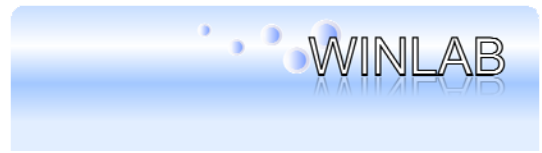


WINLAB PTY LTD

2 Pinnacle St, Brendale, Queensland, Australia, 4500
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CHIRALPAK AD AND CHIRALPAK AS
Amylose-derived Chiral Stationary Phases

CHIRALCEL OD & CHIRALCEL OJ and other cellulose derivatives
Cellulose-derived Chiral Stationary Phases

CHIRALPAK and CHIRALCEL [- RH Series]
DAICEL Polysaccharide – derived Reverse Phase Chiral stationary Phases
Developed specifically for aqueous / organic mobile phases

Amylose and Cellulose – derived Chiral Stationary Phases
Analytical and Semi – Preparative columns for Reverse Phase HPLC

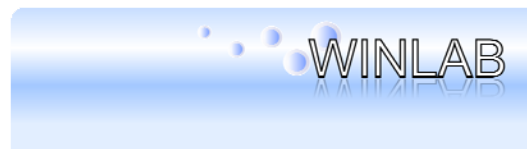
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Daicel CHIRAL for SPECIAL APPLICATIONS

Anion Exchange Chiral Stationary Phases

CHIRALPAK QD-AX and CHIRALPAK QN-AX columns

CHIRALPAK QN-AX and CHIRALPAK QD-AX are enantioselective weak anion-exchange (AX) HPLC columns. They were developed by Prof. W. Lindner's group in Vienna and are designed specifically for enantioselective HPLC of chiral acids and possess exceptional enantiomer separation capabilities for acidic chiral compounds containing carboxylic, phosphonic, phosphoric or sulfonic acid groups. In some cases, weakly acidic compounds such as phenols can also be separated.

These two columns are based on two complimentary stereoisomeric quinine (QN) and quinidine (QD) derivatives. Owing to their psuedo enantiomeric character they usually reveal reversed elution order for opposite enantiomers.

They can be used in reversed phase (RP) mode or in polar organic mode (non-aqueous, polar organic solvents containing organic acids and bases as buffer constituents).

In addition the separation of chiral basic and neutral compounds may also be possible, but usually under normal phase (NP) conditions. In this mobile phase mode, CHIRALPAK QN-AX and CHIRALPAK QD-AX behave like a standard Pirkle type chiral stationery phase.

They are compatible with all common HPLC solvents (e.g. methanol, acetonitrile, tetrahydrofuran, 1,4-dioxane or chloroform) as well as in a wide pH range spanning from pH 2 to 8.

Typical buffers used in hydro-organic mode are acetate, formate, citrate, and phosphate.

Crown Ether Chiral Stationary Phases

CROWNPAK CR (+) / CR (-) columns

These columns contain a chiral crown ether s a chiral selector which is coated onto a 5µm silica support.

Acidic mobile phases such as Perchloric acid pH 1 to 2. are used to operate these columns under standard conditions. Note that to shorten the retention time of hydrophobic samples, the addition of Methanol (**15% maximum** v/v) has been shown to be effective.

These columns are the reference columns for achieving amino acid separations, with the advantage that the elution order of the enantiomers can be reversed when necessary (CR(-) column gives the reversed elution order compared to CR (+) column).

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Ligand Exchange Chiral Stationary Phases

CHIRALPAK WH and MA(+) columns

The chiral stationary phases in these columns are made of amino acids and its derivatives coated or bonded to silica supports (with a particle size of 10um for WH and 3um for MA(+)).

Since these columns are ligand-exchange type columns, the standard mobile phase to use is an aqueous solution of CuSO₄ (0.1 to 2mM).

These columns can tolerate organic modifiers such as Methanol and Acetonitrile according to the specifications in the instruction manual.

Polymethacrylate Chiral Stationary Phases

CHIRALPAK OT(+) and OP(+) columns

These were the first CSPs invented by Professor Okamoto of Nagoya University (Japan). The chiral selector is a chiral synthetic methacrylate polymer coated onto a 10um silica support. The best chromatographic results are obtained using 100% Methanol as mobile phase.

The polymer used for the CHIRALPAK OT(+) column is very delicate and is slowly degraded by alcohols. To avoid this phenomenon, we recommend to run the analyses at low temperatures (0 – 5° C).

Anion Exchange Chiral Stationary Phases Analytical and Semi-Preparative Columns for HPLC

CHIRALPAK QD-AX

0-9-(tert-butylcarbamoyl) quinidine immobilized on a 5um silica support

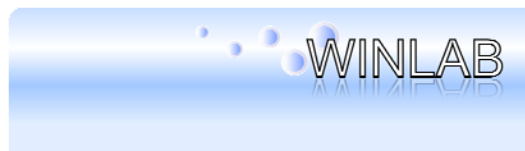
CHIRALPAK QN-AX

0-9-(tert-butylcarbamoyl) quinine immobilized on a 5um silica support

For acidic chiral compounds containing carboxylic, phosphonic, phosphinic, phosphoric or sulfonic acid groups. In some cases, weakly acidic compounds such as phenols can also be separated.

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**Crown Ether Chiral Stationary Phases
Analytical Columns for HPLC**

CROWNPAK CR(+)
CROWNPAK CR(-)

For amino acids and compounds with a primary amino group near the asymmetric centre, including dipeptides.

Note that the CROWNPAK CR(-) provides reversed order of elution relative to CROWNPAK CR(+).

**Ligand Exchange Chiral Stationary Phases
Analytical Columns for HPLC**

CHIRALPAK WH

For α -amino acids and their derivatives.

CHIRALPAK MA(+)

For hydroxycarboxylic acids, amino acids (including their derivatives), dipeptides.

**Polymethacrylate Chiral Stationary Phases
Analytical Columns for HPLC**

CHIRALPAK OP(+)
CHIRALPAK OT(+)

Special columns to resolve compounds by the chiral polymers' helicity.

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