/25)
Hexane/IPA + 0.01 M
Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 9.5 min
k'_1 = 2.73
α = 1.56
reference 46

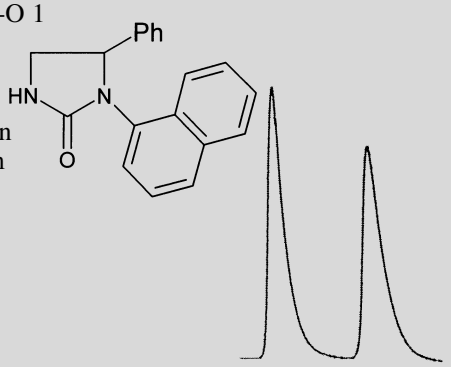


Bendroflumethiazide

bendroflumethiazide
k'_1 = 7.89
α = 1.16
1:1 hexane/IPA
1 ml/min; 220 nm
run time = 30 min
4.6 mm x 25 cm
Whelk-O 1
reference 18

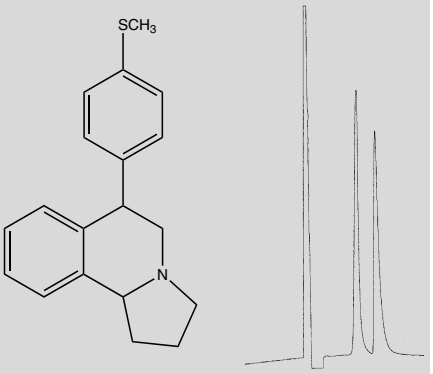


Column: (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase: (80/20)
Hexane/IPA
Flow Rate: 2.0 mL/min
Detection: UV 254 nm
Run Time: 32.0 min
k'_1 = 15.64
α = 1.33
reference 55



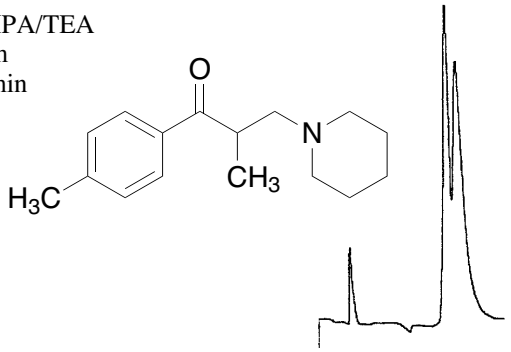
McN 5652

McN 5652
2% IPA/hex w. 0.2%
diethylamine
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 0.85$
$\alpha = 1.36$
reference 32



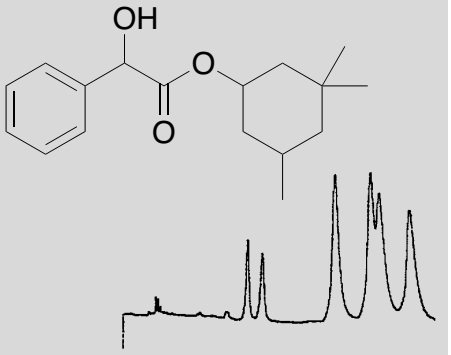
Tolperisone

Tolperisone
99:1:0.1 hexane/IPA/TEA
1 ml/min; 254 nm
Run Time = 18 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 4.81$
$\alpha = 1.10$
reference 18

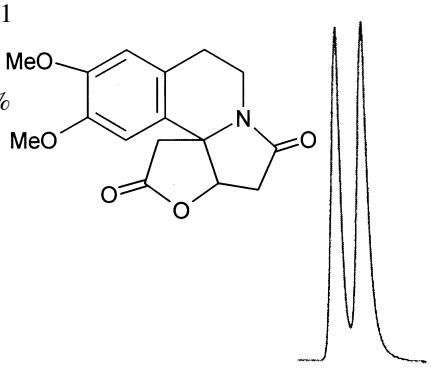


Cyclandelate

Cyclandelate
(mixture of isomers)
hexane
1 ml/min; 254 nm
Run Time = 35 min
4.6 mm x 25 cm
Whelk-O 1
reference 18

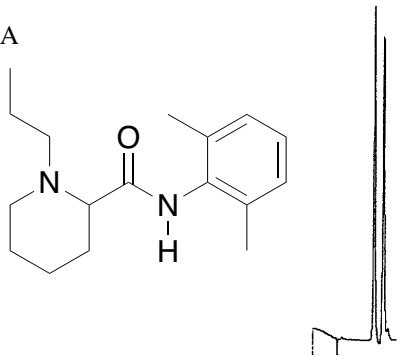


Column: (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase: (60/40)
Ethanol/Hexane + 0.1%
Triethylamine
Flow Rate: 1.0 mL/min
Detection: UV 280 nm
Run Time: 17.0 min
$k'_1 = 3.78$
$\alpha = 1.14$
reference 56



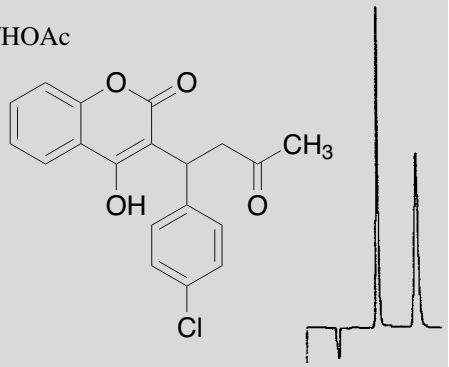
Bupivacaine

Bupivacaine
80:20:0.1 hexane/IPA/TEA
1 ml/min; 254 nm
Run Time = 7-8 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 1.89$
$\alpha = 1.25$
reference 18



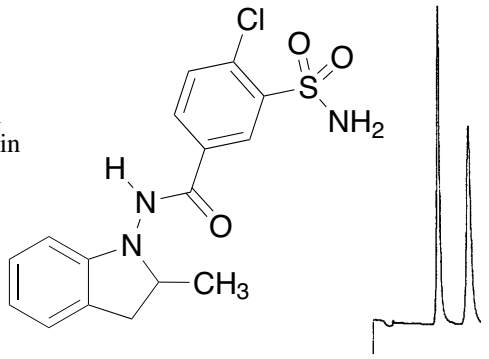
p-Chloro-Warfarin

p-Chloro-Warfarin
85:15:0.1 MeOH/H_2O/HOAc
1 ml/min; 254 nm
Run Time = 12 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 1.64$
$\alpha = 1.93$
reference 18

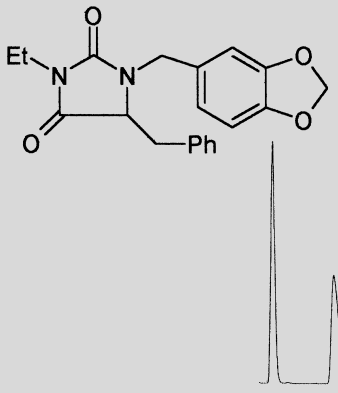


Indapamide

Iindapamide
$k'_1 = 2.46$
$\alpha = 1.68$
1:1 hexane/IPA
1 ml/min; 220 nm
Run Time = 14 min
4.6 mm x 25 cm
Whelk-O 1
reference 18

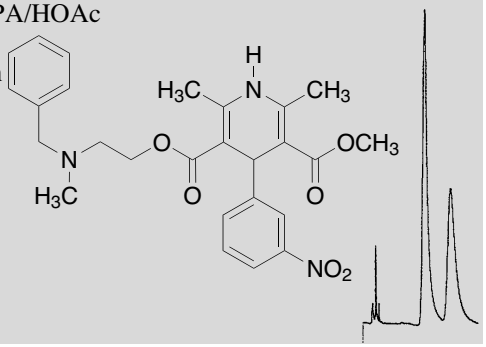


Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (95/5)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 25.0 min
$k'_1 = 3.45$
$\alpha = 2.04$
reference 53



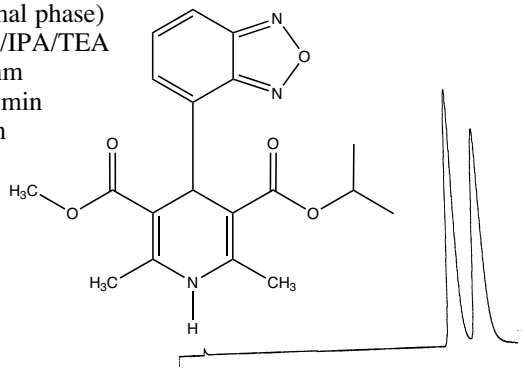
Nicardipine

Nicardipine
73:27:0.1 hexane/IPA/HOAc
1 ml/min; 254 nm
Run Time = 30 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 6.06
α = 1.52
reference 18



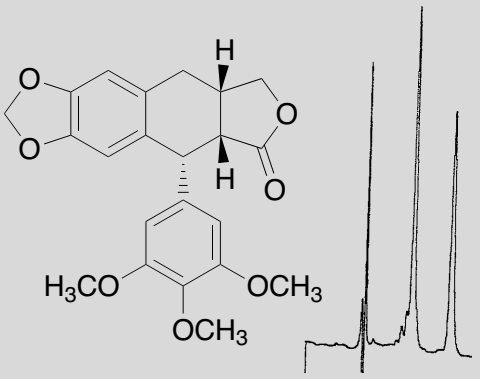
Isradipine (normal phase)

Isradipine (normal phase)
98:2:0.5 hexane/IPA/TEA
1 ml/min; 254 nm
Run Time = 52 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 9.71
α = 1.10
reference 18



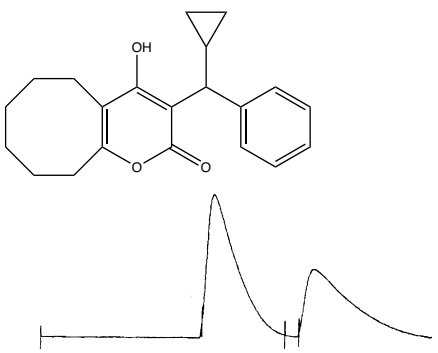
Hanessian's Lignan

Hanessian's lignan
methanol
1 ml/min; 254 nm
Run Time = 8 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 0.94
α = 1.69
reference 7



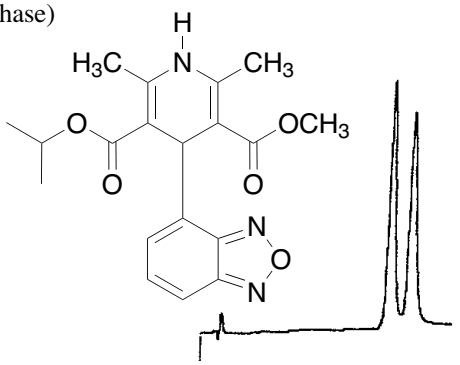
U-100057

U-100057
65:35 hexane/IPA
90 ml/min to 34 min,
then 120 ml/min
Run Time = 50 min
5.1 cm x 25 cm
Whelk-O 1
Sample Load = 1.9 g
reference 37



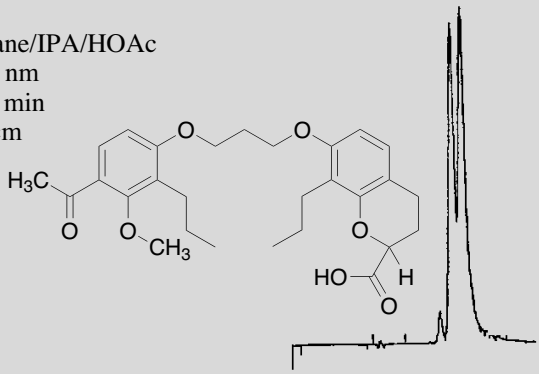
Isradipine (reversed phase)

Isradipine (reversed phase)
63/37 MeOH/H_2O
1 ml/min; 254 nm
Run Time = 35 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 11.21
α = 1.12
reference 18



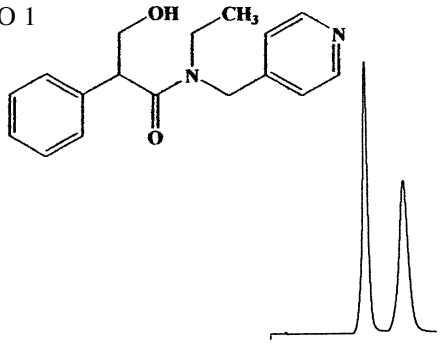
SC 41930

SC 41930
80:20:0.5 hexane/IPA/HOAc
1 ml/min; 254 nm
Run Time = 6 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 1.05
α = 1.12
reference 7



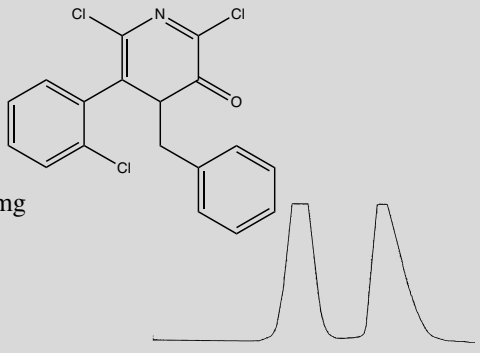
Tropicamide

Tropicamide
Column: (R,R)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase: (75/25)
Hexane/Ethanol
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
Run Time = 13.9 min
k'_1 = 4.52
α = 1.49
reference 46



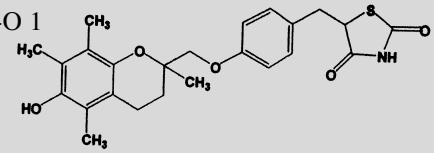
U-94863

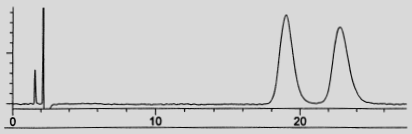
U-94863
70:30:0.5 hexane/
IPA/HOAC
12 ml/min; 254 nm
2.1 cm x 25 cm
Whelk-O 1
Run Time = 12 min
Sample Load = 40 mg
reference 37



Troglitazone

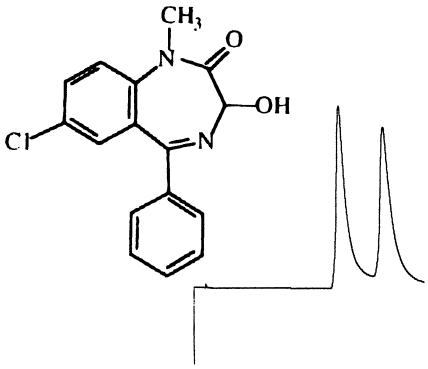
Troglitazone
Column = (S,S)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase = (90/10)
Hexane/IPA
+ 0.1% Acetic Acid
Flow Rate = 2.0 mL/min
Detection = UV 220 nm
k'_1 = 13.05
α = 1.22
reference 46



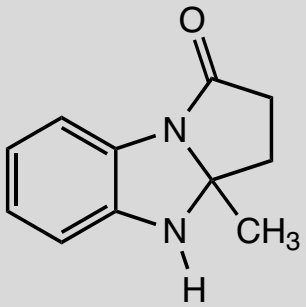


Temazepam

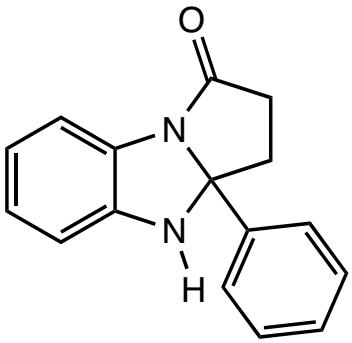
Column: (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase: (97/3)
Hexane/IPA +
0.1% Acetic acid
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
Run Time: 31.0 min
k'_1 = 12.05
α = 1.34
reference 46



30% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 1.61
α = 1.48
reference 44

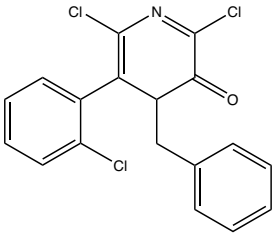


30% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 1.29
α = 1.83
reference 44



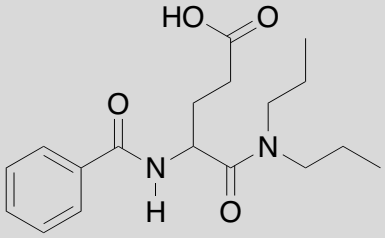
U-94863

U-94863
40:60:0.5 hexane/IPA/HOAc
1 ml/min; 254 nm
run time = 15 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 2.26
α = 1.95
reference 37

