Хиральные колонки Astec CHIROBIOTIC TM Chiral

Astec CHIROBIOTIC™ Chiral HPLC Columns

MACROCYCLIC GLYCOPROTEIN STATIONARY PHASES FOR CHIRAL SEPARATIONS AND HIGHLY SELECTIVE ACHIRAL SEPARATIONS

CHIROBIOTIC phases are based on covalently bonding macrocyclic glycoproteins to a high purity 5 micron silica gel in such a way as to establish it's stability while retaining essential components for chiral recognition. CHIROBIOTIC V and V2 are based on bonding Vancomycin, which contains 18 chiral centers surrounding three pockets or cavities. Five aromatic ring structures bridge these strategic cavities. Hydrogen donor acceptor sites are readily available close to the ring structures. CHIROBIOTIC V has demonstrated selectivity similar to glycoprotein phases except it is stable from 0-100% organic modifier and exhibits high sample capacity.

For **CHIROBIOTIC V2**, changes to the linkage chemistry and silica offer improvements for preparative LC and for more demanding chiral separations. **CHIROBIOTIC T**, T2, and TAG are based on bonding the amphoteric glycopeptide, Teicoplanin, which contains 23 chiral centers surrounding four

pockets or cavities. For **CHIROBIOTIC T2**, changes to the linkage chemistry and silica offer improvements for preparative LC and for more demanding chiral separations. **CHIROBIOTIC TAG** has the sugars removed from the macrocyclic glycopeptide to produce an aglycone structure as a variant of **CHIROBIOTIC T**. **CHIROBIOTIC R** is based on bonding Ristocetin A to high purity 5 micron silica.

Astec CHIROBIOTIC™ V2

FEATURES

- Enhanced selectivity and capacity in the polar organic mode and polar ionic mode
- Capacity increases of 2 to 20 fold over standard CHIROBIOTIC phases
- Most beneficial for basic molecules
- Neutral molecules can often be run in pure methanol

The polar organic and the polar ionic modes have become increasingly popular largely because of their ideal compatibility with MS detection and preparative LC. Important changes in linkage chemistries and the silica have led to the CHIROBIOTIC V2 and T2 chiral stationary phases – columns of choice for difficult separations, and especially, for preparative LC.

These phases extend the capabilities of the series. They are designed to be used in the optimization process since they offer some distinct advantages in the polar ionic mode and polar organic mode. The standard CHIROBIOTIC phases remain the columns of choice for method development screening and for reversed phase separations.

Astec CHIROBIOTIC™ T

FEATURES

- Complex chiral environment
- π-π interactions
- Chiral hydrogen bonding sites
- Peptide binding site
- Inclusion complexation
- Multi-modal possibilites
- Excellent alternative to crown ether and ligand exchange for amino acids and hydroxy acids
- Complementary to CHIROBIOTIC™ V

CHIROBIOTIC™ phases are based on covalently bonding macrocyclic glycoproteins to a high purity, spherical silica gel in such a way as to establish its stability while retaining essential components for chiral recognition. The CHIROBIOTIC™ T is based on bonding the amphoteric glycopeptide Teicoplanin to a 5µm silica gel through multiple covalent linkages. Teicoplanin contains 23 chiral centers surrounding four pockets or cavities. Hydrogen donor and acceptor sites

are readily available close to seven aromatic rings. This type of arrangement is known to be highly favorable for a number of enantiomeric separations.

TYPES OF CHIRAL ANALYTES

The CHIROBIOTIC™ T has unique selectivity for a number of classes of molecules, specifically underivatized amino acids, N-derivatized amino acids, i.e. FMOC, CBZ and hydroxy-carboxylic acids, acidic compounds including carboxylic acids and phenols, small peptides, neutral aromatic analytes and cyclic aromatic and aliphatic amines. One of the major features of CHIROBIOTIC™ T is its "complementary stereoselectivity" to the CHIROBIOTIC™ V column. If, after optimization, the CHIROBIOTIC™ V column does not resolve the analyte to baseline, using the CHIROBIOTIC™ T column in the same mobile phase results in complete resolution. This phenomena also works in reverse.

