The Reporter

Reprinted from Volume 16, No. 2, 1997

T297052

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A Versatile New Chiral Capillary GC Column — β-DEX 325

Y. Belov, Gas Chromatography, Supelco, Bellefonte, PA, USA

A new chiral column, the β-DEX 325 column, separates more enantiomeric pairs of organic compounds than other chiral columns.

The β-DEX™ 325 column is one of the most versatile chiral gas chromatography (GC) capillary columns presently available for the separation of enantiomers. It is useful for enantioseparation of organic compounds contains a wide range of functionalities. Table 1 includes data on the enantioselectivity, retention, and resolution factors from separations of alcohols using the β-DEX 325 column.

Cyclodextrin derivatives are used as chiral stationary phases for the separation of a great variety of enantiomers. Cyclodextrins, cyclic oligomers of glucose bonded through α-1,4 linkage, are able to form inclusion complexes with many classes of organic compounds. Separation of enantiomers is thought to be the result of their inclusion into the chiral cavity of the cyclodextrin derivatives.

The β-DEX 325 column is prepared by coating fused silica tubing with a 25% solution of heptakis(2,3-di-O-methyl-6-O-tert-butyldimethylsilyl)-β-cyclodextrin in SPB™-20 poly(20%-diphenyl/80%-dimethylsiloxane). The derivatized cyclodextrin and phenyl-substituted siloxane are prepared under tightly controlled reaction conditions. The result is a reliable, consistent, highly versatile column.

Figure A shows the separations of three alcohols — 1-phenyl-2-propanol, 6-methyl-5-hepten-2-ol, and isopinocampheol. Each compound is separated well, with the peaks resolved to baseline.

Ordering Information:

Description	Cat. No.
β-DEX 325 Capillary GC Column 30m x 0.25mm ID, 0.25µm film (β = 250)	**24308**

DEX is a trademark of Sigma-Aldrich Co.

Table 1. Enantioseparation Factors for Alcohols on a β-DEX 325 Column

Analyte	Temp. (°C)	α	k_1'	R_s
Borneol	120	1.049	6.2(-)	2.5
Glycidol	60	1.048	4.9	1.8
Isoborneol	120	1.028	5.8	1.3
Isopinocampheol	100	1.060	15.5(-)	3.0
Isopulegol	100	1.077	11.1(+)	3.0
Linalool	90	1.054	14.1(-)	2.0
Menthol	110	1.020	9.6(+)	1.2
trans-2-Methylcyclopentanol	70	1.078	9.9	2.5
6-Methyl-5-hepten-2-ol	90	1.062	6.7	3.5
Neomenthol	110	1.068	8.6(+)	3.5
exo-Norborneol	120	1.035	3.7	1.5
2-Octanol	80	—	10.9	0.6
1-Octen-3-ol	80	1.014	12.4	0.9
1-Phenyl-1-butanol	130	1.033	7.7(S)	2.0
1-Phenylethanol	120	1.045	5.0(R)	2.5
2-Phenyl-1-propanol	110	1.041	13.6	3.5
1-Phenyl-2-propanol	110	1.046	9.3	2.5
α-Terpineol	110	1.018	12.5(+)	2.5
Terpinen-4-ol	100	1.034	14.4(+)	1.5

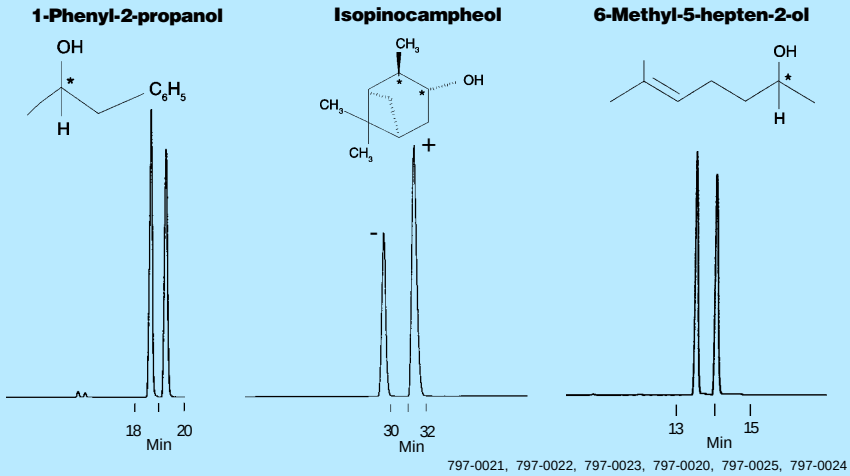
α — enantioselectivity

k_1' — retention factor for first peak (first peak indentified when known)

R_s — resolution factor

Figure A. Enantioseparation of Alcohols on a β-DEX 325 Column

Column: **β-DEX 325, 30m x 0.25mm ID, 0.25µm film**
Cat. No.: **24308**
Oven: 110°C, 1-phenyl-2-propanol; 100°C, isopinocampheol; and 90°C, 6-methyl-5-hepten-2-ol
Carrier: helium, 20cm/sec set at the analysis temperature
Det.: FID, 300°C
Inj.: 1µL methylene chloride (1mg/mL each analyte), split (100:1) 220°C



797-0021, 797-0022, 797-0023, 797-0020, 797-0025, 797-0024

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