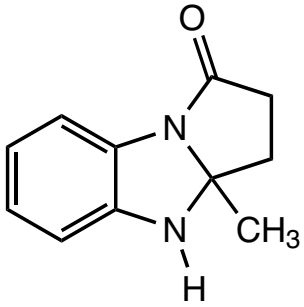


Proglumide

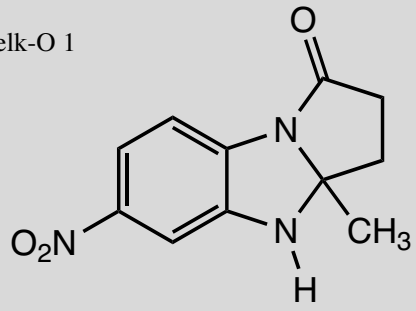
Proglumide
75:25:0.1 hexane/IPA/HOAc
1 ml/min; 254 nm
run time = 10 min
4.6 mm x 25 cm
Whelk-O 1
k'_1 = 1.54
α = 1.49
reference 18



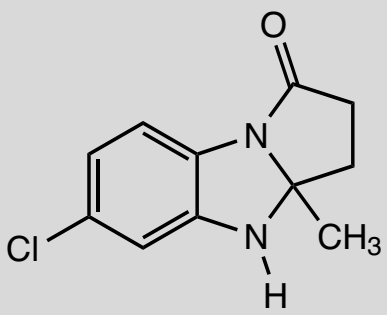
30% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 1.66
α = 1.69
reference 44



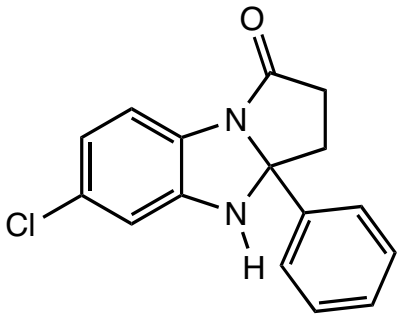
30% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm Whelk-O 1
k'_1 = 2.56
α = 1.25
reference 44



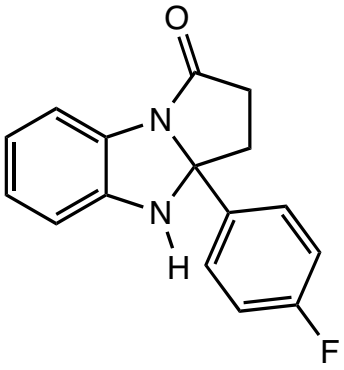
30% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 1.38$
$\alpha = 1.44$
reference 44



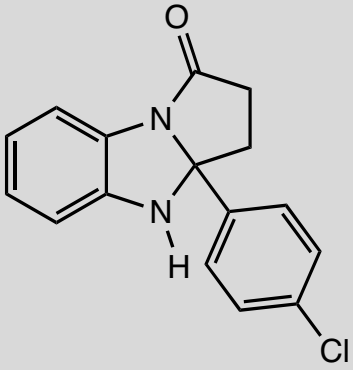
30% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 1.34$
$\alpha = 1.60$
reference 44



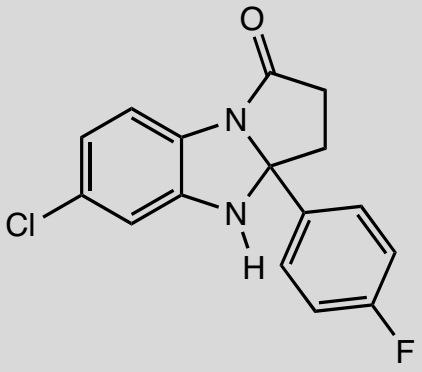
30% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 1.29$
$\alpha = 1.83$
reference 44



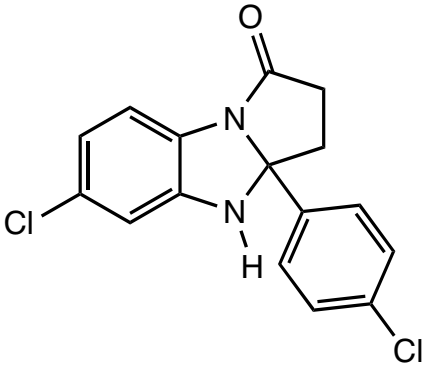
30% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 1.37$
$\alpha = 1.90$
reference 44



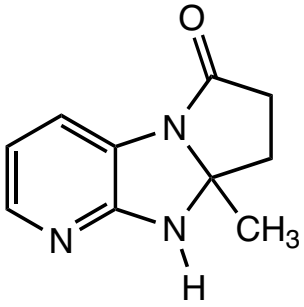
30% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 1.18$
$\alpha = 1.72$
reference 44



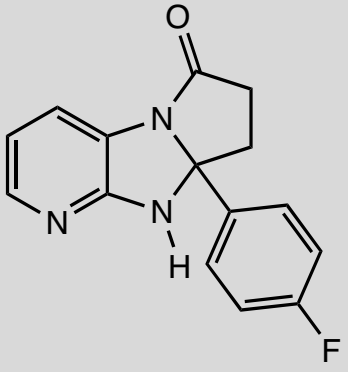
30% IPA/hexane
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 1.34$
$\alpha = 1.78$
reference 44



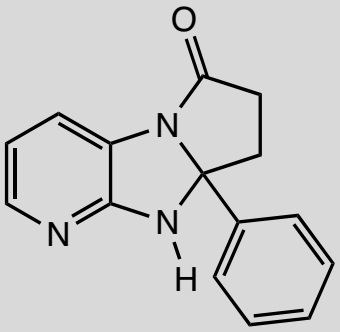
70:30:05 hexane/
2-propanol/diethyl amine
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 2.36$
$\alpha = 1.33$
reference 44



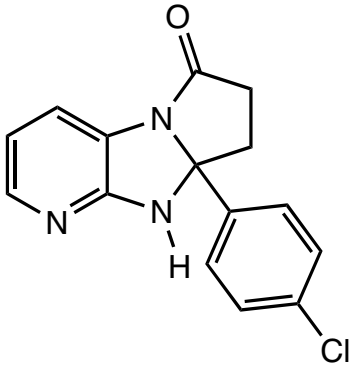
70:30:05 hexane/
2-propanol/diethyl amine
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 1.70$
$\alpha = 1.55$
reference 44



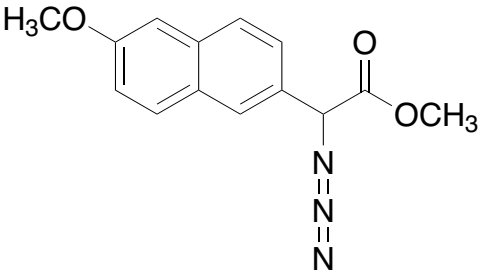
70:30:05 hexane/
2-propanol/diethyl amine
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 1.90$
$\alpha = 1.45$
reference 44



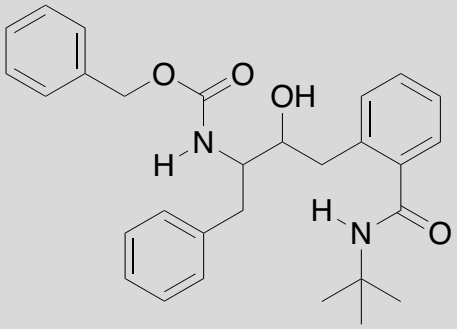
70:30:05 hexane/
2-propanol/diethyl amine
1 ml/min; 254 nm
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 1.73$
$\alpha = 1.59$
reference 44



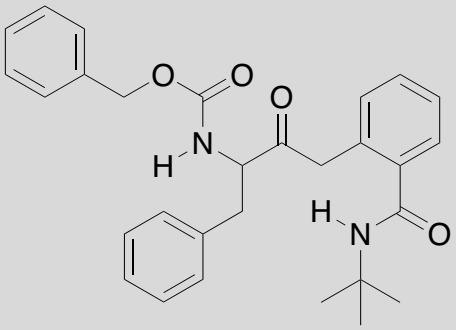
40% IPA/hexane
1 ml/min
4.6 mm x 25 cm
(*S,S*) Whelk-O 1
$\alpha = 1.34$
Rs = 2.10
reference 45



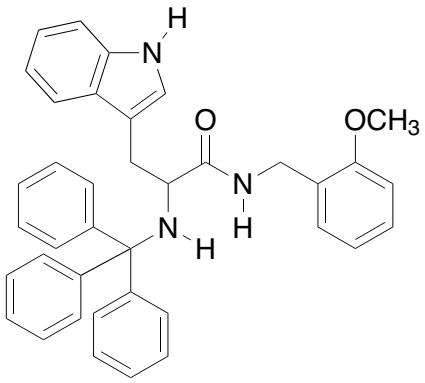
10% IPA/hexane
1 ml/min
4.6 mm x 25 cm
(*S,S*) Whelk-O 1
$\alpha = 1.29$
Rs = 2.10
reference 45



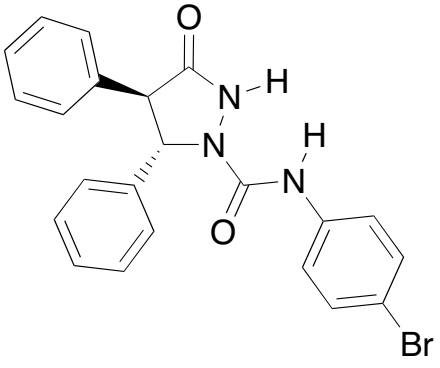
10% IPA/hexane
1 ml/min
4.6 mm x 25 cm
(*S,S*) Whelk-O 1
$\alpha = 1.10$
Rs = 0.95
reference 45



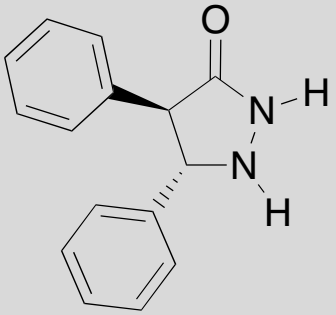
50% IPA/hexane
1 ml/min
4.6 mm x 25 cm
(*S,S*) Whelk-O 1
$\alpha = 1.32$
Rs = 2.10
reference 45



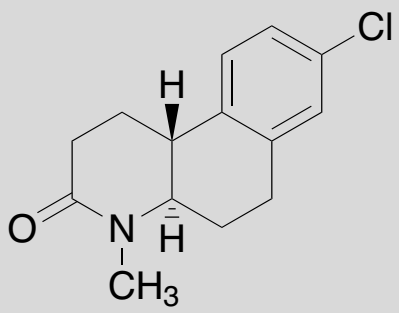
45% IPA/hexane
1 ml/min
4.6 mm x 25 cm
(*S,S*) Whelk-O 1
$\alpha = 2.17$
Rs = 2.20
reference 45



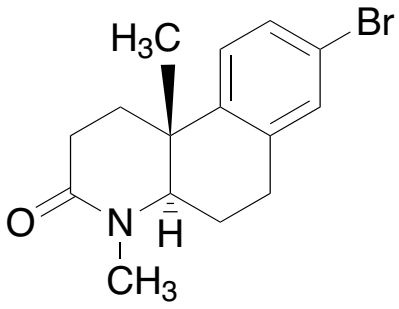
45% IPA/hexane
1 ml/min
4.6 mm x 25 cm
(*S,S*) Whelk-O 1
$\alpha = 1.57$
Rs = 2.20
reference 45



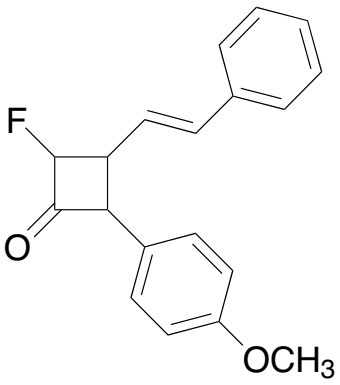
10% IPA/hexane
1 ml/min
4.6 mm x 25 cm
(*S,S*) Whelk-O 1
α = 1.04
Rs = 0.60
reference 45



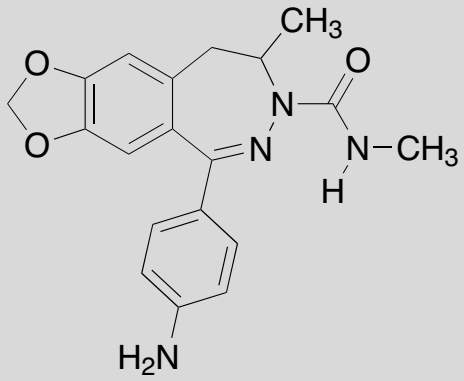
10% IPA/hexane
1 ml/min
4.6 mm x 25 cm
(*S,S*) Whelk-O 1
α = 1.04
Rs = 0.60
reference 45



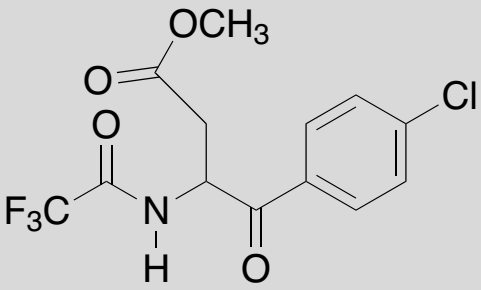
15% IPA/hexane
1 ml/min
4.6 mm x 25 cm
(*S,S*) Whelk-O 1
α = 1.13
Rs = 1.50
reference 45



40% IPA/hexane
1 ml/min
4.6 mm x 25 cm
(*S,S*) Whelk-O 1
α = 1.22
Rs = 1.50
reference 45

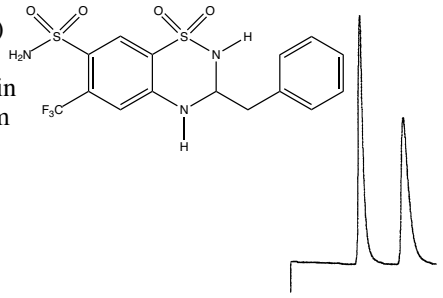


10% IPA/hexane
1 ml/min
4.6 mm x 25 cm
(*S,S*) Whelk-O 1
α = 1.11
Rs = 1.50
reference 45



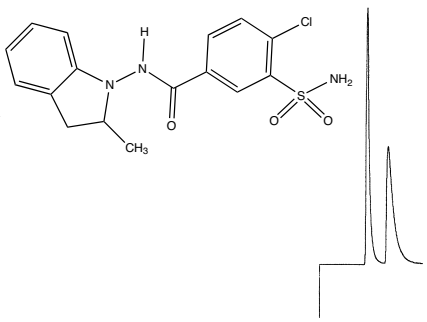
Bendroflumethiazide

Bendroflumethiazide
Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase = (75/25)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 18 min
k'_1 = 2.99
α = 1.84
reference 46



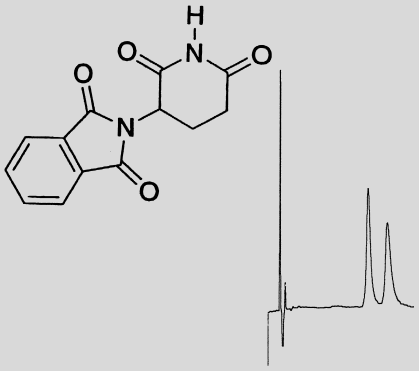
Indapamide

Indapamide
Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase = (75/25)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 16 min
k'_1 = 3.09
α = 1.58
reference 46



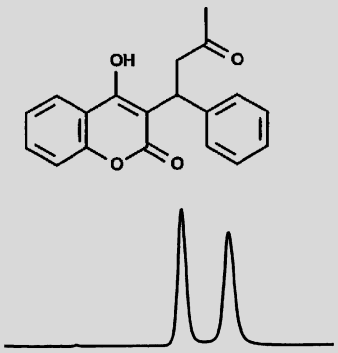
Thalidomide

Thalidomide
Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase: (90/10)
Hexane/IPA + 0.1%
Acetic acid
Flow Rate = 1.0 mL/min
Detection = UV 220 nm
Run Time = 28.0 min
k'_1 = 7.71
α = 1.22
reference 46



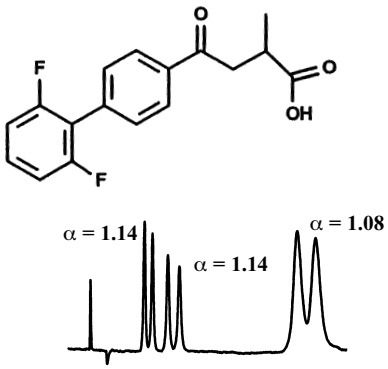
Warfarin

Warfarin
Column: (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase: (70/30)
Heptane/IPA + 0.1% TFA
Flow Rate: 1.0 mL/min
Detection: UV 230 nm
Run Time: 6.5 min
$k'_1 = 0.89$
$\alpha = 1.36$
reference 48



