GC COLUMNS

PRECIX Advanced Chromatography

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HAMILTON
THE MEASURE OF EXCELLENCE™

Don´t compromise your results!

With the GC column PRECIX you can expect the same outstanding quality as with our established products like the world-famous MICROLITER™ syringe.

Our quality assurance starts from the very beginning. Only the best fused silica tubing is chosen. The inner diameter has an extremely narrow tolerance. Then the capillaries are subjected to hydrothermal treatment. This is to ensure that the surface has a high and uniform density of silanol groups, which is critical for the subsequent manufacturing steps.

In the second step the surface is deactivated. The third step involves bonding and crosslinking. HAMILTON uses extremely pure polymers for its phases in order to ensure efficiency, reproducibility, stability and minimal bleed. The polymers are carefully fractionated so as to eliminate low molecular weight components and trace catalysts. This results in higher thermal stability and less bleed. Then these polymers are tested by means of spectroscopic (FTIR, UV, NMR) and chromatographic (GPC) techniques and by differential thermal analysis.

The crosslinking and bonding of the stationary phase is achieved by avoiding the use of peroxides, which are the cause of problems related to residual acidity in many columns on the market. After each manufacturing step every column is individually tested and is only processed further if it has passed our rigorous testing.

Our GC columns are intended for environmental analysis, quality control of food stuffs and many more applications thus making our world a bit safer.

HAMILTON is quality

All-Around-Protection™: Column is completely protected

We care for our customers in every respect. So we have invented the Secure-Lock™. The Secure-Lock™ prevents the column from falling out of the box even when it is bottom-up.

With a slight turn the column is released.

Columns of other manufacturers may fall down and break. So HAMILTON has invented a column cage with All-Around-Protection™.
With All-Around-Protection™ the column is protected by a sophisticated stainless steel cage from each side.

Secure-Lock™: Column in locked-position

Secure-Lock™: Column in release-position

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Phase Cross Reference

Maximum Efficiency

All manufacturing steps are optimised in order to be able to offer our customers columns of very high efficiency.

Maximum Reproducibility

When you select a HAMILTON column for your analyses you can be assured that each of the steps in the production process has been thoroughly controlled to ensure that there are no batch-to-batch variations. We make use of the maximum possible automation procedures. This translates into a high reproducibility of our columns.

Internal diameter (mm)	Theoretical Plates (N/m)
0.10	7.000 - 9.000
0.20	4.700 - 5.500
0.25	3.300 - 4.600
0.32	2.700 - 3.700
0.53	1.400 - 2.200

Wide Stationary Phase Selection

HAMILTON includes in this catalog a selection of capillary columns prepared with the stationary phases most commonly used in the field of gas chromatography (Table 1).

STATIONARY PHASE CROSS REFERENCE (Table 1)

HAMILTON	PHASE COMPOSITION	AGILENT	SUPELCO	RESTEK	VARIAN	SGE	ALLTECH	QUADREX	USP NOMENCLATURE
HB-1,HB-1ht,HB1ms, HB-Sulfur, HB-Petrol,HB-Petrol, HB.Pona,HB-2887	100% dimethylpolysiloxane	HP-1,HP101,ULTRA-1 DB-1,DB-1ht,DB-2887	SPB-1, EQUITY-1 SPB-1 SULFUR	Rtx-1,Rtx-2887	CP-SIL5CB CP-SIL5CBMS	BP-1	AT-1	007-1	G1,G2,G38
HB-5,HB-5ht,HB-5ms, HB-Sterol, HB-5Amine, HB-5.625,HB-G27	95%dimethyl-5%diphenyl polysiloxane	HP-5,ULTRA-2,DB-5 DB-5.625,DB-5ht, PAS-5	SPB-5.EQUITY-5 PTE-5.SAC-5, PTE-5QTM	Rtx-5,XTI-5, Rtx-5 MS	CP-SIL8CB	BP-5	AT-5	007-2	G27, G36
HB-5TA	95%dimethyl-5%diphenyl polysilphenylene	HP-5TA.DB-5MS	MDN-5	Rtx-5Sil MS	CP-SIL8CB LowBleed/MS	BPX-5	AT-5ms	007-5 MS	
HB-1301,HB-624, HB-G43	6% cyanopropylphenyl-94% dimethylpolysiloxane	HP-1301, HP-624 DB-1301, DB-624	SPB-1301 OVI- G43	Rtx-1301, Rtx-624		BPX-624	AT-624		G43
HB-13	14%diphenyl-86%dimethyl polysiloxane				CP-SIL13CB				
HB-20	20%diphenyl-80%dimethyl polysiloxane		SPB-20.VOCOL				AT-20	007-7	G28.G32
HB-35	35%diphenyl-65%dimethyl polysiloxane	HP-35.DB-35	SPB-35	Rtx-35		BPX-35, BPX-608	AT-35	007-11	G42
HB-1701	14% cyanopropylphenyl-86% dimethyl polysiloxane	HP-1701.PAS-1701 DB-1701	SPB-1701	Rtx-1701	CP-SIL19CB	BP-10	AT-1701	007-1701	
HB-225	50% cyanopropylphenyl-50% dimethyl polysiloxane	HP-225.DB-225		Rtx-225	CP-SIL43CB	BP-225	AT-225	007-225	G7.G19
HB-PAG	50% polyethylene-50% polypropylene qlycol		PAG						
HB-FFAP	treated polyethylene glycol for acidic compounds	HP-FFAP.DB-FFAP	NUKOL.SP-1000	STABILWAX-DB	CP-WAX58CB	BP-21	AT-1000. FFAP	007-FFAP	G25.G35
HB-50	50% diphenyl-50%dimethyl polysiloxane	HP-50+,DB-17, DB-608	SPB-50. SPB-2250	Rtx-50	CP-SIL24CB		AT-50	007-17	G3
HB-50ht	50% diphenyl-50%dimethyl polysiloxane	DB17ht		Rtx-65	TAB-CB			007-65HT	G17
HB-210	50% trifluoropropyl 50% methyl polysiloxane	DB-210.DB-200		Rtx-200			AT-210	007-210	G6
HB-Wax	100% polyethylene glycol	HP-20M.INNOWAX DB-WAX, DB-WAXetr	SUPELCOWAX 10 Carbowax 20M	STABILWAX	CP-WAX52CB	BP-20	AT-WAX	007-CW	G14,G15,G16, G20.G39
HB-BasicWax	treated polyethylene glycol for basic compounds	CAM,HP-BasicWax	Carbowax-Amine		CP-WAX51CB				
HB-2340	100%polyethylene glycol	HP-WAX, DB-WAX			CP-WAX57CB				
HB-OmegaWax	100%polyethylene glycol		OMEGAWAX	FAMEWAX					
HB-2340	100%biscyanopropyl polysiloxane		SP-2340	Rt-2340	CP-SIL88				
HB-Cresol	proprietary nonbonded phase				CP-CRESOL				
HB-17	50%diphenyl-50%dimethyl polysiloxane	HP-17							G3
HB-VOC	proprietary bonded phase	DB-502.2,HP-VOC	VOCOL	Rtx-502.2					
HB-608	proprietary bonded phase	HP-608	SPB-608			BP-608			
HB-TCEP	1,2,3-tris(cyanoethoxy)propane		TCEP	Rt-TCEP	CP-TCEP				

USP Capillary Column Equivalents

USP CODE	GENERAL DESCRIPTION	HAMILTON RECOMMENDED CAPILLARY EQUIVALENT
G1	Dimethylpolysiloxane oil	HB-1, HB-1ms
G2	Dimethylpolysiloxane gum	HB-1, HB-1ms
G3	50%Phenyl-50%methylpolysiloxane	HB-50
G5	3-Cyanopropylsiloxane	HB-2340
G8	90%-3-Cyanopropyl-10%phenylmethylsiloxane	HB-2340
G9	Methylvinylpolysiloxane	HB-1, HB-1ms
G14	Polyethylene glycol (MW = 951-1050)	HB-20Wax
G15	Polyethylene glycol (MW = 3000-3070)	HB-20Wax
G16	Polyethylene glycol (MW = 15000)	HB-20Wax
G19	25%Phenyl-25%cyanopropylmethylsiloxane	HB-225
G20	Polyethylene glycol (MW = 380-420)	HB-Wax
G25	Polyethylene glycol TPA	HB-FFAP
G27	5%Phenyl-95%methylpolysiloxane	HB-5, HB-5ms, HB-5TA
G28	25%Phenyl-75%dimethylpolysiloxane	HB-20
G32	20%Phenylmethyl-80%dimethylpolysiloxane	HB-20
G35	Polyethylene glycol with Nitroterephthalic acid	HB-FFAP
G36	1%Vinyl-5%phenylmethylpolysiloxane	HB-5, HB-5ms, HB-5TA
G39	Polyethylene glycol (MW=1500)	HB-20Wax
G42	35%Diphenyl-65%dimethylpolysiloxane	HB-35
G43	6%Cyanopropylphenyl-94%dimethylpolysiloxane	HB-624, HB-1301, HB-G43
G46	14%Cyanopropylphenyl-86%dimethylpolysiloxane	HB-1701

EPA Drinking Water Test Methods

EPA METHOD	APPLICATION	RECOMMENDED HAMILTON CAPILLARY COLUMN		P/N
501.3	Trihalomethanes by GC/MS and SIM	HB-624	30m x 0.53mm x 3.0 µm	204733
		HB-624	75m x 0.53mm x 3. µm	204734
		HB-624	105m x 0.53mm x 3.0 µm	205462
		HB-624	30m x 0.25mm x 1.0 µm	204737
502.2	Volatile halogenated organics in water by purge & trap GC/PID/ELCD	HB-624	30m x 0.53mm x 3.0 µm	204733
503.1	Volatile aromatics & unsaturated organics	HB-624	30m x 0.53mm x 3.0 µm	204733
	By purge & trap GC	HB-624	30m x 0.25mm x 1.4 µm	205459
504.1	1,2-Dibromoethane (EDB), 1,2-Dibromo-3-chloropropane (DBCP), and 1,2,3-Trichloropropane (123TCP) by GC/MS	HB-1	30m x 0.32mm x 0.25 µm	204658
		HB-624	30m x 0.53mm x 3.0 µm	204733
		HB-624	30m x 0.25mm x 1.4 µm	205459
505	Organohalide pesticides & aroclors by GC/ECD	HB-1	30m x 0.32mm x 1.0 µm	204660
		HB-50	30m x 0.32mm x 0.5 µm	205364
		HB-50	30m x 0.25mm x 0.25 µm	204784
507	Nitrogen & phosphorous containing pesticides in water by GC/NPD	HB-5	30m x 0.25mm x 0.25 µm	204681
		HB-5ms	30m x 0.25mm x 0.25 µm	204698
		HB-1701	30m x 0.25mm x 0.25 µm	204751
508	Chlorinated pesticides in water by GC/MS	HB-5	30m x 0.25mm x 0.25 µm	204681
		HB-5ms	30m x 0.25mm x 0.25 µm	204698
		HB-1701	30m x 0.25mm x 0.25 µm	204751
513	2,3,7,8-Tetrachlorodibenzo-p-dioxin by GC/MS	HB-5ms	60m x 0.25mm x 0.10 µm	205394
515.2	Determination of chlorinated acids in water using liquid-solid extraction & GC/ECD	HB-1	30m x 0.32mm x 0.25 µm	204658
		HB-5	30m x 0.32mm x 0.25 µm	204686
		HB-1701	30m x 0.32mm x 0.25 µm	204753
		HB-5ms	30m x 0.32mm x 0.25 µm	205398
524.2	Measurement of purgeable organic compounds in water by purge & trap capillary column GC/MS	HB-624	30m x 0.25mm x 1.4 µm	205459
		HB-624	30m x 0.53mm x 3.0 µm	204733
		HB-624	75m x 0.53mm x 3.0 µm	204734
		HB-624	60m x 0.32mm x 1.8 µm	205460
525	Organic compounds in drinking water by liquid-solid extraction and capillary column GC/MS	HB-5	30m x 0.32mm x 0.25 µm	204686
		HB-5ms	30m x 0.25mm x 0.25 µm	204698

EPA Solid Waste Test Methods

EPA METHOD	APPLICATION	RECOMMENDED HAMILTON CAPILLARY COLUMN		P/N
8010	Halogenated volatile organics	HB-624	75m x 0.53mm x 3.0 µm	204734
		HB-624	30m x 0.25mm x 1.4 µm	205459
8015	Non-halogenated volatile organics	HB-624	30m x 0.53mm x 3.0 µm	204733
		HB-624	30m x 0.25mm x 1.4 µm	205459
8020/8021	Aromatic volatile organics	HB-624	30m x 0.53mm x 3.0 µm	204733
		HB-624	30m x 0.25mm x 1.4 µm	205459
8030/8031	Acrolein, acrylonitrile, acetonitrile	HB-624	30m x 0.53mm x 3.0 µm	204733
		HB-624	30m x 0.25mm x 1.4 µm	205459
8040/8041	Phenols	HB-5	30m x 0.53mm x 1.5 µm	204694
		HB-5ms	30m x 0.25mm x 0.25 µm	204698
8060/8061	Phthalate esters	HB-1	15m x 0.53mm x 1.5 µm	205076
		HB-1ms	30m x 0.25mm x 0.4 µm	205591
8080	Organochlorine pesticides and PCBs	HB-5	30m x 0.53mm x 1.5 µm	204694
		HB-5ms	30m x 0.25mm x 0.5 µm	205592
8081/8082	Organochlorine pesticides and PCBs as Aroclor	HB-5	30m x 0.53mm x 1.5 µm	204694
		HB-1701	30m x 0.53mm x 1.0 µm	204757
8090/8091	Nitroaromatics and cyclics ketones	HB-5	30m x 0.53mm x 1.5 µm	204694
		HB-5ms	30m x 0.25mm x 0.5 µm	205593
8100	Polynuclear aromatic hydrocarbons	HB-5	30m x 0.32mm x 0.25 µm	204686
		HB-5ms	30m x 0.32mm x 0.25 µm	205398
8120/8121	Chlorinated hydrocarbons	HB-1	30m x 0.32mm x 1.0 µm	204660
		HB-1ms	30m x 0.32mm x 1.0 µm	205594
8140	Organophosphorus pesticides	HB-1	30m x 0.32mm x 1.5 µm	204669
		HB-1701	30m x 0.53mm x 1.0 µm	204757
		HB-1	30m x 0.25mm x 0.25 µm	204653
8141	Organophosphorous pesticides	HB-5	15m x 0.53mm x 1.5 µm	204691
		HB-5ms	15m x 0.25mm x 0.25 µm	205396
8150/8151	Chlorinated herbicides	HB-5	25m x 0.53mm x 1.0 µm	205595
		HB-1701	30m x 0.53mm x 1.0 µm	204757
		HB-5ms	15m x 0.25mm x 0.25 µm	204698
8240	GC/MS for volatile organics	HB-624	30m x 0.53mm x 3.0 µm	204733
		HB-624	75m x 0.53mm x 3.0 µm	204734
		HB-624	105m x 0.53mm x 3.0 µm	205462
		HB-624	30m x 0.25mm x 1.0 µm	204737
8250	GC/MS for semi-volatile organics	HB-5ms	30m x 0.25mm x 0.5 µm	205596
8260	GC/MS for volatile organics capillary techniques	HB-624	30m x 0.53mm x 3.0 µm	204733
		HB-624	75m x 0.53mm x 3.0 µm	204734
		HB-624	105m x 0.53mm x 3.0 µm	205462
		HB-624	30m x 0.25mm x 1.0 µm	204737

EPA Waste Water Test Methods

EPA Solid Waste Test Methods (Cont.)

EPA METHOD	APPLICATION	RECOMMENDED HAMILTON CAPILLARY COLUMN		P/N
8270	GC/MS for semi-volatile organics capillary techniques	HB-5	30m x 0.25mm x 1.0 µm	204682
		HB-5ms	30m x 0.25mm x 1.0 µm	205408
8280	Analysis of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans	HB-5	30m x 0.25mm x 0.25 µm	204681
		HB-5	60m x 0.25mm x 0.25 µm	205394

EPA Waste Water Test Methods

EPA METHOD	APPLICATION	RECOMMENDED HAMILTON CAPILLARY COLUMN		P/N
601	Purgeable halocarbons	HB-624	30m x 0.53mm x 3.0 µm	204733
		HB-624	75m x 0.53mm x 3.0 µm	204734
		HB-624	105m x 0.53mm x 3.0 µm	205462
		HB-1301	30m x 0.25mm x 1.0 µm	204737
602	Purgeable aromatics	HB-624	30m x 0.53mm x 3.0 µm	204733
		HB-624	105m x 0.53mm x 3.0 µm	205462
		HB-1301	30m x 0.25mm x 1.0 µm	204737
603	Acrolein and acylonitrile	HB-624	30m x 0.53mm x 3.0 µm	204733
		HB-1301	30m x 0.25mm x 1.0 µm	204737
604/605	Phenols amd benzidines	HB-5ms	30m x 0.53mm x 1.4 µm	205597
		HB-5ms	30m x 0.25mm x 0.25 µm	204698
606	Phthalate esters	HB-5	15m x 0.53mm x 1.5 µm	204691
		HB-5ms	30m x 0.25mm x 0.25 µm	204698
606	Phthalate esters	HB-5	15m x 0.53mm x 1.5 µm	204691
		HB-5ms	30m x 0.25mm x 0.25 µm	204698
607	Nitrosamines	HB-5	30m x 0.53mm x 1.5 µm	204694
		HB-5ms	30m x 0.25mm x 0.50 µm	205592
608	Organochlorine pesticides and PCBs	HB-5	50m x 0.53mm x 1.0 µm	205599
		HB-5ms	50m x 0.25mm x 0.12 µm	205600
609	Nitroaromatics and isophorone	HB-5	30m x 0.53mm x 1.5 µm	204694
		HB-5ms	30m x 0.25mm x 0.5 µm	205601
610	Polycyclic aromatic hydrocarbons	HB-5	30m x 0.32mm x 0.25 µm	204686
		HB-5ms	30m x 0.32mm x 0.10 µm	205393
611	Haloethers	HB-5	15m x 0.53mm x 1.5 µm	204691
		HB-5ms	30m x 0.25mm x 0.50 µm	205601
612	Chlorinated hydrocarbons	HB-5	30m x 0.32mm x 1.0 µm	204688
		HHB-5ms	30m x 0.25mm x 1.0 µm	205408
613	2,3,7,8-Tetrachlorodibenzo-p-dioxin	HB-5ms	60m x 0.25mm x 0.10 µm	205394

EPA Waste Water Test Methods

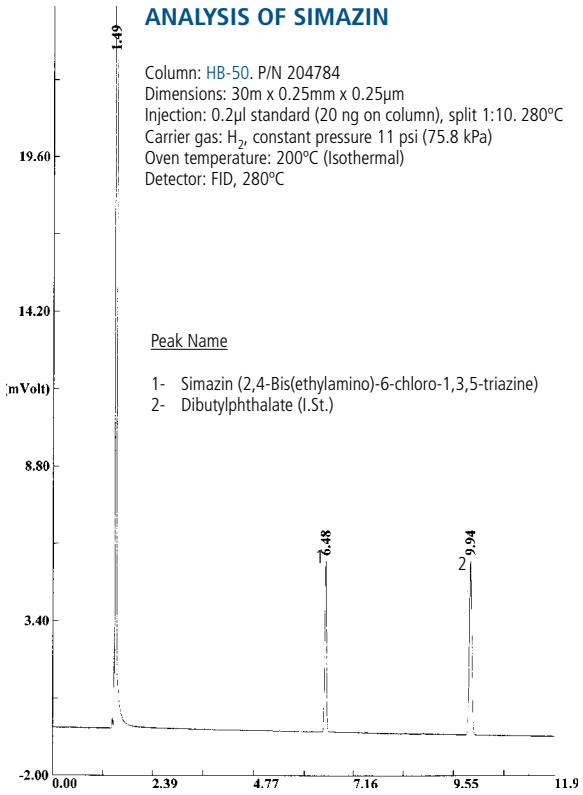
EPA METHOD	APPLICATION	RECOMMENDED HAMILTON CAPILLARY COLUMN		P/N
615	Chlorinated herbicides	HB-1701	30m x 0.53mm x 1.0 µm	204757
		HB-1701	30m x 0.25mm x 0.25 µm	204751
619	Triazine herbicides	HB-50	30m x 0.53mm x 1.0 µm	205369
		HB-50	30m x 0.25mm x 0.50 µm	205363
624	Purgeables	HB-624	30m x 0.53mm x 3.0 µm	204733
		HB-624	75m x 0.53mm x 3.0 µm	204734
		HB-624	105m x 0.53mm x 3.0 µm	205462
		HB-624	30m x 0.25mm x 1.4 µm	205459
625	Base/neutrals and acids	HB-5ms	30m x 0.32mm x 0.25 µm	205398
		HB-1ms	30m x 0.25mm x 0.25 µm	204676
680	Pesticides and PCBs in water and soil/sediment	HB-5	30m x 0.32mm x 0.25 µm	204686
		HB-5ms	30m x 0.32mm x 0.25 µm	205398
1624	Volatile organic compounds by isotope dilution GC/MS	HB-624	30m x 0.53mm x 3.0 µm	204733
		HB-624	30m x 0.25mm x 1.4 µm	205459
1625	Semivolatile organic compounds by isotope dilution	HB-5	30m x 0.25mm x 0.25 µm	204681
		HB-5ms	30m x 0.25mm x 0.25 µm	204698
1653	Chlorinated phenols in waste water by in-situ MS acylation and GC low bleed/MS	HB-5	30m x 0.32mm x 0.25 µm	204686
		HB-5ms	30m x 0.32mm x 0.25 µm	205398

Index GC Applications

Chemical, Biological & Industrial Applications

ANALYSIS OF SIMAZIN

Column: HB-50. P/N 204784
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 0.2µl standard (20 ng on column), split 1:10. 280°C
Carrier gas: H_2, constant pressure 11 psi (75.8 kPa)
Oven temperature: 200°C (Isothermal)
Detector: FID, 280°C

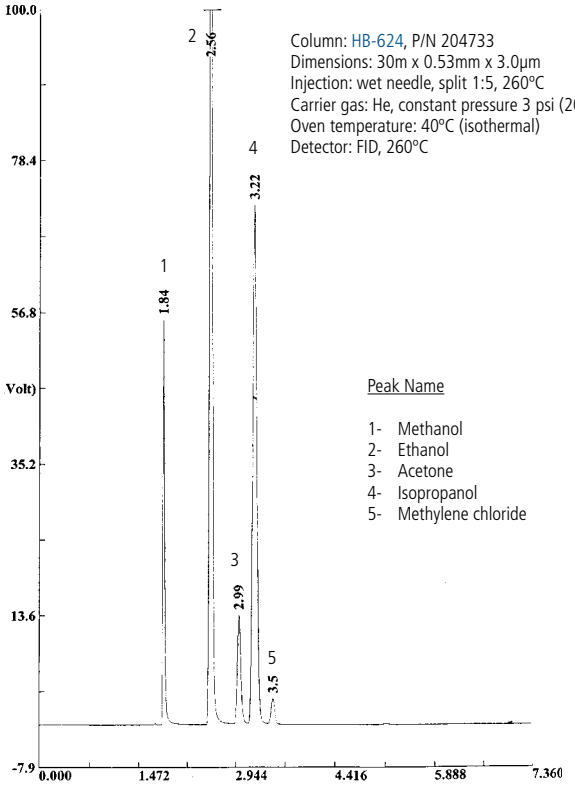


Peak Name

1- Simazin (2,4-Bis(ethylamino)-6-chloro-1,3,5-triazine)
2- Dibutylphthalate (I.St.)

SOLVENTS

Column: HB-624, P/N 204733
Dimensions: 30m x 0.53mm x 3.0µm
Injection: wet needle, split 1:5, 260°C
Carrier gas: He, constant pressure 3 psi (20.7 kPa).
Oven temperature: 40°C (isothermal)
Detector: FID, 260°C



Peak Name

1- Methanol
2- Ethanol
3- Acetone
4- Isopropanol
5- Methylene chloride

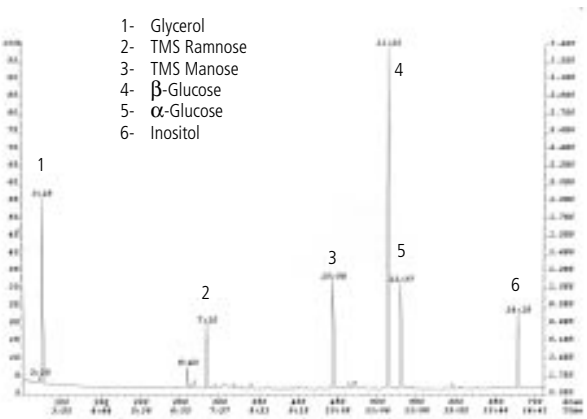
TRIMETHYLSILYL DERIVATIVES OF METHYLGLYCOSIDES FROM BACTERIOLOGICAL POLYSACCHARIDES

Column: HB-1, P/N 204651
Dimensions: 25m x 0.25mm x 0.25µm
Injection: 1µl, split1:3, 250°C
Carrier gas: He, constant pressure 10 psi (69 kPa).
Oven program: 140°C(2min) @ 8°C/min to 280°C(30min)
Detector: MS, 300°C

Chromatogram provided by Antonio Gil of Department of Organic Chemistry. CSIC (Sevilla)

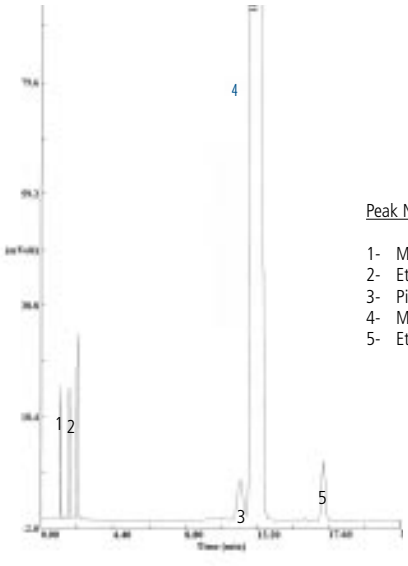
Peak Name

1- Glycerol
2- TMS Ramnose
3- TMS Manose
4- β-Glucose
5- α-Glucose
6- Inositol



IMPURITIES OF METHYL PIVALATE

Column: HB-5TA, P/N 204763
Dimensions: 30m x 0.53mm x 5.0µm
Injection: 0.5 µl Methyl Pivalate (+ 0.1% of each impurity), split 1:25, 250°C
Carrier gas: H_2, constant pressure, 2.5 psi (17.23 kPa).
Oven program: 40°C(10min) @ 5°C/min to 130°C
Detector: FID, 280°C



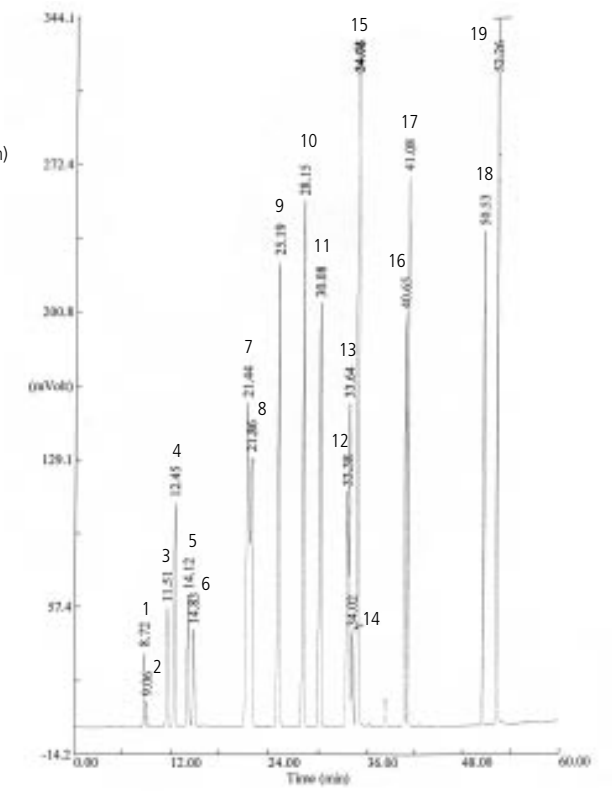
Peak Name

1- Methanol
2- Ethanol
3- Pinacolone
4- Methyl Pivalate
5- Ethyl Pivalate

Chemical, Biological & Industrial Applications

ANALYSIS OF SOLVENTS

Column: HB-20Wax, P/N 204718
Dimensions: 60m x 0.53mm x 2.0µm
Injection: wet needle, split, 250°C
Carrier gas: H_2, constant pressure 4 psi (27.6 kPa).
Oven program: 55°C(20min) @ 3°C/min to 220°C(15min)
Detector: FID, 260°C

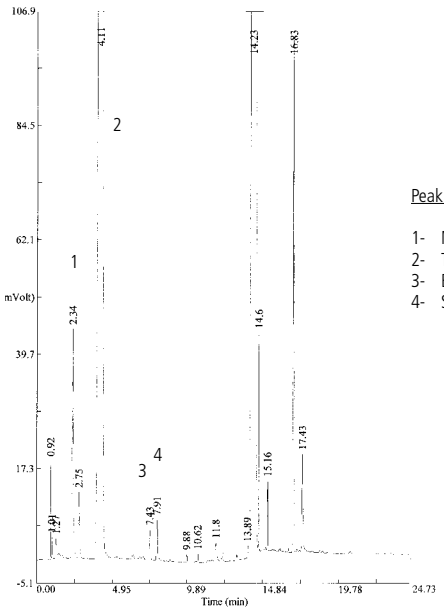


Peak Name

1- Acetone
2- Methyl acetate
3- Ethyl acetate
4- Methanol + MEK
5- Isopropanol
6- Ethanol
7- MIKB
8- Methoxypropyl acetate
9- Isobutyl acetate
10- Toluene
11- Methoxypropanol
12- n-butyl acetate
13- Isobutanol
14- n-Butanol
15- p,m-Xylenes
16- o-Xylene
17- Ethylglycol
18- Diacetone alcohol
19- Butyl glycol

SEPARATION OF MONOMERS IN PAINTS

Column: HB-Wax P/N 204777
Dimensions: 30m x 0.53mm x 1.0µm
Injection: 1µl Monomers mixture (20ppm, 100ppm toluene in DMSO), split 1:50. 240°C
Carrier gas: He, 4 psi (27.6 kPa)
Oven temperature: 40°C(5min) @ 15°C/min to 180°C(15min)
Detector: FID, 240°C