MOBILE PHASES

The CHIROBIOTIC™ T has demonstrated equal versatility in both reversed phase and normal phase solvents. It has shown great versatility in the new polar organic phase mode. Since Teicoplanin contains peptide, carbohydrate and other ionizable groups, it is not surprising that the enantioselectivity appears to be different in each of these modes. This allows for the potential to separate a greater variety of chiral analytes. The stationary phase is unaffected when switching between the three mobile phase systems.

Astec CHIROBIOTIC™ T2 Chiral HPLC Columns

FEATURES

- Enhanced selectivity and capacity in the polar organic mode and polar ionic mode
- Capacity increases of 2 to 20 fold over standard CHIROBIOTIC phases
- Most beneficial for basic molecules
- Neutral molecules can often be run in pure methanol

The polar organic and the polar ionic modes have become increasingly popular largely because of their ideal compatibility with MS detection and preparative LC. Important changes in linkage chemistries and the silica have led to the CHIROBIOTIC V2 and T2 chiral stationary phases – columns of choice for difficult separations, and especially, for preparative LC.

These phases extend the capabilities of the series. They are designed to be used in the optimization process since they offer some distinct advantages in the polar ionic mode and polar organic mode. The standard CHIROBIOTIC phases remain the columns of choice for method development screening and for reversed phase separations.

Astec CHIROBIOTIC™ TAG

FEATURES

- Complex chiral environment
- Chiral π-π interactions
- Chiral hydrogen bonding sites
- Peptide binding site
- Carbohydrate binding site
- Inclusion complexation
- Multi-modal possibilities
- Higher capacity and greater stability over protein phases
- Greater solvent versatility and higher throughputs than cellulose phases
- Complementary to CHIROBIOTIC T

CHIROBIOTIC phases are based on covalently bonding macrocyclic glycoproteins to a high purity, spherical silica gel in such a way as to establish long term stability while retaining essential components for chiral recognition. Five linkages assure long term stability in any recommended mobile phase condition. The CHIROBIOTIC TAG is a variation of CHIROBIOTIC T. The sugars are removed from the macrocyclic glycopeptide to produce an aglycone structure which is then linked through standard CHIROBIOTIC chemistry.

The preparation and applications of the aglycone form of CHIROBIOTIC T was a concept conceived and published by Dr. Francesco Gasparrini, Universita Degli Studi Di Roma, Italy. It was under his guidance that Astec produced this product.

TYPES OF CHIRAL ANALYTES

A selectivity increase is observed for the analysis of amphoteric molecules like the amino acids. A large number of α, β, γ and cyclic amino acids have been separated on this phase. The separation of carnitine is one of the more important analyses performed on this column. A substantial increase in the selectivity for a number of β-amino acids has been reported. Selectivity for some compounds other than amino acids has been diminished indicating the importance of the sugar moieties. However, many neutral molecules have been well separated in single solvents like methanol, ethanol, acetonitrile or combinations. Examples of neutral molecules include hydantoins, oxazolidinones and diazopenes. Many sulfur containing compounds have been resolved in typical normal phase solvents demonstrating its versatility in SFC.

CHIROBIOTIC TAG (Teicoplanin Aglycone)

Compound Type	Polar Organic Mode	Polar Ionic Mode	Reversed-Phase Mode	Normal Phase Mode
Acids		✓	✓	
Bases		✓	✓	

CHIROBIOTIC TAG (Teicoplanin Aglycone)

Neutrals	✓	✓	✓

Note: Compound is classified acid or base by virtue of functional group on or near the stereogenic center.

MOBILE PHASES

CHIROBIOTIC TAG has demonstrated broad selectivity in reversed phase, normal phase, polar organic and polar ionic modes. For details on these mobile phases, see the CHIROBIOTIC HANDBOOK.