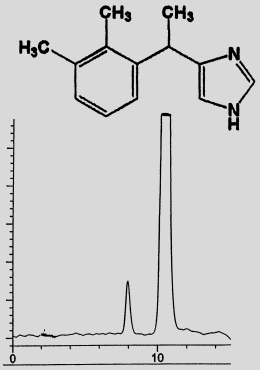
Flobufen Metabolites

Flobufen Metabolites
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (97/3)
Heptane/Glyme +
0.1% TFA
Flow Rate = 1.0 mL/min
Detection = UV 215 nm
Run Time = 21.0 min
reference 47



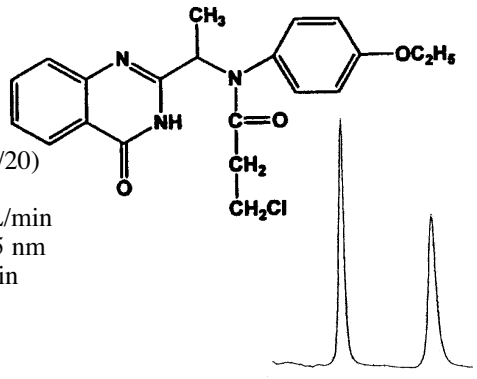
Dexmedetomidine (Enriched)

Dexmedetomidine (Enriched)
Column = (S,S)-Whelk-O 2
25 cm x 4.6 mm
Mobile Phase = (90/10)
Hexane/Ethanol
+ 10 mM Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 220 nm
$k'_1 = 3.41$
$\alpha = 1.39$
reference 46



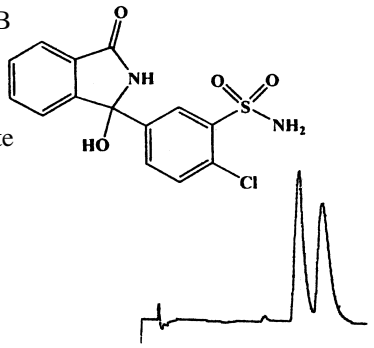
4(3H)-Quinazolone Derivatives

4(3H)-quinazolone
derivatives
Column = (S,S)-
Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (80/20)
Hexane/Ethanol
Flow Rate = 1.0 mL/min
Detection = UV 225 nm
Run Time = 17.0 min
$k'_1 = 2.95$
$\alpha = 1.62$
reference 58



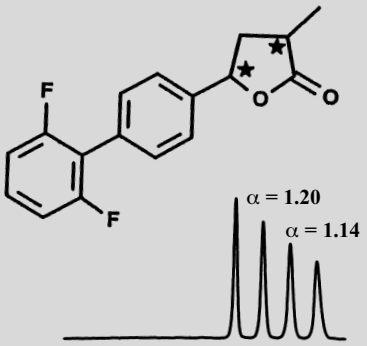
Chlorthalidone

Chlorthalidone
Column = (S,S)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase = (99/1)
CH_2Cl_2/CH_3OH +
0.01 M Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 20.0 min
$k'_1 = 9.38$
$\alpha = 1.18$
reference 46



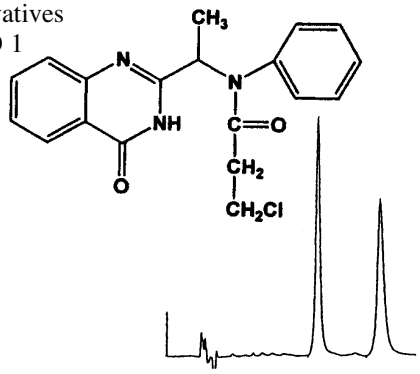
Flobufen and Flobufen Metabolites

Flobufen and Flobufen
Metabolites
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (90/10)
Heptane/IPA + 0.1% TFA
Flow Rate = 2.0 mL/min
Detection = UV 230 nm
Run Time = 24.0 min
reference 47



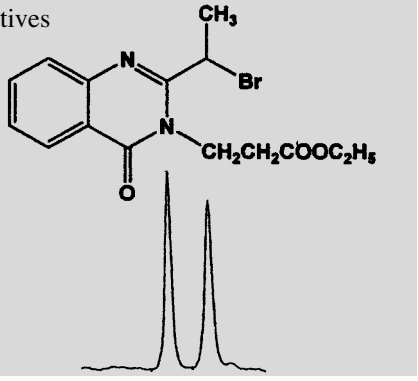
4(3H)-Quinazolone Derivatives

4(3H)-Quinazolone Derivatives
Column = (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (80/20)
Hexane/Ethanol
Flow Rate = 1.0 mL/min
Detection = UV 225 nm
Run Time = 16.0 min
$k'_1 = 2.88$
$\alpha = 1.56$
reference 58



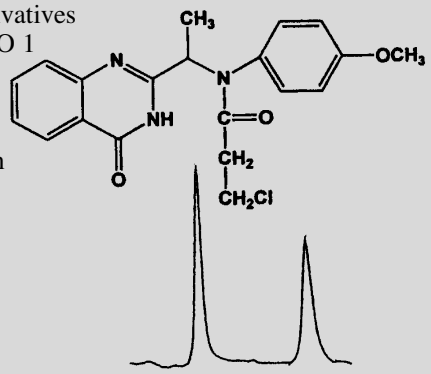
4(3H)-Quinazolone Derivatives

4(3H)-quinazolone derivatives
Column = (S,S)-
Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (90/10)
Hexane/IPA
Flow Rate = 1.0 mL/min
Detection = UV 225 nm
Run Time = 15.0 min
$k'_1 = 3.54$
$\alpha = 1.19$
reference 58



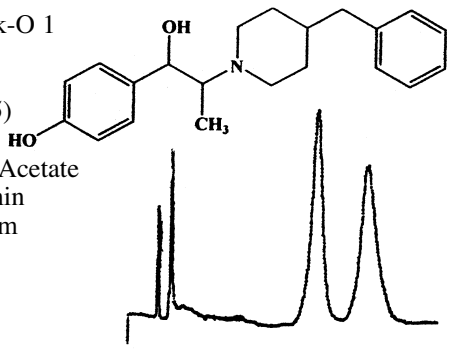
4(3H)-Quinazolone Derivatives

4(3H)-Quinazolone Derivatives
Column = (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (80/20)
Hexane/Ethanol
Flow Rate = 1.0 mL/min
Detection = UV 225 nm
Run Time = 21.0 min
k'_1 = 3.75
α = 1.57
reference 58



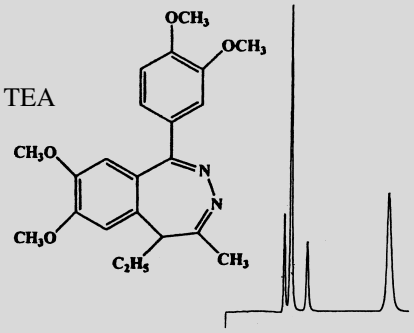
Ifenprodil

Ifenprodil
Column = (S,S)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase = (85/15)
Hexane/IPA +
0.01 M Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 220 nm
Run Time = 16.5 min
k'_1 = 6.16
α = 1.32
reference 46



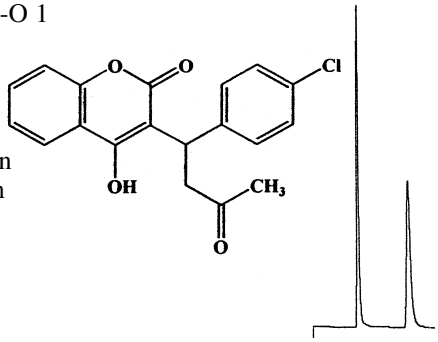
Tofisopam and it's Conformers

Tofisopam and it's Conformers
Column = (R,R)-β-Gem 1
25 cm x 4.6 mm
Mobile Phase = (70/30)
Hexane/Ethanol + 0.1% TEA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 25.0 min
k'_1 = 2.66
α = 3.13
reference 46



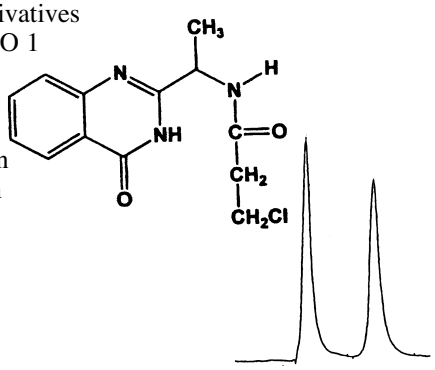
Coumachlor

Coumachlor
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (65/35)
Hexane/Ethanol +
0.1% Acetic Acid
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 10.0 min
k'_1 = 1.48
α = 2.90
reference 46



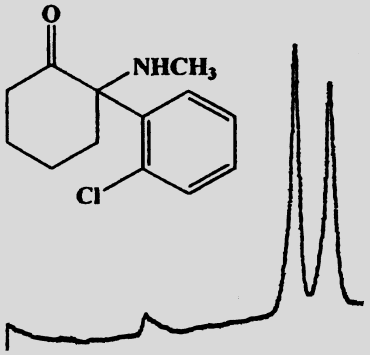
4(3H)-Quinazolone Derivatives

4(3H)-Quinazolone Derivatives
Column = (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (80/20)
Hexane/Ethanol
Flow Rate = 1.0 mL/min
Detection = UV 225 nm
Run Time = 15.0 min
k'_1 = 3.19
α = 1.37
reference 58



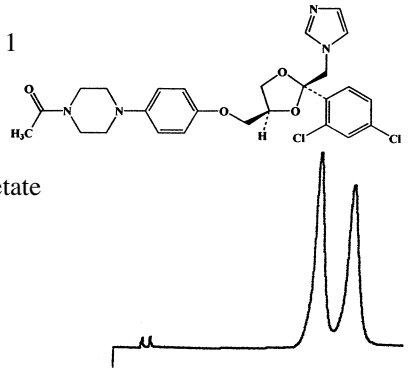
Ketamine

Ketamine
Column = (S,S)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase = (99/1)
Hexane/IPA + 0.1% TEA
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 22.0 min
k'_1 = 6.37
α = 1.14
reference 46



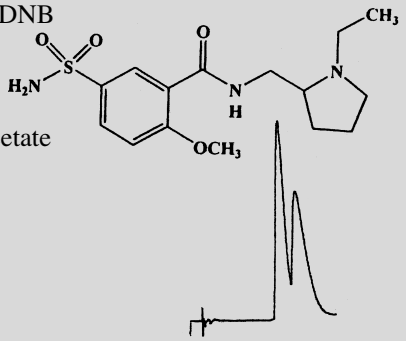
Ketoconazole

Ketoconazole
Column = (S,S)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase = (46/46/8)
CH_2Cl_2/Hexane/IPA +
0.01 M Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 16.0 min
k'_1 = 6.60
α = 1.19
reference 46



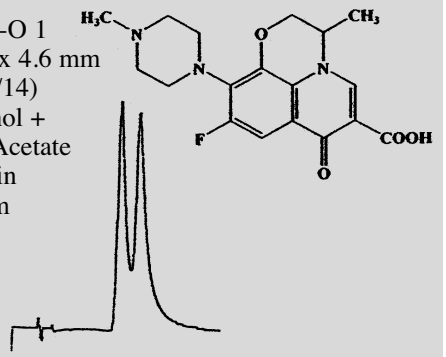
Sulpiride

Sulpiride
Column = (R,R)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase = (95/5)
CH_2Cl_2/Ethanol +
0.01 M Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 14.0 min
k'_1 = 5.92
α = 1.24
reference 46



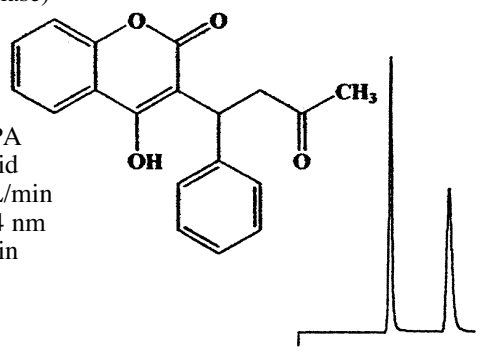
Ofloxacin

Ofloxacin
Column = (S,S)-Whelk-O 1
10/100 (FEC) 25 cm x 4.6 mm
Mobile Phase = (43/43/14)
CH_2Cl_2/Hexane/Ethanol +
0.01 M Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 10.0 min
k'_1 = 2.96
α = 1.24
reference 46



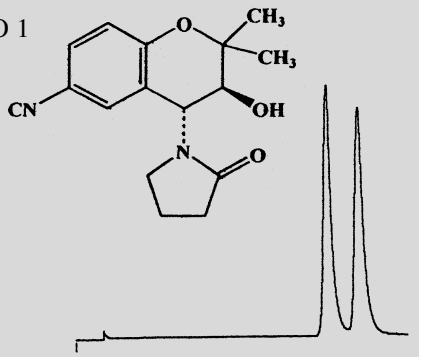
Warfarin (Normal Phase)

Warfarin (normal phase)
Column = (R,R)-
Whelk-O 1
25 cm x 4.6 mm
Mobile Phase =
(65/35) Hexane/IPA
+ 0.1% Acetic Acid
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 11.5 min
k'_1 = 1.54
α = 2.07
reference 46



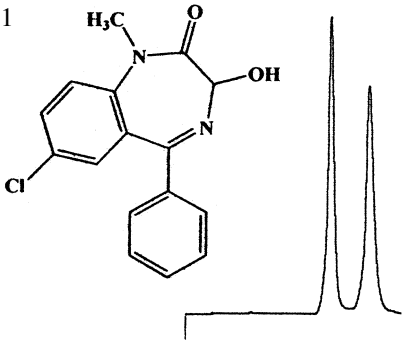
Cromakalim

Cromakalim
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (92/8)
Hexane/Ethanol
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 21.0 min
k'_1 = 9.18
α = 1.14
reference 46



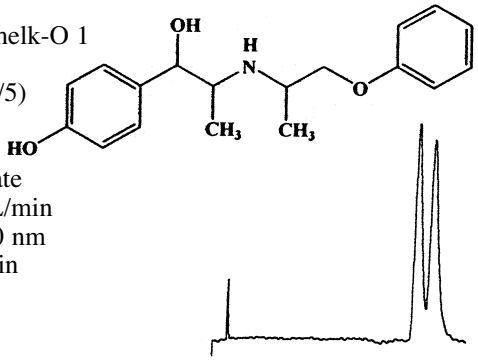
Temazepam

Temazepam
Column = (S,S)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase =
(80/20) Hexane/IPA
+ 0.1% Acetic Acid
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
Run Time = 13.0 min
k'_1 = 6.86
α = 1.34
reference 46



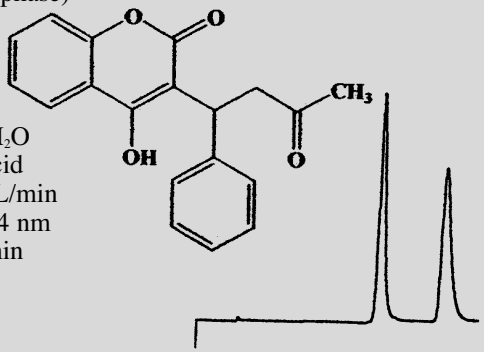
Isoxsuprine

Isoxsuprine
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (95/5)
Hexane/Ethanol +
0.01 M
Ammonium Acetate
Flow Rate = 2.0 mL/min
Detection = UV 220 nm
Run Time = 28.0 min
k'_1 = 17.91
α = 1.08
reference 46



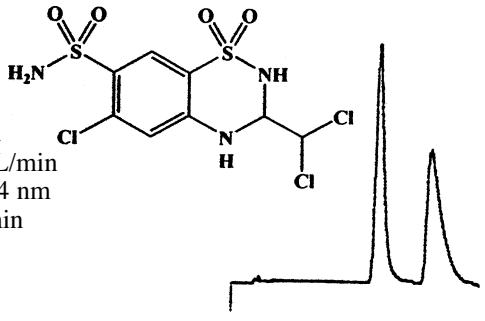
Warfarin (Reversed Phase)

Warfarin (reversed phase)
Column = (R,R)-
Whelk-O 1
25 cm x 4.6 mm
Mobile Phase =
(70/30) CH_3OH/H_2O
+ 0.1% Acetic Acid
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 15.0 min
k'_1 = 3.54
α = 1.55
reference 46