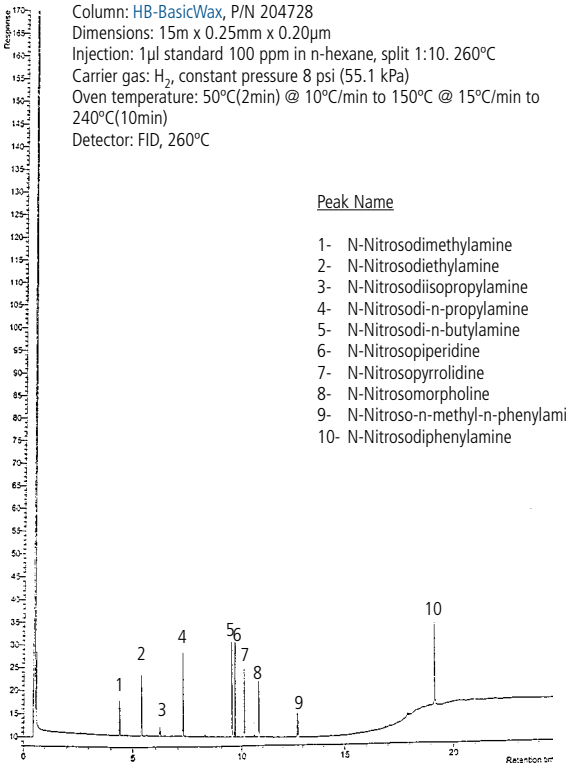


Peak Name

1- Methyl acrylate
2- Toluene
3- Butyl acrylate
4- Styrene

SEPARATION OF NITROSOAMINES

Column: HB-BasicWax, P/N 204728
Dimensions: 15m x 0.25mm x 0.20µm
Injection: 1µl standard 100 ppm in n-hexane, split 1:10. 260°C
Carrier gas: H_2, constant pressure 8 psi (55.1 kPa)
Oven temperature: 50°C(2min) @ 10°C/min to 150°C @ 15°C/min to 240°C(10min)
Detector: FID, 260°C



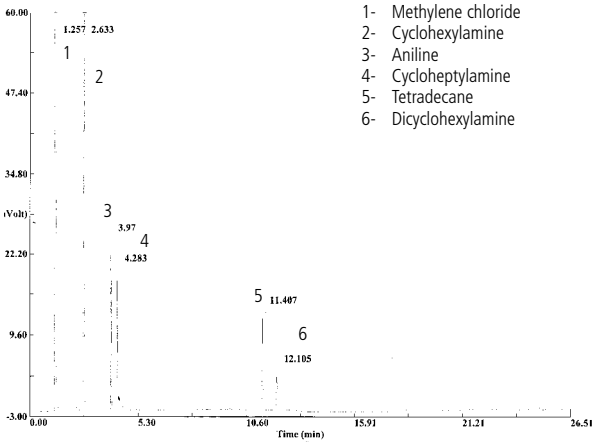
Peak Name

1- N-Nitrosodimethylamine
2- N-Nitrosodiethylamine
3- N-Nitrosodiisopropylamine
4- N-Nitrosodi-n-propylamine
5- N-Nitrosodi-n-butylamine
6- N-Nitrosopiperidine
7- N-Nitrosopyrrolidine
8- N-Nitrosomorpholine
9- N-Nitroso-n-methyl-n-phenylamine
10- N-Nitrosodiphenylamine

Chemical, Biological & Industrial Applications

SODIUM CYCLAMATE IMPURITIES

Column: HB-5Amine, P/N 204773
Dimensions: 30m x 0.32mm x 0.5µm
Injection: 1µL (50-500 ppm), split 1:15, 280ºC
Carrier gas: He, constant pressure 17 psi (117.1 kPa)
Oven program: 85ºC (1 min)@ 8ºC/min to 150ºC(10min) @ 30ºC/min to 220ºC(5min)
Detector: FID, 280ºC

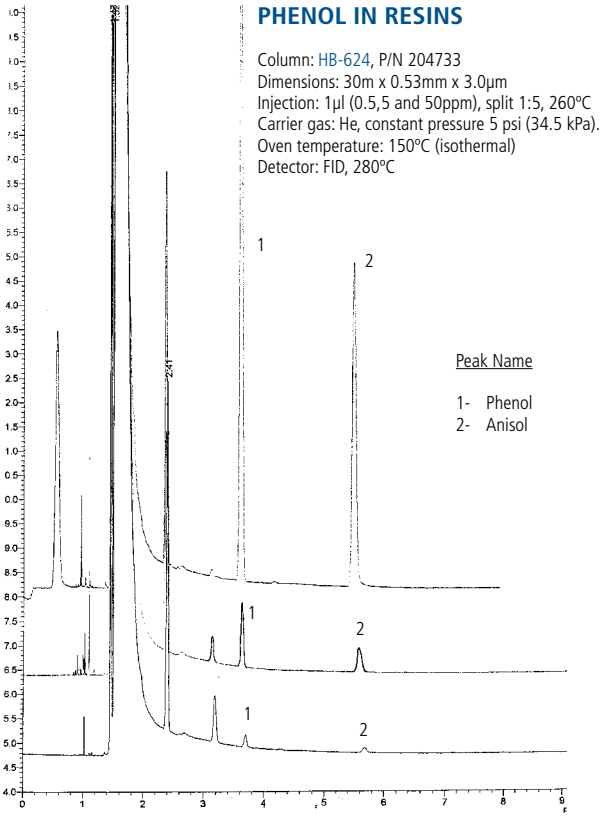


Peak Name

1- Methylene chloride
2- Cyclohexylamine
3- Aniline
4- Cycloheptylamine
5- Tetradecane
6- Dicyclohexylamine

PHENOL IN RESINS

Column: HB-624, P/N 204733
Dimensions: 30m x 0.53mm x 3.0µm
Injection: 1µl (0.5,5 and 50ppm), split 1:5, 260ºC
Carrier gas: He, constant pressure 5 psi (34.5 kPa).
Oven temperature: 150ºC (isothermal)
Detector: FID, 280ºC

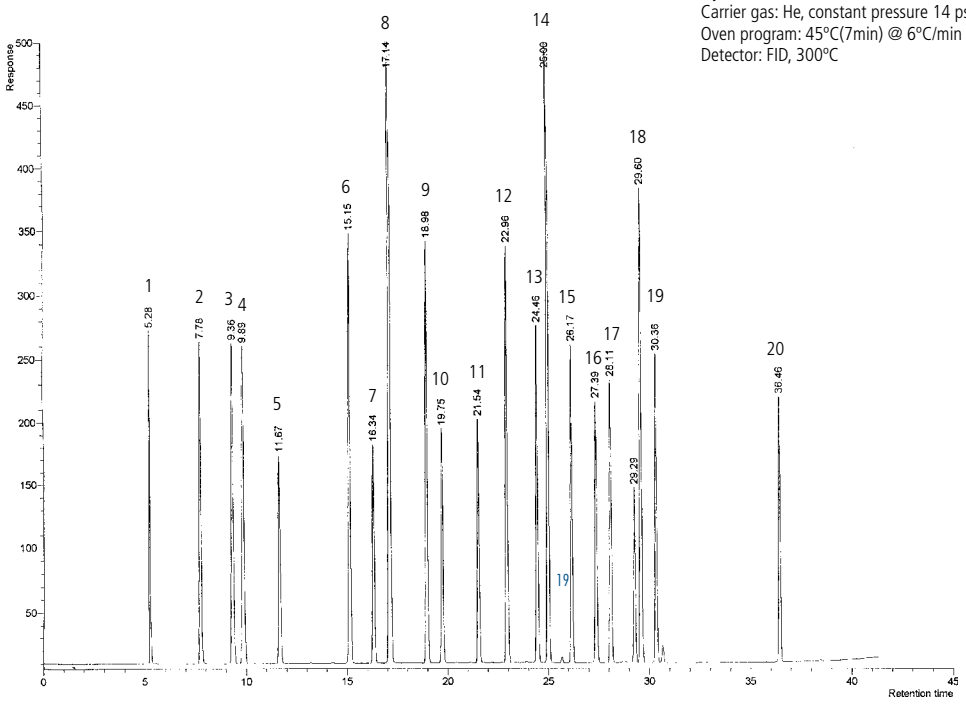


Peak Name

1- Phenol
2- Anisol

SEPARATION OF SOLVENTS

Column: HB-1, P/N 204664
Dimensions: 60m x 0.32mm x 5.0µm
Injection: wet needle (solvent mixture), split 1:100. 280ºC
Carrier gas: He, constant pressure 14 psi (96.5 kPa).
Oven program: 45ºC(7min) @ 6ºC/min to 260ºC(5min)
Detector: FID, 300ºC



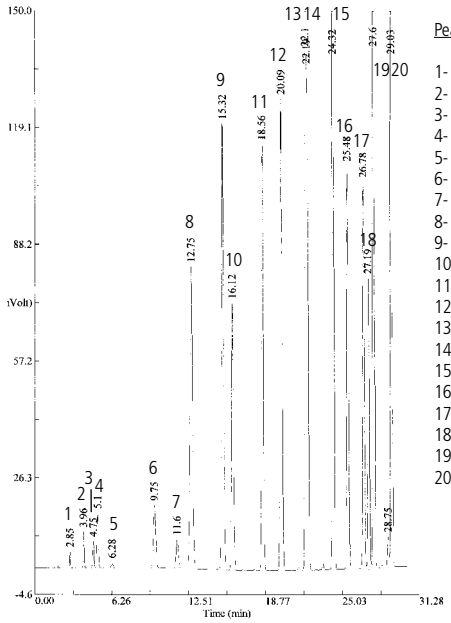
Peak Name

1- Methanol
2- Ethanol
3- Acetone
4- Isopropanol
5- Methyl acetate
6- Methylethyl ketone
7- Ethyl acetate
8- n-Butanol
9- Isobutanol
10- 2-Methoxypropanol
11- Ethyleneglycol
12- Methyl isobutyl ketone
13- Isobutyl acetate
14- Toluene
15- Butyl acetate
16- Diacetone alcohol
17- 2-Methoxypropanol acetate
18- Xylene
19- Butyl glycol
20- Butyl glycol acetate

Chemical, Biological & Industrial Applications

SEPARATION OF SOLVENTS

Column: HB-1, P/N 204675
Dimensions: 60m x 0.53mm x 5.0µm
Injection: 0.1µl solvent mix, split, 250°C
Carrier gas: H_2, constant pressure 6.5 psi (45 kPa).
Oven program: 40°C (10min) @ 5°C/min to 200°C(15min)
Detector: FID, 280°C

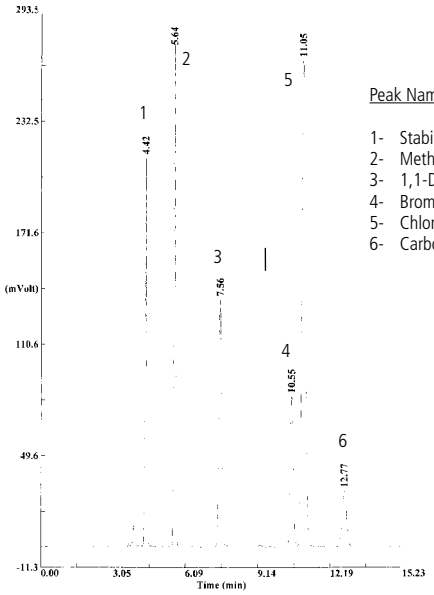


Peak Name

1- Methanol
2- Ethanol
3- Acetone
4- Isopropanol
5- Methyl acetate
6- Methylethyl ketone
7- Ethyl acetate
8- Isobutanol
9- n-Butanol
10- 2-Methoxypropanol
11- Ethyl glycol
12- Methyl isobutyl ketone
13- Isobutyl acetate
14- Toluene
15- Butyl acetate
16- Diacetone alcohol
17- p,m-Xylenes
18- o-Xylene
19- AMP
20- Butyl glycol

CHLOROFORM IMPURITIES

Column: HB-624, P/N 204733
Dimensions: 30m x 0.53mm x 3.0µm
Injection: 1µl chloroform, split 5:1, 150°C
Carrier gas: He, constant pressure 3 psi (20.7 kPa)
Oven temperature: 35°C (isothermal)
Detector: FID, 200°C

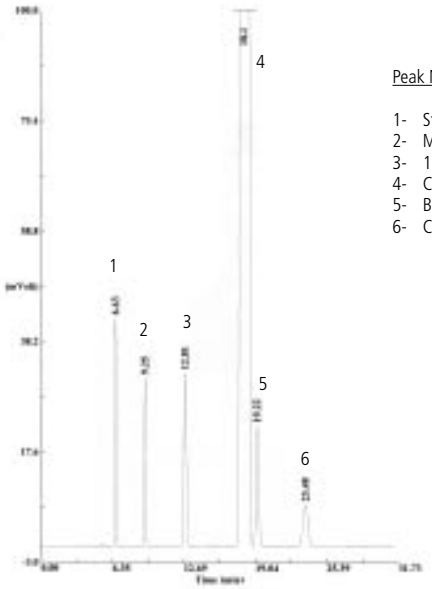


Peak Name

1- Stabilizer
2- Methylene chloride
3- 1,1-Dichloroethane
4- Bromochloromethane
5- Chloroform
6- Carbon tetrachloride

CHLOROFORM IMPURITIES

Column: HB-VOC, P/N 204722
Dimensions: 30m x 0.53mm x 3.0µm
Injection: 1µl chloroform , split, 5:1, 150°C
Carrier gas: He, constant pressure 2 psi (13.8 kPa), 19.53 cm/s (30°C)
Oven program: 30°C (isothermal)
Detector: FID, 200°C



Peak Name

1- Stabilizer
2- Methylene chloride
3- 1,1 Dicholoroethane
4- Chloroform
5- Bromochloromethane
6- Carbon tetrachloride

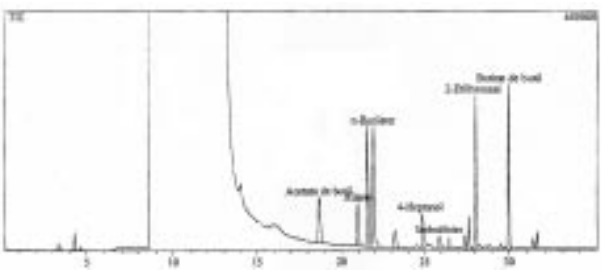
IMPURITIES OF n-BUTANOL

Column: HB-5, P/N 204681
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1µl n-Butanol, split 1:20. 250°C
Carrier gas: He, constant flow 1 mL/min
Oven temperature: 40°C @ (5min) @ 4°C/min to 200°C @ 15°C/min to 300°C
Detector: MS, 280°C (interphase)

Chromatogram provided by F. Sisteré of IUCT

Peak Name

1- Butyl acetate
2- Xylene
3- n-Butylether
4- 4-Heptanol
5- Isobutylether
6- 2-Ethylhexanal
7- Butyl butyrate



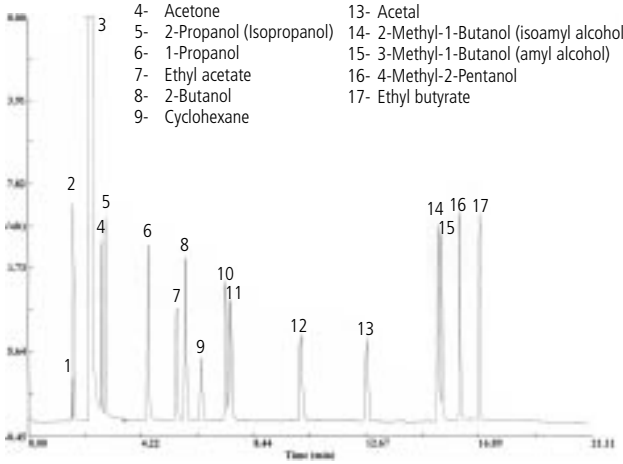
Chemical, Biological & Industrial Applications

ALCOHOL IMPURITIES

Column: HB-624, P/N 204732
Dimensions: 30m x 0.32mm x 1.8µm
Injection: 0.5µl standard in Ethanol/H2O (96:4), split 1:5, 260°C
Carrier gas: He, constant pressure 6.8 psi (46.9 kPa).
Oven temperature: 40°C(12min) @ 10°C/min to 200°C(10min)
Detector: FID, 260°C

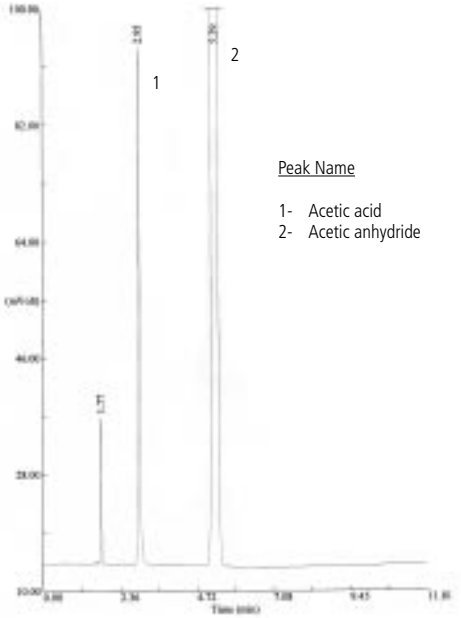
Peak Name

1- Acetaldehyde
2- Methanol
3- Ethanol
4- Acetone
5- 2-Propanol (Isopropanol)
6- 1-Propanol
7- Ethyl acetate
8- 2-Butanol
9- Cyclohexane
10- Benzene
11- Isobutanol
12- 1-Butanol
13- Acetal
14- 2-Methyl-1-Butanol (isoamyl alcohol)
15- 3-Methyl-1-Butanol (amyl alcohol)
16- 4-Methyl-2-Pentanol
17- Ethyl butyrate



SEPARATION OF ACETIC ACID AND ACETIC ANHYDRIDE

Column: HB-1, P/N 204672
Dimensions: 30m x 0.53mm x 5.0µm
Injection: wet needle (solvent mixture), split 1:100. 200°C
Carrier gas: H_2, constant pressure 3 psi (20.7 kPa).
Oven program: 90°C
Detector: FID, 260°C

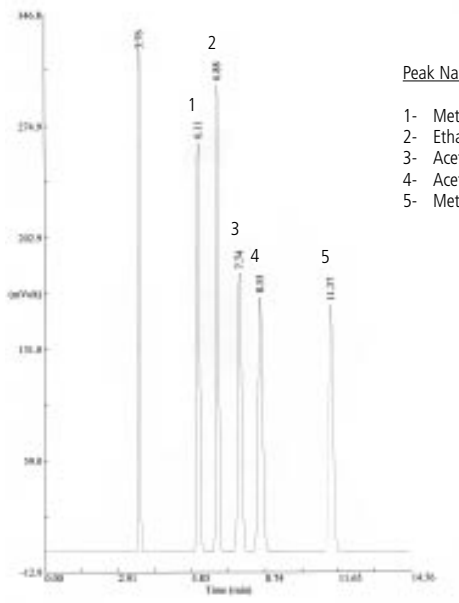


Peak Name

1- Acetic acid
2- Acetic anhydride

SEPARATION OF SOLVENTS

Column: HB-1, P/N 204674
Dimensions: 60m x 0.53mm x 7.0µm
Injection: wet needle (solvent mixture), split 1:100. 260°C
Carrier gas: He, constant pressure 6 psi (41.3 kPa).
Oven program: 32°C (isothermal)
Detector: FID, 260°C



Peak Name

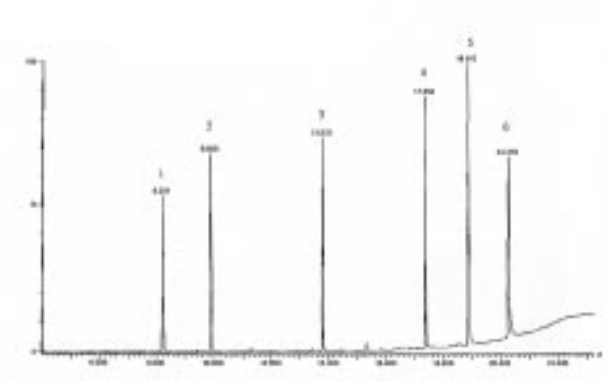
1- Methanol
2- Ethanol
3- Acetone
4- Acetonitrile
5- Methylene chloride

SEPARATION OF PAE (PHTHALATE ALKYL ESTER) MIX EPA

Column: HB-5TA, P/N 204759
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1 µl standard (7.1ng/g in Hexane), 250°C
Carrier gas: H_2, constant pressure 12 psi (82.7 kPa).
Oven temperature: 100°C(1min) @ 10°C/min to 310°C(5min)
Detector: FID, 310°C

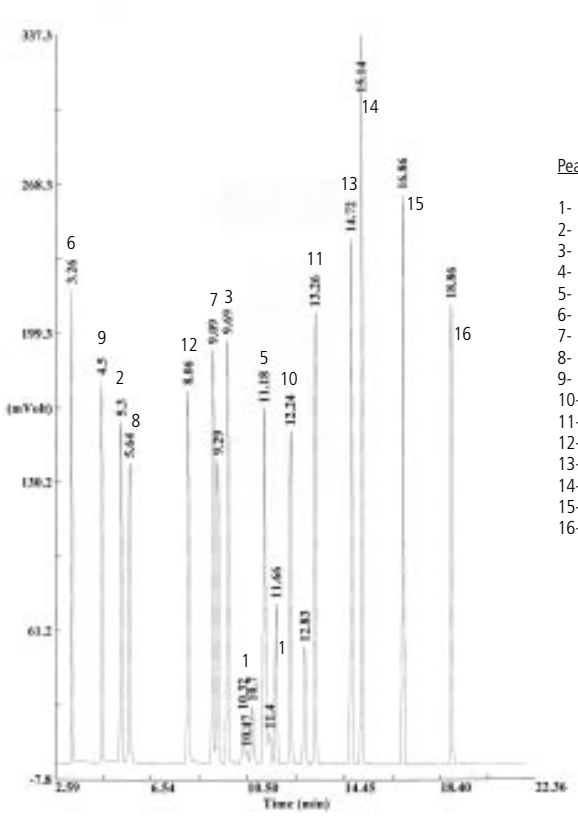
Peak Name

1- Dimethyl phthalate
2- Diethyl phthalate
3- Di-n-Butyl phthalate
4- Butyl benzyl phthalate
5- Bis-2-Ethylhexyl phthalate
6- Dioctyl phthalate



SEPARATION OF SOLVENTS

Column: HB-624, P/N 204734
Dimensions: 75m x 0.53mm x 3.0µm
Injection: 0.2µl, split 1:5, 260°C
Carrier gas: H_2, constant pressure 7.8 psi (53.74 kPa).
Oven temperature: 40°C(5min) @ 7°C/min to 240°C
Detector: FID, 280°C



Peak Name

1- Heptane
2- Acetone
3- Tetrahydrofurane
4- Ethyl acetate
5- Isopropyl acetate
6- Methanol
7- MEK
8- Isopropanol
9- Ethanol
10- n-Propyl acetate
11- MIBK
12- n-Propanol
13- Toluene
14- Butyl acetate
15- Methoxypropanol
16- Methoxypropyl acetate

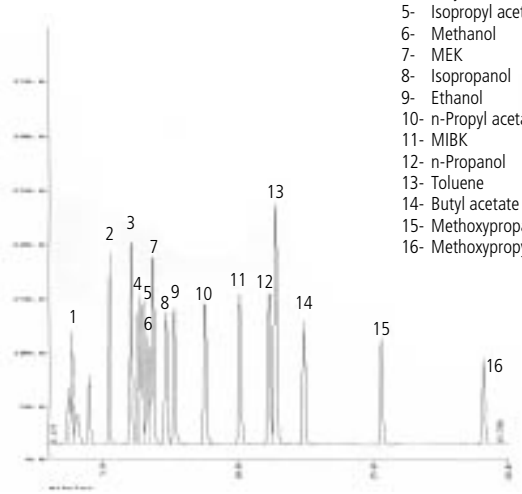
SEPARATION OF SOLVENTS

Column: HB-20Wax, P/N 204709
Dimensions: 50m x 0.32mm x 1.2µm
Injection: 1 µl standard (500 ng/mL comp.), split 1:25, 260°C
Carrier gas: He, constant pressure 12 psi (82.7 Kpa)
Oven temperature: 65°C(7min) @ 4°C/min to 117°C
Detector: FID, 260°C

Chromatogram provided by
Jaume Piedrabuena of Danisco

Peak Name

1- Heptane (isomers mixture)
2- Acetone
3- Tetrahydrofurane
4- Ethyl acetate
5- Isopropyl acetate
6- Methanol
7- MEK
8- Isopropanol
9- Ethanol
10- n-Propyl acetate
11- MIBK
12- n-Propanol
13- Toluene
14- Butyl acetate
15- Methoxypropanol
16- Methoxypropyl acetate

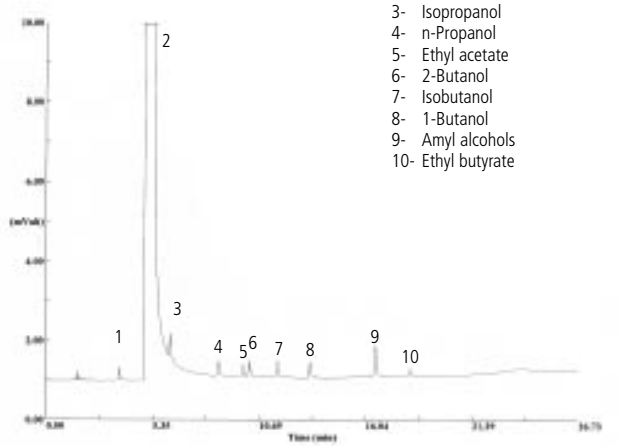


IMPURITIES OF ETHANOL

Column: HB-G43, P/N 204738
Dimensions: 30m x 0.53mm x 3.0µm
Injection: 1µl standard alcohols (20 ppm/comp), split 1:5, 200°C
Carrier gas: He, constant pressure 2.6 psi (17.9 kPa).
Oven temperature: 42°C(4min) @ 5°C/min to 140°C(4min)
Detector: FID, 200°C

Peak Name

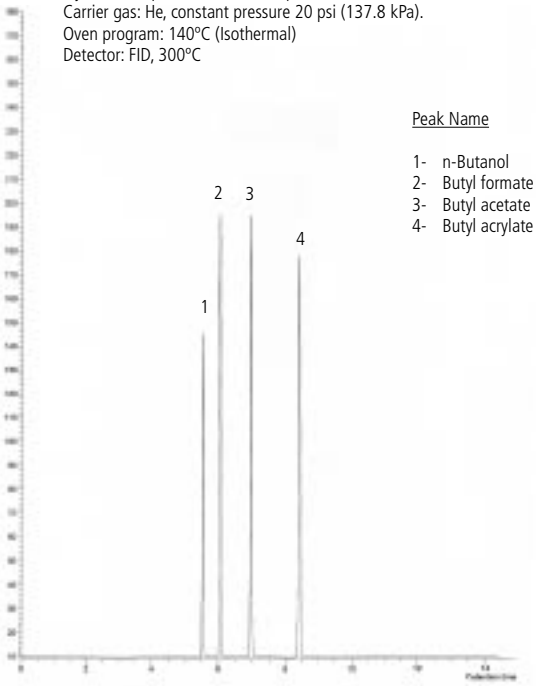
1- Methanol
2- Ethanol
3- Isopropanol
4- n-Propanol
5- Ethyl acetate
6- 2-Butanol
7- Isobutanol
8- 1-Butanol
9- Amyl alcohols
10- Ethyl butyrate



Chemical, Biological & Industrial Applications

SEPARATION IMPURITIES OF BUTYL ACRYLATE

Column: HB-1, P/N 204666
Dimensions: 50m x 0.25mm x 1.0µm
Injection: 0.2µl solvent mixture, split 1:50. 280°C
Carrier gas: He, constant pressure 20 psi (137.8 kPa).
Oven program: 140°C (Isothermal)
Detector: FID, 300°C



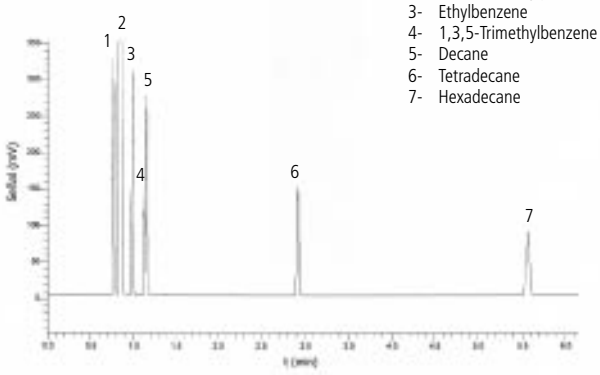
Peak Name

1- n-Butanol
2- Butyl formate
3- Butyl acetate
4- Butyl acrylate

SEPARATION OF HYDROCARBONS (FAST CHROMATOGRAPHY)

Column: HB-1, P/N 205038
Dimensions: 10m x 0.10mm x 0.40µm
Injection: 0.5µl standard Hydrocarbons (0.95%/comp. in 2,2,4-Trimethylpentane), split 1:200. 200°C
Carrier gas: He, constant pressure 40 psi (275.6KPa).
Oven temperature: 190°C (Isothermal)
Detector: FID, 200°C

Chromatogram provided by J.I. Gómez Cívicos, MªA. Uguina Zamorano and J.L. Sotelo Sancho of Universidad Complutense de Madrid

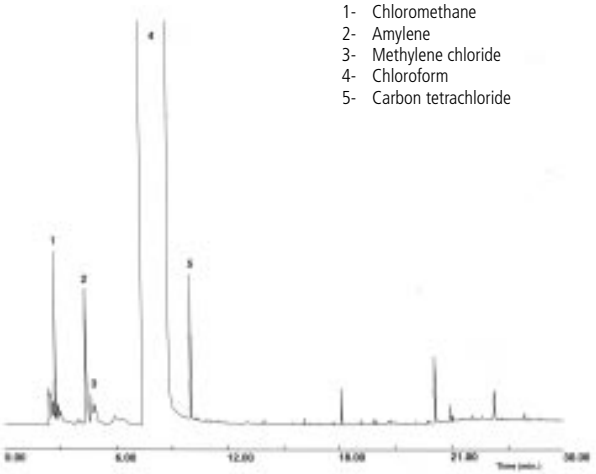


Peak Name

1- n-Pentane
2- 2,2,4-Trimethylpentane
3- Ethylbenzene
4- 1,3,5-Trimethylbenzene
5- Decane
6- Tetradecane
7- Hexadecane