Recommended Starting Mobile Phases

CHIROBIOTIC TAG	Phase Type
20/80: MeOH/20mM NH_4OAc, pH 6.0	Reversed Phase
100/0.2/0.1: MeOH/HOAc/TEA	Polar Ionic
20/80: EtOH/Heptane	Normal Phase
EtOH	Polar Organic

Astec CHIROBIOTIC™ T

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CHIROBIOTIC™ T is based on bonding the amphoteric glycopeptide Teicoplanin to a 5µm silica gel through multiple covalent linkages. Teicoplanin contains 23 chiral centers surrounding four pockets or cavities. Hydrogen donor and acceptor sites are readily available close to seven aromatic rings. This type of arrangement is known to be highly favorable for a number of enantiomeric separations.

TYPES OF CHIRAL ANALYTES

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MOBILE PHASES

The CHIROBIOTIC™ T has demonstrated equal versatility in both reversed phase and normal phase solvents. It has shown great versatility in the new polar organic phase mode. Since Teicoplanin contains peptide, carbohydrate and other ionizable groups, it is not surprising that the enantioselectivity appears to be different in each of these modes. This allows for the potential to separate a greater variety of chiral analytes. The stationary phase is unaffected when switching between the three mobile phase systems.

Astec CHIROBIOTIC™ R

FEATURES

- Covalently bonded glycopeptide - Ristocetin A
- Multi-modal - operates in normal, reversed and polar organic phase
- Targets anionic chiral molecules
- Complementary to CHIROBIOTIC V and CHIROBIOTIC T

CHIROBIOTIC R is one of the HPLC phases utilizing macrocyclic glycopeptides as chiral selectors. Ristocetin A has been covalently bonded to a 5 micron silica support resulting in the largest and most complex of these products.

As with CHIROBIOTIC V and CHIROBIOTIC T, CHIROBIOTIC R has the mechanisms to obtain selectivity in all three modes: polar organic; reversed phase; and, normal phase. These interactions have been identified as hydrophobic or dispersive, π-π, electrostatic, hydrogen bonding, dipole and steric. Combinations of these interactions are driven by the type of mobile phase used. Statistically, it has been shown that the normal phase type interactions driven by polar organic mode have the highest potential for separation. This is followed by reversed phase and, finally, by typical normal phase solvents like hexane/ethanol.

The main area of interaction appears to be the amine function of Ristocetin A and, as a result, this stationary phase has a particular selectivity for anionic analytes. This phase also shows good selectivity for di- and tripeptides. The D terminal dipeptides are retained longer than the L terminal. In general, the CHIROBIOTIC R has the best selectivity for α-hydroxy acids, substituted aliphatic acids, chiral alcohols, secondary and tertiary amines.

Materials

Product No.	Description
13022AST	**Astec® CHIROBIOTIC® R Chiral HPLC Column**5 µm particle size, L × I.D. 10 cm × 4.6 mm
13019AST	**Astec® CHIROBIOTIC® R Chiral HPLC Column**5 µm particle size, L × I.D. 15 cm × 2.1 mm
13023AST	**Astec® CHIROBIOTIC® R Chiral HPLC Column**5 µm particle size, L × I.D. 15 cm × 4.6 mm
13020AST	**Astec® CHIROBIOTIC® R Chiral HPLC Column**5 µm particle size, L × I.D. 25 cm × 2.1 mm
13024AST	**Astec® CHIROBIOTIC® R Chiral HPLC Column**5 µm particle size, L × I.D. 25 cm × 4.6 mm
13101AST	**Astec® CHIROBIOTIC® R Chiral HPLC Guard Column**Column, 5 µm particle size, L × I.D. 2 cm × 1 mm
21150AST	**Supelguard™ Guard Cartridge Holder**Stand-Alone (Swivel-type), for use with Supelguard cartridges (2 cm L. x 2 to 4.6 mm I.D.)