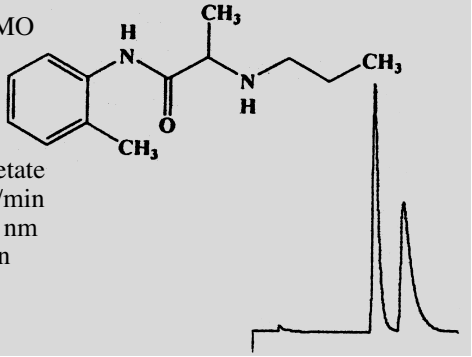
Trichlormethiazide

Trichlormethiazide
Column = (R,R)-ULMO
25 cm x 4.6 mm
Mobile Phase =
(75/25)
Hexane/IPA +
0.1% Acetic Acid
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 15.0 min
k'_1 = 5.16
α = 1.43
reference 46



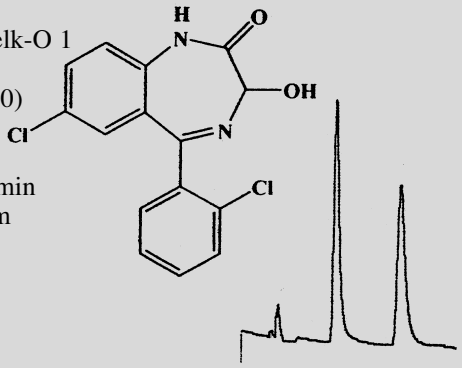
Prilocaine

Prilocaine
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase =
(99/1) Hexane/
Ethanol + 0.01
M Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 15.0 min
k'_1 = 5.70
α = 1.28
reference 46



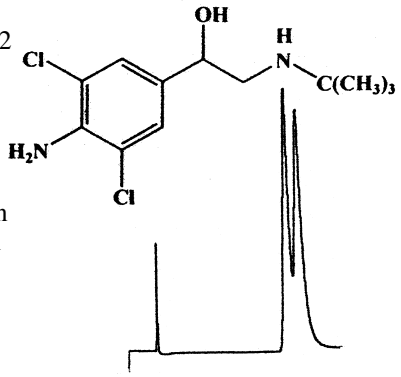
Lorazepam

Lorazepam
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (70/30)
Hexane/IPA +
0.1% Acetic Acid
Flow Rate = 1.5 mL/min
Dtection - UV 254 nm
Run Time = 9.0 min
k'_1 = 2.08
α = 2.02
reference 46



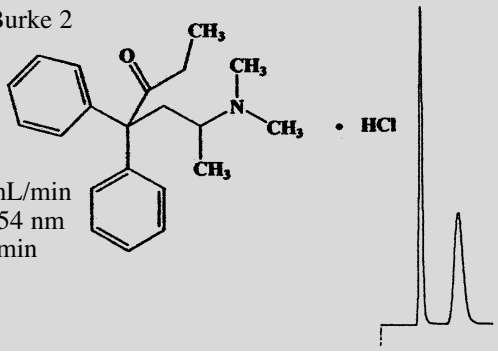
Clenbuterol

Clenbuterol
Column = (R)-α-Burke 2
25 cm x 4.6 mm
Mobile Phase = (90/10)
CH_2Cl_2/Ethanol +
0.01 M Ammonium
Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 12.0 min
k'_1 = 4.99
α = 1.09
reference 46



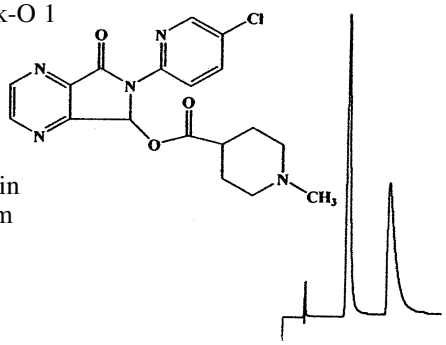
Methadone Hydrochloride

Methadone Hydrochloride
Column = (S)-α-Burke 2
25 cm x 4.6 mm
Mobile Phase =
(88/12)
Hexane/Ethanol
+ 0.1% TEA
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 10.0 min
k'_1 = 3.50
α = 1.34
reference 46



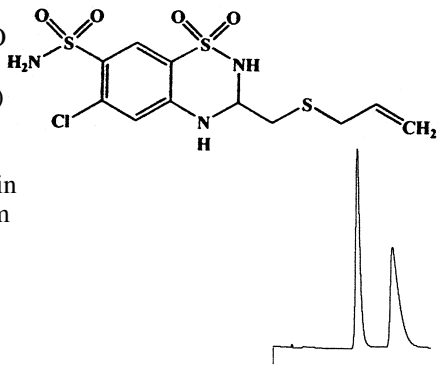
Zopiclone

Zopiclone
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (95/5)
CH_2Cl_2/Ethanol
+ 0.01 M
Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 8.5 min
k'_1 = 1.94
α = 2.01
reference 46



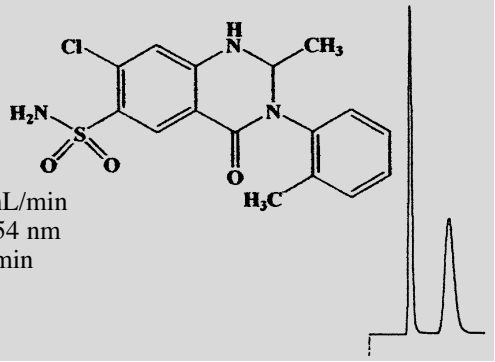
Althiazide

Althiazide
Column = (S,S)-ULMO
25 cm x 4.6 mm
Mobile Phase = (75/25)
Hexane/IPA +
0.1% Acetic Acid
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 13.0 min
k'_1 = 3.94
α = 1.53
reference 46



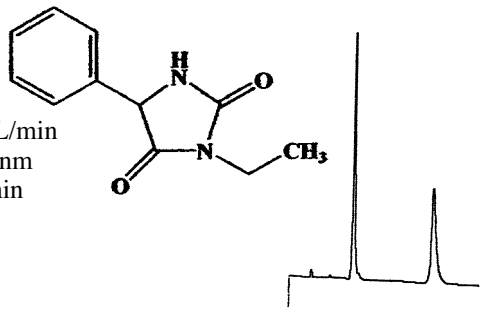
Metolazone

Metolazone
Column = (R,R)-
Whelk-O 1
25 cm x 4.6 mm
Mobile Phase =
(55/45)
Hexane/Ethanol
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 10.0 min
k'_1 = 1.93
α = 2.43
reference 46



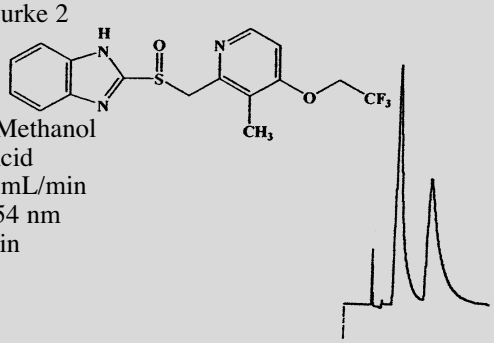
Ethotoin

Ethotoin
Column = (S,S)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase =
(75/25)
Hexane/Ethanol
Flow Rate = 1.5 mL/min
Dtection - UV 254 nm
Run Time = 11.0 min
k'_1 = 1.65
α = 3.03
reference 46



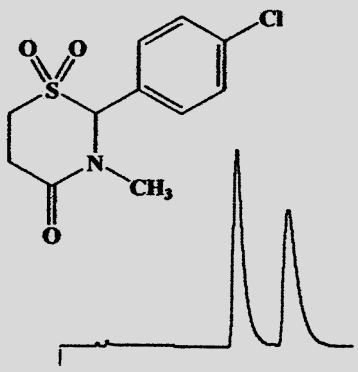
Lansoprazole

Lansoprazole
Column = (S)-α-Burke 2
25 cm x 4.6 mm
Mobile Phase =
(94/3/3)
CH_2Cl_2/Ethanol/Methanol
+ 0.2% Acetic Acid
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 6.0 min
k'_1 = 0.88
α = 2.43
reference 46



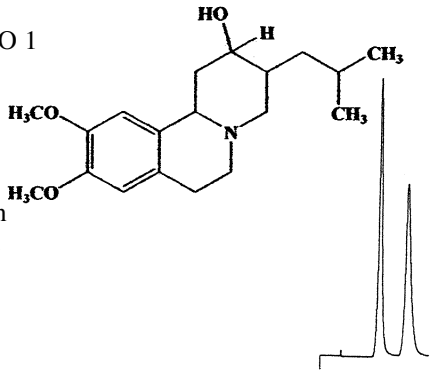
Chlormezanone

Chlormezanone
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (60/40)
Hexane/IPA
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 13.0 min
k'_1 = 4.48
α = 1.36
reference 46



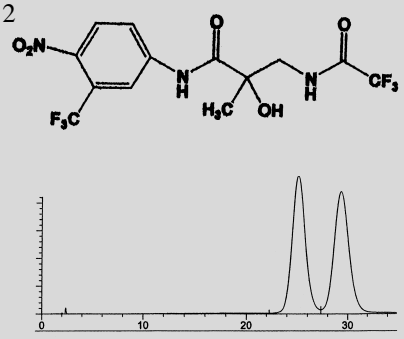
Dihydrotetrabenazine

Dihydrotetrabenazine
Column = (S,S)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase =
(60/40) Hexane/IPA
+ 0.1% TFA
Flow Rate = 1.5 mL/min
Detection = UV 280 nm
Run Time = 9.3 min
k'_1 = 2.50
α = 1.65
reference 46



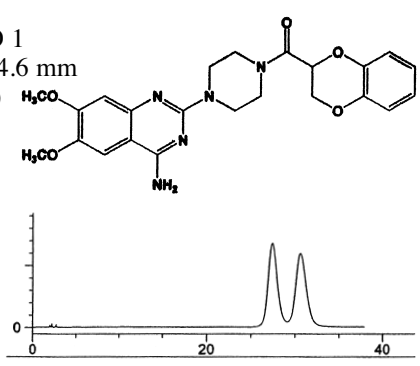
Fluridil

Fluridil
Column = (S,S)-Whelk-O 2
25 cm x 4.6 mm
Mobile Phase =
(57/43)
H_2O/CH_3OH
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
k'_1 = 12.9
α = 1.18
reference 46



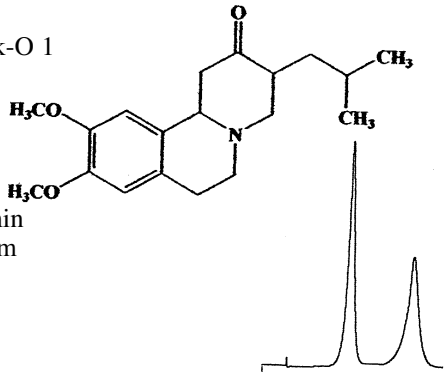
Doxazosin

Doxazosin
Column = (S,S)-Whelk-O 1
10/100 (FEC) 25 cm x 4.6 mm
Mobile Phase = (66/29/5)
Hexane/CH_2Cl_2/
Ethanol + 5 mM
Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
k'_1 = 14.2
α = 1.13
reference 46



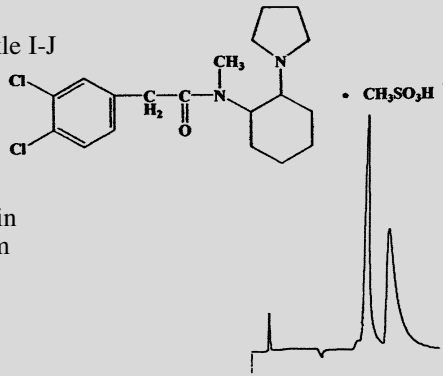
Tetrabenazine

Tetrabenazine
Column = (S,S)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase =
(55/45) Hexane/IPA
+ 0.1% TFA
Flow Rate = 1.5 mL/min
Detection = UV 280 nm
Run Time = 13.4 min
k'_1 = 3.35
α = 1.93
reference 46



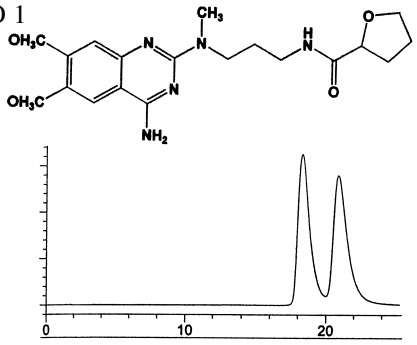
trans-U-50488H

trans-U-50488H
Column = (3R,4S)-Pirkle I-J
25 cm x 4.6 mm
Mobile Phase = (92/8)
Hexane/Ethanol +
0.01 M Ammonium
Acetate
Flow Rate = 2.0 mL/min
Detection = UV 220 nm
Run Time = 12.0 min
k'_1 = 6.71
α = 1.27
reference 46



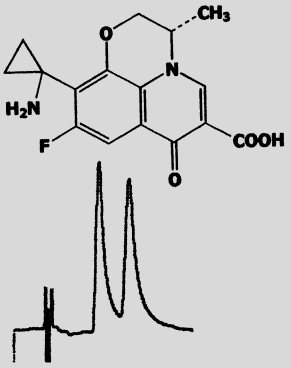
Alfuzosin

Alfuzosin
Column = (R,R)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase = (68/28/4)
Hexane/CH_2Cl_2/
Ethanol + 4 mM
Ammonium Acetate
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
k'_1 = 7.37
α = 1.15
reference 46



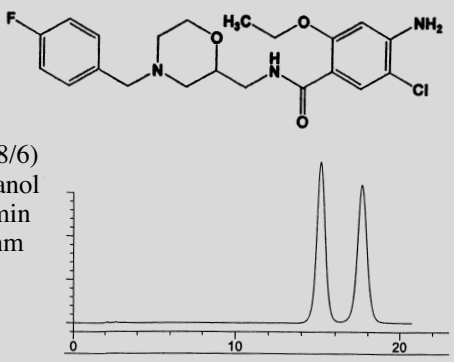
Pazufloxacin

Pazufloxacin
Column = (S,S)-Whelk-O 1
10/100 (FEC) 25 cm x 4.6 mm
Mobile Phase = (40/40/20)
CH_2Cl_2/Hexane/IPA
+ 0.15% TFA
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 6.7 min
k'_1 = 1.71
α = 1.58
reference 46



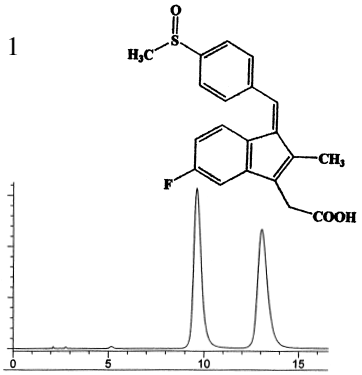
Mosapride

Mosapride
Column = (R,R)-
Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase = (66/28/6)
Hexane/CH_2Cl_2/Ethanol
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
k'_1 = 7.37
α = 1.19
reference 46



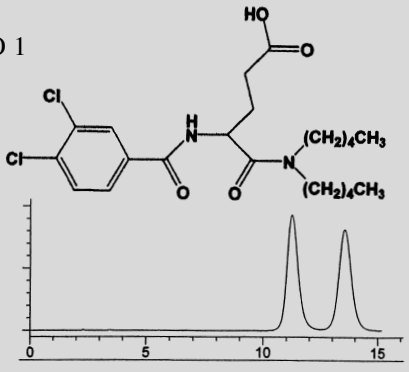
Sulindac

Sulindac
Column = (R,R)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase = (48/48/4)
Hexane/CH_2Cl_2/IPA
+ 0.1% Acetic acid
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
k'_1 = 4.32
α = 1.45
reference 46



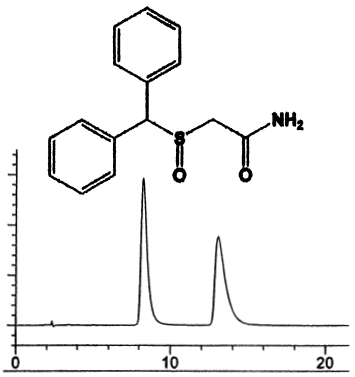
Lorglumide

Lorglumide
Column = (R,R)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase = (95/5)
Hexane/IPA
+ 0.1% Acetic Acid
Flow Rate = 2.0 mL/min
Detection = UV 254 nm
k'_1 = 5.22
α = 1.25
reference 46