CHLOROFORM PURITY

Column: HB-5, P/N 204689
Dimensions: 60m x 0.32mm x 1.0µm
Injection: 250°C, 2µL (split 20:1)
Carrier gas: H_2, 11 psi (75,8 kPa).
Oven temperature: 40°C (8 min)to 200°C(5min) @ 10°C/min
Detector: FID, 250°C



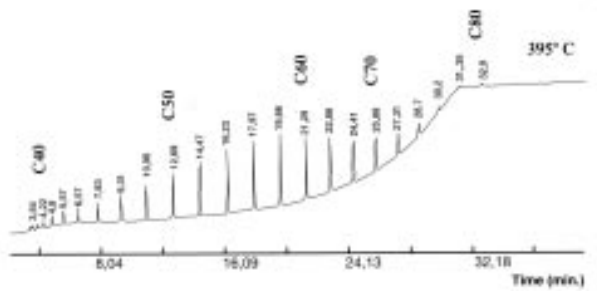
Peak Name

1- Chloromethane
2- Amylene
3- Methylene chloride
4- Chloroform
5- Carbon tetrachloride

POLYWAX 655

Column: HB-5ht, P/N 204767
Dimensions: 15m x 0.32mm x 0.1µm
Injection: 0. 2µL (split) 2% Polywax 655 in Carbon sulfide
Oven program: 70°C to 250°C @ 70°C/min. to 395°C(10min) @ 5°C/min.
Detector: FID, 410°C

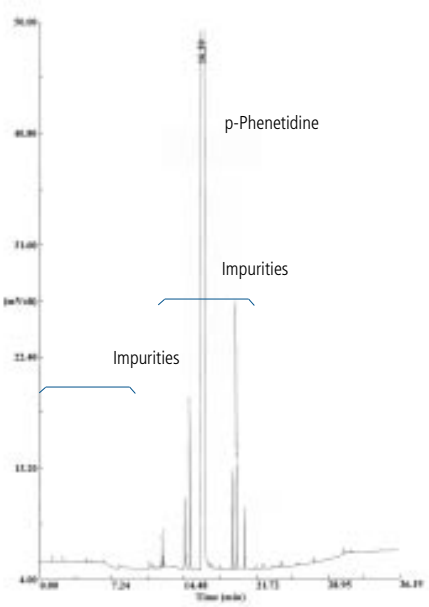
(baseline without compensation)



Chemical, Biological & Industrial Applications

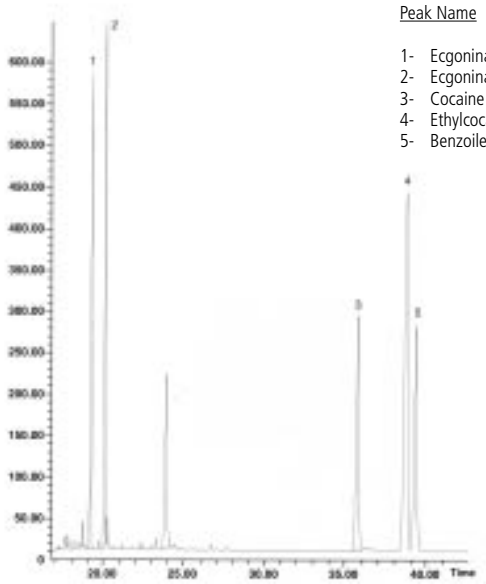
IMPURITIES OF p-PHENETIDINE

Column: HB-5Amine, P/N 204774
Dimensions: 30m x 0.32mm x 0.50µm
Injection: p-Phenetidine wet needle, split 1:50. 260ºC
Carrier gas: H_2, 11 psi (69 kPa)
Oven temperature: 80ºC(5min) @ 7ºC/min to 260ºC (6min)
Detector: FID, 300ºC



DRUGS IN URINE

Column: HB-5ms, P/N 204700
Dimensions:25m x 0.20mm x 0.11µm
Injection: 250ºC, 1 µl splitless (BSTFA Derivatives in ACN)
Carrier gas: He, 15 psi (103.3 kPa)
Oven temperature: 60ºC (1´) to 180ºC (1´) @ 10ºC/min. to 220ºC @ 10ºC/min.
Detector: FID,280ºC



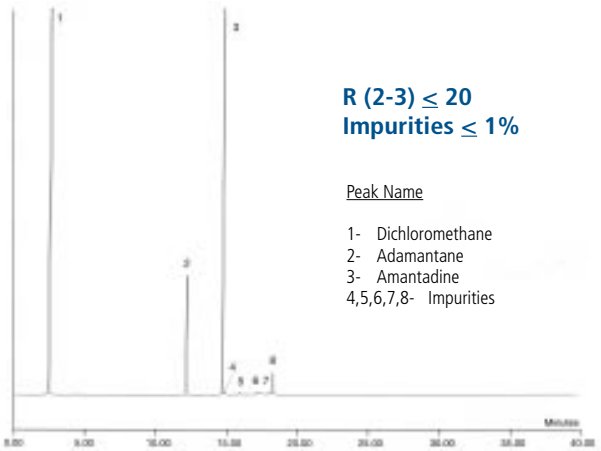
Peak Name

1- Ecgonina methylester
2- Ecgonina ethylester
3- Cocaine
4- Ethylcocaine
5- Benzoilecgonina

Chromatogram provided by Jordi To, Hospital Clínico from Barcelona.

AMANTADINE HYDROCHLORIDE IMPURITIES

Column: HB-5 Amine, P/N 204772
Dimensions: 30m x 0.53mm x 1.0m
Injection: 2 µl (split 1:50), 220ºC
Carrier gas: He, 4.2 psi (28.9 kPa)
Oven temperature: 70ºC (5´) to 250ºC (20min) @ 10ºC/min.
Detector: FID, 300ºC
Sample: Test solution according to USP 25



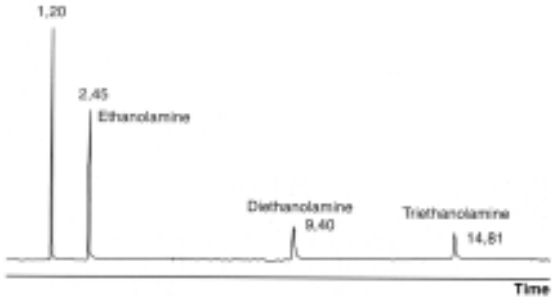
R (2-3) ≤ 20
Impurities ≤ 1%

Peak Name

1- Dichloromethane
2- Adamantane
3- Amantadine
4,5,6,7,8- Impurities

ETHANOLAMINES SEPARATION (25 ng/peak level)

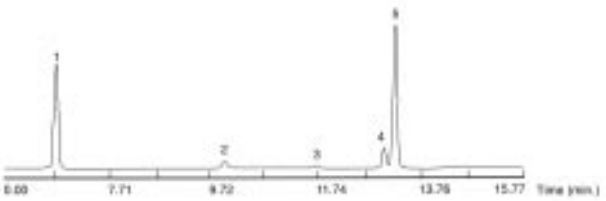
Column: HB-5 Amine, P/N 204773
Dimensions: 30m x 0.32mm x 0.50 µm
Injection: 2 µl (split 1:50), 280ºC
Carrier gas: H_2, 7 psi (48.2 kPa)
Oven temperature: 50ºC (2´) to 200ºC @ 10ºC/min.
Detector: FID, 300ºC
Sample: Ethanolamines in methanol (1.25 mg/ml)



USP SOLVENTS <USP>
COLUMN HB-G27+GUARD COLUMN 5M

Column: HB-G27, P/N-204701
Dimensions: 30m x 0.53mm x 5.0µm
Oven temp.: 35ºC(5') to 175ºC@ 8ºC/min. to 260ºC (16')@35ºC/min.
Carrier gas: He, 4.5 psi (31 kPa), 35 cms. to 35ºC
Injector temp: 70ºC
FID temp: 260ºC
Injection: Direct injection of 1 µl standard solution in distilled water (1:10)

	Concentration	Standard
1-	Methylene chloride	600ppm
2-	Chloroform	60ppm
3-	Benzene	2ppm
4-	Trichloroethylene	80ppm
5-	1,4 - Dioxan	380ppm

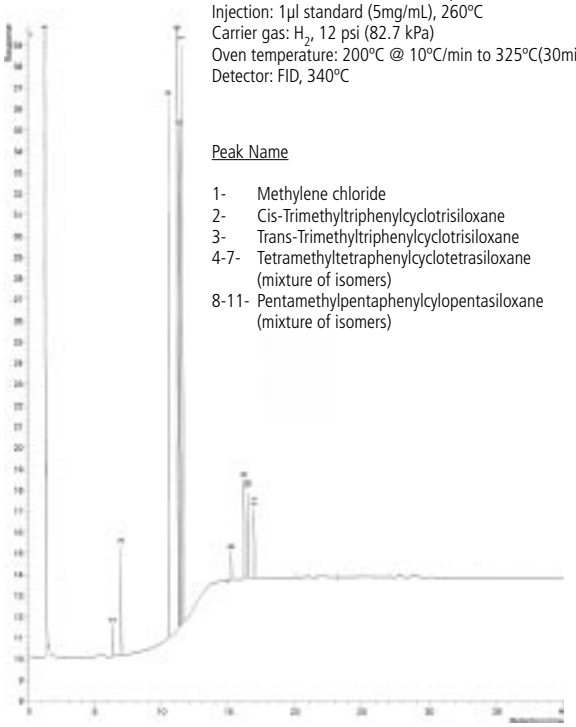


ANALYSIS OF CYCLOSILOXANES

Column: HB-5, P/N 204681
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1µl standard (5mg/mL), 260ºC
Carrier gas: H_2, 12 psi (82.7 kPa)
Oven temperature: 200ºC @ 10ºC/min to 325ºC(30min)
Detector: FID, 340ºC

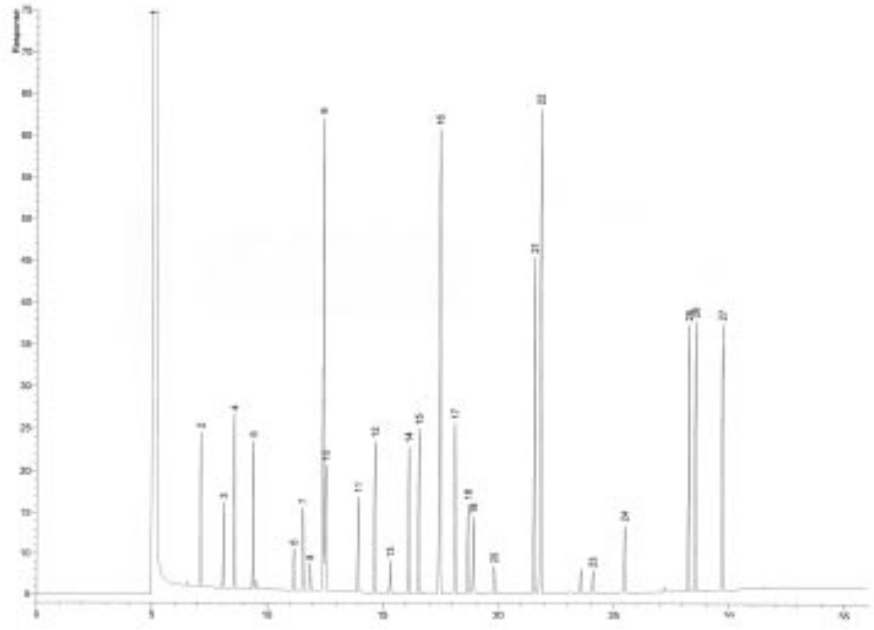
Peak Name

1- Methylene chloride
2- Cis-Trimethyltriphenylcyclotrisiloxane
3- Trans-Trimethyltriphenylcyclotrisiloxane
4-7- Tetramethyltetraphenylcyclotetrasiloxane (mixture of isomers)
8-11- Pentamethylpentaphenylcylopentasiloxane (mixture of isomers)



EPA 601/602 PURGEABLE HALOCARBONS PLUS 2-CHLOROETHYL VINYL ETHER

Column: HB-624, P/N 204731
Dimensions: 60m x 0.25mm x 1.4µm
Injection: 0.5µl EPA 601/602 Purgeable Halocarbons (2000 ng/mL), split 1:50. 260ºC
Carrier gas: He 30cm/s, constant pressure 35 psi (241.15 kPa)
Oven temperature: 40ºC(3min) @ 8ºC/min to 90ºC(4min) @ 6ºC/min to 200ºC(5min)
Detector: FID, 260ºC



Peak Name

1- Methanol
2- 1,1-Dichloroethylene
3- Methylene chloride
4- trans-1,2-Dichloroethylene
5- 1,1-Dichloroethane
6- Chloroform
7- 1,1,1-Trichloroethane
8- Carbon Tetrachloride
9- Benzene
10- 1,2-Dichloroethane
11- Trichloroethylene
12- 1,2-Dichloropropane
13- Bromodichloromethane
14- 2-Chloroethyl vinyl ether
15- cis-1,3-Dichloropropene
16- Toluene
17- trans-1,3-Dichloropropene
18- 1,1,2-Trichloroethane
19- Tetrachloroethylene
20- Dibromochloromethane
21- Chlorobenzene
22- Ethylbenzene
23- Bromoform
24- 1,1,2,2-Tetrachloroethane
25- 1,3-Dichlorobenzene
26- 1,4-Dichlorobenzene
27- 1,2-Dichlorobenzene

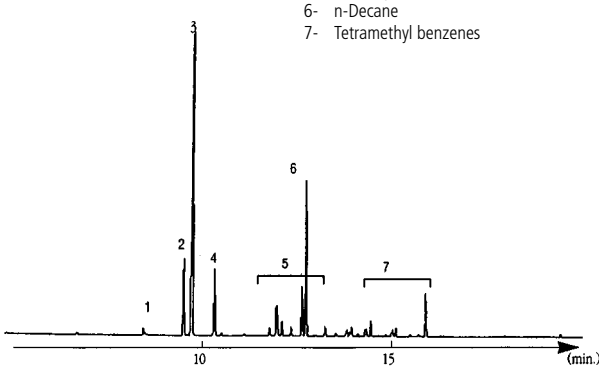
Chemical, Biological & Industrial Applications

SOLVENTS IN WATER

Column: HB-5, P/N 204681
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1 µl, split
Carrier gas: He
Oven temperature:
Detector: FID

Peak Name

1- Butyl acetate
2- Ethyl benzene
3- m,p-Xylene
4- o-Xylene
5- Trimethyl benzenes
6- n-Decane
7- Tetramethyl benzenes



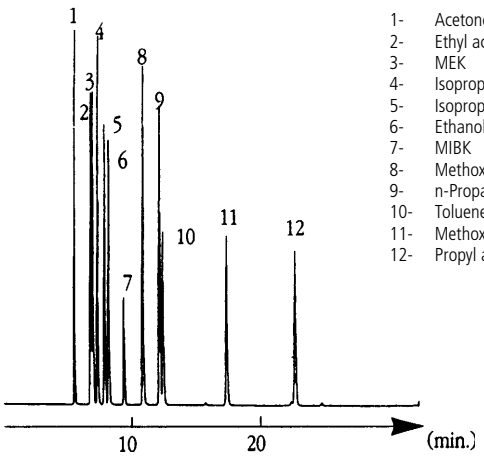
Chromatogram provided by J. Teixidor and E. Bosch from Laboratory Dr. Riera

INDUSTRIAL SOLVENTS

Column: HB-20Wax, P/N 204709
Dimensions: 50m x 0.32mm x 1.2µm
Injection: 0.1 µl, split
Carrier gas: H_2, 16 psi (110.24 kPa)
Oven temperature: 60°C @ 2°C/min to 125°C
Detector: FID, 250°C

Peak Name

1- Acetone
2- Ethyl acetate
3- MEK
4- Isopropyl acetate
5- Isopropanol
6- Ethanol
7- MIBK
8- Methoxypropyl acetate
9- n-Propanol
10- Toluene
11- Methoxypropanol
12- Propyl acetate

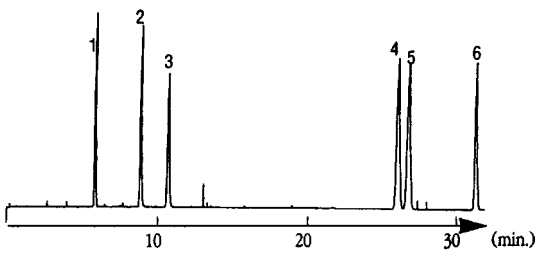


INDUSTRIAL SOLVENTS

Column: HB-20Wax, P/N 204720
Dimensions: 30m x 0.32mm x 1.2µm
Injection: 0.1 µL, split
Carrier gas: He, 12 psi (82.7 kPa)
Oven temperature: 40°C @ 1°C/min to 70°C @ 7.5°C/min to 125°C
Detector: FID, 250°C

Peak Name

1- Acetone
2- Methanol
3- Ethanol
4- p-Xylene
5- m-Xylene
6- o-Xylene

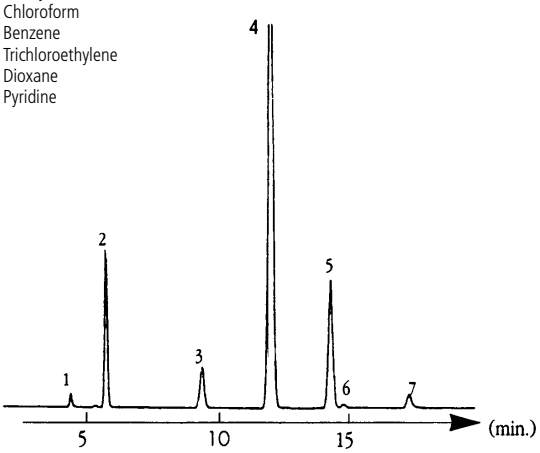


INDUSTRIAL SOLVENTS IN RAW MATERIALS

Column: HB-5, P/N 204697
Dimensions: 30m x 0.53mm x 5.0µm
Injection: 1 µl, head space
Carrier gas: N_2, 5 mL/min
Oven temperature: 40°C(5min) @ 3°C/min to 110°C
Detector: FID

Peak Name

1- Acetonitrile
2- Methylene chloride
3- Chloroform
4- Benzene
5- Trichloroethylene
6- Dioxane
7- Pyridine

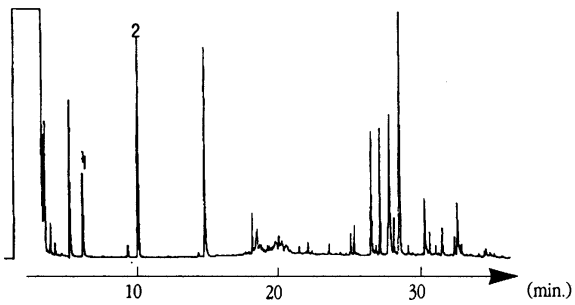


IMPURITIES IN RAW MATERIALS
Analysis of Monochloroacetic acid

Column: HB-5, P/N 204686
Dimensions: 30m x 0.32mm x 0.25µm
Injection: splitless 1 min, 260°C
Carrier gas: He, 8 psi
Oven temperature: 30°C(12min) @ 10°C/min to 250°C
Detector: FID, 260°C

Peak Name

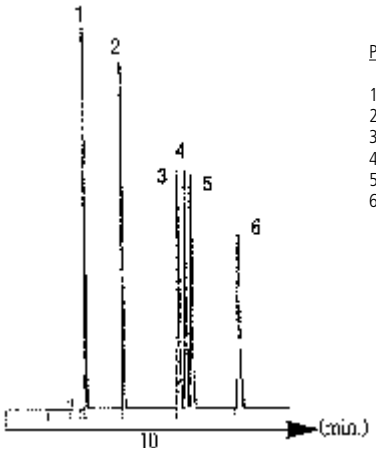
1- Methyl chloroacetate
2- Internal Standard



Chromatogram provided by A. Tintó of MOEHS, S.A., Barcelona.

AROMATIC SOLVENTS

Column: HB-20Wax, P/N 204720
Dimensions: 30m x 0.32mm x 1.2µm
Injection: split
Carrier gas: He, 10 psi (68.9 kPa)
Oven temperature: 80°C (Isothermal)
Detector: FID, 250°C



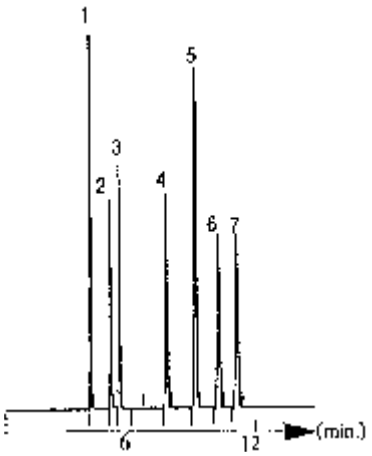
Peak Name

1- Benzene
2- Toluene
3- Ethyl benzene
4- p-Xylene
5- m-Xylene
6- o-Xylene

Chromatogram provided by E. Cura of SGS, S.A., Barcelona.

MIXTURE OF SOLVENTS

Column: HB-20Wax, P/N 204720
Dimensions: 30m x 0.32mm x 1.2µm
Injection: split
Carrier gas: He, 10 psi (68.9 kPa)
Oven temperature: 75°C (Isothermal)
Detector: FID, 250°C



Peak Name

1- Acetone
2- Methanol
3- Isopropanol
4- MIBK
5- Toluene
6- Butyl acetate
7- Isobutanol

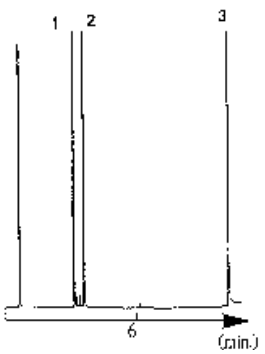
Chromatogram provided by E. Cura of SGS, S.A., Barcelona.

GLYCOLS IN WATER

Column: HB-FFAP, P/N 204746
Dimensions: 30m x 0.53mm x 0.5µm
Injection: 1 µl, split
Carrier gas: H_2, 2 psi (13.8 kPa)
Oven temperature: 100°C @ 10°C/min to 220°C
Detector: FID

Peak Name

1- Butanediol
2- Propylene glycol
3- Glycerine



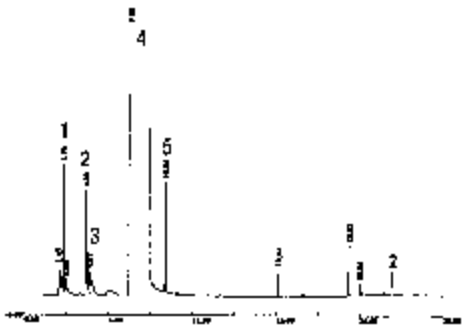
Chemical, Biological & Industrial Applications

PURITY OF CHLOROFORM

Column: HB-5, P/N 204689
Dimensions: 60m x 0.32mm x 1.0µm
Injection: 2 µl, split, 260°C
Carrier gas: H_2, 11 psi (75.8 kPa)
Oven temperature: 40°C(8min) @ 10°C/min to 200°C(5min)
Detector: FID, 260°C

Peak Name

1- Methyl chloroform
2- Amylene
3- Methylene chloride
4- Chloroform
5- Carbon tetrachloride

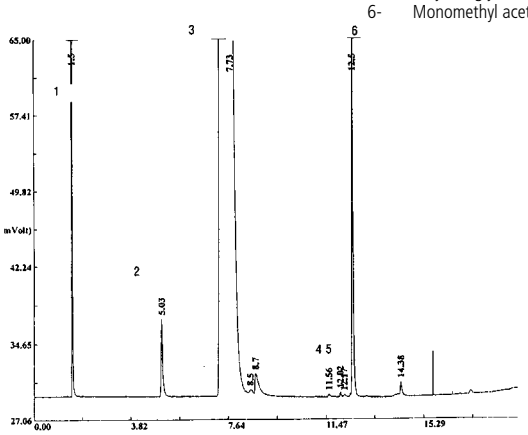


IMPURITIES OF DIMETHYLACETAMIDE

Column: HB-20Wax P/N 204704
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 0.3 µl, split, 260°C
Carrier gas: H_2, 11 psi (78.8 kPa)
Oven temperature: 75°C(7min) @ 10°C/min to 200°C
Detector: FID, 280°C

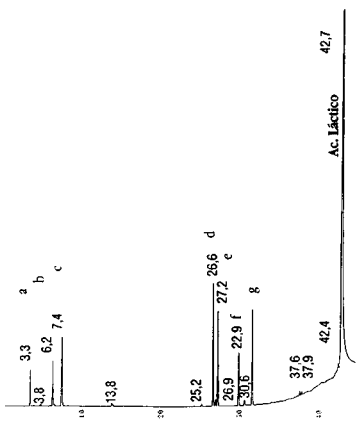
Peak Name

1- Methanol
2- Dimethylformamide
3- Dimethylacetamide
4- Propylene glycol
5- Ethylene glycol
6- Monomethyl acetamide



IMPURITIES OF LACTIC ACID

Column: HB-FFAP, P/N 204747
Dimensions: 30m x 0.53mm x 1.0µm
Injection: 0.5 µl, split, 260°C
Carrier gas: H_2, 3 psi (20.7 kPa)
Oven temperature: 45°C(15min) @ 8°C/min to 240°C(15min)
Detector: FID, 280°C

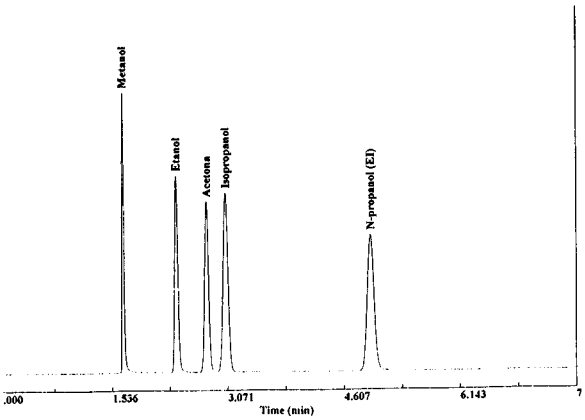


ALCOHOLS IN BLOOD

Column: HB-G43, P/N 204738
Dimensions: 30m x 0.53mm x 3.0µm
Injection: 1 µl, split, alcohol standards
Carrier gas: H_2, 4 psi (27.6 kPa)
Oven temperature: 35°C (isothermal)
Detector: FID, 250°C

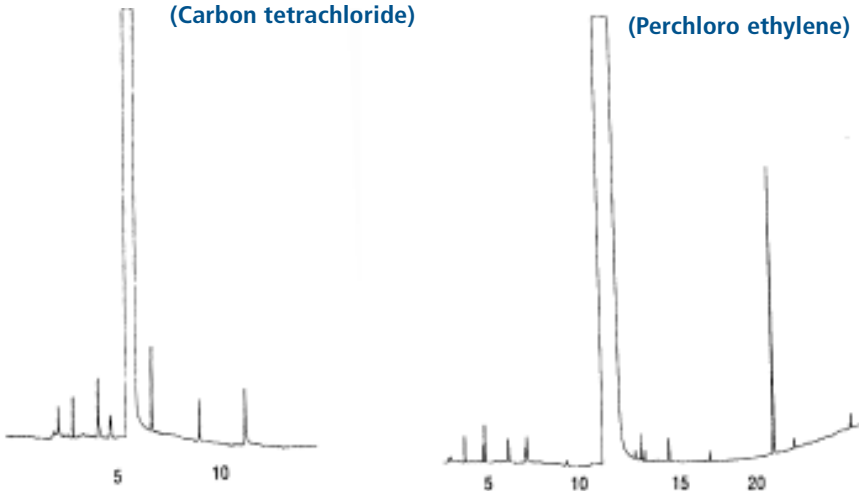
Peak Name

1- Methanol
2- Ethanol
3- Acetone
4- Isopropanol
5- n-Propanol (I.St.)



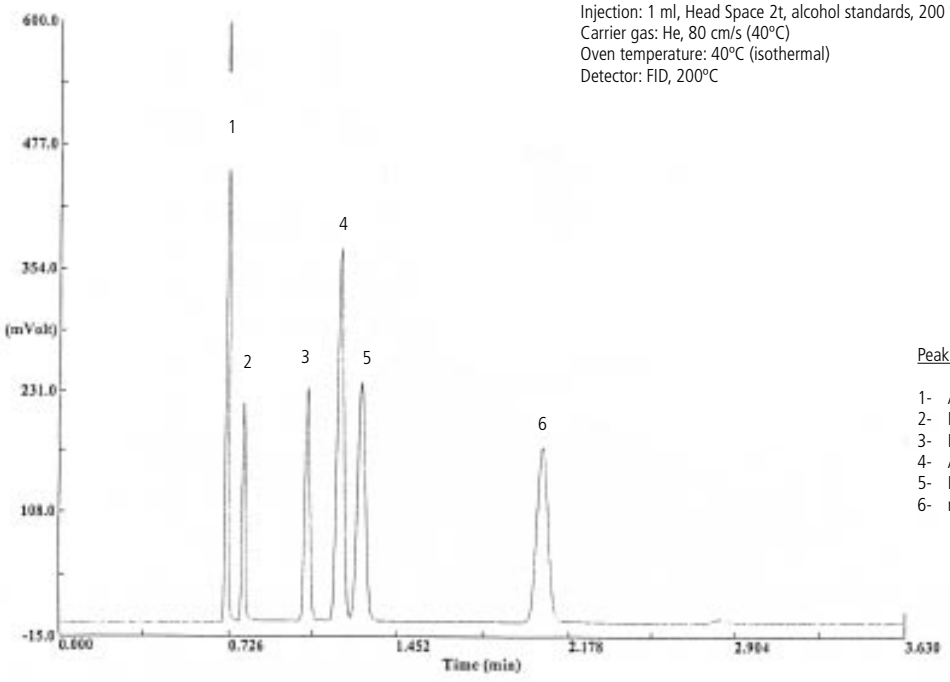
IMPURITIES IN SOLVENTS

Column: HB-1, P/N 204654
Dimensions: 50m x 0.25mm x 0.33µm
Injection: 1 µl, split
Carrier gas: H_2, 19 psi (130.9 kPa)
Oven temperature: 35°C(5min) @ 6°C/min to 150°C(5min)
Detector: FID, 275°C



ALCOHOLS IN BLOOD

Column: HB-1701, P/N 204758
Dimensions: 30m x 0.53mm x 2.0µm
Injection: 1 ml, Head Space 2t, alcohol standards, 200 °C
Carrier gas: He, 80 cm/s (40°C)
Oven temperature: 40°C (isothermal)
Detector: FID, 200°C



Peak Name

1- Acetaldehyde
2- Methanol
3- Ethanol
4- Acetone
5- Isopropanol
6- n-Propanol

Environmental Applications

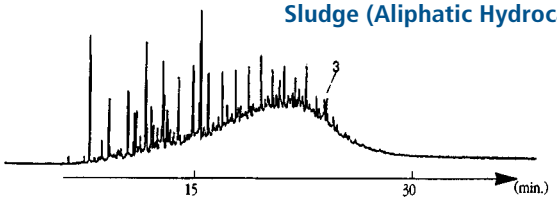
Peak Name

1- Tg
2- Tm
3- C29 ab
4- C30 ab
5- C31 ab (22S)
6- C31 ab (22R)

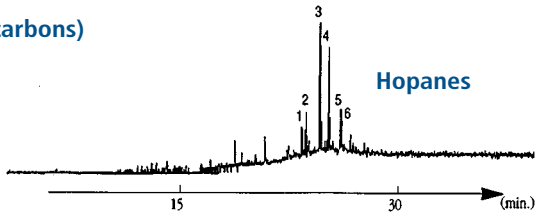
ANALYSIS OF SOIL AND SLUDGE FROM A WATER TREATMENT PLANT

Column: HB-5, P/N 204686
Dimensions: 30m x 0.32mm x 0.25µm
Injection: splitless 1 min
Carrier gas: He, 20 psi
Oven temperature: 65°C(1.2 min) @ 30°C/min to 90°C(1 min) @ 10°C/min to 300°C(15 min)
Detector: MS

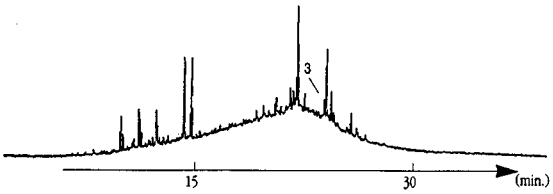
Sludge (Aliphatic Hydrocarbons)



Hopanes



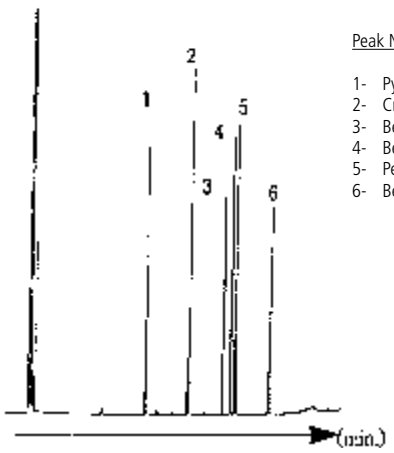
Soil + Sludge (Aliphatic Hydrocarbons)



Chromatogram provided by T. Vaguero, L. Stronguiló and L. Comellas of CETS Institut Químic de Sarrià, Barcelona.