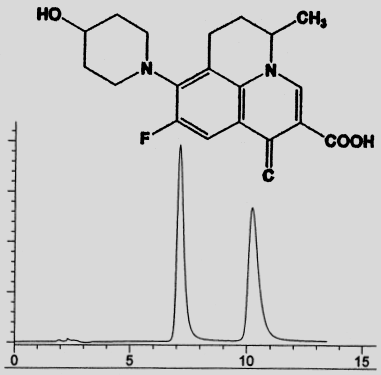
Modafinil

Modafinil
Column = (S,S)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase = (65/35)
Hexane/IPA
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
k'_1 = 3.57
α = 1.75
reference 46



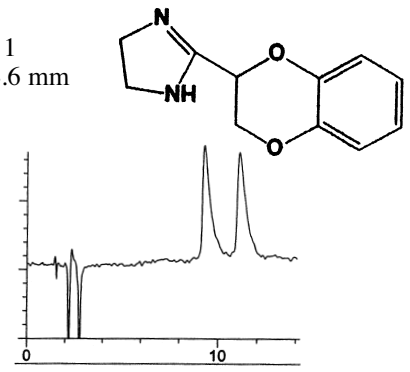
Nadifloxacin

Nadifloxacin
Column = (S,S)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase = (45/45/10)
CH_2Cl_2/Hexane/IPA
+ 10 mM Ammonium
Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
k'_1 = 2.95
α = 1.58
reference 46



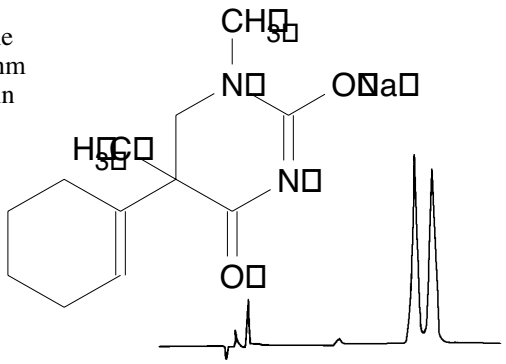
Idazoxan

Idazoxan
Column = (S,S)-Whelk-O 1
10/100 (FEC) 25 cm x 4.6 mm
Mobile Phase = (70/29/1)
Hexane/Methylene
Chloride/IPA
+ 0.1% TEA
Flow Rate = 2.0 mL/min
Dtection - UV 254 nm
k'_1 = 5.86
α = 1.23
reference 46



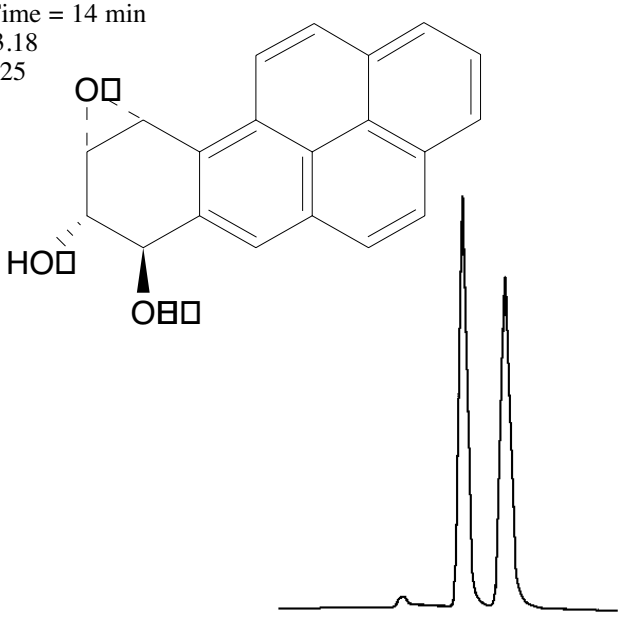
Hexobarbital

Hexobarbital
5% EtOH/Hexane
0.7 ml/min; 254nm
run time = 16 min
4.6 mm x 25 cm
L-Leucine
$k'_1 = 2.89$
$\alpha = 1.10$



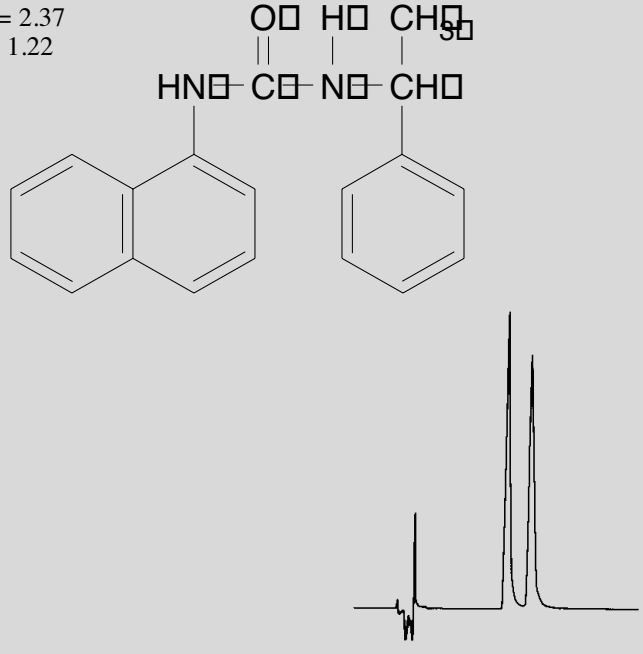
r-7,t-8-Dihydroxy-t-9, 10-epoxy-7,8,9, 10-tetrahydrobenzo[a]pyrene

r-7,t-8-Dihydroxy-t-9, 10-epoxy-7,8,9,
10-tetrahydrobenzo[a]pyrene
40% EtOH/Hexane
4.6 mm x 25 cm (*R,R*) β-Gem 1
1 ml/min; 254 nm
Run Time = 14 min
$k'_1 = 3.18$
$\alpha = 1.25$



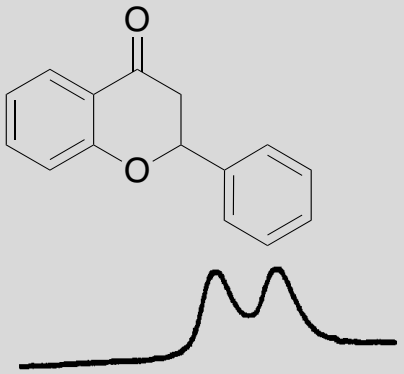
1-Naphthylureaphenethylamine

1-Naphthylureaphenethylamine
30% EtOH/Hexane
4.6 mm x 25 cm
D-Phenyglycine
1 ml/min; 254 nm
Run Time = 10 min
$k'_1 = 2.37$
$\alpha = 1.22$



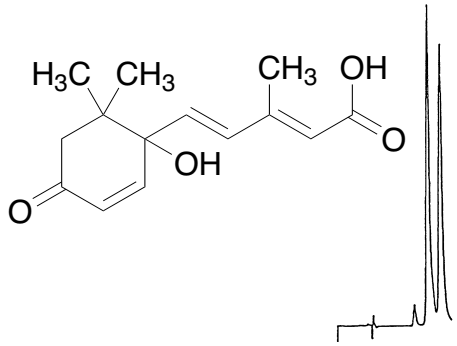
Flavanone

Flavanone
1% IPA/hexane
1 ml/min; 254 nm
Run Time = 25 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 7.08$
$\alpha = 1.04$
reference 26



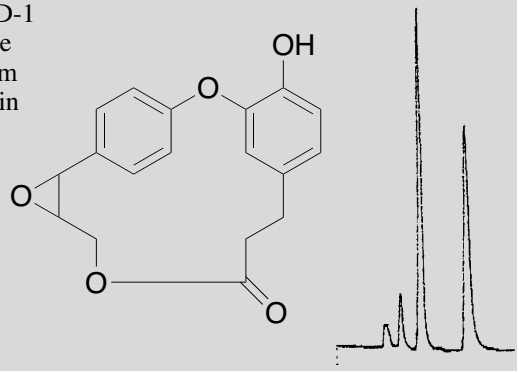
2-trans-4-trans-Abscisic Acid

2-*trans*-4-*trans*-Abscisic Acid (ABA)
80:20:0.5
Hexane/IPA/HOAc
1 ml/min; 254 nm
Run Time = 5 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 2.08$
$\alpha = 1.21$
reference 9



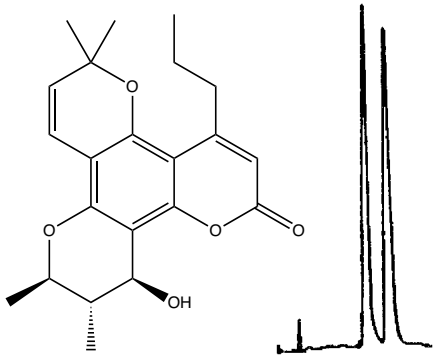
Combretastatin D-1

Combretastatin D-1
20% IPA/Hexane
2 ml/min; 254 nm
run time = 13 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 4.54$
$\alpha = 1.45$
reference 17



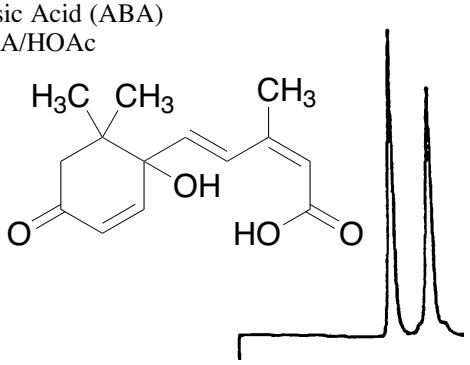
Calanolide A

Calanolide A
10% IPA/hexane
1.25 ml/min; 270 nm
run time = 18 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 3.2$
$\alpha = 1.4$
reference 16



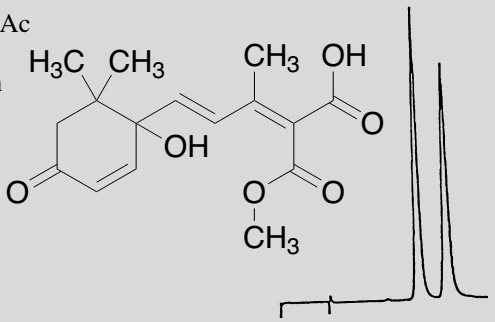
2-cis-4-trans-Abscisic Acid (ABA)

2-*cis*-4-*trans*-Abscisic Acid (ABA)
80:20:0.5 hexane/IPA/HOAc
1 ml/min; 254 nm
Run Time = 5 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 1.58$
$\alpha = 1.39$
reference 9



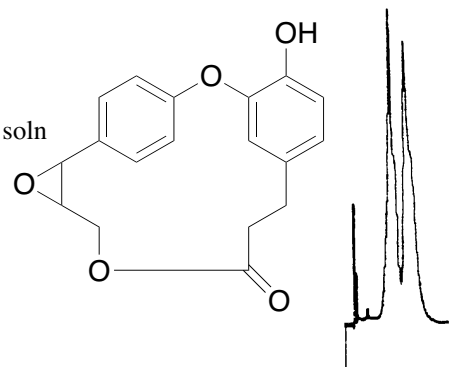
ABA Methyl Ester

ABA Methyl Ester
80:20:0.5
Hexane/IPA/HOAc
1 ml/min; 254 nm
Run Time = 5 min
4.6 mm x 25 cm
Whelk-O 1
$k'_1 = 2.41$
$\alpha = 1.31$
reference 9



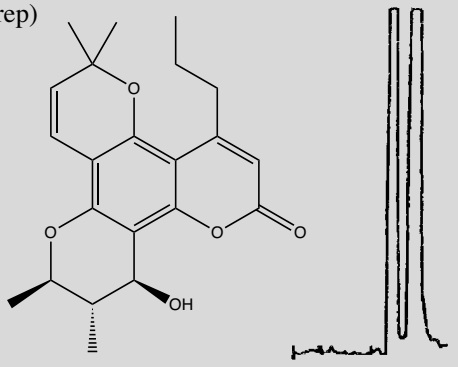
Combretastatin D-1

Combretastatin D-1
semi-prep separation
20% IPA/hexane
2 ml/min; 300 nm
200 µl of 12.7 mg/ml soln
load = 2.5 mg
run time = 10 min
4.6 mm x 25 cm
Whelk-O 1
reference 17



Calanolide A (semi prep)

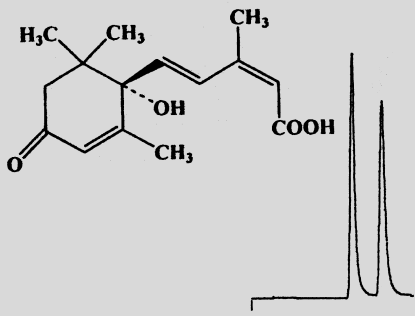
Calanolide A (semi prep)
10% IPA/hexane
1.25 ml/min; 270 nm
run time = 18 min
4.6 mm x 25 cm
Whelk-O 1
5 mg sample
$k'_1 = 3.2$
$\alpha = 1.4$
reference 16



REGIS Natural Products

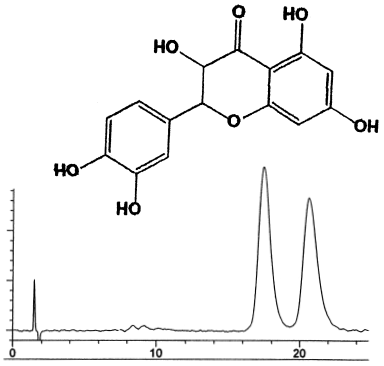
Abscisic Acid

Abscisic Acid
Column = (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase = (85/15)
Hexane/IPA +
0.1% Acetic Acid
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 11.0 min
k'_1 = 3.52
α = 1.38
reference 46



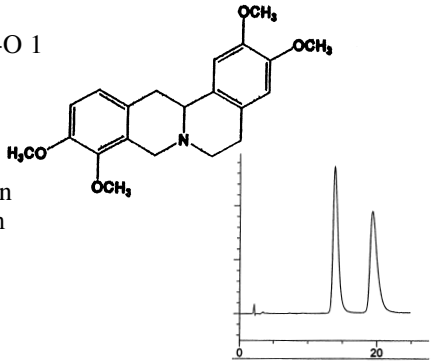
Taxifolin

Taxifolin
Column = (S,S)-Whelk-O 2
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase = (85/15)
Hexane/Ethanol
+ 0.1% TFA
Flow Rate = 2.0 mL/min
Detection = UV 220 nm
k'_1 = 11.87
α = 1.20
reference 46



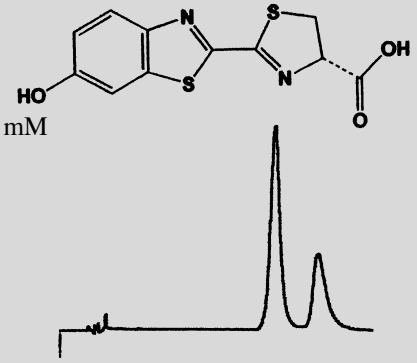
Tetrahydropalmatine

Tetrahydropalmatine
Column = (S,S)-Whelk-O 1
10/100 (FEC)
25 cm x 4.6 mm
Mobile Phase = (50/50)
Hexane/IPA
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
k'_1 = 6.66
α = 1.46
reference 46



Luciferin

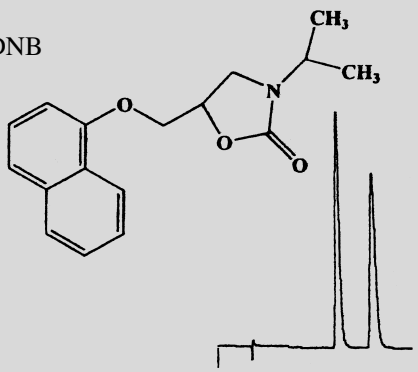
Luciferin
Column = L-Leucine
25 cm x 4.6 mm
Mobile Phase = (60/40)
Hexane/Ethanol + 0.04 mM
Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 15.5 min
k'_1 = 6.09
α = 1.25
reference 46



REGIS β–Blockers

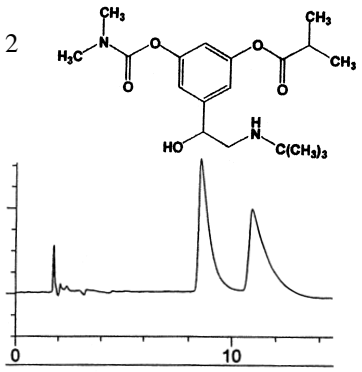
β-Blocker

β-blocker
Column: (S,S)-DACH-DNB
25 cm x 4.6 mm
Mobile Phase: (92/8)
CH_2Cl_2/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 11.0 min
k'_1: 2.27
α: 1.42
reference 59