ANALYSIS OF POLYCYCLIC AROMATIC HYDROCARBONS

Column: HB-5, P/N 204681
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1 µl, cold on-column
Carrier gas: H_2, 50 cm/s
Oven temperature: 110°C @ 6°C/min to 300°C
Detector: FID, 325°C



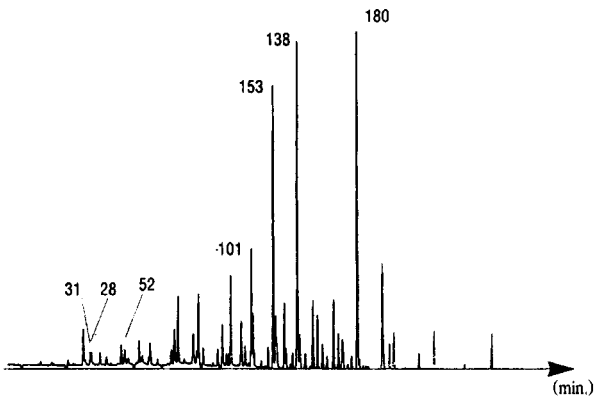
Peak Name

1- Pyrene
2- Crysene
3- Benzo(b)fluoranthene
4- Benzo(e)pyrene
5- Perylene
6- Benzo(g,h,i)Perylene

ANALYSIS OF PCBs

Column: HB-5, P/N 204684
Dimensions: 60m x 0.25mm x 0.25µm

Chromatogram provided by A. de Pablo of ASINEL S.A., Madrid.



Environmental Applications

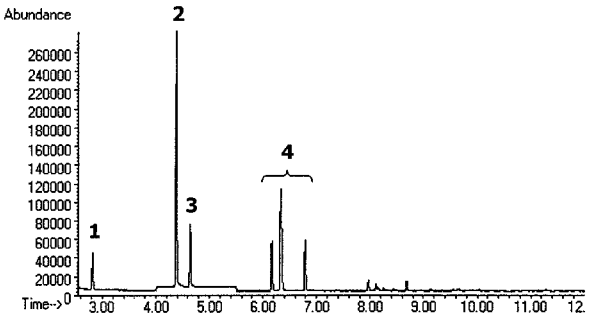
SEPARATION OF BTX

Column: HB-5TA, P/N 204759
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1µl BTX mixture, split 1:20. 250°C
Carrier gas: He, constant pressure 10 psi (68.9 kPa)
Oven temperature: 40°C (2min)@ 10°C/min to 100°C @ 20°C/min to 200°C
Detector: MS, SIM, 250°C transfer line

Chromatogram provided by Bàrbara Bagó and Lluis Comellas of Institut Químic de Sarrià (IQS), Barcelona.

Peak Name

1- Benzene
2- Toluene
3- 2-Fluorotoluene (I.St.)
4- Xylenes



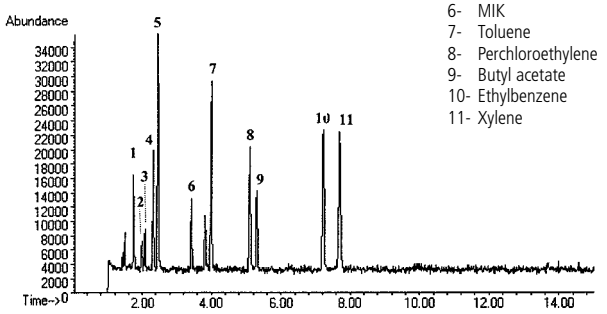
SEPARATION OF VOLATILE SOLVENTS

Column: HB-5TA, P/N 204759
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1µl solvents mixture, Head Space, split 1:20. 250°C
Carrier gas: He, constant pressure 11 psi (75.8 kPa)
Oven program: 50°C (10min)@ 3°C/min to 90°C (0.5min) @ 30°C/min to 200°C(5min)
Detector: MS, full scan, 250°C transfer line

Chromatogram provided by Bàrbara Bagó and Lluis Comellas of Institut Químic de Sarrià (IQS), Barcelona.

Peak Name

1- Methylene chloride
2- MEK
3- Ethyl acetate
4- Trichloroethane
5- Benzene
6- MIK
7- Toluene
8- Perchloroethylene
9- Butyl acetate
10- Ethylbenzene
11- Xylene

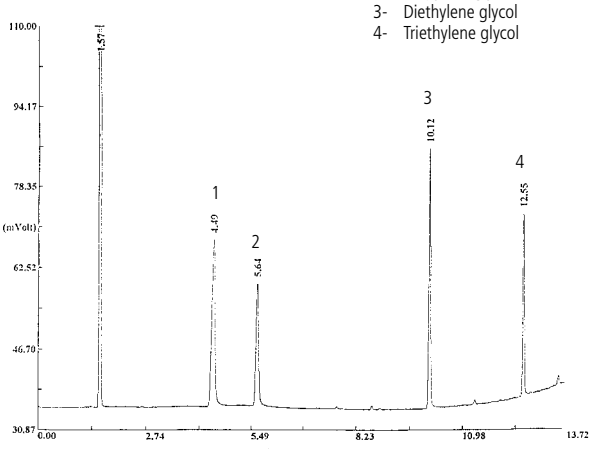


GLYCOLS

Column: HB-210. P/N 204724
Dimensions: 15m x 0.53mm x 1.0µm
Injection: 0.4µl Glycols mixture in Methanol, split 1:50. 15ng/comp on column, 250°C
Carrier gas: H_2, constant pressure 1.5 psi (10.3 kPa), 40.15 cm/s (40°C)
Oven program: 40°C (5min) to 210°C/(10min) @ 15°C/min
Detector: FID, 280°C

Peak Name

1- Ethylene glycol
2- Propylene glycol
3- Diethylene glycol
4- Triethylene glycol

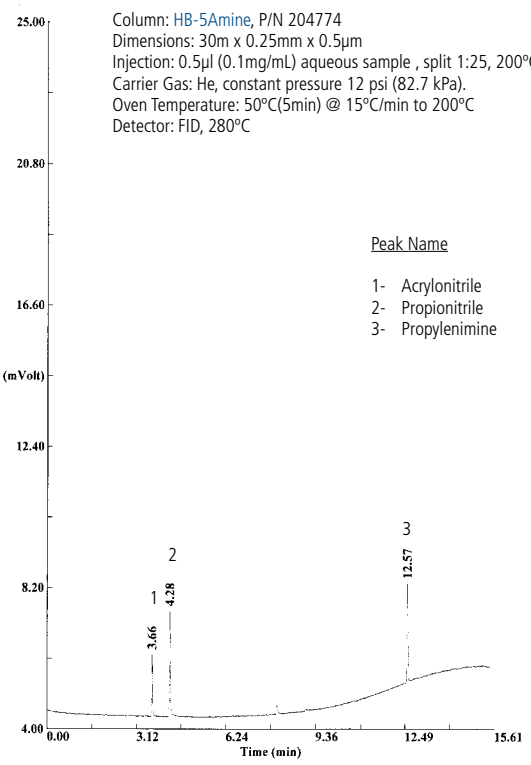


NITRILES AND AMINES IN WATER

Column: HB-5Amine, P/N 204774
Dimensions: 30m x 0.25mm x 0.5µm
Injection: 0.5µl (0.1mg/mL) aqueous sample , split 1:25, 200°C
Carrier Gas: He, constant pressure 12 psi (82.7 kPa).
Oven Temperature: 50°C(5min) @ 15°C/min to 200°C
Detector: FID, 280°C

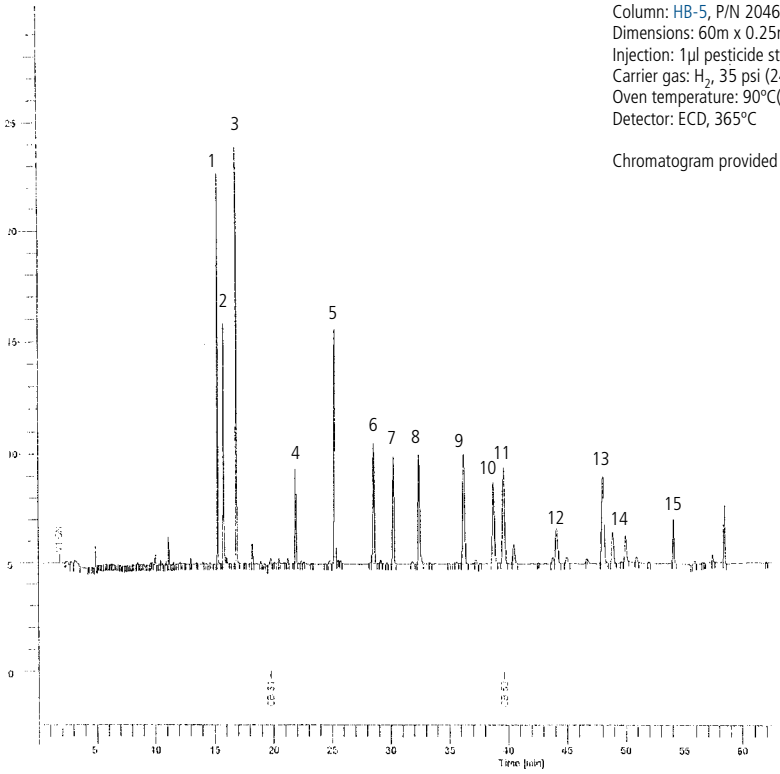
Peak Name

1- Acrylonitrile
2- Propionitrile
3- Propylenimine



Environmental Applications

SEPARATION OF ORGANOCHLORINATED PESTICIDES



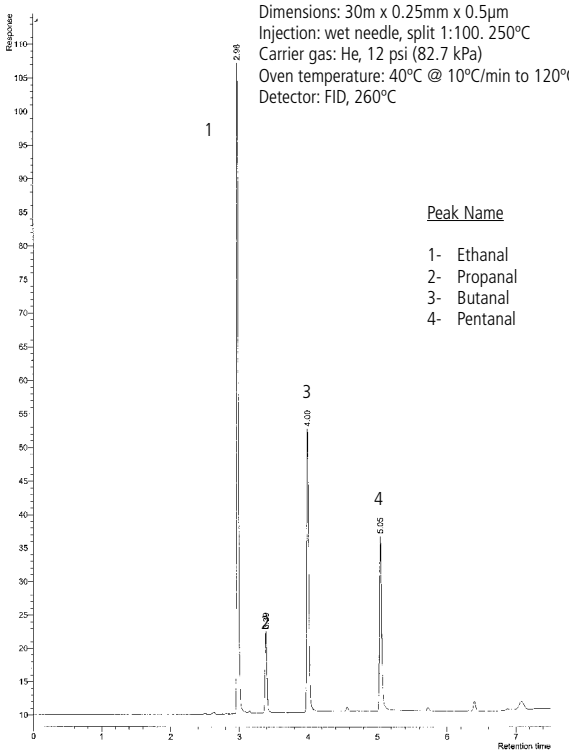
Column: HB-5, P/N 204684
Dimensions: 60m x 0.25mm x 0.25µm
Injection: 1µl pesticide standard, 270°C
Carrier gas: H_2, 35 psi (241.1 kPa)
Oven temperature: 90°C(8min) @ 30°C/min to 215°C(40min) @ 5°C/min to 275°C(20min)
Detector: ECD, 365°C

Chromatogram provided by Nieves Caro of Centro Control de Calidad do Medio Mariño

Peak Name

1- α-HCH
2- HCB
3- γ-HCH
4- Heptachlor
5- Aldrin
6- Isodrin
7- Heptachlorepoxide
8- PCB-155
9- Transnonador
10- 4,4'-DDE
11- Dieldrin
12- Endrin
13- 4,4'-DDD
14- 2,4-DDT
15- 4,4'-DDT

SEPARATION OF ALDEHYDES



Column: HB-Wax P/N 204776
Dimensions: 30m x 0.25mm x 0.5µm
Injection: wet needle, split 1:100. 250°C
Carrier gas: He, 12 psi (82.7 kPa)
Oven temperature: 40°C @ 10°C/min to 120°C
Detector: FID, 260°C

Peak Name

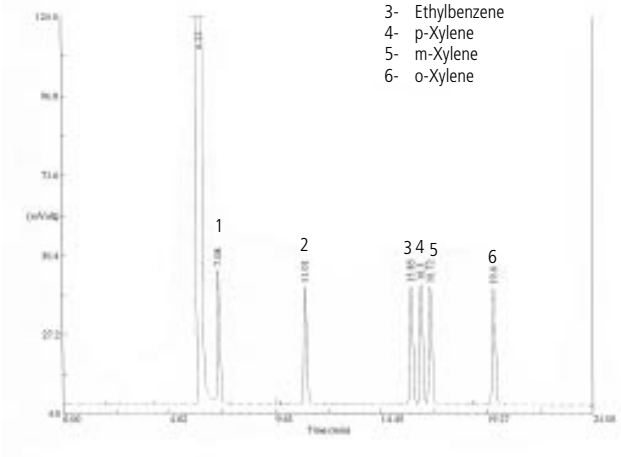
1- Ethanal
2- Propanal
3- Butanal
4- Pentanal

SEPARATION OF BTEX ISOMERS

Column: HB-Wax, P/N 204777
Dimensions: 30m x 0.53mm x 1.0µm
Injection: 1µl BTEX sample (50 ppm on column), 200°C
Carrier gas: He, 25 cm/s (35°C)
Oven temperature: 35°C @ 2°C/min to 75°C(5min)
Detector: FID, 260°C

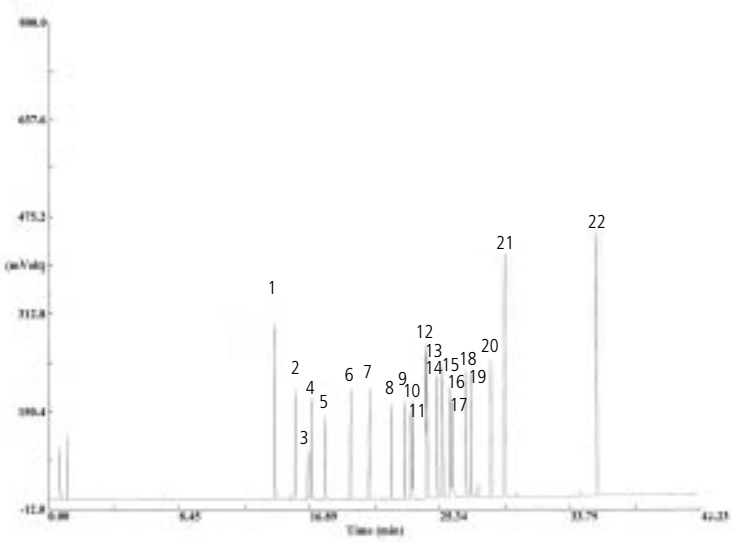
Peak Name

1- Benzene
2- Toluene
3- Ethylbenzene
4- p-Xylene
5- m-Xylene
6- o-Xylene



CHLORINATED PESTICIDES

Column: HB-5TA, P/N 204759
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1µl chlorinated pesticide mix, splitless (0.5 min), 250°C (50-170 ppb on column)
Carrier gas: H_2, constant pressure 20 psi (137.8 kPa)
Oven program: 80°C (5min) to 100°C @ 15°C/min to 160°C @ 8°C/min to 285°C(5min) @ 5°C/min
Detector: ECD, 310°C

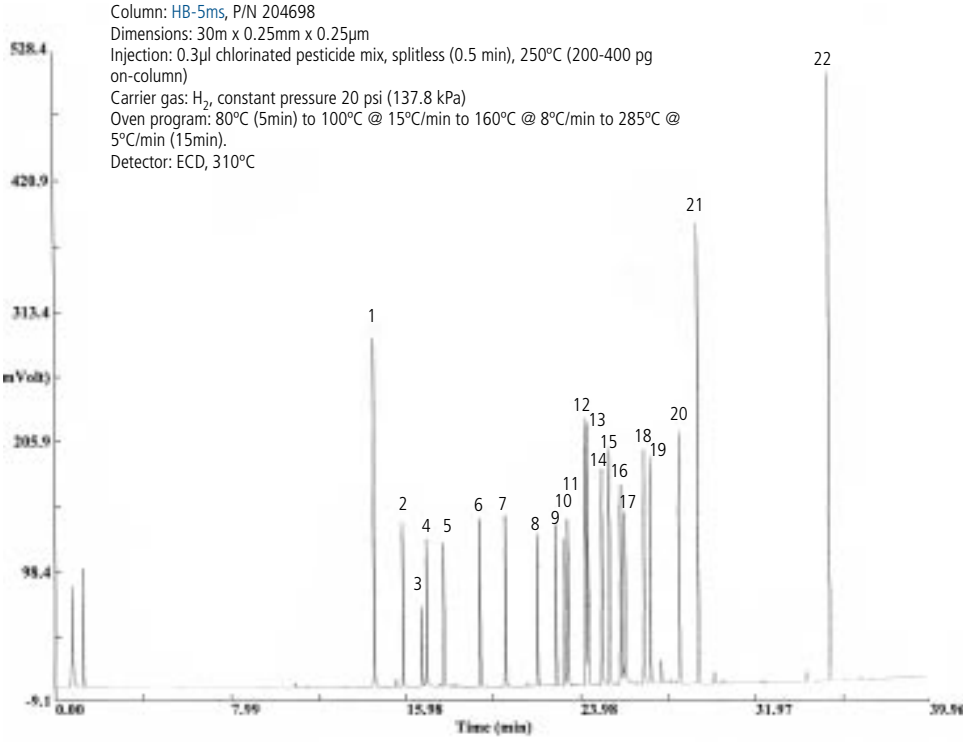


Peak Name

1- Tetrachloro-m-xylene
2- α-BHC
3- β-BHC
4- γ-BHC
5- δ-BHC
6- Heptachlor
7- Aldrin
8- Heptachlor epoxide
9- γ-chlordane
10- Endosulfan I
11- α-chlordane
12- Dieldrin
13- 4,4´-DDE
14- Endrin
15- Endosulfan II
16- 4,4´-DDD
17- Endrin aldehyde
18- Enduosulfan sulfate
19- 4,4´-DDT
20- Endrin ketone
21- Methoxychlor
22- Decachlorobiphenyl

CHLORINATED PESTICIDES

Column: HB-5ms, P/N 204698
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 0.3µl chlorinated pesticide mix, splitless (0.5 min), 250°C (200-400 pg on-column)
Carrier gas: H_2, constant pressure 20 psi (137.8 kPa)
Oven program: 80°C (5min) to 100°C @ 15°C/min to 160°C @ 8°C/min to 285°C @ 5°C/min (15min).
Detector: ECD, 310°C

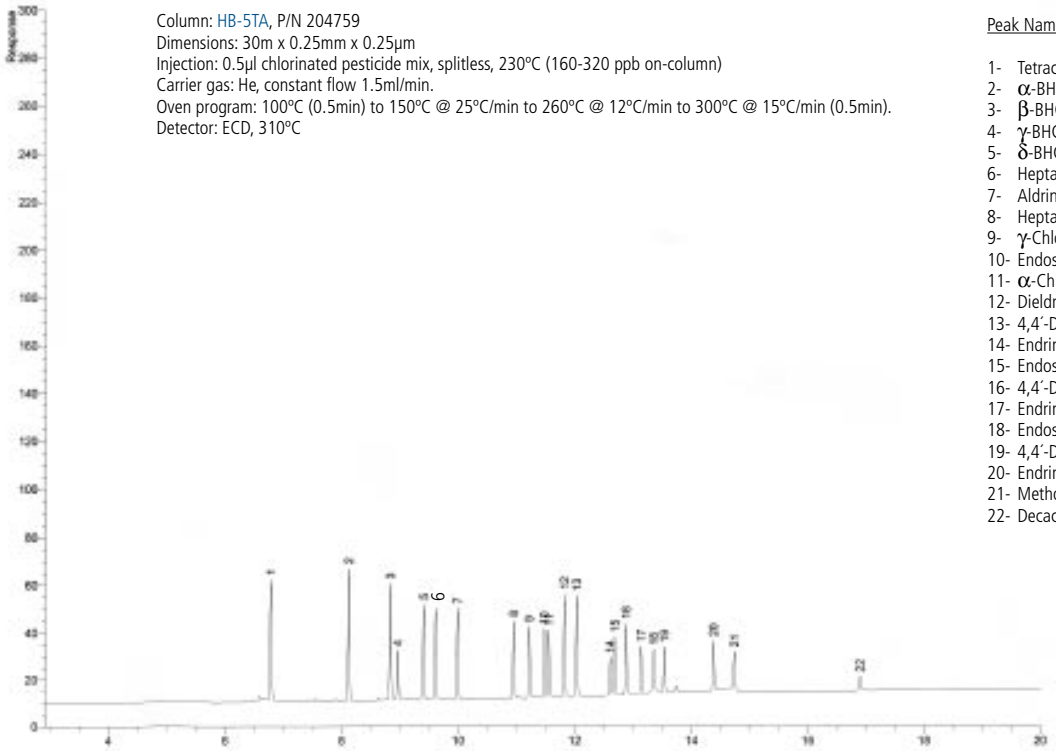


Peak Name

1- Tetrachloro-m-xylene
2- α-BHC
3- β-BHC
4- γ-BHC
5- δ-BHC
6- Heptachlor
7- Aldrin
8- Heptachlor epoxide
9- γ-chlordane
10- Endosulfan I
11- α-chlordane
12- Dieldrin
13- 4,4´-DDE
14- Endrin
15- Endosulfan II
16- 4,4´-DDD
17- Endrin aldehyde
18- Enduosulfan sulfate
19- 4,4´-DDT
20- Endrin ketone
21- Methoxychlor
22- Decachlorobiphenyl

Environmental Applications

CHLORINATED PESTICIDES



Column: HB-5TA, P/N 204759
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 0.5µl chlorinated pesticide mix, splitless, 230ºC (160-320 ppb on-column)
Carrier gas: He, constant flow 1.5ml/min.
Oven program: 100ºC (0.5min) to 150ºC @ 25ºC/min to 260ºC @ 12ºC/min to 300ºC @ 15ºC/min (0.5min).
Detector: ECD, 310ºC

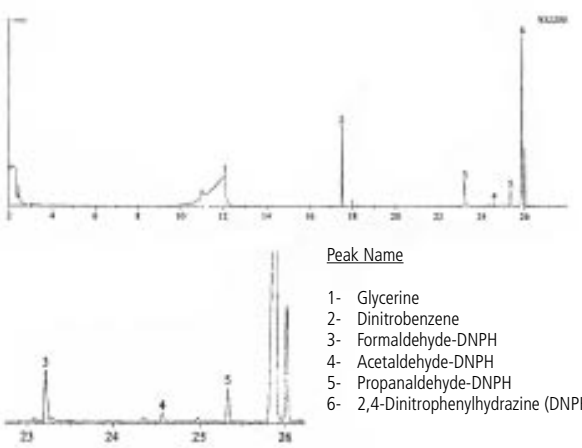
Peak Name

1- Tetrachloro-m-xylene
2- α-BHC
3- β-BHC
4- γ-BHC
5- δ-BHC
6- Heptachlor
7- Aldrin
8- Heptachlor epoxide
9- γ-Chlordane
10- Endosulfan I
11- α-Chlordane
12- Dieldrin
13- 4,4´-DDE
14- Endrin
15- Endosulfan II
16- 4,4´-DDD
17- Endrin aldehyde
18- Endosulfan sulfate
19- 4,4´-DDT
20- Endrin ketone
21- Methoxychlor
22- Decachlorobiphenyl

ALDEHYDES IN AIR SAMPLE

Column: HB-5, P/N 204681
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1µl Aldehydes in Air Sample after extraction (derivatisized with DNPH), splitless (1 min), 250ºC
Carrier gas: He, constant flow 1 ml/min
Oven temperature: 50ºC(1min) @ 10ºC/min to 300ºC
Detector: MS, 280ºC ¡

Chromatogram provided by F. Sisteré of IUCT



Peak Name

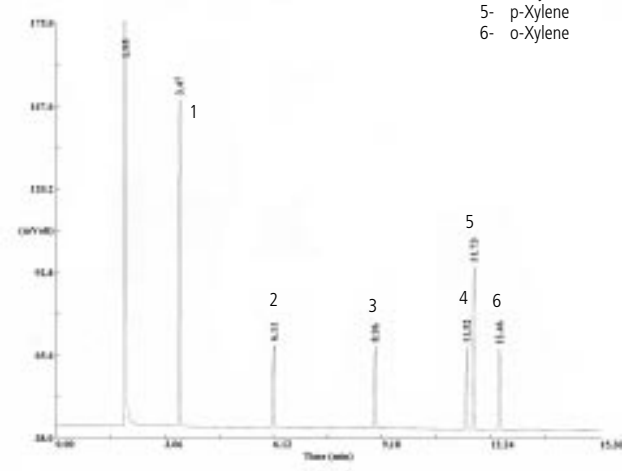
1- Glycerine
2- Dinitrobenzene
3- Formaldehyde-DNPH
4- Acetaldehyde-DNPH
5- Propanaldehyde-DNPH
6- 2,4-Dinitrophenylhydrazine (DNPH)

SEPARATION OF BTEX ISOMERS

Column: HB-624, P/N 204732
Dimensions: 30m x 0.32mm x 1.8µm
Injection: 1µl BTEX sample (50 ppm on column), 260ºC
Carrier gas: H_2, 6.9 psi (47.9 kPa)
Oven temperature: 40ºC @ 8ºC/min to 240ºC(10min)
Detector: FID, 260ºC

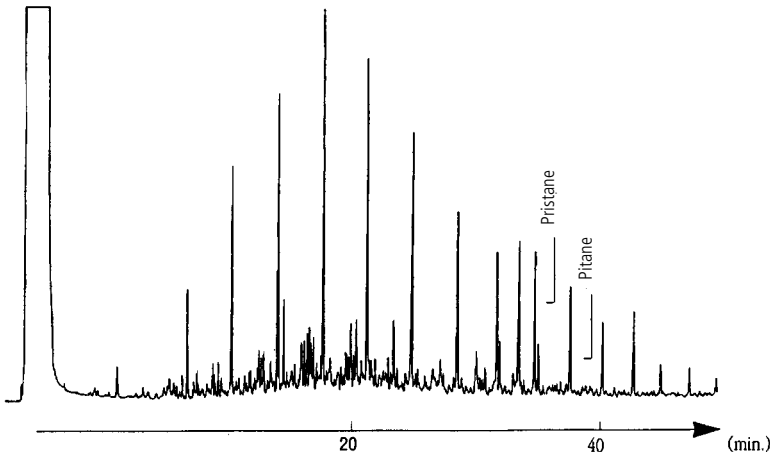
Peak Name

1- Benzene
2- Toluene
3- Ethylbenzene
4- m-Xylene
5- p-Xylene
6- o-Xylene



ANALYSIS OF HYDROCARBONS (GASOIL)

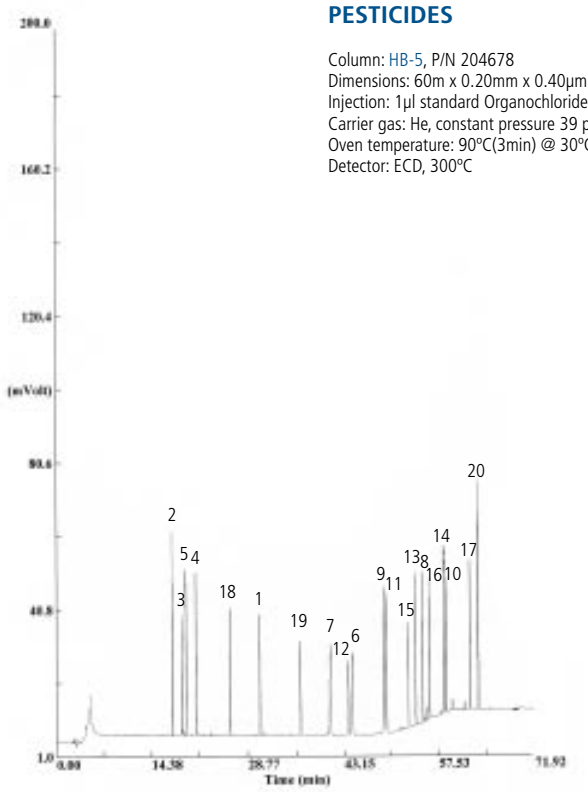
Column: HB-5, P/N 204681
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1 µl, splitless 0.7min
Carrier gas: H_2, 50 cm/s (110°C)
Oven temperature: 60°C(3 min) @ 4°C/min to 300°C
Detector: FID, 305°C



Chromatogram provided by Dr. Caixach of Laboratori Espectrometria de Masses, CSIC, Barcelona

PESTICIDES

Column: HB-5, P/N 204678
Dimensions: 60m x 0.20mm x 0.40µm
Injection: 1µl standard Organochloride Pesticide Mix AB#2, splitless(1min), 270°C
Carrier gas: He, constant pressure 39 psi (268.7 Kpa)
Oven temperature: 90°C(3min) @ 30°C/min to 215°C(40min) @ 5°C/min to 275°C(30min)
Detector: ECD, 300°C



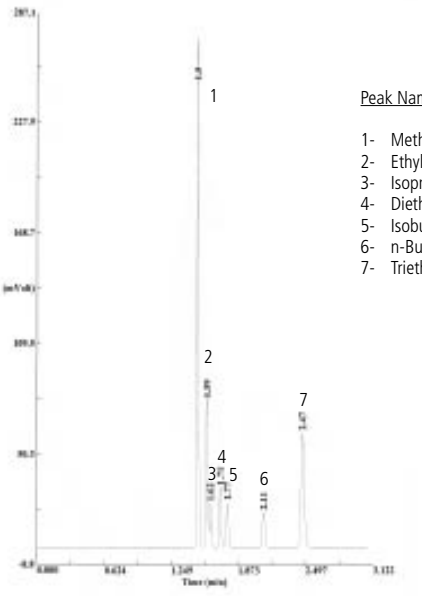
Peak Name

1- Aldrin
2- α-BHC
3- β-BHC
4- δ-BHC
5- γ-BHC (lindane)
6- α-Chlordane
7- γ-Chlordane
8- 4-4'-DDD
9- 4,4'-DDE
10- 4,4'-DDT
11- Dieldrin
12- Endosulfan I
13- Endosulfan II
14- Endosulfan sulfate
15- Endrin
16- Endrin aldehyde
17- Endrin ketone
18- Heptachlor
19- Heptachlor epoxide (B)
20- Methoxychlor

Environmental Applications

AMINES

Column: HB-BasicWax, P/N 204727
Dimensions: 30m x 0.53mm x 1.0µm
Injection: 1 µl Amines mixture, Head Space, split 1:50. 260ºC
Carrier gas: H_2, constant pressure 1.8 psi (12.40 kPa)
Oven temperature: 60ºC
Detector: FID, 280ºC

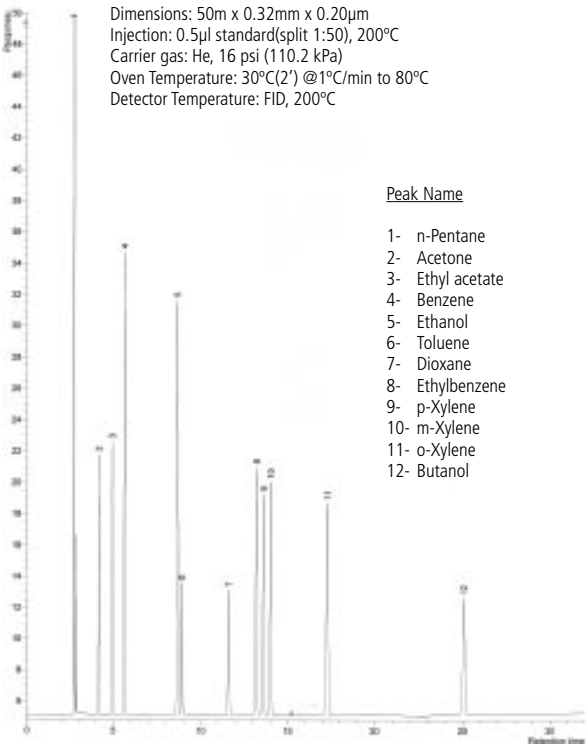


Peak Name

1- Methylamine
2- Ethylamine
3- Isopropylamine
4- Diethylamine
5- Isobutylamine
6- n-Butylamine
7- Triethylamine

SEPARATION OF SOLVENTS

Column: HB-CarboWax 400. P/N 204771
Dimensions: 50m x 0.32mm x 0.20µm
Injection: 0.5µl standard(split 1:50), 200ºC
Carrier gas: He, 16 psi (110.2 kPa)
Oven Temperature: 30ºC(2') @1ºC/min to 80ºC
Detector Temperature: FID, 200ºC

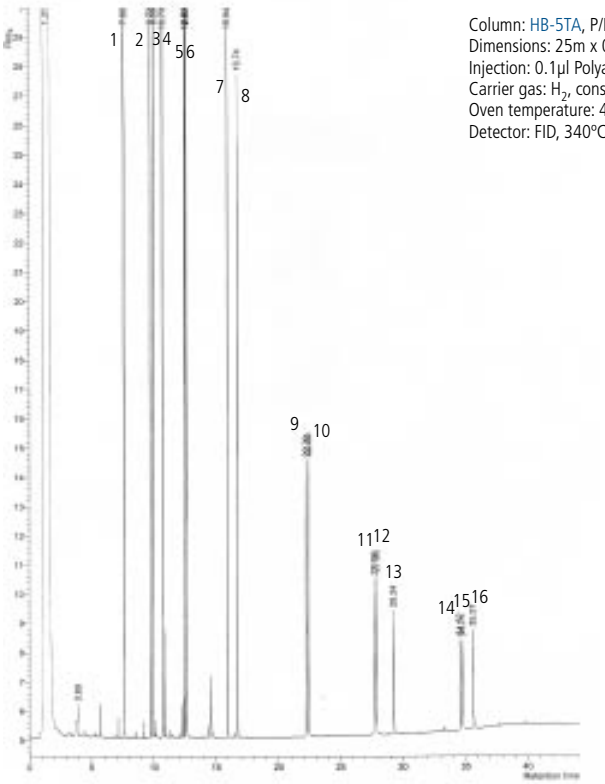


Peak Name

1- n-Pentane
2- Acetone
3- Ethyl acetate
4- Benzene
5- Ethanol
6- Toluene
7- Dioxane
8- Ethylbenzene
9- p-Xylene
10- m-Xylene
11- o-Xylene
12- Butanol

POLYAROMATIC HYDROCARBONS

Column: HB-5TA, P/N 204762
Dimensions: 25m x 0.15mm x 0.15µm
Injection: 0.1µl Polyaromatic hydrocarbons, (200ng/comp), splitless 30s, 300ºC
Carrier gas: H_2, constant pressure 35 psi (241.1 kPa)
Oven temperature: 40ºC(2min) @ 20ºC/min to 200ºC @ 4ºC/min to 310ºC(5min)
Detector: FID, 340ºC



Peak Name

1- Naphthalene
2- Acenaphtylene
3- Acenaphtene
4- Fluorene
5- Phenanthrene
6- Anthracene
7- Fluoranthene
8- Pyrene
9- Benzo(a)Anthracene
10- Chrysene
11- Benzo(b)Fluoranthene
12- Benzo(k)Fluoranthene
13- Benzo(a)Pyrene
14- Indeno(1,2,3)Pyrene
15- Dibenzo(a,h)Anthracene
16- Benzo(g,h,i)P0erylene

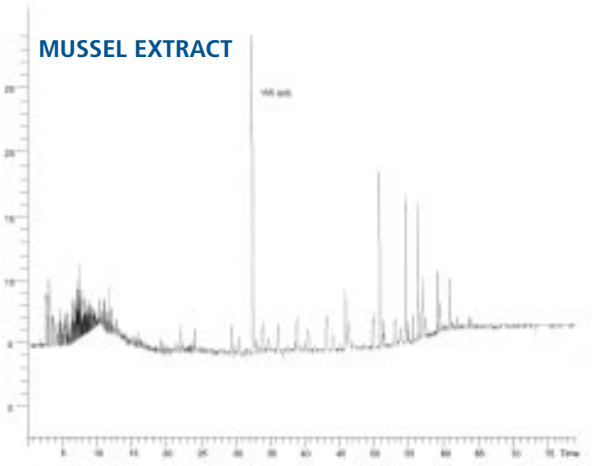
Environmental Applications

PCBs IN MUSSELS

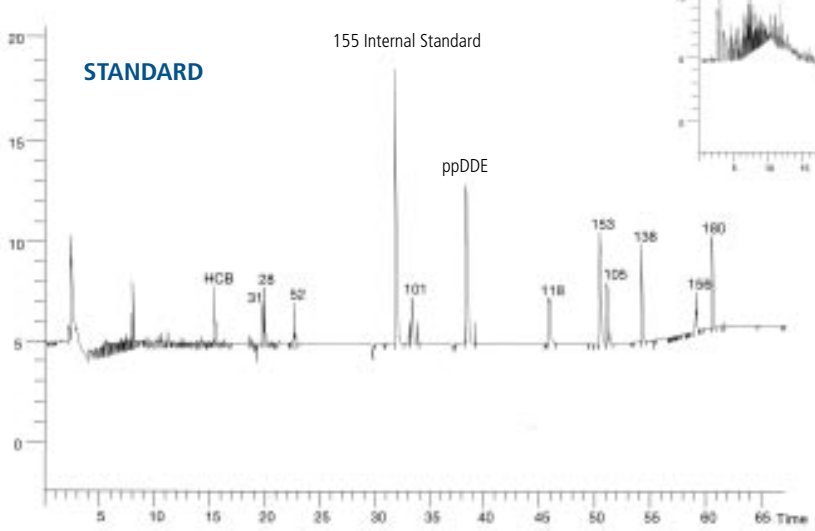
Column: HB-5, P/N 204684
Dimensions: 60m x 0.25mm x 0.25µm
Injection: PCBs in mussle, split (1:30) 270ºC
Carrier gas: H_2, 35 psi (241.1 kPa)
Oven program: 90ºC (8´) to 215ºC(40´) @ 30ºC/min. to 275ºC(20´) @ 5ºC/min.
Detector: ECD, 365ºC, make up Argon/Methane

Chromatogram provided by Nieves Caro of Centro Control de Calidad do Medio Mariño.

MUSSEL EXTRACT



STANDARD

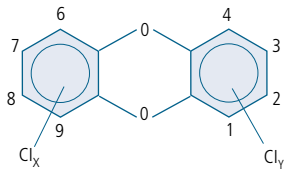


SEPARATION OF DIOXINS AND FURANS

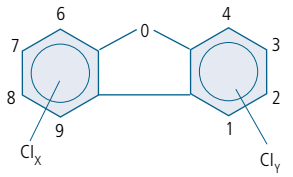
Column: HB-5ms, P/N 204699
Dimensions: 60m x 0.25mm x 0.25µm
Injection: 1 µl, splitless, 1´, 300ºC
Carrier gas: He, 250 kPa, Pcte.

Oven program: 150ºC to 200ºC @ 30ºC/min. to 235ºC(10´) @ 3ºC/min. to 300ºC
Detector: MS (SIR), 260ºC
Sample: EPA 1613CS3 standard

Chromatogram provided by Jordi Diaz of Laboratorio Medioambiental IQS.

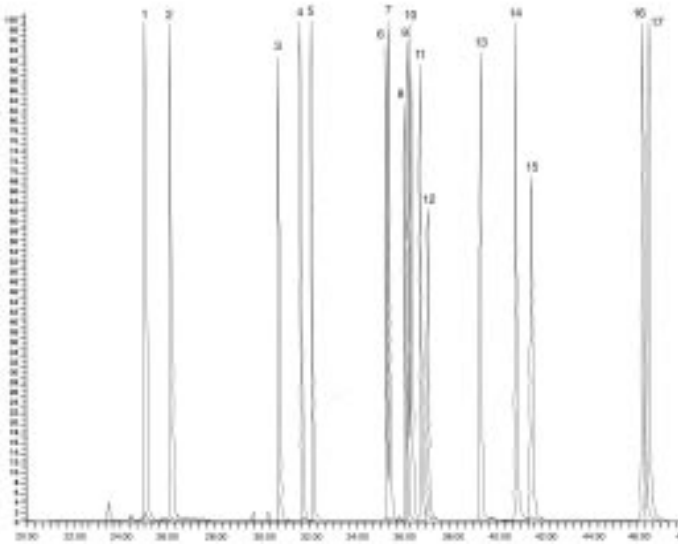


Polychlorinated dibenzo-p-dioxins



Polychlorinated dibenzofurans

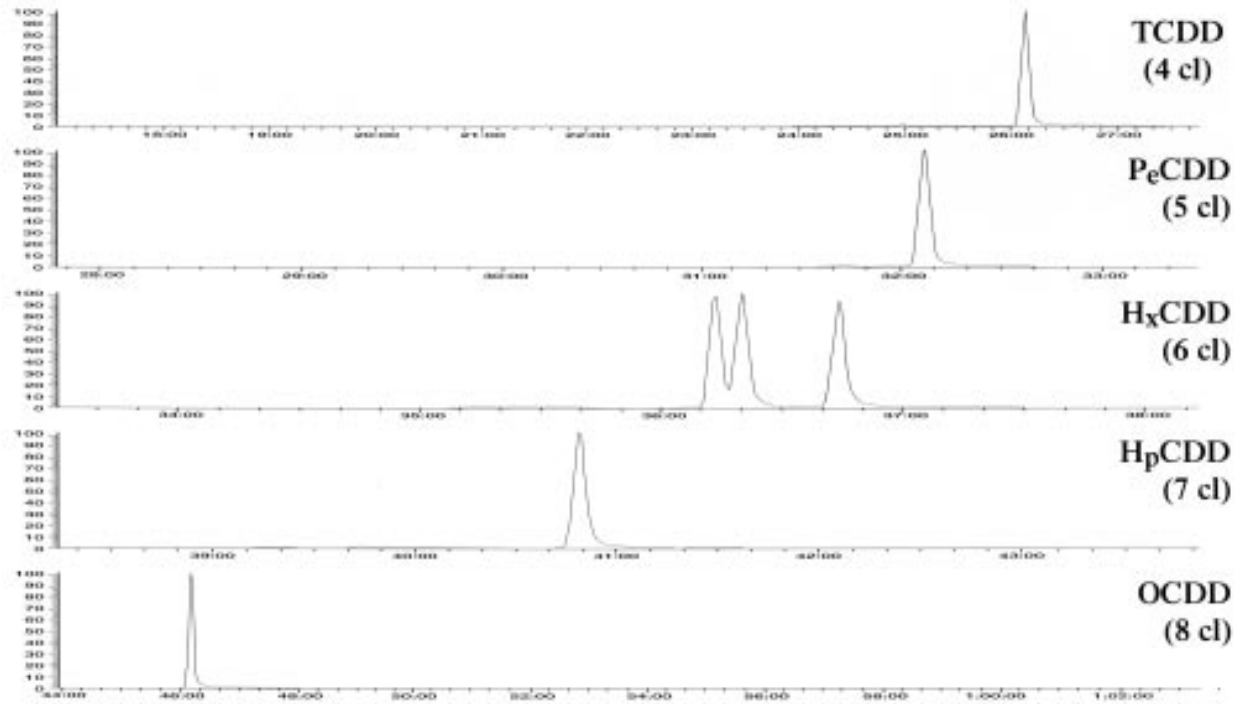
SEPARATION OF ANALOGUES 2,3,7,8, SUBSTITUTED BY A PCDDs AND PCDFs STANDARD



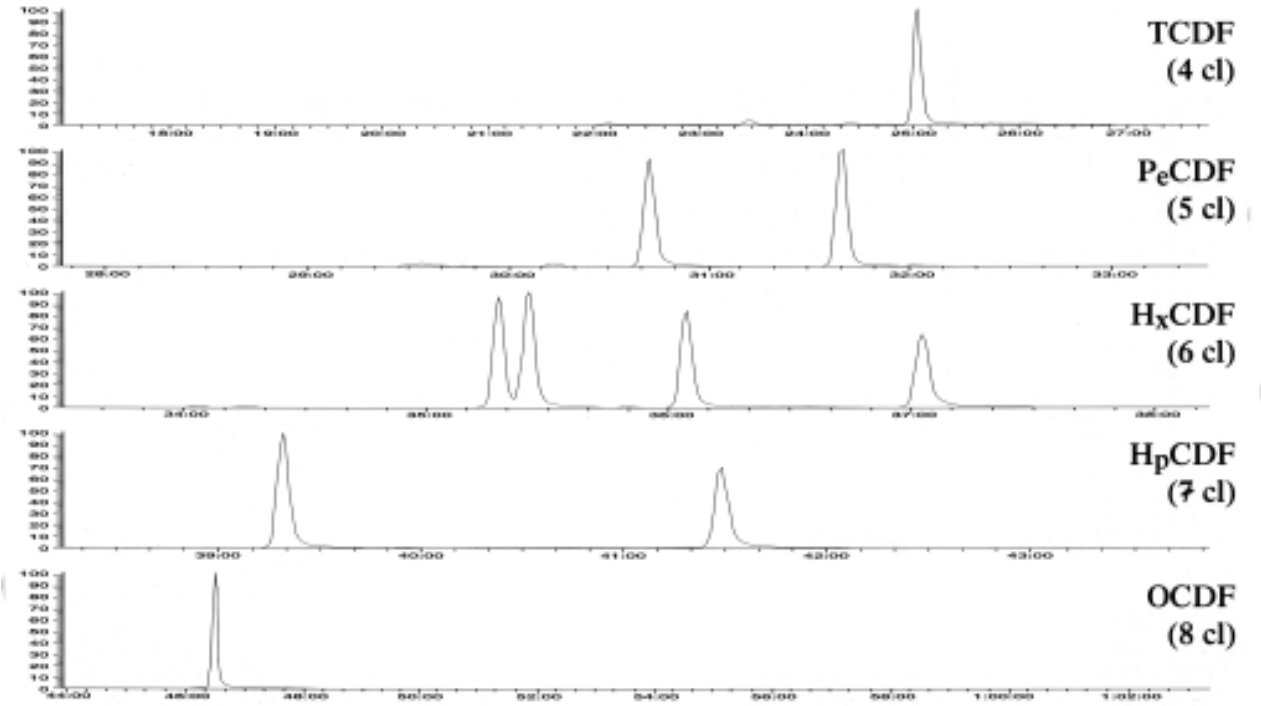
Peak Name

1- 2,3,7,8 - TCDF
2- 2,3,7,8 - TCDD
3- 1,2,3,7,8 - PCDF
4- 2,3,4,7,8 -PCDF
5- 1,2,3,7,8 - PCDD
6- 1,2,3,4,7,8 - H_xCDF
7- 1,2,3,6,7,8 - H_xCDF
8- 2,3,4,6,7,8 - H_xCDF
9- 1,2,3,4,7,8 - H_xCDD
10- 1,2,3,6,7,8 - H_xCDD
11- 1,2,3,7,8,9 - H_xCDD
12- 1,2,3,7,8,9 - H_xCDF
13- 1,2,3,4,6,7,8 - H_pCDF
14- 1,2,3,4,6,7,8 - H_pCDD
15- 1,2,3,4,7,8,9 - H_pCDF
16- OCDF
17- OCDD

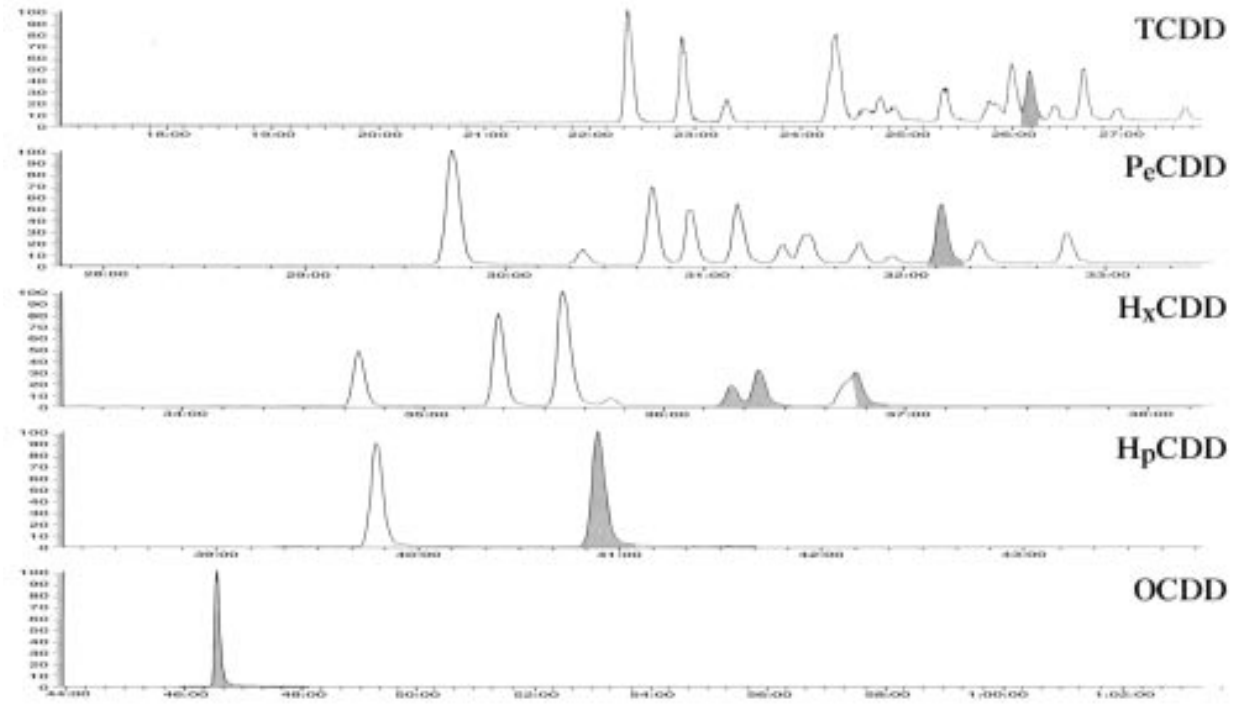
HB-5MS DIOXINS



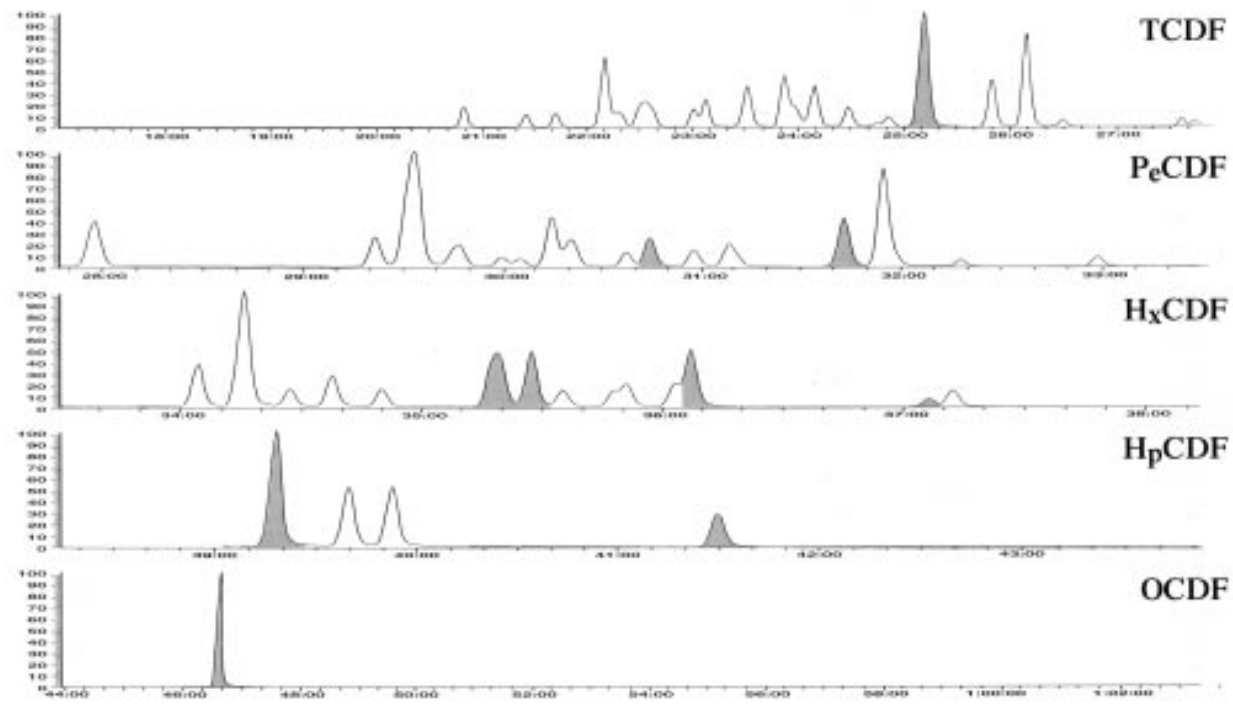
HB-5MS FURANS



HB-5MS DIOXINS - EMISSION SAMPLE

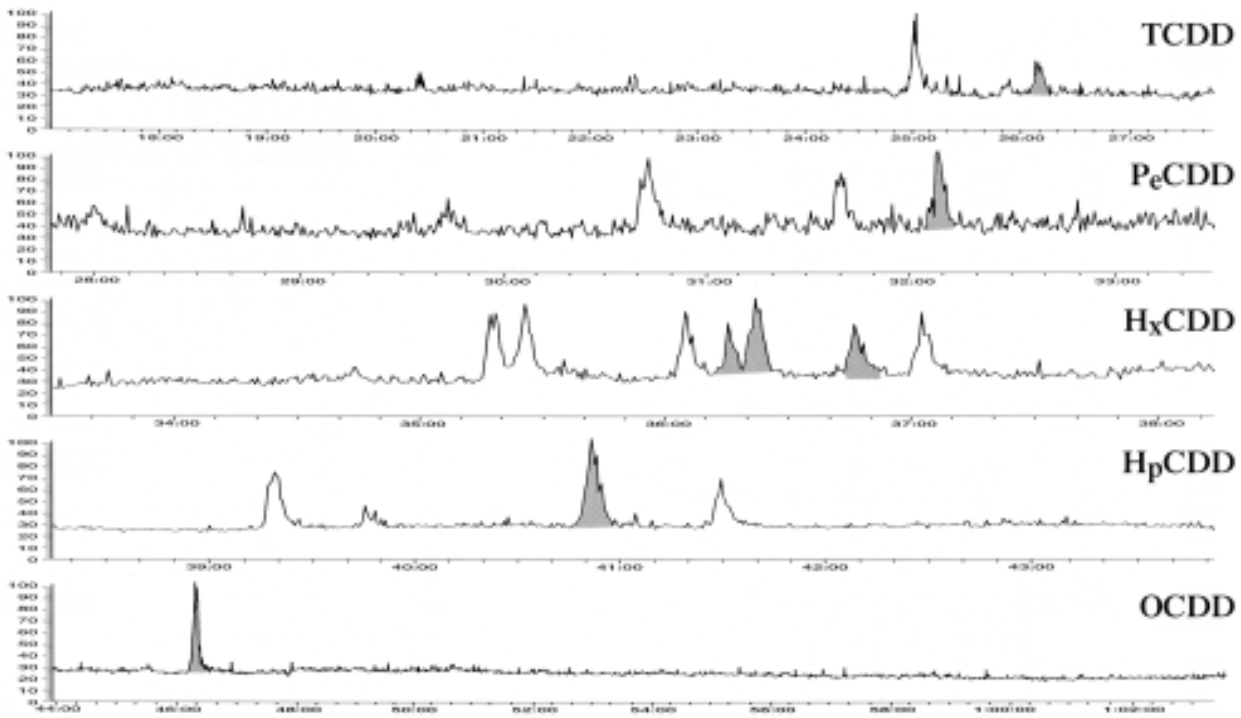


HB-5MS FURANS - EMISSION SAMPLE

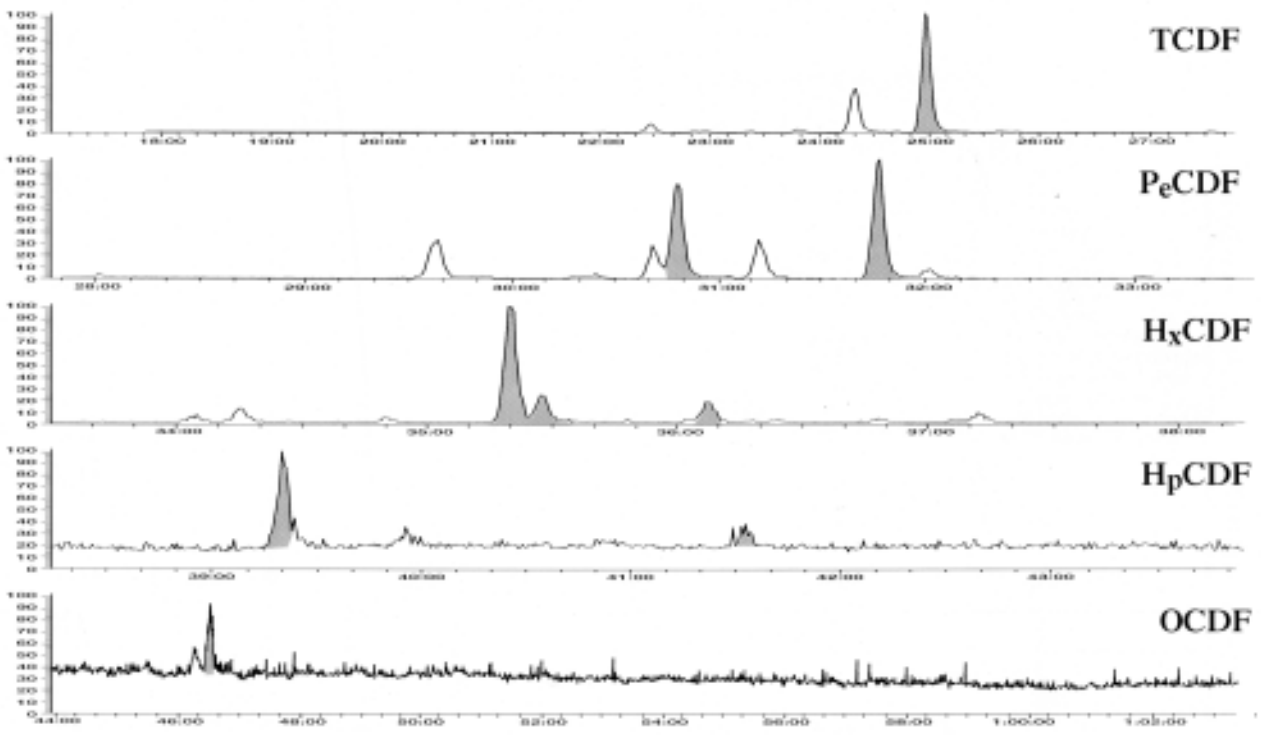


Environmental Applications

HB-5MS DIOXINS - FOOD SAMPLE



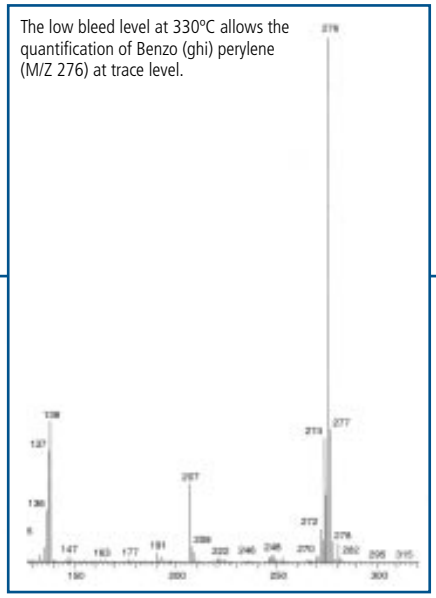
HB-5MS FURANS - FOOD SAMPLE



OPTIMUM RESOLUTION IN SEMIVOLATILE COMPOUNDS ANALYSIS

Column: HB-5TA, P/N 204761
Dimensions: 30m x 0.25mm x 0.50µm
Injection: 0.3 µl, splitless, 1min. 300°C
Carrier gas: He, 0.9ml/min. constant flow
Oven temperature: 35°C (2') to 260°C @ 20°C/min. to 330°C(1min) @ 2°C/min.
Detector: MS, full scan 35-450 AMU, 310°c transfer line
Sample: EPA 8270 standard (150/200 ng/µl)

The low bleed level at 330°C allows the quantification of Benzo (ghi) perylene (M/Z 276) at trace level.