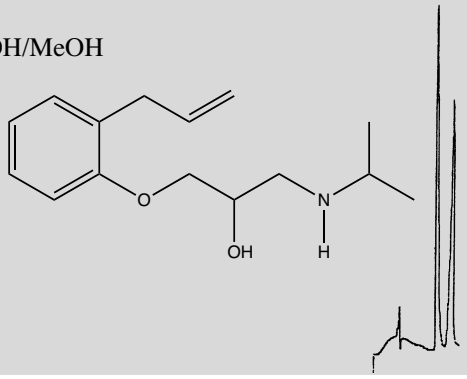
Bambuterol

Bambuterol
Column = (R,R)-alpha-Burke 2
25 cm x 4.6 mm
Mobile Phase = (40/40/20)
Hexane/Methylene
Chloride/Ethanol + 20 mM
Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
k'_1 = 3.74
α = 1.35
reference 46



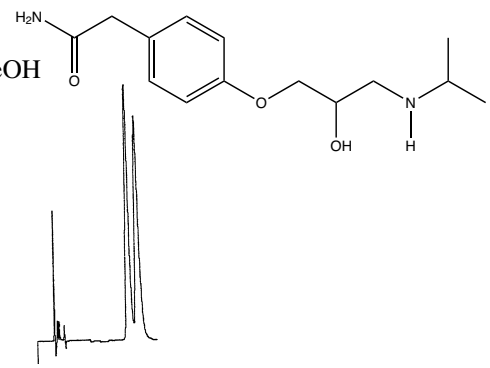
Alprenolol

Alprenolol
90:5:5 CH_2C1_2/EtOH/MeOH
10 mM NH_4OAc
1 ml/min; 254 nm
run time = 10 min
4.6 mm x 25 cm
α-Burke 2
k'_1 = 1.44
α = 1.44
reference 33



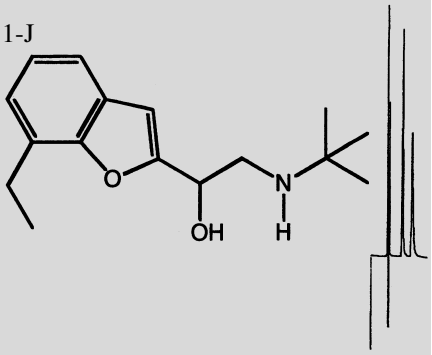
Atenolol

Atenolol
85:10:5
CH_2C1_2/EtOH/MeOH
15 mM NH_4OAc
1 ml/min; 254 nm
run time = 16 min
4.6 mm x 25 cm
α-Burke 2
k'_1 = 4.41
α = 1.13
reference 33



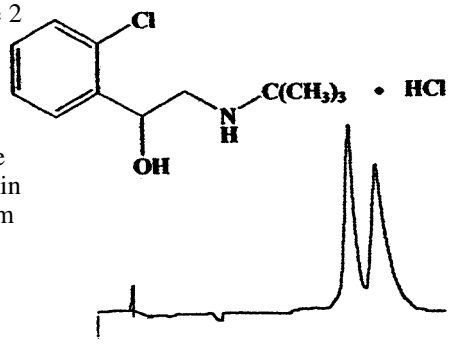
Bufuralol

Bufuralol
Column: (3R,4S)-Pirkle 1-J
25 cm x 4.6 mm
Mobile Phase: (90/10)
CH_2Cl_2/Ethanol
+ 0.02 M Ammonium Acetate
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 7.0 min
k'_1: 0.91
α: 2.01
reference 46



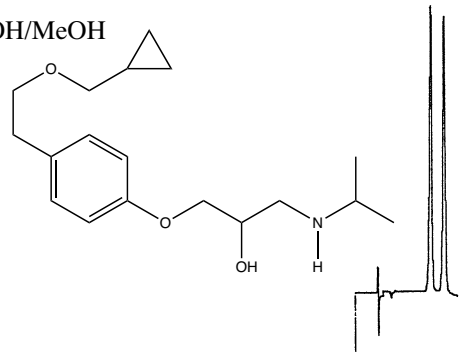
Tulobuterol HCl

Tulobuterol HCl
Column: (S)-α-Burke 2
25 cm x 4.6 mm
Mobile Phase: (91/9)
CH_2Cl_2/Ethanol
+ 0.01 M Ammonium Acetate
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
Run Time: 15.0 min
k'_1: 6.38
α: 1.13
reference 46



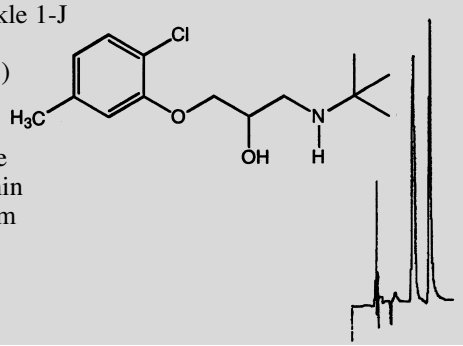
Betaxolol

Betaxolol
85:10:5 CH_2C1_2/EtOH/MeOH
10 mM NH_4OAc
1 ml/min; 254 nm
run time = 11 min
4.6 mm x 25 cm
α-Burke 2
k'_1 = 2.36
α = 1.25
reference 33



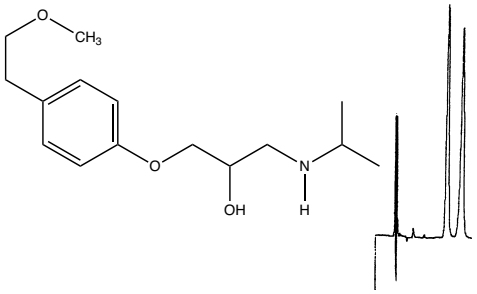
Bupranolol

Bupranolol
Column: (3R,4S)-Pirkle 1-J
25 cm x 4.6 mm
Mobile Phase: (85/15)
CH_2Cl_2/Ethanol
+ 0.015M Ammonium Acetate
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 8.5 min
k'_1: 1.44
α: 1.47
reference 46



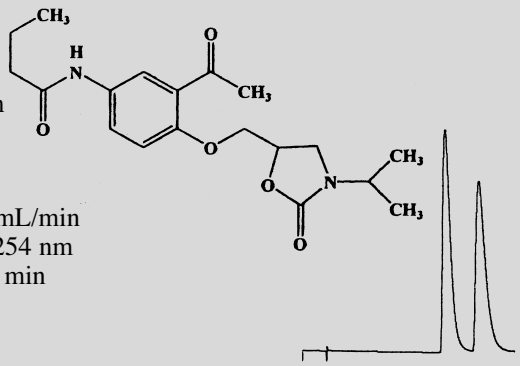
Metoprolol

metoprolol
85:10:5 CH_2C1_2/EtOH/MeOH
10 mM NH_4OAc
1 ml/min; 254 nm
run time = 13 min
4.6 mm x 25 cm
α-Burke 2
k'_1 = 2.66
α = 1.28
reference 33



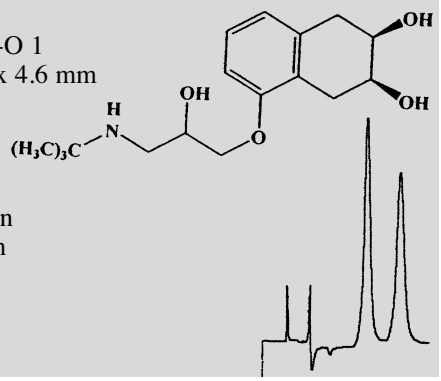
β-Blocker

β-Blocker
Column: (S,S)-
DACH-DNB
25 cm x 4.6 mm
Mobile Phase:
(90/10)
CH_2Cl_2/IPA
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 18.0 min
k'_1: 4.52
α: 1.29
reference 59



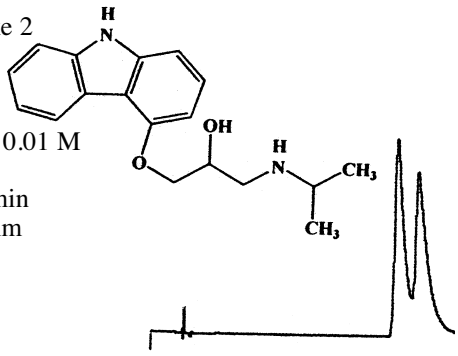
Nadolol

Nadolol
Column = (S,S)-Whelk-O 1
10/100 (FEC) 25 cm x 4.6 mm
Mobile Phase = (78/22)
Hexane/Ethanol +
0.01 M Ammonium
Acetate
Flow Rate = 1.5 mL/min
Detection = UV 270 nm
Run Time = 9.5 min
k'_1 = 3.05
α = 1.43
reference 46



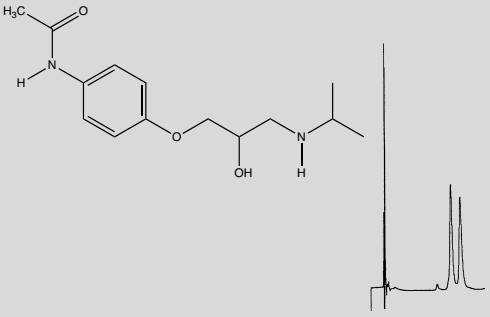
Carazolol

Carazolol
Column = (R)-α-Burke 2
25 cm x 4.6 mm
Mobile Phase =
(46/46/8) CH_2Cl_2/
Methanol/Ethanol + 0.01 M
Ammonium Acetate
Flow Rate = 1.5 mL/min
Detection = UV 254 nm
Run Time = 15.0 min
k'_1 = 6.73
α = 1.10
reference 46



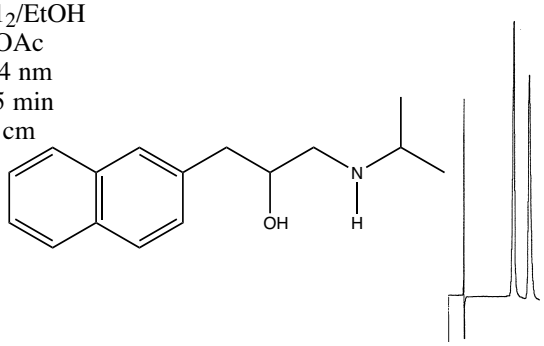
Practolol

Practolol
85:10:5 CH_2C1_2/
EtOH/MeOH
15 mM NH_4OAc
1 ml/min; 254 nm
run time = 19 min
4.6 mm x 25 cm
α-Burke 2
k'_1 = 4.78
α = 1.14
reference 33



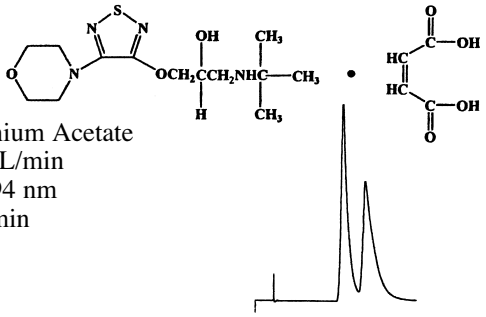
Pronethalol

Pronethalol
90:10 CH_2C1_2/EtOH
15 mM NH_4OAc
1 ml/min; 254 nm
run time = 15 min
4.6 mm x 25 cm
α-Burke 2
k'_1 = 3.26
α = 1.31
reference 33



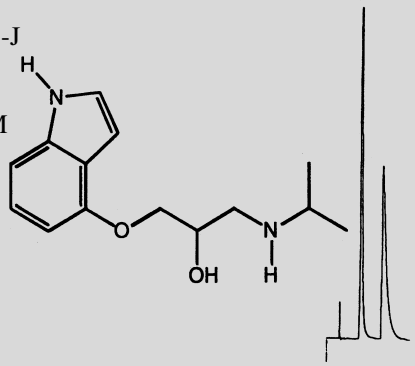
Timolol Maleate

Timolol Maleate
Column = (3R,4S)-Pirkle 1-J
25 cm x 4.6 mm
Mobile Phase =
(94/3/3) CH_2Cl_2/
Ethanol/IPA
+ 0.01M Ammonium Acetate
Flow Rate = 1.0 mL/min
Detection = UV 294 nm
Run Time = 16.0 min
k'_1 = 3.72
α = 1.33
reference 46



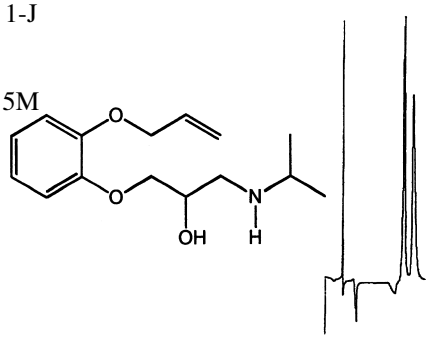
Pindolol

Pindolol
Column: (3R,4S)-Pirkle 1-J
25 cm x 4.6 mm
Mobile Phase: (80/20)
CH_2Cl_2/Ethanol + 0.04M
Ammonium Acetate
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 11.0 min
k'_1: 1.56
α: 2.06
reference 46



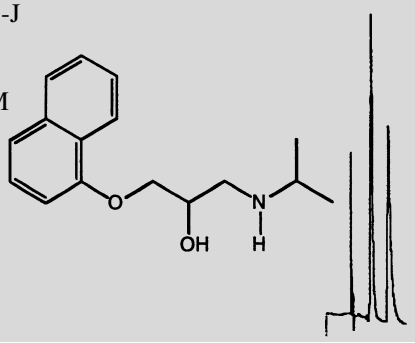
Oxprenolol

Oxprenolol
Column: (3R,4S)-Pirkle 1-J
25 cm x 4.6 mm
Mobile Phase: (90/10)
CH_2Cl_2/Ethanol + 0.015M
Ammonium Acetate
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 13.5 min
k'_1: 3.55
α: 1.15
reference 46



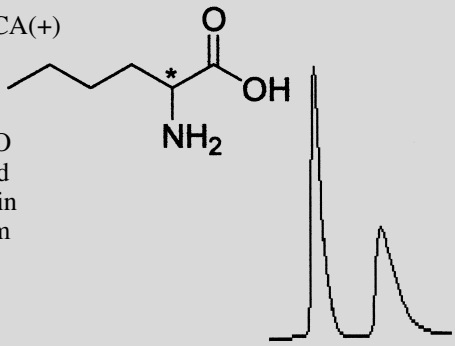
Propranolol

Propranolol
Column: (3R,4S)-Pirkle 1-J
25 cm x 4.6 mm
Mobile Phase: (80/20)
CH_2Cl_2/Ethanol + 0.04M
Ammonium Acetate
Flow Rate: 1.0 mL/min
Detection: UV 254 nm
Run Time: 6.5 min
k'_1: 0.80
α: 1.80
reference 46



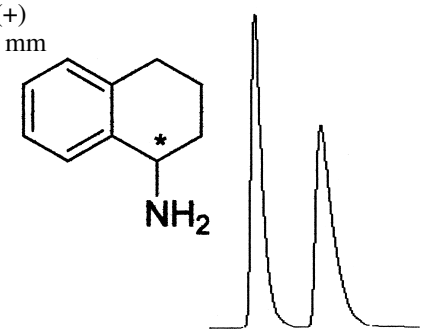
Norleucine

Norleucine
Column: ChiroSil® RCA(+) or SCA(-) 15 cm x 4.6 mm
Mobile Phase: (45/55) CH_3OH/H_2O +10 mM Acetic acid
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Run Time: 5.6 min
k'_1: 1.28
α: 1.75



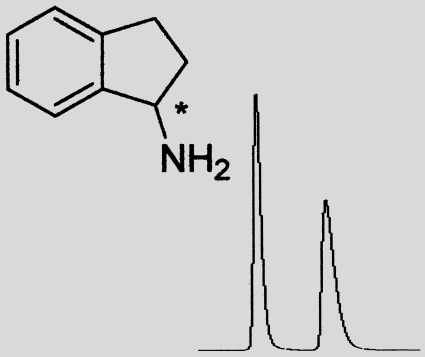
1,2,3,4-Tetrahydro-1-naphthylamine

1,2,3,4-Tetrahydro-1-naphthylamine
Column: ChiroSil® RCA(+) or SCA(-) 15 cm x 4.6 mm
Mobile Phase: (84/16) CH_3OH/H_2O +10 mM H_2SO_4 and 0.1% TEA
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Run Time: 3.5 min
k'_1: 0.82
α: 1.76