Peak Name

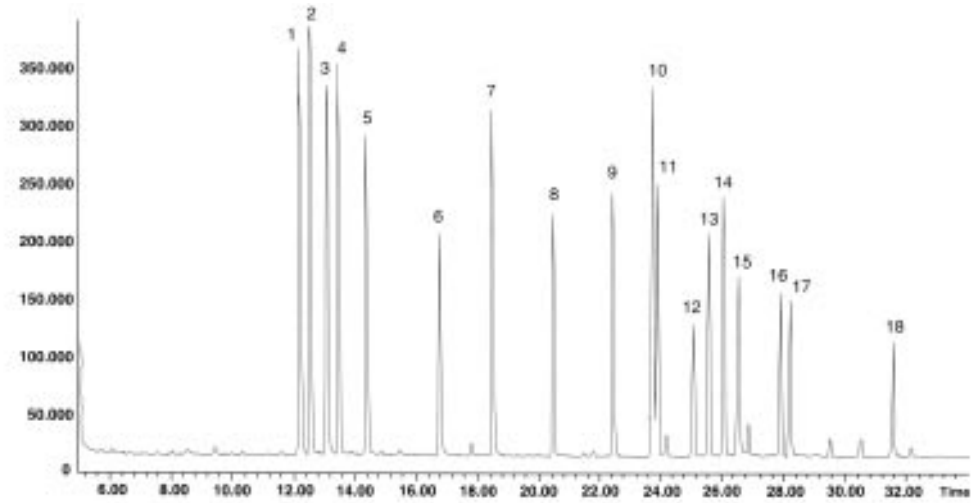
1- Methyl methanesulfonate
2- Ethyl methanesulfonate
3- Phenol
4- Aniline
5- bis (2-Chloroethyl) ether
6- 2-Chlorophenol
7- 1,3-Dichlorobenzene
8- 1,4-Dichlorobenzene
9- Benzyl alcohol
10- 1,2-Dichlorobenzene
11- 2-Methylphenol
12- bis(2-Chloroisopropyl)ether
13- 4-Methyl phenol
14- 3-Methyl phenol
15- Acetophenone
16- N-nitroso-di-n-propylamine
17- Hexachloroethane
18- Nitrobenzene
19- Isophorone
20- 2-Nitrophenol
21- 2,4-Dimethylphenol
22- bis(2-Chloroethoxy)methane
23- Benzoic acid
24- 2,4-Dichlorophenol
25- 1,2,4-Trichlorobenzene
26- Naphtalene
27- 4-Chloraniline
28- 2,6-Dichlorophenol
29- Hexachloropropene
30- Hexacloro-1, 3-butadiene
31- 4-Chloro-3-methylphenol
32- Safrole
33- 1-Methylnaphthalene
34- 2-Methylnaphthalene
35- Hexachlorocyclopentadiene
36- 1,2,4,5-Tetrachlorobenzene
37- 2,4,6-Trichlorophenol
38- 2,4,5-Trichlorophenol
39- Isosafrole (cis&trans)
40- 2-Chloronaphthalene
41- 2-Nitroaniline
42- 1,4-Naphthoquinone
43- Dimethylphthalate
44- 1,3-Dinitrobenzene
45- 2,6-Dinitrotoluene
46- Acenaphthylene
47- 3-Nitroaniline
48- Acenaphthene
49- 2,4-Dinitrophenol
50- 4-Nitrophenol
51- Pentachlorobenzene
52- 2,4-Dinitrotoluene
53- Dibenzofuran
54- 2,3,4,6-Tetrachlorophenol
55- Diethyl phtalate
56- 4-Chlorophenyl phenyl ether
57- Fluorene
58- 4-Nitroaniline
59- 4,6-Dinitro-2methylphenol
60- Diphenylamine
61- Azobenzene
62- 1,3,5-Trinitrobenzene
63- Phenacetin
64- 4-Bromophenyl phenyl ether
65- Hexachlorobenzene
66- Pentachlorophenol
67- Pentachloronitrobenzene
68- Dinoseb
69- Phenantrene
70- Anthracene
71- Di-n-butylphtalate
72- 4-Nitroquinoline-n-oxide
73- Isodrin
74- Fluoranthene
75- Benzidine
76- Pyrene
77- Aramite B
78- Aramite A
79- Chlorobenzilate
80- Butyl benzyl phtalate
81- Kepone
82- 3,3´-Dichlorobenzidine
83- Benzo (a) Anthracene
84- bis (2-Ethylhexyl) Phthalate
85- Chrysene
86- Di-n-octyl Phthalate
87- Benzo (b) Fluoranthene
88- Benzo (k) Fluoranthene
89- Benzo (a) Pyrene
90- 3-Methylchlorantrene
91- Indeno (1,2,3-cd) Pyrene
92- Dibenz (a,h) Anthracene
93- Benzo (g,h,i) Perylene

Environmental Applications

PESTICIDES ANALYSIS

Column: HB-5TA P/N 204759
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1.0 µl standard, 10 ppm in Isooctane, splitless, 250°C
Carrier gas: He, constant pressure, 9 psi (62 kPa)
Oven program: 100°C (3,1min.) to 170°C @ 50°C/min. to 300°C(5,6min.) @ 5°C/min.
Detector: MSD @ 280°C, scan 50-500 amus

Chromatogram supplied by J. Díaz of Chromatography Department, IQS.



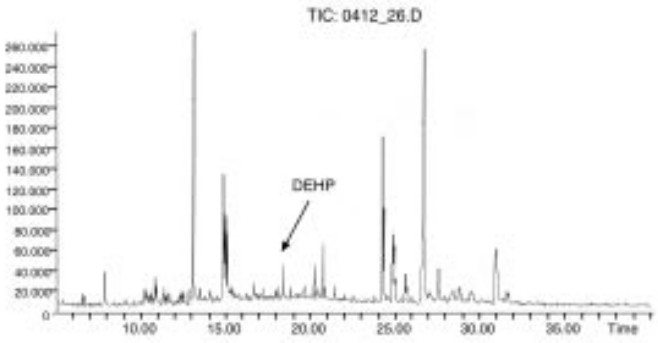
Peak Name

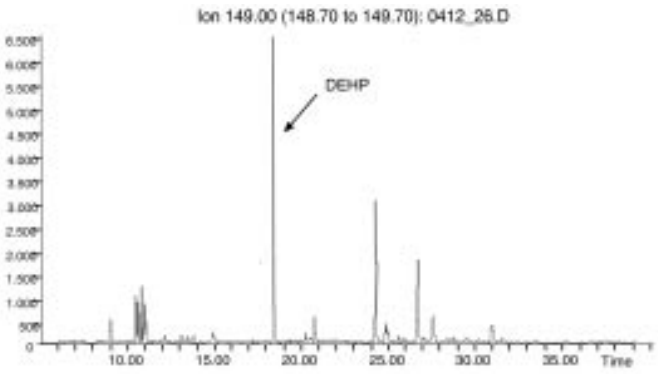
1- α-Hexachlorocyclohexane
2- Hexachlorobenzene
3- γ-Hexachlorobenzene
4- β-Hexachlorocyclohexane
5- Heptachlor
6- δ-Hexachlorocyclohexane
7- Aldrin
8- Heptachlor epoxide
9- Endosulfan I
10- p,p´- DDE
11- Dieldrin
12- Endrin
13- Endosulfan II
14- p.p´-DDD
15- Endrin Aldehyde
16- Endosulfan sulfate
17- p.p´-DDT
18- Metoxychlor

ANALYSIS OF SLUDGE FROM PURIFIER

Column: HB-5TA P/N 204759
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 2.0 µl standard (split 1:50), 280°C
Carrier gas: He, 9 psi (62 kPa)
Oven temperature: 120°C (1min.) to 300°C (21min.) @ 10°C/min.
Detector: MS, full scan 50-550 amu, 280°C
Sample: Urban sludge from purifier (250ppm di (2-ethylhexyl) phthalate, DEHP)

Chromatogram by B. Bagó, J. Díaz. Chromatography Dep. IQS.



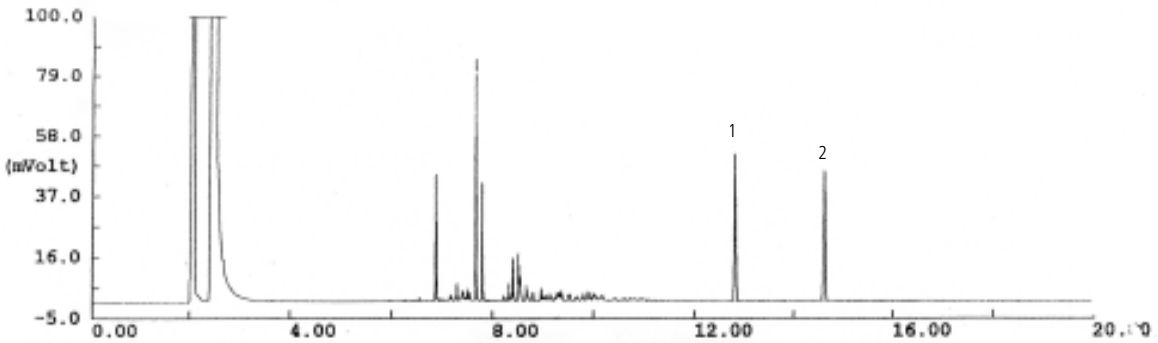


SEPARATION OF PESTICIDES

Column: HB-5TA, P/N 204759
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1 µl standard (600 mg/L), split 1:20. 200ºC
Carrier gas: He, 1ml/min
Oven program: 90ºC(1min) @ 20ºC/min to 200ºC @ 3ºC/min to 220ºC
Detector: ECD, 250ºC

Chromatogram provided by AINIA

	Peak Name	RT (min)
1-	Nonadecane (Internal Standard)	12.79
2-	Chlorpiryphos	14.59

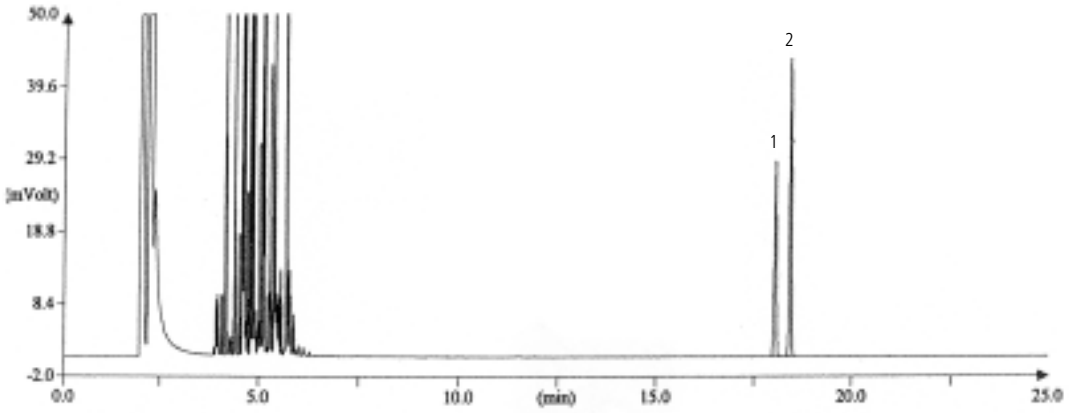


SEPARATION OF PESTICIDES

Column: HB-5TA, P/N 204759
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1 µl standard (717 mg/L), split 1:20. 200ºC
Carrier gas: He, 1mL/min
Oven program: 70ºC(1min) @ 20ºC/min to 150ºC @ 3ºC/min to 200ºC
Detector: ECD, 250ºC

Chromatogram provided by AINIA

	Peak Name	RT (min)
1-	Methyl chlorpiryphos	18.07
2-	Nonadecane (Internal Standard)	18.45

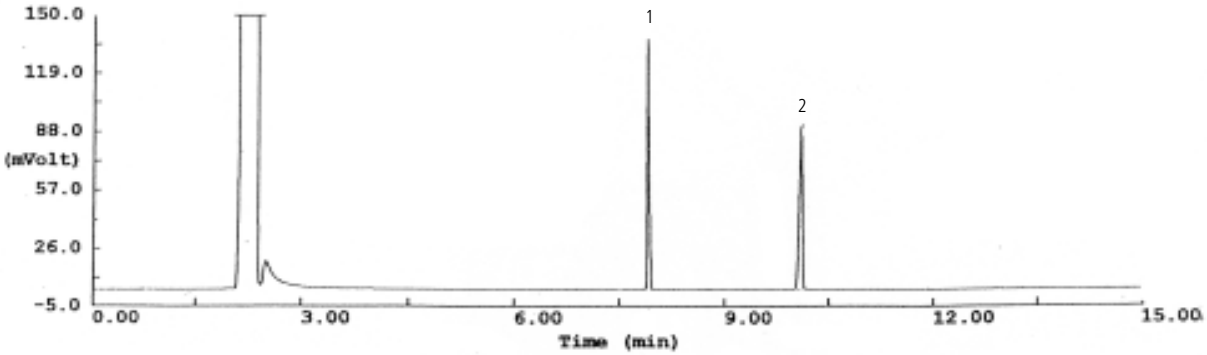


SEPARATION OF PESTICIDES

Column: HB-5TA, P/N 204759
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1 µl standard (440 mg/L), split 1:20. 200°C
Carrier gas: He, 1ml/min
Oven program: 70°C(1min) @ 20°C/min to 150°C @ 3°C/min to 200°C
Detector: ECD, 250°C

Chromatogram provided by AINIA

	Peak Name	RT (min)
1-	Nonadecane (Internal Standard)	7.91
2-	Pendimethalyn	10.09

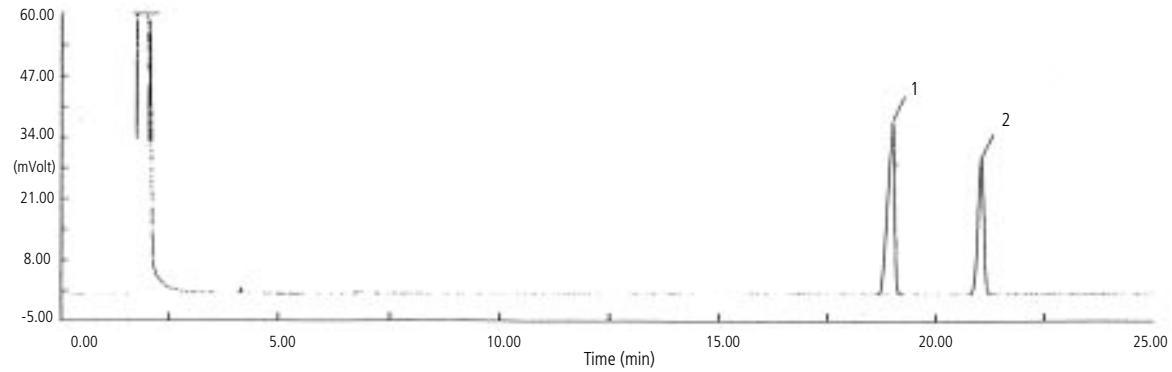


SEPARATION OF PESTICIDES

Column: HB-5TA, P/N 204759
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1 µl standard (1950 mg/L), split 1:20. 200°C
Carrier gas: He, 1mL/min
Oven program: 70°C(1min) @ 20°C/min to 150°C @ 3°C/min to 200°C
Detector: ECD, 250°C

Chromatogram provided by AINIA

	Peak Name	RT (min)
1-	Procolaz	18.99
2-	Octacosane (Internal Standard)	21.02



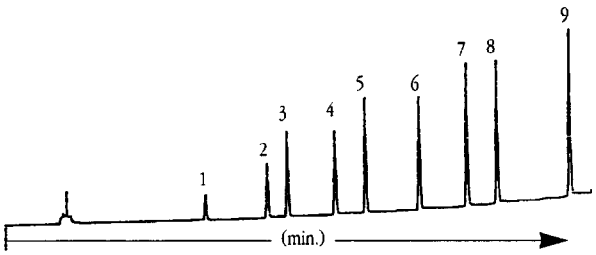
Environmental Applications

FREE ACIDS IN WATER

Column: HB-FFAP, P/N 204747
Dimensions: 30m x 0.53mm x 1.0µm
Injection: 1µl, split
Carrier gas: He, 4 psi (27.56 kPa)
Oven temperature: 120°C @ 4°C/min to 220°C
Detector: FID, 275°C

Peak Name

1- Acetic acid
2- Propionic acid
3- Isobutyric acid
4- Butyric acid
5- Isovaleric acid
6- Valeric acid
7- Isocaproic acid
8- Caproic acid
9- Heptanoic acid

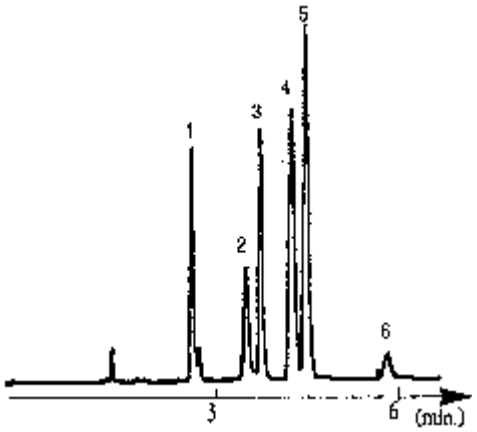


SOLVENTS IN WATER (100 ppm)

Column: HB-20Wax, P/N 204718
Dimensions: 60m x 0.53mm x 2.0µm
Injection: 1 µl, split
Carrier gas: He, 14 psi (96.46 kPa)
Oven temperature: 60°C (Isothermal)
Detector: FID, 280°CC

Peak Name

1- Acetone
2- Ethyl acetate
3- Methanol
4- Isopropanol
5- Ethanol
6- Chloroform



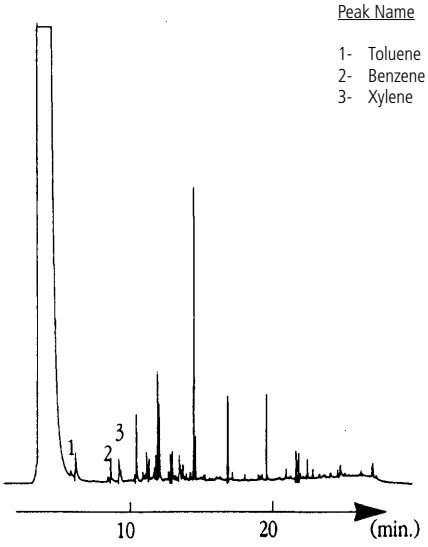
ANALYSIS OF FIRE RESIDUES (PYROLYSIS)

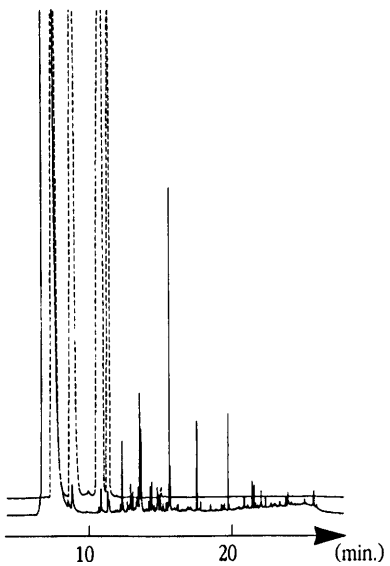
Column: HB-5, P/N 204684
Dimensions: 60m x 0.25mm x 0.25µm
Injection: 1µl, splitless
Carrier gas: He, 1.8 mL/min
Oven temperature: 150°C @ 2°C/min to 225°C
Detector: FID, 300°C

Chromatogram provided by Montse Elias and Jordi Codina of Laboratori General d'Assaigs i Investigacions

Peak Name

1- Toluene
2- Benzene
3- Xylene



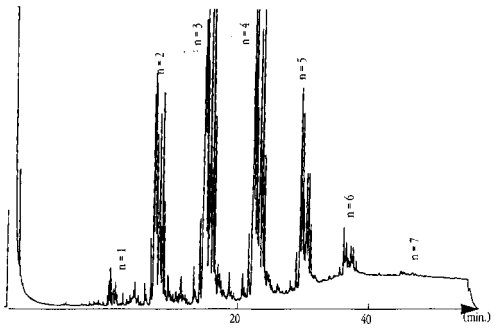


Environmental Applications

ANALYSIS OF NONYLPHENOLS

Column: HB-5, P/N 204684
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1µl, split
Carrier gas: H_2, 50 cm/s (110°C)
Oven temperature: 110°C @ 20°C/min to 220°C(1min) @ 4°C/min to 300°C
Detector: FID, 310°C

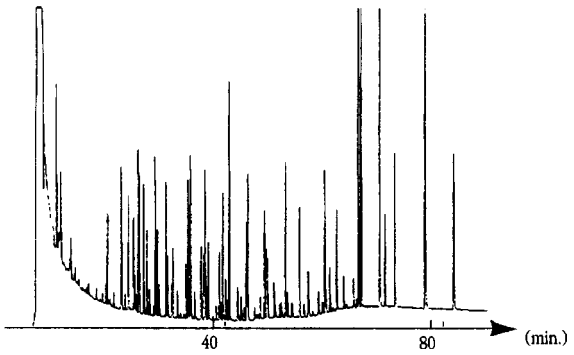
Chromatogram provided by Dr. Caixach of Laboratori Espectrometria Masses, CSIC, Barcelona.



ANALYSIS OF AROCLORS

Column: HB-5, P/N 204683
Dimensions: 60m x 0.22mm x 0.20µm
Injection: splitless
Carrier gas: H_2, 150 kPa
Oven temperature: 80°C(3,1min) @ 50°C/min to 190°C(5min) @ 1°C/min to 230°C(4min) @ 4°C/min to 260°C
Detector: ECD, 350°C

Chromatogram provided by C. Rodríguez and L. Comellas of Institut Químic de Sarrià, Barcelona.

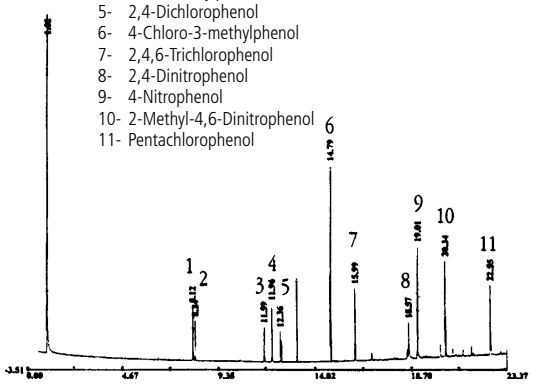


PHENOLS EPA 604

Column: HB-5, P/N 204681
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1 µl, split, 2 to 6 ng/comp, 250°C
Carrier gas: H_2, 12 psi (82.68 kPa)
Oven temperature: 80°C(4min) @ 8°C/min to 250°C
Detector: FID, 280°C

Peak Name

1- Phenol
2- Chorophenol
3- 2-Nitrophenol
4- 2,4-Dimethylphenol
5- 2,4-Dichlorophenol
6- 4-Chloro-3-methylphenol
7- 2,4,6-Trichlorophenol
8- 2,4-Dinitrophenol
9- 4-Nitrophenol
10- 2-Methyl-4,6-Dinitrophenol
11- Pentachlorophenol

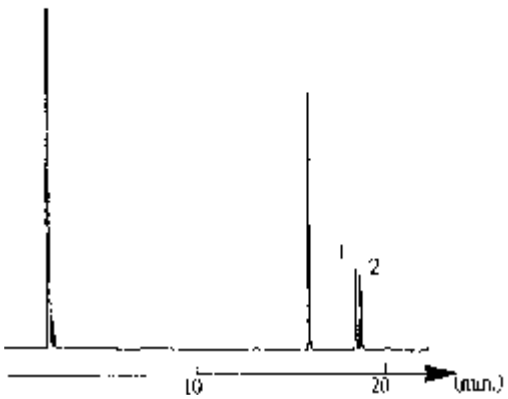


ANALYSIS OF PESTICIDES

Column: HB-5, P/N 204681
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1 µl, split
Carrier gas: He, 14 psi (96.46 kPa)
Oven temperature: 150°C @ 5°C/min to 265°C
Detector: FID, 325°C

Peak Name

1- Captan
2- Folpet

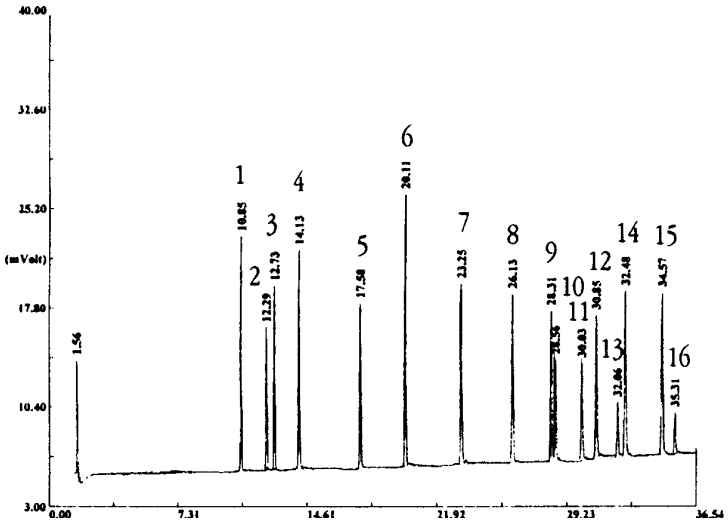


ORGANOCHLORINATED PESTICIDES EPA 608

Column: HB-5, P/N 204681
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 0.8µl pesticides standard (40-400 pg), split, 230°C
Carrier gas: H_2, 42 cm/s (150°C)
Oven temperature: 150°C @ 2°C/min to 225°C
Detector: FID, 300°C

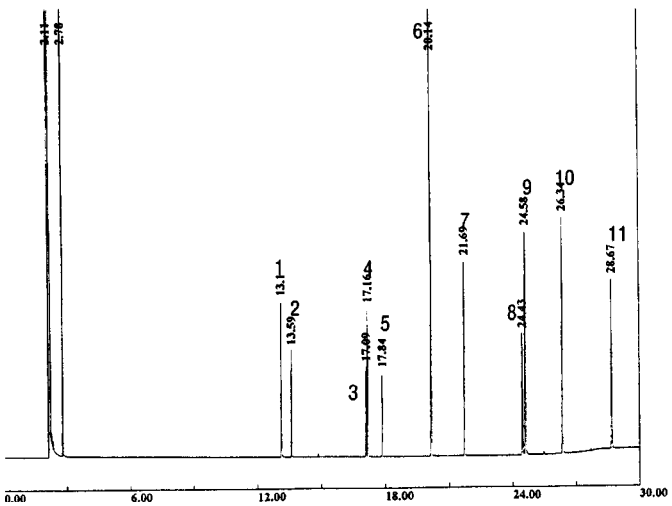
Peak Name

1- α-BHC
2- β-BHC
3- γ-BHC
4- δ-BHC
5- Heptachlor
6- Aldrin
7- Heptachlor epoxide
8- Endosulfan I
9- Dieldrin
10- 4,4'-DDE
11- Endrin
12- Endosulfan II
13- 4,4'-DDD
14- Endrin aldehyde
15- Endosulfan sulfate
16- 4,4'-DDT



SEPARATION OF PHENOLS EPA 604

Column: HB-5,, P/N 204678
Dimensions: 60m x 0.20mm x 0.4µm
Injection: 1 µl standard phenols EPA 604, split
Carrier gas: H_2, 38.5 psi (265.27 kPa)
Oven temperature: 50°C(4min) @ 8°C/min to 250°C(5min)
Detector: FID, 280°C



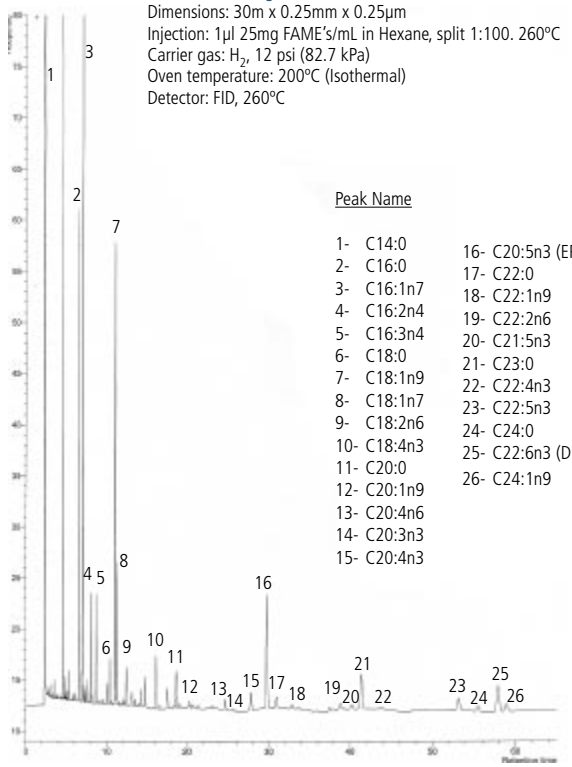
Peak Name

1- Phenol
2- 2-Chlorophenol
3- 2-Nitrophenol
4- 2,4-Dimethylphenol
5- 2,4-Dichlorophenol
6- 4-Chloro-3-Methylphenol
7- 2,4,6-Trichlorophenol
8- 2,4-Dinitrophenol
9- 4-Nitrophenol
10- 2-Methyl-4,6-Dinitrophenol
11- Pentachlorophenol