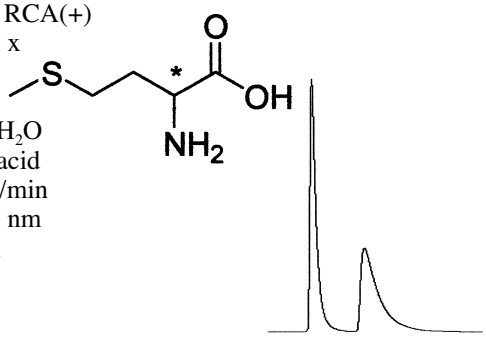
1-Aminoindan

1-Aminoindan
Column: ChiroSil® RCA(+) or SCA(-) 15 cm x 4.6 mm
Mobile Phase: (84/16) CH_3OH/H_2O +5 mM $HClO_4$
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Run Time: 4.8 min
k'_1: 1.44
α: 1.91



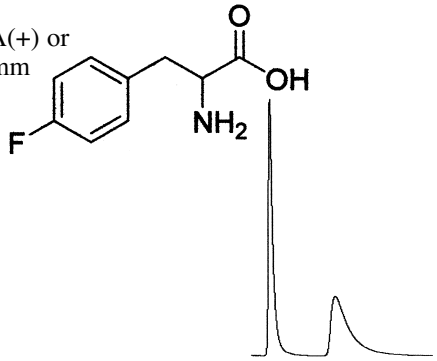
Methionine

Methionine
Column: ChiroSil® RCA(+) or SCA(-) 15 cm x 4.6 mm
Mobile Phase: (45/55) CH_3OH/H_2O +10 mM Acetic acid
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Run Time: 7.5 min
k'_1: 1.64
α: 2.04



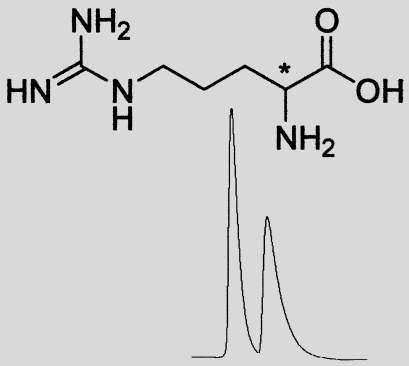
4-Fluorophenyalanine

4-Fluorophenyalanine
Column: ChiroSil® RCA(+) or SCA(-) 15 cm x 4.6 mm
Mobile Phase: (70/30) CH_3OH/H_2O+10 mM Acetic acid
Flow Rate: 1.5 mL/min
Detection: UV 210 nm
Run Time: 9.6 min
k'_1: 2.92
α: 2.56



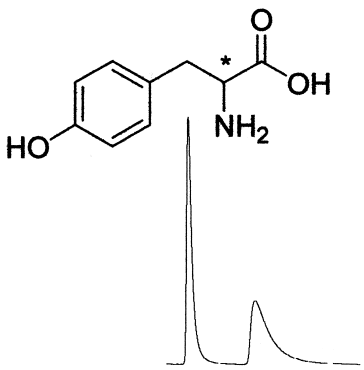
Arginine

Arginine
Column: ChiroSil® RCA(+) or SCA(-) 15 cm x 4.6 mm
Mobile Phase: (84/16) CH_3OH/H_2O +10 mM H_2SO_4
Flow Rate: 0.8 mL/min
Detection: UV 210 nm
Run Time: 4.9 min
k'_1: 1.21
α: 1.64



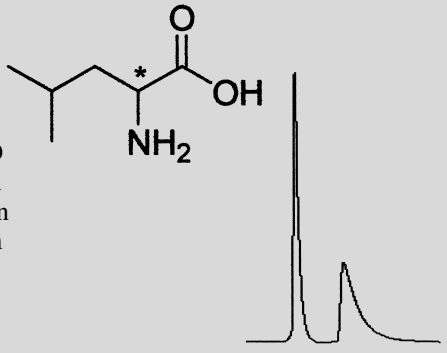
Tyrosine

Tyrosine
Column: ChiroSil® RCA(+) or SCA(-) 15 cm x 4.6 mm
Mobile Phase: (70/30) CH_3OH/H_2O +10 mM Acetic acid
Flow Rate: 1.5 mL/min
Detection: UV 210 nm
Run Time: 9.1 min
k'_1: 2.95
α: 2.38



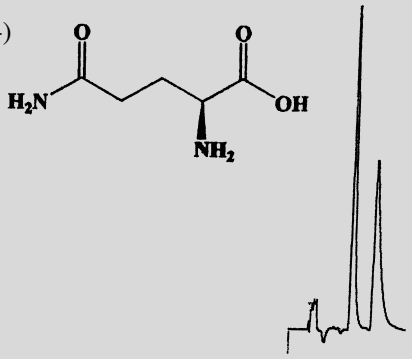
Leucine

Leucine
Column: ChiroSil® RCA(+) or SCA(-) 15 cm x 4.6 mm
Mobile Phase: (45/55) CH_3OH/H_2O +10 mM Acetic acid
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Run Time: 5.5 min
k'_1: 1.03
α: 2.14



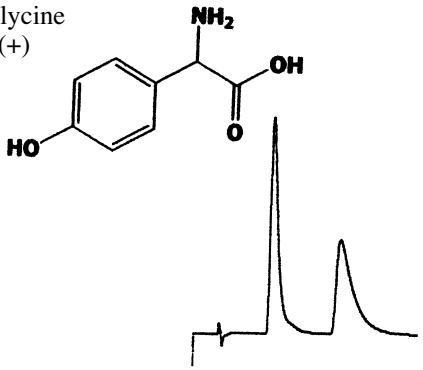
Glutamine

Glutamine
Column: ChiroSil® SCA(-)
25 cm x 4.6 mm
Mobile Phase:
(65/35) CH_3CN/H_2O
+0.01% Acetic acid
Flow Rate: 1.5 mL/min
Detection: UV 210 nm
Run Time: 6.5 min
k'_1: 1.51
α: 1.61
reference 46



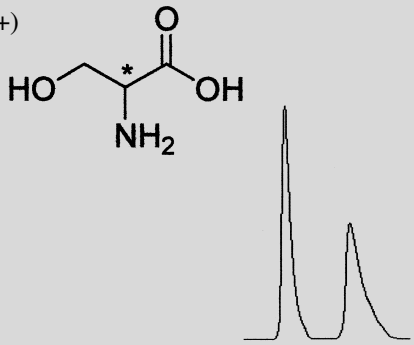
D,L-p-Hydroxy-Phenylglycine

D,L-p-Hydroxy-Phenylglycine
Column: ChiroSil®-SCA(+)
15 cm x 4.6 mm
Mobile Phase:
(50/50) CH_3ON/H_2O
+0.02% Acetic acid
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Run Time: 11.0 min
k'_1: 2.11
α: 2.29
reference 46



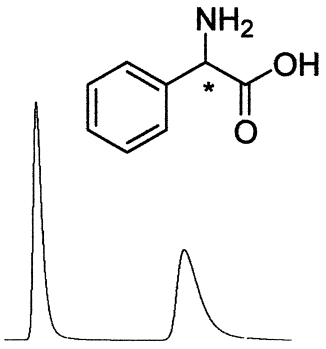
Serine

Serine
Column: ChiroSil® RCA(+)
or SCA(-)
15 cm x 4.6 mm
Mobile Phase:
(84/16) CH_3OH/H_2O
+5 mM $HClO_4$
Flow Rate: 0.8 mL/min
Detection: UV 210 nm
Run Time: 6.0 min
k'_1: 1.37
α: 1.99



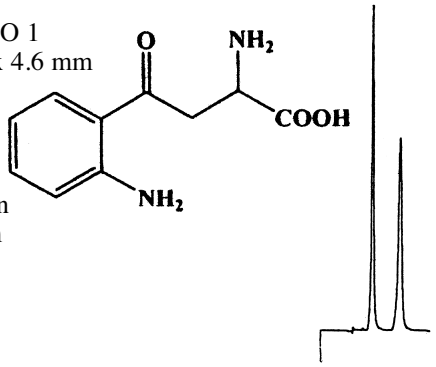
Phenylglycine

Phenylglycine
Column: ChiroSil® RCA(+)
or SCA(-)15 cm x 4.6 mm
Mobile Phase: (70/30)
CH_3OH/H_2O
+10 mM H_2SO_4 and
0.1% TEA
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Run Time: 13.1 min
k'_1: 3.14
α: 2.60



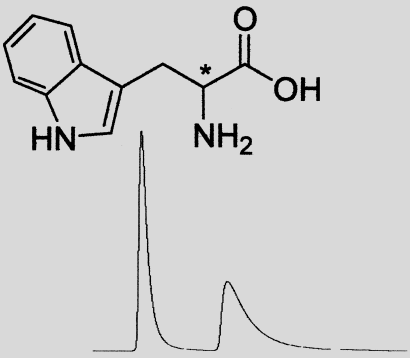
Kynurenine

Kynurenine
Column = (S,S)-Whelk-O 1
10/100 (FEC) 25 cm x 4.6 mm
Mobile Phase =
(65/35)
H_2O/CH_3OH +
0.1% Acetic Acid
Flow Rate = 1.0 mL/min
Detection = UV 254 nm
Run Time = 9.0 min
k'_1 = 1.17
α = 1.99
reference 46



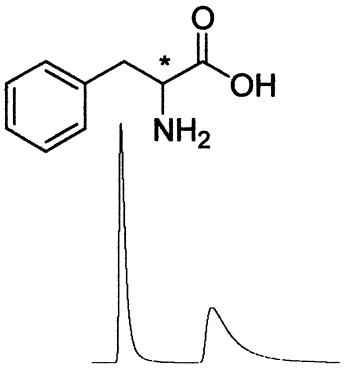
Tryptophan

Tryptophan
Column: ChiroSil®
RCA(+) or SCA(-)
15 cm x 4.6 mm
Mobile Phase: (70/30)
CH_3OH/H_2O
+10 mM Acetic acid
Flow Rate: 1.5 mL/min
Detection: UV 210 nm
Run Time: 11.0 min
k'_1: 4.06
α: 2.15



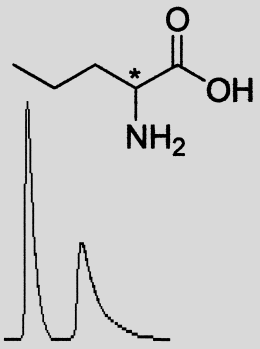
Phenylalanine

Phenylalanine
Column: ChiroSil® RCA(+) or
SCA(-) 15 cm x 4.6 mm
Mobile Phase: (70/30)
CH_3OH/H_2O
+10 mM Acetic acid
Flow Rate: 1.5 mL/min
Detection: UV 210 nm
Run Time: 8.9 min
k'_1: 2.66
α: 2.57



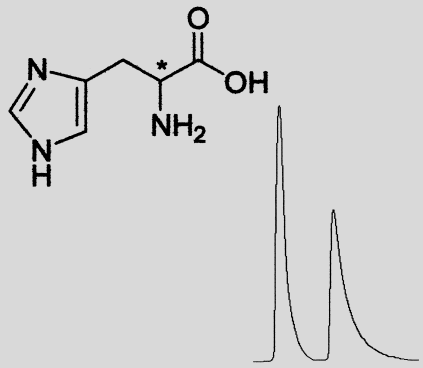
Norvaline

Norvaline
Column: ChiroSil® RCA(+) or
SCA(-)15 cm x 4.6 mm
Mobile Phase:
(45/55) CH_3OH/H_2O
+10 mM Acetic acid
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Run Time: 5.3 min
k'_1: 1.15
α: 1.79



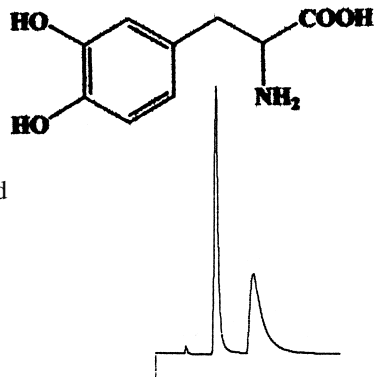
Histidine

Histidine
Column: ChiroSil®
RCA(+) or SCA(-)
15 cm x 4.6 mm
Mobile Phase:
(45/55) CH_3OH/H_2O
+10 mM Acetic acid
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Run Time: 26.0 min
k'_1: 10.96
α: 1.27



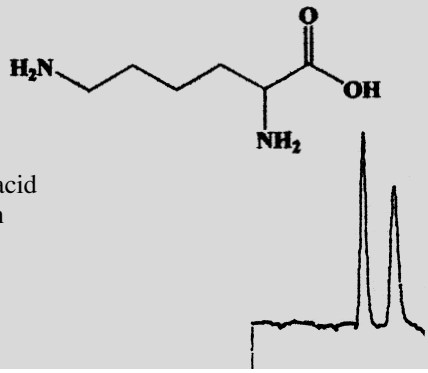
DOPA

DOPA
Column: ChiroSil®
RCA(+) or SCA(-)
15 cm x 4.6 mm
Mobile Phase:
(70/30) CH_3OH/H_2O
+0.01% Phosphoric acid
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Run Time: 5.5 min
k'_1: 0.97
α: 2.30



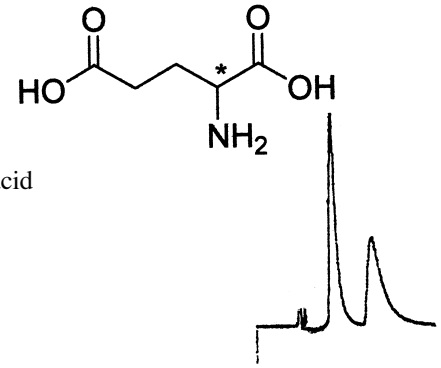
Lysine

Lysine
Column: ChiroSil®
RCA(+) or SCA(-)
15 cm x 4.6 mm
Mobile Phase:
(70/30) CH_3OH/H_2O
+0.01% Phosphoric acid
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Run Time: 5.3 min
k'_1: 1.44
α: 1.48



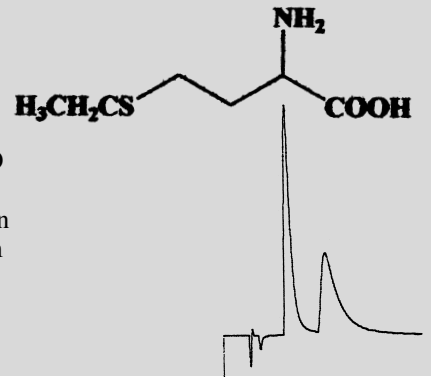
Glutamic Acid

Glutamic Acid
Column: ChiroSil®
RCA(+) or SCA(-)
15 cm x 4.6 mm
Mobile Phase:
(65/35) CH_3OH/H_2O
+0.05% Phosphoric acid
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Run Time: 4.5 min
k'_1: 0.71
α: 2.27



Ethionine

Ethionine
Column: ChiroSil®
RCA(+) or SCA(-)
15 cm x 4.6 mm
Mobile Phase:
(75/25) CH_3OH/H_2O
+0.02% Acetic acid
Flow Rate: 1.0 mL/min
Detection: UV 210 nm
Run Time: 6.2 min
k'_1: 1.29
α: 2.07



Frequently Asked Questions

ABOUT PIRKLE-TYPE CHIRAL STATIONARY PHASES AND COLUMNS FROM REGIS

Throughout the past 20 years, the Sales and Technical persons at Regis have fielded hundreds of different questions related to our Chiral Stationary Phases (CSP's). Listed here you will find some of the frequently asked questions. By no means is this a complete list, if you have questions regarding chiral chromatography, please feel free to contact Regis directly or pass your question on through one of our distributors.

What is the pressure rating of your columns?
All analytical (25cm x 4.6 mm i.d.) and semi-preparative (25cm x 10.0 mm i.d.) columns manufactured by Regis can tolerate pressures up to 6000 psi. Larger columns will tolerate 3000 psi. It is very important not to exceed the maximum pressure rating for any HPLC column as you may disrupt the integrity of the silica bed and destroy the column.

Can Regis columns be reversed?
Yes, all columns packed by Regis are fully reversible. In fact, Regis was the first column manufacturer to sell a fully reversible HPLC column. It is recommended to reverse your column frequently. This helps keep the frit surface from becoming clogged with undissolved sample or particulates in the mobile phase, thus extending the column life.

What is the pH range of your columns?
All of Regis' Chiral phases are bonded on silica. The recommended pH range is 2.5 to 7.5. Limited usage outside of this pH range can be tolerated, but it has been proven that extended usage outside of the range will decrease column life.