Foods & Flavors Applications

SEPARATION OF FAMES

Column: HB-OmegaWax, P/N 204729
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1µl 25mg FAME's/mL in Hexane, split 1:100. 260°C
Carrier gas: H_2, 12 psi (82.7 kPa)
Oven temperature: 200°C (Isothermal)
Detector: FID, 260°C

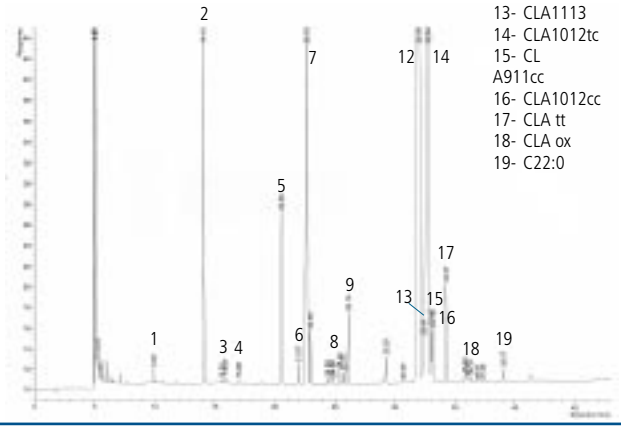


Peak Name

1- C14:0
2- C16:0
3- C16:1n7
4- C16:2n4
5- C16:3n4
6- C18:0
7- C18:1n9
8- C18:1n7
9- C18:2n6
10- C18:4n3
11- C20:0
12- C20:1n9
13- C20:4n6
14- C20:3n3
15- C20:4n3
16- C20:5n3 (EPA)
17- C22:0
18- C22:1n9
19- C22:2n6
20- C21:5n3
21- C23:0
22- C22:4n3
23- C22:5n3
24- C24:0
25- C22:6n3 (DHA)
26- C24:1n9

SEPARATION OF FAMES

Column: HB-2340. P/N 204779
Dimensions: 60m x 0.25mm x 0.20µm
Injection: 0.4µl (10 mg/mL), split 1:100. 260°C
Carrier gas: H_2, 25 psi (172.2 kPa)
Oven program: 160°C(10min) @ 1°C/min a 220°C(5min)
Detector: FID, 260°C

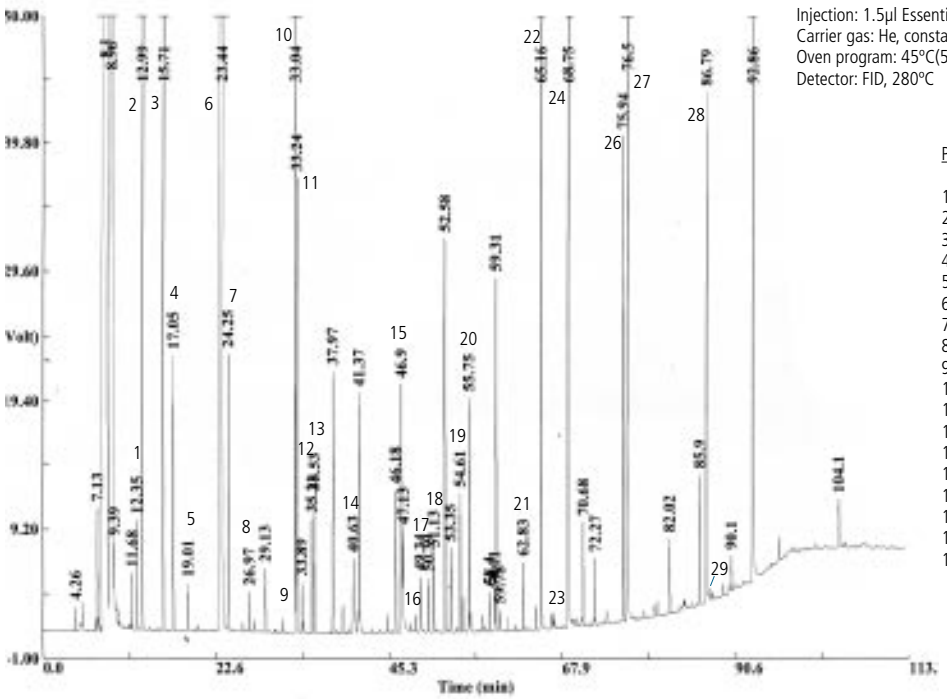


Peak Name

1- C14:0
2- C16:0
3- C16:1c
4- C17:0
5- C18:0
6- C18:1t
7- C18:1c
8- C18:2t
9- C18:2c
10- C20:0
11- C20:1c
12- CLA911ct
13- CLA1113
14- CLA1012tc
15- CL A911cc
16- CLA1012cc
17- CLA tt
18- CLA ox
19- C22:0

ESSENTIAL OIL

Column: HB-20Wax, P/N 204706
Dimensions: 60m x 0.25mm x 0.25µm
Injection: 1.5µl Essential oil, splitless 0.5min, 250°C
Carrier gas: He, constant pressure 26 psi (180 kPa).
Oven program: 45°C(5min) @ 2°C/min to 230°C(15min)
Detector: FID, 280°C



Peak Name

1- Ethyl butyrate
2- 1-Propanol
3- Isobutanol
4- Isoamyl acetate
5- 1-Butanol
6- Isoamyl alcohol
7- Ethyl hexanoate
8- n-Hexyl acetate
9- 1-Butanal
10- Ethyl lactate
11- 1-Hexanol
12- 3-Ethoxy-1-Propanol
13- cis-3-Hexenol
14- Furfural
15- Propionic acid
16- Isobutyric acid
17- Methyl furfural
18- Butyric acid
19- Diethyl succinate
20- α-Terpineol
21- Phenyl ethyl acetate
22- Hexanoic acid
23- Geraniol
24- Phenyl ethanol
25- Enantic acid
26- 4-Ethyl guaiacol
27- Octanoic acid
28- Decanoic acid
29- Ethyl palmitate

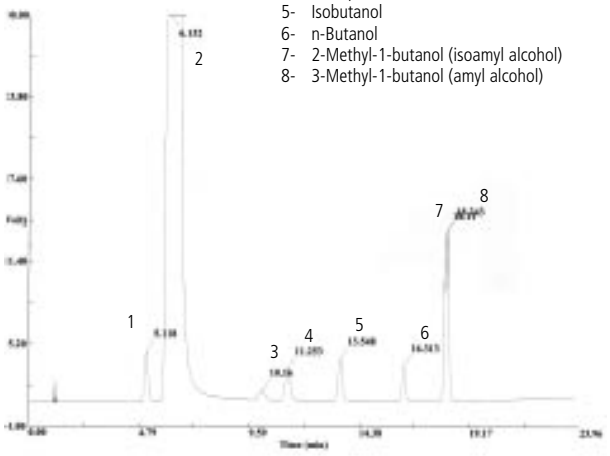
Foods & Flavors Applications

SEPARATION OF ALCOHOLS

Column: HB-Wax, P/N 204777
Dimensions: 30m x 0.53mm x 1.0µm
Injection: 1µl standard, split 1:4, 200°C
Carrier gas: He, 3 psi (20.7 kPa)
Oven temperature: 40°C(10min) @ 6°C/min to 125°C(5min)
Detector: FID, 200°C

Peak Name

1- Methanol
2- Ethanol
3- 2-Butanol
4- n-Propanol
5- Isobutanol
6- n-Butanol
7- 2-Methyl-1-butanol (isoamyl alcohol)
8- 3-Methyl-1-butanol (amyl alcohol)

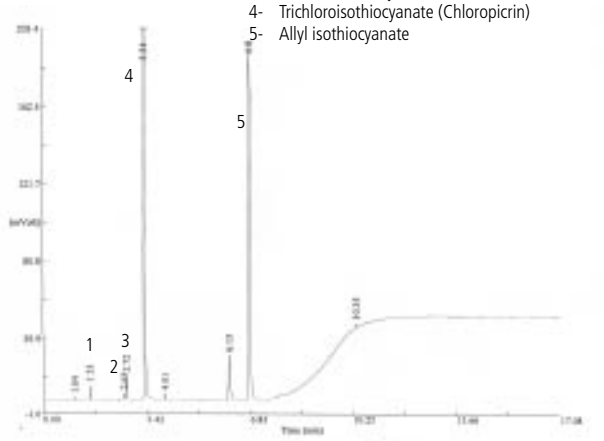


ANALYSIS OF CHLOROPICRINE IN WINES

Column: HB-5, P/N 204681
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1µl standard (5mg/L), 200°C
Carrier gas: H_2, 12 psi (82.7 kPa)
Oven temperature: 43°C(7min) @ 30°C/min to 120°C(10min)
Detector: ECD, 300°C

Peak Name

1- Monochloroisothiocyanate
2- Methyl isothiocyanate
3- Dichloroisothiocyanate
4- Trichloroisothiocyanate (Chloropicrin)
5- Allyl isothiocyanate

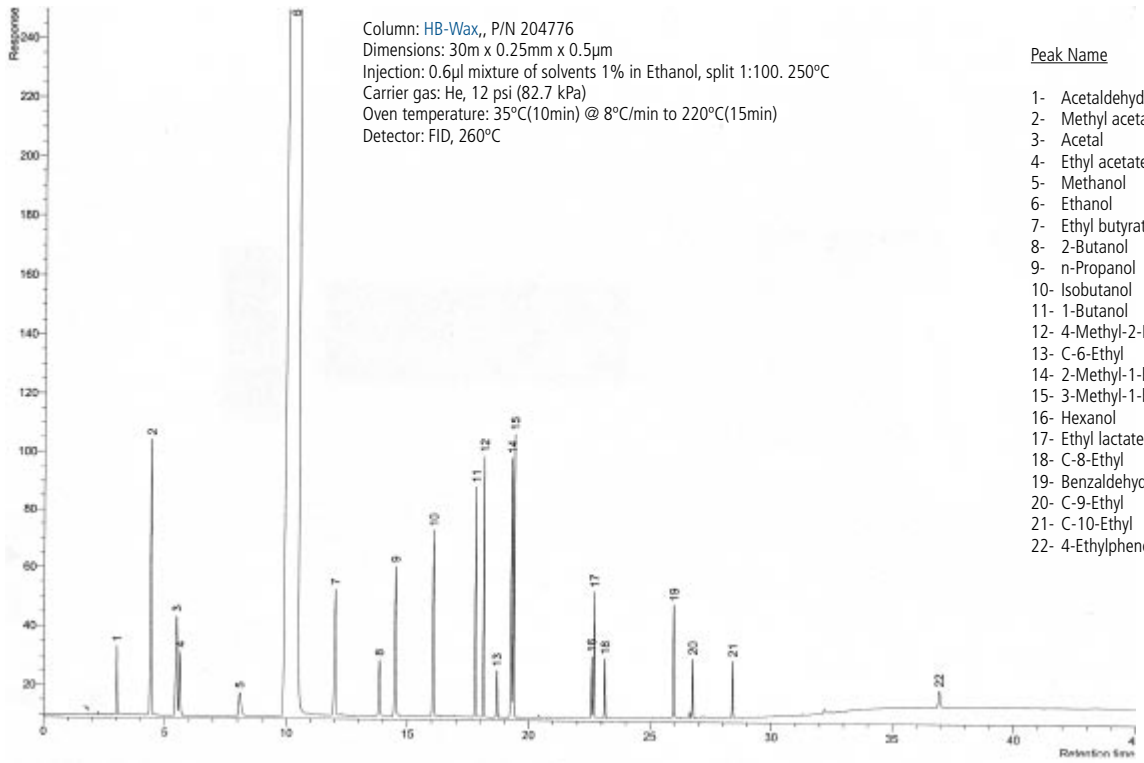


SEPARATION OF VOLATILES IN ALCOHOLIC BEVERAGES

Column: HB-Wax,, P/N 204776
Dimensions: 30m x 0.25mm x 0.5µm
Injection: 0.6µl mixture of solvents 1% in Ethanol, split 1:100. 250°C
Carrier gas: He, 12 psi (82.7 kPa)
Oven temperature: 35°C(10min) @ 8°C/min to 220°C(15min)
Detector: FID, 260°C

Peak Name

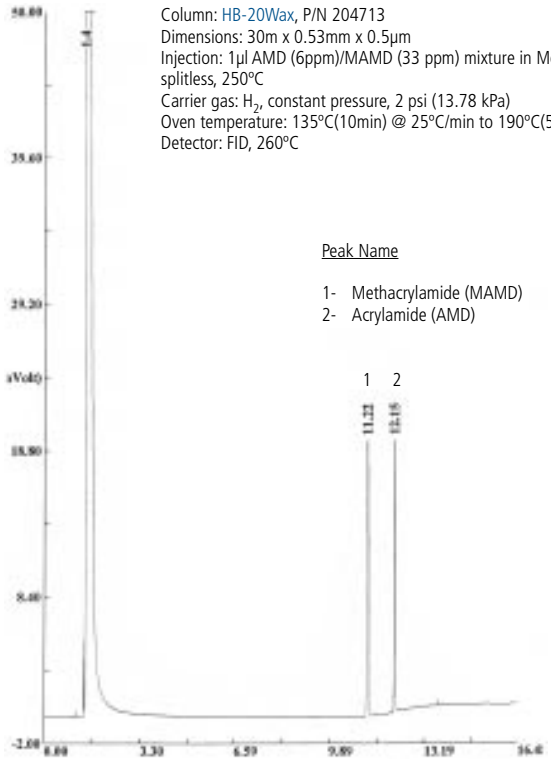
1- Acetaldehyde
2- Methyl acetate
3- Acetal
4- Ethyl acetate
5- Methanol
6- Ethanol
7- Ethyl butyrate
8- 2-Butanol
9- n-Propanol
10- Isobutanol
11- 1-Butanol
12- 4-Methyl-2-Pentanol (I. St.)
13- C-6-Ethyl
14- 2-Methyl-1-butanol
15- 3-Methyl-1-butanol
16- Hexanol
17- Ethyl lactate
18- C-8-Ethyl
19- Benzaldehyde
20- C-9-Ethyl
21- C-10-Ethyl
22- 4-Ethylphenol



Foods & Flavors Applications

SEPARATION OF ACRYLAMIDE

Column: HB-20Wax, P/N 204713
Dimensions: 30m x 0.53mm x 0.5µm
Injection: 1µl AMD (6ppm)/MAMD (33 ppm) mixture in Methanol, splitless, 250°C
Carrier gas: H_2, constant pressure, 2 psi (13.78 kPa)
Oven temperature: 135°C(10min) @ 25°C/min to 190°C(5min)
Detector: FID, 260°C



Peak Name

1- Methacrylamide (MAMD)
2- Acrylamide (AMD)

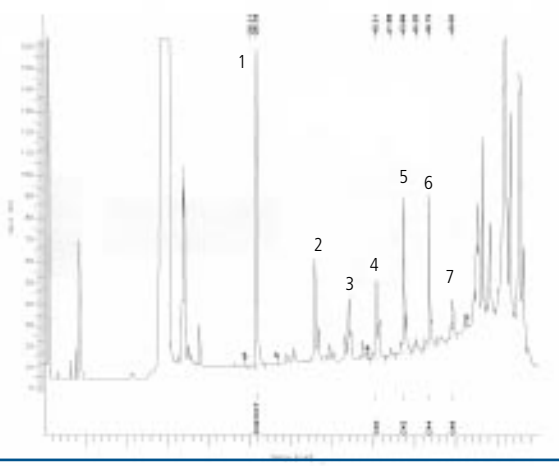
IDENTIFICATION OF WAX IN OLIVE OIL

Column: HB-5, P/N 204685
Dimensions: 15m x 0.32mm x 0.1µm
Injection: 1µl olive oil extract, On Column, 280°C
Carrier gas: H_2, 2mL/min
Oven program: 85°C @ 35°C/min to 180°C @ 3°C/min to 330°C
Detector: FID, 350°C

Chromatogram provided by J.E. Trujillo of Ybarra (Sevilla)

Peak Name

1- C32 (I.ST.)
2- C36
3- C38
4- C40
5- C42
6- C44
7- C46

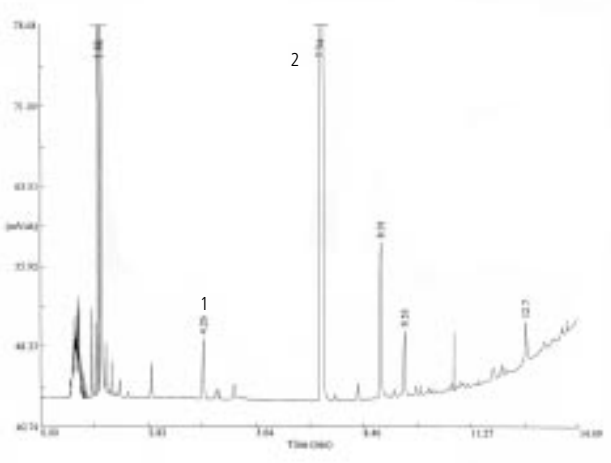


SEPARATION OF ACETOIN IN VINEGAR

Column: HB-FFAP, P/N 204742
Dimensions: 25m x 0.53mm x 1.0µm
Inyection: 1µl, split 1:100. 250°C
Carrier gas: H_2 , constant pressure 2.9 psi (19.98 Kpa)
Oven temperature: 100°C(5 min) @ 10°C/min a 200°C
Detector: FID, 250°C

Peak Name

1- Acetoin
2- Acetic acid

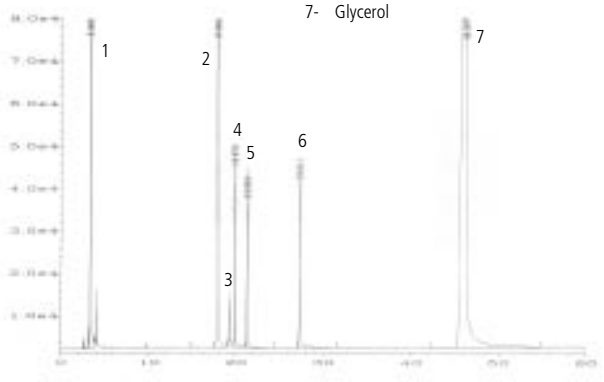


SEPARATION OF POLYOLS IN WINE

Column: HB-FFAP, P/N 204740
Dimensions: 60m x 0.25mm x 0.25µm
Injection: 1µl, split 1:100. 250°C
Carrier gas: H_2 , constant flow 1mL/min
Oven temperature: 80°C(5 min) @ 3°C/min to 200°C(15 min)
Detector: FID, 250°C

Peak Name

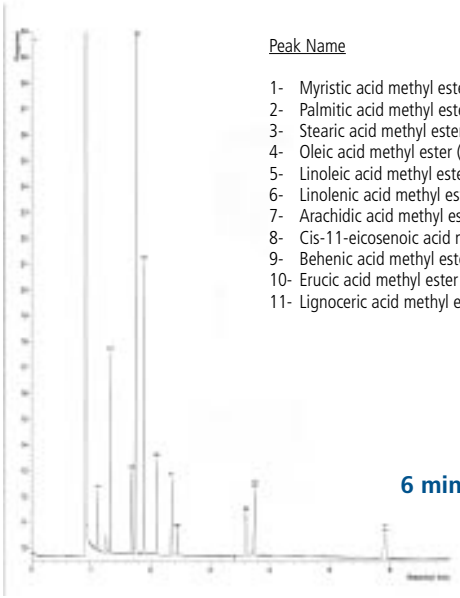
1- Methanol
2- D(-)-2,3-Butanediol
3- Meso-2,3-Butanediol
4- 1,2-Propanediol
5- Ethyleneglycol
6- 1,3-Butanediol
7- Glycerol



Foods & Flavors Applications

ANALYSIS OF RAPESEED OIL (FAST CHROMATOGRAPHY)

Column: HB-20Wax P/N 205218
Dimensions: 20m x 0.10mm x 0.2µm
Injection: 0.7µl Rapeseed oil, split 1:500. 280ºC
Carrier gas: H_2, constant pressure, 54 psi (372 kPa), 41.15 cm/s
Oven temperature: 205ºC (Isothermal)
Detector: FID, 280ºC

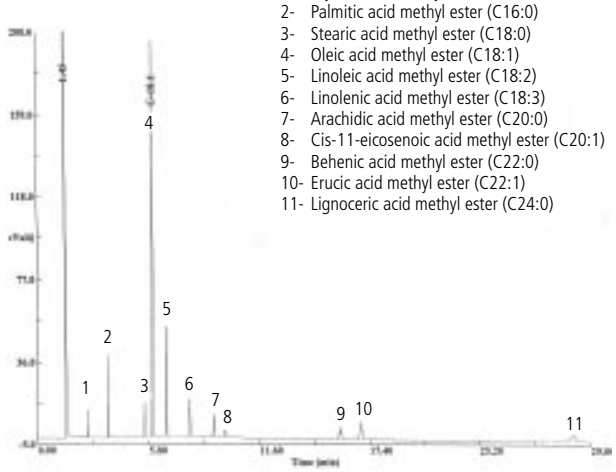


Peak Name

1- Myristic acid methyl ester (C14:0)
2- Palmitic acid methyl ester (C16:0)
3- Stearic acid methyl ester (C18:0)
4- Oleic acid methyl ester (C18:1)
5- Linoleic acid methyl ester (C18:2)
6- Linolenic acid methyl ester (C18:3)
7- Arachidic acid methyl ester (C20:0)
8- Cis-11-eicosenoic acid methyl ester (C20:1)
9- Behenic acid methyl ester (C22:0)
10- Erucic acid methyl ester (C22:1)
11- Lignoceric acid methyl ester (C24:0)

ANALYSIS OF RAPESEED OIL

Column: HB-20WAX P/N 204704
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1µl Rapeseed oil, split 1:50. 280ºC
Carrier gas: H_2, 36.23 cm/s
Oven temperature: 205ºC (Isothermal)
Detector: FID, 280ºC



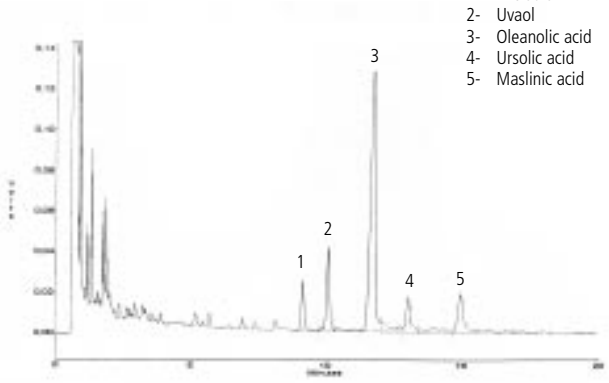
Peak Name

1- Myristic acid methyl ester (C14:0)
2- Palmitic acid methyl ester (C16:0)
3- Stearic acid methyl ester (C18:0)
4- Oleic acid methyl ester (C18:1)
5- Linoleic acid methyl ester (C18:2)
6- Linolenic acid methyl ester (C18:3)
7- Arachidic acid methyl ester (C20:0)
8- Cis-11-eicosenoic acid methyl ester (C20:1)
9- Behenic acid methyl ester (C22:0)
10- Erucic acid methyl ester (C22:1)
11- Lignoceric acid methyl ester (C24:0)

ALCOHOLS AND TERPENIC ACIDS (OLIVE OIL)

Column: HB-35, P/N 204780
Dimensions: 30m x 0.25mm x 0.15µm
Injection: 1 µl extract of leaf of Olive Tree, split 1:20. 300ºC
Carrier gas: H_2, constant pressure 12 psi (82.7 kPa).
Oven temperature: 275ºC
Detector: FID, 300ºC

Chromatogram provided by Angeles Guinda of Instituto de la Grasa, CSIC.

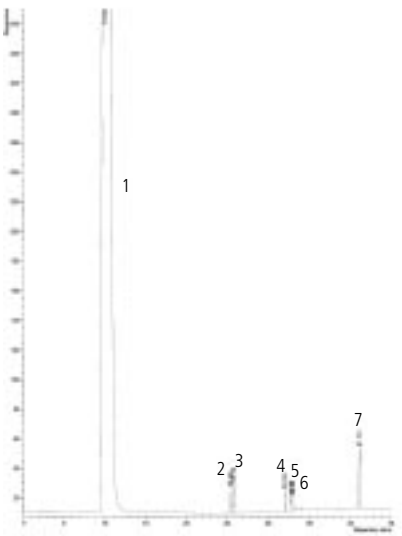


Peak Name

1- Eritrodiol
2- Uvaol
3- Oleanolic acid
4- Ursolic acid
5- Maslinic acid

ANALYSIS BERGAMOL

Column: HB-Wax, P/N 204776
Dimensions: 30m x 0.25mm x 0.5µm
Injection: 1 µl standard 0.3% v/v Bergamol/Diethyl Phtalate in Ethanol, split 1:50. 260ºC
Carrier gas: H_2, 12 psi (82.7 kPa).
Oven temperature: 35ºC(10min) @ 8ºC/min to 220ºC(20min)
Detector: FID, 260ºC

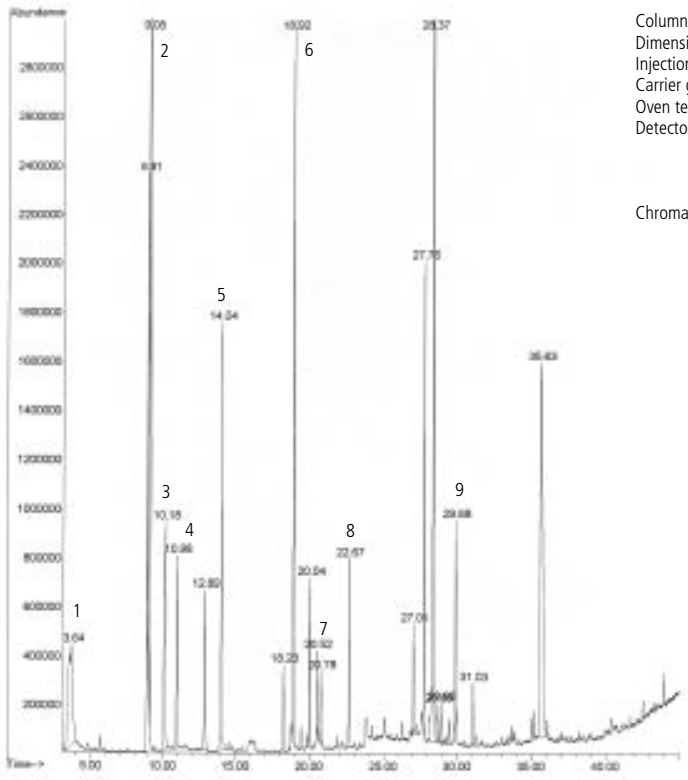


Peak Name

1- Ethanol
2-6-Bergamol
7- Diethyl Phtalate

Foods & Flavors Applications

ALDEHYDES



Column: HB-5TA, P/N 204759
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1 µl reaction Epoxydecenal and Butylamine, splitless (1.5min), 280ºC
Carrier gas: He, constant pressure 12 psi (82.7 kPa).
Oven temperature: 50ºC(1min) @ 5ºC/min to 240ºC @ 10ºC/min to 300ºC
Detector: MS, 280ºC

Chromatogram provided by F. Javier Hidalgo García of Instituto de la Grasa, CSIC.