Can your columns be used in normal and reversed-phase solvents?
Yes, all Pirkle-Type Chiral HPLC columns can be used in *BOTH* normal and reversed-phase solvents. Generally, the Pirkle-Type CSP's will give better separations by using them with normal-phase solvents. There are numerous examples, however; where separations with reversed-phase solvents will outperform those with normal-phase solvents.

Can I use the same column for reversed-phase and normal-phase solvent systems while doing method development?
Yes, just make sure you completely flush out the column with a miscible solvent such as IPA or ethanol. We recommend at least 20 column volumes.

How long does it take your columns to equilibrate?
The column should equilibrate after about 20 column volumes. When you are switching from normal to reversed-phase solvent systems and vise-versa, flush the column with a miscible solvent for 20 column volumes. It should take another 20 column volumes to equilibrate. The equilibration volumes may vary depending on the composition of the mobile phase.

What type of silica do you use?
Regis exclusively uses Exsil® for our 5-micron material and Kromasil, for 10 and 16-micron material. Both brands of silica are 100 angstrom in pore size.

Do you always need a modifier in the mobile phase?
No modifiers are usually needed for initial method development. Modifiers can be used to improve peak shape and resolution when the samples are extremely basic or acidic in nature. Acetic acid or ammonium acetate are recommended for acidic compounds, and triethylamine, diethylamine or ammonium acetate are recommended for basic compounds. Usually 0.1% of modifier is all that is required. *Note: Although TFA may be used as a modifier, its use should be limited. Acetic acid usually works as well as TFA.*

Can I use your columns for SMB chromatography and SFC?
Yes, many analytical and preparative chromatographers use Pirkle-Type Chiral columns in both SFC and SMB. Special hardware is necessary for certain column dimensions.

What is the difference between Whelk-O 1 and Whelk-O 2?
Although the Whelk-O 1 and Whelk-O 2 both share the same Chiral selector, they have distinct differences. The Whelk-O 1 is monofunctionally bonded to silica and the Whelk-O 2 is trifunctionally bonded. The Whelk-O 2 was designed to tolerate strong acidic modifiers such as TFA. The Whelk-O 2 was designed for preparative use and is not available on 5-micron silica. Due to the fact the Whelk-O 2 is a trifunctional bond, coverage on the silica will be less than with Whelk-O 1. This decrease in the actual number of bonded sites will decrease selectivity and not allow for exact reproducibility of a method developed on a Whelk-O 1 column.

Does my compound need an aromatic ring to achieve separation on a Pirkle-Type Chiral column?
In most cases (not all), yes. Chiral recognition occurs at binding sites. The potential π-π interaction that can occur between the aromatic rings on the Chiral selector and the aromatic ring on the sample is a major factor in achieving selectivity. Binding does occur at other sites such as acidic sites, basic sites and steric interaction sites—this is why you do not always need a ring—but by far, the π-π interaction is the major binding site.

Can I use the Pirkle-Type Chiral columns in polar organic mode?
Yes, even though the success rate is very poor, you can use the columns in polar organic mode. We do not recommend dedicating a slot in your method development station for a Pirkle-Type Chiral column if you are exclusively running in polar organic mode. Add another Pirkle-Type column to your normal-phase system to achieve a higher success rate.

What sampling loading can I expect from Pirkle-Type Chiral HPLC columns?
The typical loading range – with relative retention's (alpha) greater than 1.3—is ~ 4-16 mg of sample per gram of packing. Below are typical loadings for some of the different column sizes: *Note: Factors, such as solubility, will greatly affect loading capacity.*

Analytical column, 25cm x 4.6mm, ~ 3.5 grams of packing, loading is 14-56 mg/ injection.

Semi-prep column, 25cm x 10.0mm, ~ 16 grams of packing, loading is 64-256 mg/ injection.

Prep column, 25cm x 21.1mm, ~ 72.5 grams of packing, loading is 288-1,152 mg/ injection.

Quick Scheme Method Development

FOR THE REGIS PIRKLE-TYPE CHIRAL STATIONARY PHASES

STEP 1:

Choosing the Appropriate Column:

We recommend using the following sequence of columns to start your method development. When doing method development at Regis, the Whelk-O is our first choice as it exhibits the broadest degree of generality.

Order of Preference:

- ❍ Whelk-O
- ❍ ULMO
- ❍ DACH-DNB
- ❍ α-Burke
- ❍ β-Gem
- ❍ Pirkle 1-J
- ❍ Leucine
- ❍ Phenylglycine

STEP 2:

Choosing the Mobile Phase:

Certain factors such as solubility and future considerations for preparative work usually help to determine whether to perform you method development with reversed-phase or normal phase solvents. Pirkle-Type phases can be used in both modes, but typically performs the best with normal phase solvents. Since the majority of analytical Chiral methods move on to preparative separations, we recommend using normal phase solvents.

Typical Mobile Phase Combinations:

- ❍ Hexane/IPA
- ❍ Hexane/Ethanol
- ❍ Hexane/CH_2CL_2/Ethanol
- ❍ Hexane/Ethyl Acetate
- ❍ Heptane/Ethanol
- ❍ Heptane/CH_2CL_2
- ❍ Hexane/CH_2CL_2
- ❍ Heptane/IPA
- ❍ Methanol/H_2O
- ❍ Ethanol/H_2O
- ❍ Acetonitrile/H_2O
- ❍ Methanol/CH_2CL_2
- ❍ THF/H_2O
- ❍ Ethanol/CH_2CL_2

STEP 3:

Start with a high percentage (~50%) of strong solvent (ethanol, IPA, ect.):

Starting with a strong solvent system ensures that all peaks will elute off the column quickly.

Sample: Naproxen
Column: (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase: (50/50)
Hexane/Ethanol
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
Run Time: 6.5 min

k'_1: 1.37
α: 1.87
R_s: 1.59

- ❍ If you achieve any resolution, (such as the above sample) move on to STEP 4.
- ❍ If your sample comes off in the void, decrease the strong solvent by half.
- ❍ If your sample is now out of the void and you have resolution, move on to STEP 4.
- ❍ If your sample is out of the void, and there is no resolution, change the column.

Steps 4 and 5 continued on pages 84 & 85

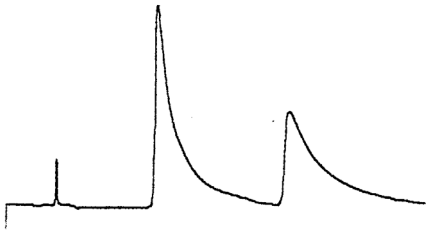
STEP 4:

Add a Mobile Phase Modifier (usually ~ 0.1%)

As you can see, the peak shape of the initial separation is very poor. To rectify this problem, a modifier is usually added. If you are satisfied with the peak shape—you do not need to add a modifier—move on to STEP 5 and optimize your separation.

- For basic or amine groups—add triethylamine, diethylamine or ammonium acetate
- For acidic groups—add acetic acid, trifluoroacetic acid or ammonium acetate

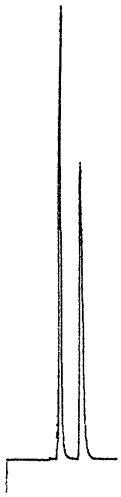
Sample: Naproxen
Column: (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase: (50/50)
Hexane/Ethanol
+ 0.1% TEA
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
Run Time: 19.0 min



k'_1: 4.63
α: 2.07
R_s: 4.14

- Although resolution increased with the addition of 0.1% of triethylamine to the mobile phase, the peak shape is still very poor.
- Try adding a different modifier

Sample: Naproxen
Column: (R,R)-Whelk-O 1
25 cm x 4.6 mm
Mobile Phase: (50/50)
Hexane/Ethanol
+ 0.1% Acetic Acid
Flow Rate: 1.5 mL/min
Detection: UV 254 nm
Run Time: 4.7 min

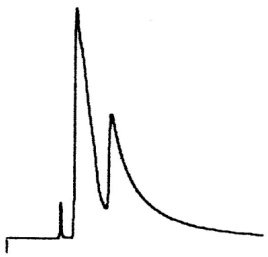


k'_1: 0.87
α: 1.85
R_s: 7.24

- Resolution and peak shape are excellent with the addition of 0.1% of acetic acid

Recapping The First Four Steps:

- For this sample, you can stop at 50/50 Hexane/Ethanol + 0.1% acetic acid if you are only looking for a basic method or you can carry it forward to STEP 5 and optimize.

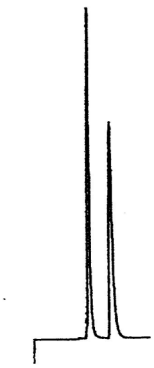


50/50
Hexane/Ethanol

k'_1: 1.37
α: 1.87
R_s: 1.59

50/50
Hexane/Ethanol
+ 0.1% TEA

k'_1: 4.63
α: 2.07
R_s: 4.14



50/50
Hexane/Ethanol
+ 0.1% Acetic Acid

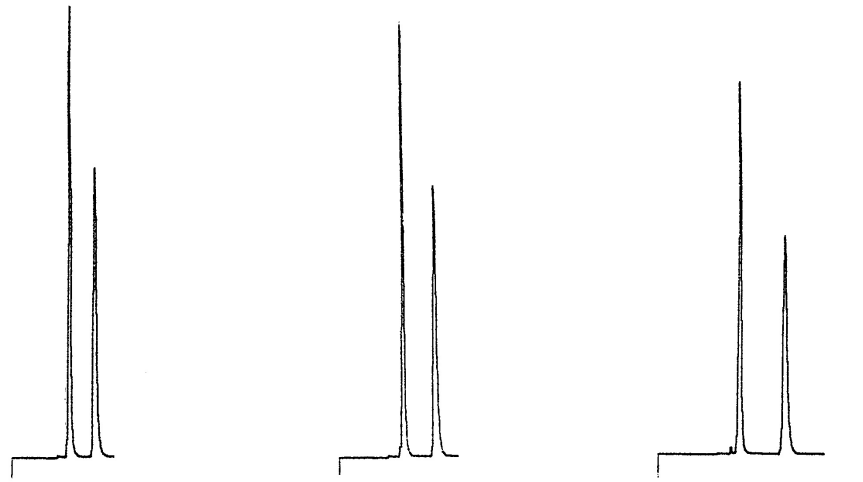
k'_1: 0.87
α: 1.85
R_s: 7.24

STEP 5:
Optimizing your method:

Optimizing a Chiral method is very similar to optimizing an achiral method. Changing mobile phase component concentrations and even the components themselves can dramatically change resolution.

Increase the concentration of the weaker solvent:

- Increasing the hexane content increased the resolution in this example. Again, you can stop here and accept this as optimized or continue on.



60/40
Hexane/Ethanol
+ 0.1% Acetic Acid
k'_1: 1.02
α: 1.87
R_s: 8.51

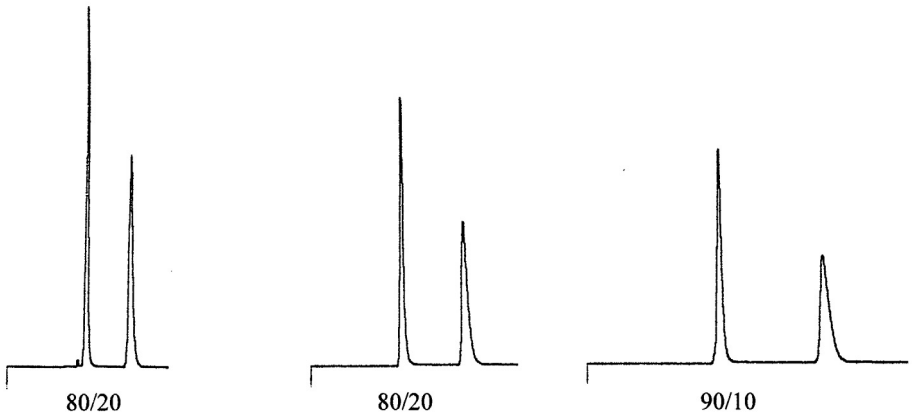
70/30
Hexane/Ethanol
+ 0.1% Acetic Acid
k'_1: 1.29
α: 1.87
R_s: 10.1

80/20
Hexane/Ethanol
+ 0.1% Acetic Acid
k'_1: 1.86
α: 1.87
R_s: 11.84

Change the strong solvent:

- By substituting IPA for ethanol, an increase in both resolution and alpha were achieved.

Optimization of a Chiral method can be as simple or as complicated as you want it to be. Different mobile phase components can be used; modifiers can be changed or eliminated; you can switch to reversed-phase solvents; you can change columns. The possibilities are endless. We suggest you keep it as simple as possible. Once you have achieved an acceptable separation, move on to the next project. Small increases in resolution and alpha are usually not worth the time spent in method development to achieve those increases.



80/20
Hexane/Ethanol
+ 0.1% Acetic Acid
k'_1: 1.86
α: 1.87
R_s: 11.84

80/20
Hexane/IPA
+ 0.1% Acetic Acid
k'_1: 2.38
α: 1.94
R_s: 11.88

90/10
Hexane/IPA
+ 0.1% Acetic Acid
k'_1: 3.85
α: 2.03
R_s: 13.31

Not sure which chiral column to use for your separation?

REGIS® TECHNOLOGIES, INC.
sales@registech.com

Let the professional staff at Regis assist you with its free chiral screening service.
Simply fill out the chiral screening data sheet (see page 91 of this Guide) and pre-fax it to Regis or send it along with your sample of interest.
STRICTLY CONFIDENTIAL • FAST TURN AROUND TIME • NO OBLIGATION TO THE CUSTOMER

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Chiral Screening Data Sheet

Contact Information:

Primary Contact _____

Other Contact _____

Company Address _____

_____

City _____

State _____ Zip Code _____

Country _____

Phone _____

Fax _____

e-mail _____

_____

Compound Structure/Name

This compound ❍ **may** or ❍ **may not** be used in an application booklet.

Separation Requirements:

Analytical ❍

Preparative ❍

Quantity _____ ❍ mg ❍ gr ❍ kg

Do you want your sample returned?

❍ **Yes** ❍ **No**

Please Note: All samples are destroyed after the screening process is complete.

Physical, Chemical, and Chromatographic Data:

MSDS Available	❍ Yes	❍ No	If yes, include a copy with your sample.
Hazardous Material	❍ Yes	❍ No	❍ Unknown
Special Handling Requirements	❍ Yes	❍ No	❍ Unknown

Appearance:

❍ Powder ❍ Crystal ❍ Oil ❍ Other

Color _____ pK_a _____ UV (max) _____ UV (min) _____

Chemical Purity _____

Chiral Screening Data Sheet

Stability/Exposure:

Light	❍ Stable	❍ Decomposes	❍ Unknown
Moisture	❍ Stable	❍ Decomposes	❍ Unknown
Temp<40˚C	❍ Stable	❍ Decomposes	❍ Unknown
ACIDS:			
Acetic Acid (<1%)	❍ Stable	❍ Decomposes	❍ Unknown
Trifluoroacetic Acid (<1%)	❍ Stable	❍ Decomposes	❍ Unknown
BASES:			
Triethylamine (<1%)	❍ Stable	❍ Decomposes	❍ Unknown
Diethylamine (<1%)	❍ Stable	❍ Decomposes	❍ Unknown

Storage Conditions:_____

_____

Solubility

Water	❍ Soluble	❍ Slightly	❍ Decomposes	❍ Unknown
Methanol	❍ Soluble	❍ Slightly	❍ Decomposes	❍ Unknown
Ethanol	❍ Soluble	❍ Slightly	❍ Decomposes	❍ Unknown
2-Propanol	❍ Soluble	❍ Slightly	❍ Decomposes	❍ Unknown
Hexane	❍ Soluble	❍ Slightly	❍ Decomposes	❍ Unknown
Ethyl Acetate	❍ Soluble	❍ Slightly	❍ Decomposes	❍ Unknown
CH_2Cl_2	❍ Soluble	❍ Slightly	❍ Decomposes	❍ Unknown
Acetonitrile	❍ Soluble	❍ Slightly	❍ Decomposes	❍ Unknown

Other _____

_____

Chromatographic Analysis:

Column _____

Column Manufacturer _____

Mobile Phase _____

Flow Rate _____ Wavelength _____

Please include a copy of the chromatogram.

Instructions:

Please send the completed form along with your sample. We would like to have at least 25 mg of sample. If you are unable to send us 25 mg, you must include sufficient solubility information. If the compound you are sending is not commercially available, please inquire if you need a confidentiality agreement signed before you send us your sample.

REGIS® TECHNOLOGIES, INC.

8210 Austin Avenue
Morton Grove,
IL 60053-0519

PH 847.967.6000
800.323.8144

FX 847.967.1214

EM Sales@RegisTech.com

www.RegisTech.com

3/2007