Peak Name

1- Hexanal
2- 1-Butylpyrrole
3- Butanal
4- 2-Octanal
5- 3-Nonanal
6- 2,4-Decadienal
7- 2-Butiloctanal
8- N-Butyl-2-Pentylpyrrole
9- N-Butyl-2-(1-Hydroxyhexyl)Pyrrole

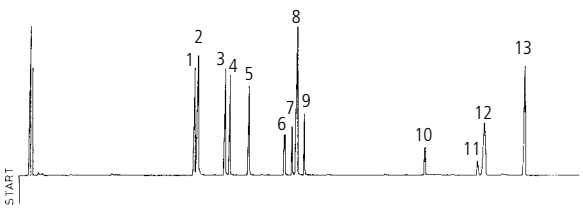
PESTICIDES IN WINES

Column: HB-5, P/N 204681
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1µl standard in Cyclohexane, 250ºC
Carrier gas: He, 1 ml/min
Oven temperature: 145ºC @ 0.55ºC/min to 220ºC
Detector: ECD, 300ºC

Chromatogram provided by J. García of INCAVI, Vilafranca del Penedès (Barcelona)

Peak Name

1- Methyl parathion
2- Vinclozoline
3- Phenitrothion
4- Diclofluanide
5- Chlorpiryphos
6- Captan
7- Folpet
8- Chlozolinate
9- Procimidone
10- Captafol
11- Iprodione
12- Bromopropilate
13- Phenarimol



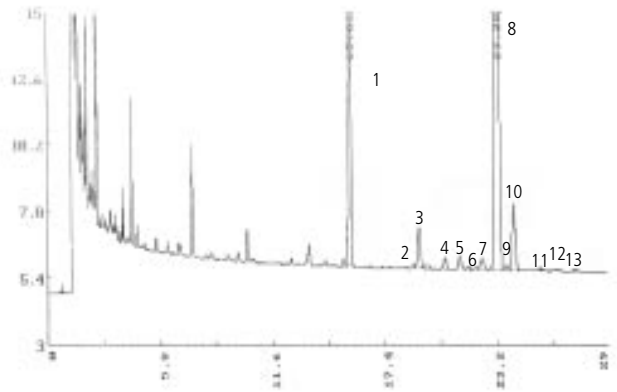
SEPARATION OF STEROLS IN OLIVE OIL (EXTRA VIRGIN)

Column: HB-1, P/N 204669
Dimensions: 30m x 0.53mm x 1.5µm
Injection: 1µl olive oil extract,
splitless (1.5min), 280ºC
Carrier gas: He, constant pressure 3 psi (20.7 kPa).
Oven program: 265ºC (Isothermal)
Detector: FID, 300ºC

Chromatogram provided by Jesus Rodríguez of Aceites Monterreal (Villa del Río, Córdoba)

Peak Name

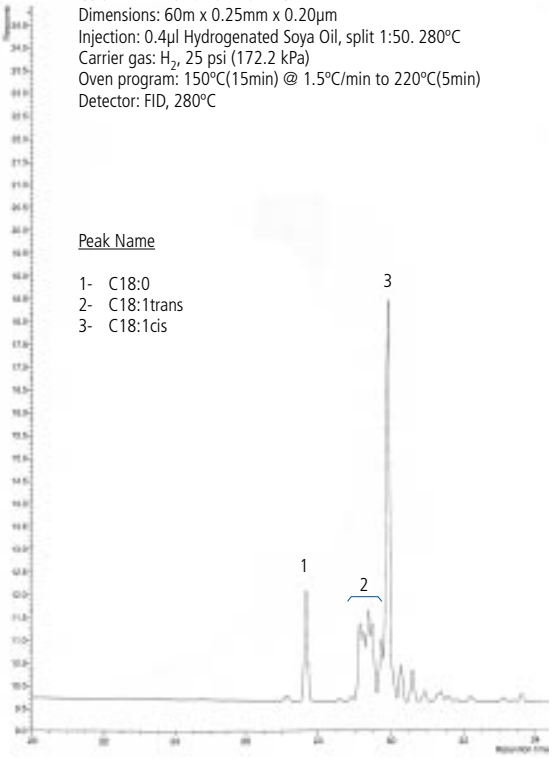
1- Cholesterol
2- 24-Methylenecholesterol
3- Campesterol
4- Stigmasterol
5- δ7-Campesterol
6- δ5,23-Stigmasterol
7- Chlerosterol
8- β-Sitosterol
9- Sitosterol
10- δ5-Avenasterol
11- δ5,24-Stigmastadienol
12- δ7-Stigmasterol
13- δ7-Avenasterol



Foods & Flavors Applications

HYDROGENATED SOYA OIL

Column: HB-2340. P/N 204779
Dimensions: 60m x 0.25mm x 0.20µm
Injection: 0.4µl Hydrogenated Soya Oil, split 1:50. 280°C
Carrier gas: H_2, 25 psi (172.2 kPa)
Oven program: 150°C(15min) @ 1.5°C/min to 220°C(5min)
Detector: FID, 280°C

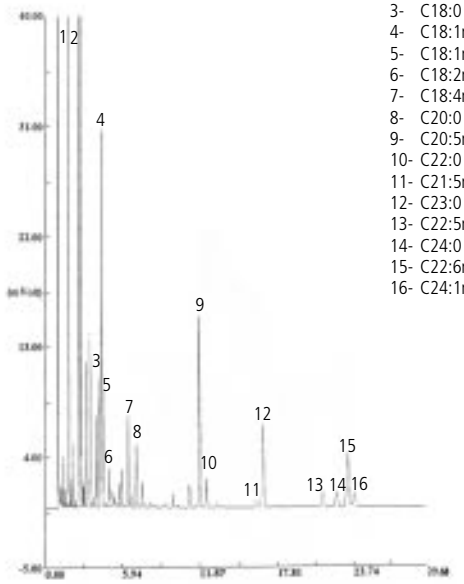


Peak Name

1- C18:0
2- C18:1trans
3- C18:1cis

SEPARATION OF FAMES

Column: HB-OmegaWax, P/N 204730
Dimensions: 30m x 0.32mm x 0.25µm
Injection: 1µl test SP-4-8476, split 1:90. 250°C
Carrier gas: H_2, 9.5 psi (65.4 kPa)
Oven temperature: 200°C (Isothermal)
Detector: FID, 260°C

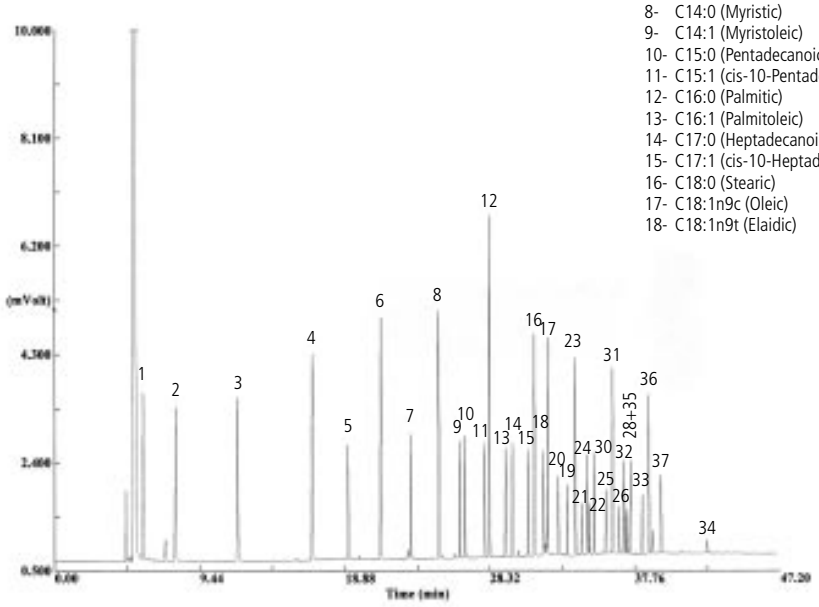


Peak Name

1- C14:0
2- C16:0
3- C18:0
4- C18:1n9
5- C18:1n7
6- C18:2n6
7- C18:4n3
8- C20:0
9- C20:5n3 (EPA)
10- C22:0
11- C21:5n3
12- C23:0
13- C22:5n3
14- C24:0
15- C22:6n3 (DHA)
16- C24:1n9

SEPARATION OF FAMES

Column: HB-2340. P/N 204779
Dimensions: 60m x 0.25mm x 0.20µm
Injection: 1µl SP-47885 (10 mg/mL), split 1:100. 260°C
Carrier gas: He, 20.15 cm/s at 185°C
Oven program: 90°C(7min) @ 5°C/min to 240°C(15min)
Detector: FID, 260°C



Peak Name

1- C4:0 (Butyric)
2- C6:0 (Caproic)
3- C8:0 (Caprylic)
4- C10:0 (Capric)
5- C11:0 (Undecanoic)
6- C12:0 (Lauric)
7- C13:0 (Tridecanoic)
8- C14:0 (Myristic)
9- C14:1 (Myristoleic)
10- C15:0 (Pentadecanoic)
11- C15:1 (cis-10-Pentadecanoic)
12- C16:0 (Palmitic)
13- C16:1 (Palmitoleic)
14- C17:0 (Heptadecanoic)
15- C17:1 (cis-10-Heptadecenoic)
16- C18:0 (Stearic)
17- C18:1n9c (Oleic)
18- C18:1n9t (Elaidic)
19- C18:2n6c (Linoleic)
20- C18:2n6t (Linolelaidic)
21- C18:3n6 (γ-Linolenic)
22- C18:3n3 (α-Linolenic)
23- C20:0 (Arachidic)
24- C20:1n9 (cis-11-Eicosenoic)
25- C20:2 (cis-11,14-Eicosadienoic)
26- C20:3n6 (cis-8,11,14-Eicosatrienoic)
27- C20:3n3 (cis-11,14,17-Eicosatrienoic)
28- C20:4n6 (Arachidonic)
29- C20:5n3 (cis-5,8,11,14,17-Eicosapentaenoic)
30- C21:0 (Henicosanoic)
31- C22:0 (Behenic)
32- C22:1n9 (Erucic)
33- C22:2 (cis-13,16-Docosadienoic)
34- C22:6n3 (cis-4,7,10.13,16,19-Docosahexaenoic)
35- C23:0 (Tricosanoic)
36- C24:0 (Lignoceric)
37- C24:1n9 (Nervonic)

Foods & Flavors Applications

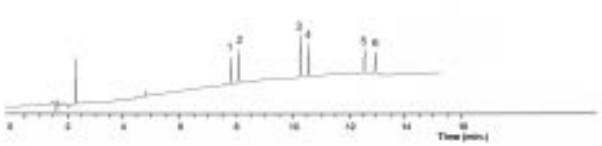
PHENOLS AND ANISOLS IN WINE

Column: HB-5ms P/N 204698
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 280°C, 1µl (St 100 ppb), split (30:1)
Carrier gas: H_2, 1,2 ml/min. 17 psi (117 kPa) to 80°C
Oven temperature: 80°C to 120°C (5min) @ 10°C/min.
Detector: ECD, 330°C

Peak Name

1- Trichlorophenol
2- Trichloroanisol
3- Tetrachlorophenol
4- Trichloroanisol
5- Pentachlorophenol
6- Pentachloroanisol

Excellent peak symmetry at the trace level!

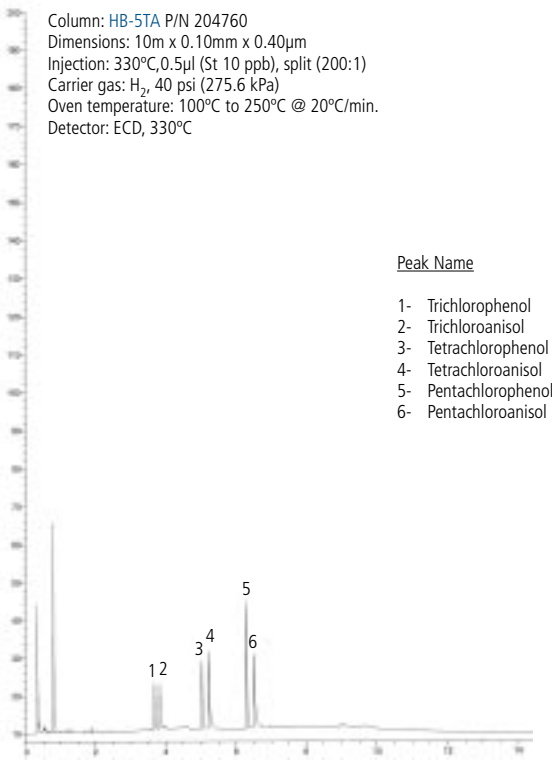


PHENOLS AND ANISOLS IN WINE (FAST CHROMATOGRAPHY)

Column: HB-5TA P/N 204760
Dimensions: 10m x 0.10mm x 0.40µm
Injection: 330°C,0.5µl (St 10 ppb), split (200:1)
Carrier gas: H_2, 40 psi (275.6 kPa)
Oven temperature: 100°C to 250°C @ 20°C/min.
Detector: ECD, 330°C

Peak Name

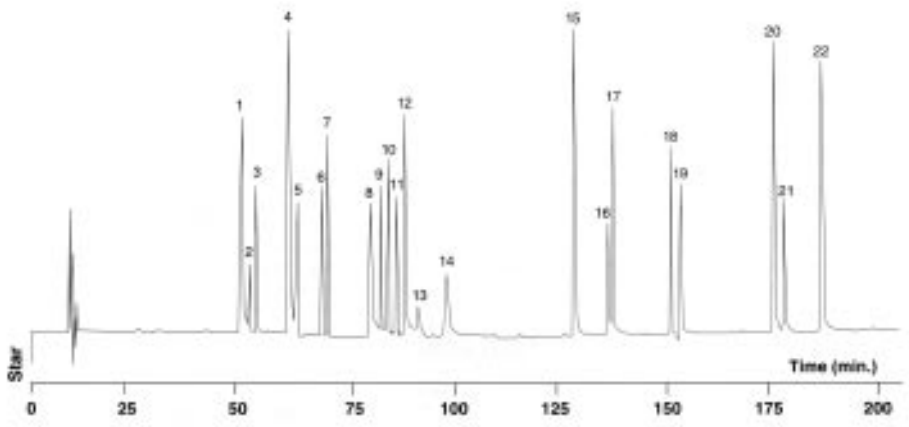
1- Trichlorophenol
2- Trichloroanisol
3- Tetrachlorophenol
4- Tetrachloroanisol
5- Pentachlorophenol
6- Pentachloroanisol



PHYTOSANITARY ANALYSIS IN WINE

Column: HB-5TA P/N 204759
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 2,0 µl split (1:100), 250°C
Carrier gas: He, 1 ml/min.
Oven temperature: 140°C to 180ªC @ 0.4°C/min. to 270°C(15min.) @1°C/min.
Detector: ECD, 300°C, make up Argon/Methane (95/5)
Sample: Phytosanitary standard INCAVI, (70-680 µg/L of each component)

Chromatogram supplied by M. Jaldo, J. García (Incavi) and J. Marco (Torres, S.A.)



Peak Name

1- Methylchlorpyrifos
2- Methylparathion
3- Vinclozoline
4- Fenitrothion
5- Dichlofluanide
6- Malathion
7- Chlorpyrifos
8- Captan
9- Penconazol
10- Folpet
11- Chlozolinate
12- Triadimenol + Procimidione
13- Triadimenol
14- Hexocanozol
15- Captafol
16- Iprodione
17- Bromopropylate
18- Fenarimol
19- Cyalotrin
20- Fenvalerate
21- Fenvalerate
22- Azoxystrobine

Foods & Flavors Applications

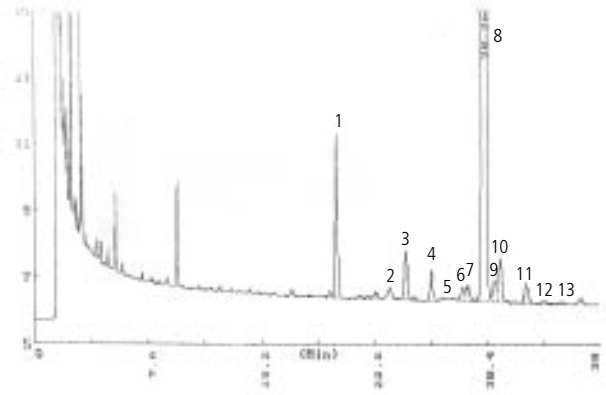
SEPARATION OF STEROLS IN OLIVE OIL (ORUJO)

Column: HB-1, P/N 204669
Dimensions: 30m x 0.53mm x 1.5µm
Injection: 1µl olive oil extract
splitless (1.5min), 280°C
Carrier gas: He, constant pressure 3 psi (20.7 kPa).
Oven program: 265°C (Isothermal)
Detector: FID, 300°C

Chromatogram provided by Jesus Rodríguez of Aceites Monterreal (Villa del Río, Córdoba)

Peak Name

1- Cholesterol
2- 24-Methylenecholesterol
3- Campesterol
4- Stigmasterol
5- δ7-Campesterol
6- δ5,23-Stigmasterol
7- Chlerosterol
8- β-Sitosterol
9- Sitosterol
10- δ5-Avenasterol
11- δ5,24-Stigmastadienol
12- δ7-Stigmasterol
13- δ7-Avenasterol

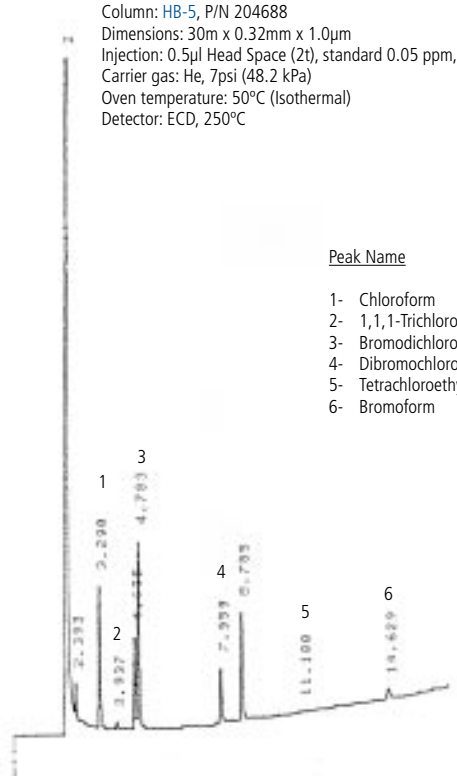


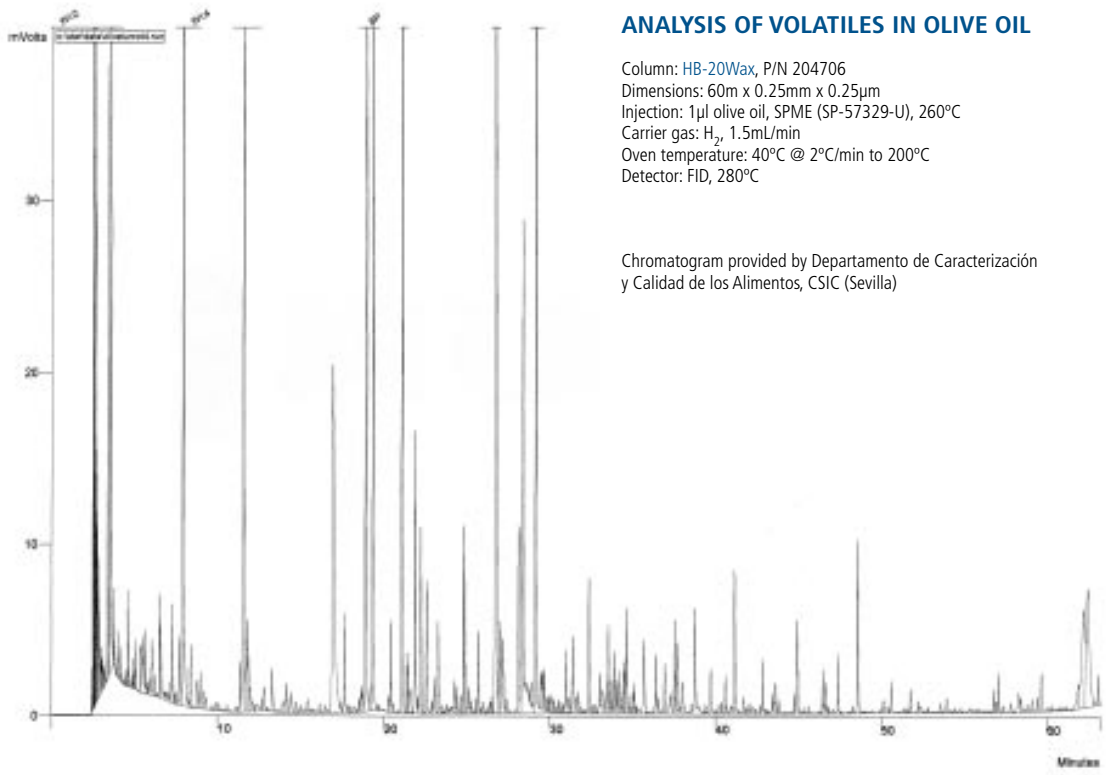
CHLORINATED SOLVENTS IN OLIVE OIL

Column: HB-5, P/N 204688
Dimensions: 30m x 0.32mm x 1.0µm
Injection: 0.5µl Head Space (2t), standard 0.05 ppm, 150°C
Carrier gas: He, 7psi (48.2 kPa)
Oven temperature: 50°C (Isothermal)
Detector: ECD, 250°C

Peak Name

1- Chloroform
2- 1,1,1-Trichloroethane
3- Bromodichloromethane
4- Dibromochloromethane
5- Tetrachloroethylene
6- Bromoform





ANALYSIS OF VOLATILES IN OLIVE OIL

Column: HB-20Wax, P/N 204706
Dimensions: 60m x 0.25mm x 0.25µm
Injection: 1µl olive oil, SPME (SP-57329-U), 260°C
Carrier gas: H_2, 1.5mL/min
Oven temperature: 40°C @ 2°C/min to 200°C
Detector: FID, 280°C

Chromatogram provided by Departamento de Caracterización y Calidad de los Alimentos, CSIC (Sevilla)

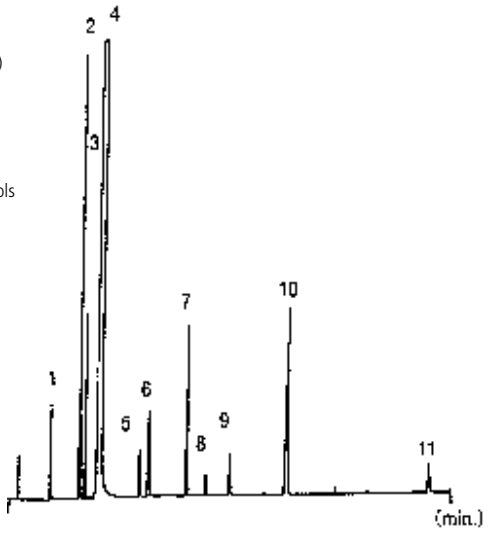
Foods & Flavors Applications

SEPARATION OF VOLATILES IN ALCOHOLIC BEVERAGES

Column: HB-20Wax, P/N 204715
Dimensions: 30m x 0.53mm x 1.0µm
Injection: 1 µl, split
Carrier gas: He, 5 psi (34.5 kPa)
Oven temperature: 40°C @ 2°C/min to 150°C
Detector: FID, 225°C

Peak Name

1- Acetaldehyde
2- Ethyl acetate
3- Methanol
4- Ethanol (50%)
5- 2-Butanol
6- 1-Propanol
7- Isobutanol
8- Allyl alcohol
9- 1-Butanol
10- Isoamyl alcohols
11- Ethyl lactate

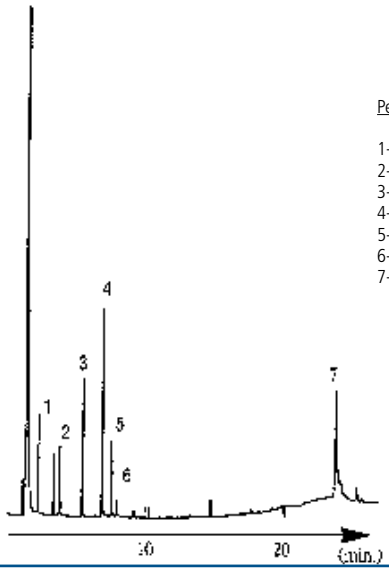


ANALYSIS OF GLYCOLS IN WINE

Column: HB-FFAP, P/N 204747
Dimensions: 30m x 0.53mm x 1.0µm
Injection: 1 µl, split
Carrier gas: He, 4 psi (27.6 kPa)
Oven temperature: 100°C @ 5°C/min to 200°C(10 min)
Detector: FID, 275°C

Peak Name

1- Isoamyl alcohol
2- Ethyl lactate
3- Acetic acid
4- Levo-2,3-Butanediol
5- Meso-2,3-Butanediol
6- 1,2-Propanediol
7- Glycerine

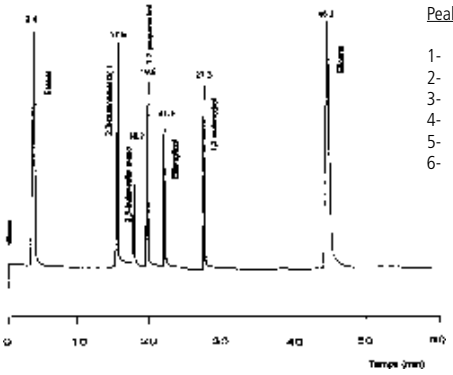


ANALYSIS OF POLYOLS IN WINE

Column: HB-FFAP, P/N 204740
Dimensions: 60m x 0.25mm x 0.25µm
Injection: 1 µl, split (100:1), glycols standard, 205°C
Carrier gas: H_2, 1 mL/min (80°C)
Oven temperature: 100°C @ 5°C/min to 200°C(10 min)
Detector: FID, 275°C

Peak Name

1- Ethanol
2- 2,3-Butanediol
3- 1,2-Propanediol
4- Ethylene glycol
5- 1,3-Butanediol
6- Glycerol



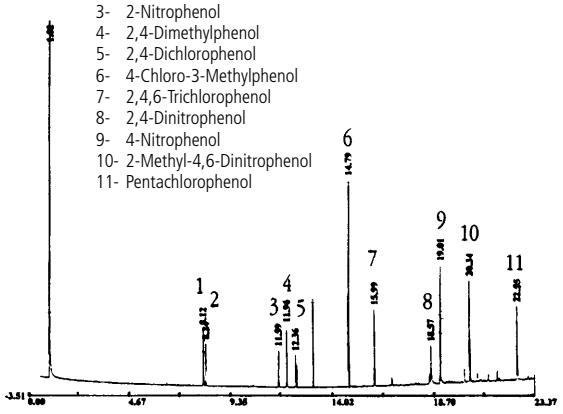
Chromatogram provided by R. Franquet and J. García of INCAVI, Vilafranca del Penedès (Barcelona)

PHENOLS EPA 604

Column: HB-5, P/N 204681
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1 µl, split, 2 to 6 ng/comp, 250°C
Carrier gas: H_2, 12 psi (82.68 kPa)
Oven temperature: 80°C(4min) @ 8°C/min to 250°C
Detector: FID, 280°C

Peak Name

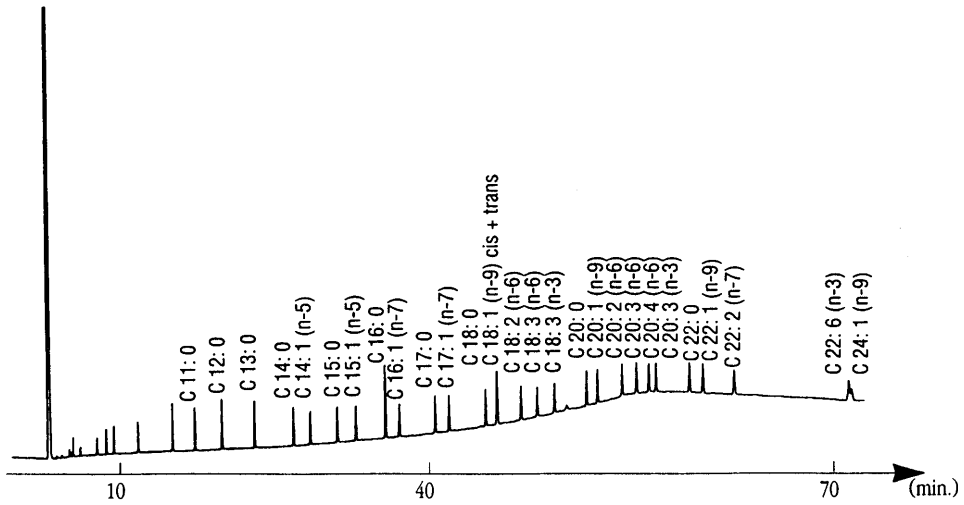
1- Phenol
2- Chorophenol
3- 2-Nitrophenol
4- 2,4-Dimethylphenol
5- 2,4-Dichlorophenol
6- 4-Chloro-3-Methylphenol
7- 2,4,6-Trichlorophenol
8- 2,4-Dinitrophenol
9- 4-Nitrophenol
10- 2-Methyl-4,6-Dinitrophenol
11- Pentachlorophenol



Foods & Flavors Applications

SEPARATION OF FAMES

Column: HB-20Wax P/N 204706
Dimensions: 60m x 0.25mm x 0.25µm
Injection: 1 µl, split
Carrier gas: He, 26 psi (179.1 kPa)
Oven temperature: 60°C @ 30°C/min to 150°C @ 2°C/min to 240°C
Detector: FID, 275°C

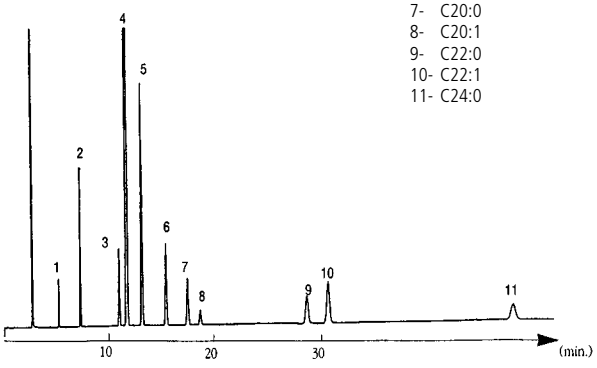


SEPARATION OF METHYL ESTERS (RAPESEED OIL)

Column: HB-20Wax, P/N 204715
Dimensions: 30m x 0.53mm x 1.0µm
Injection: 1 µl, split
Carrier gas: He, 4psi (27.6 kPa)
Oven temperature: 220°C (Isothermal)
Detector: FID, 280°C

Peak Name

1- C14:0
2- C16:0
3- C18:0
4- C18:1
5- C18:2
6- C18:3
7- C20:0
8- C20:1
9- C22:0
10- C22:1
11- C24:0



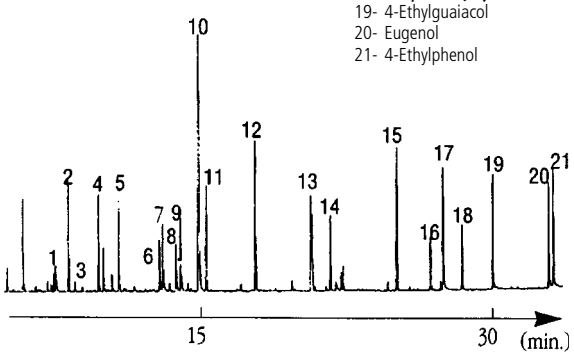
FLAVORS IN WINE

Column: HB-20Wax, P/N 205602
Dimensions: 60m x 0.22mm x 0.20µm
Injection: 1 µl, split
Carrier gas: He, 1 mL/min
Oven temperature: 45°C @ 5°C/min to 230°C
Detector: FID, 250°C

Chromatogram provided by M. Creixell, R. Franquet and J. Garcia of INCAVI, Vilafranca del Penedès, Barcelona.

Peak Name

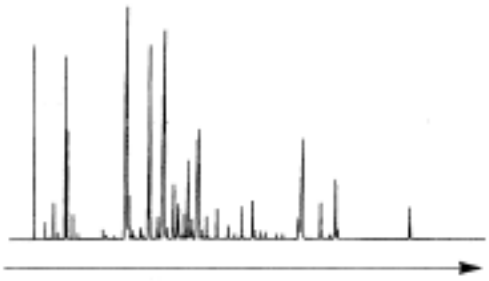
1- 2-Butanol
2- Ethyl isovalerate
3- 1-Butanol
4- Ethyl caproate
5- n-Hexyl acetate
6- Ethyl lactate
7- 1-Hexanol
8- 3-Ethoxy-1-Propanol
9- cis-3-Hexen-1-ol
10- 2-Octanol (I. St.)
11- Ethyl caprylate
12- Benzaldehyde
13- Ethyl caprate
14- γ-Butyrolactone
15- 2-Phenylethanol acetate
16- Trans-β-Methyl-γ-Octalactone
17- 2-Phenylethanol
18- Cis-β-Methyl-γ-Octalactone
19- 4-Ethylguaiacol
20- Eugenol
21- 4-Ethylphenol



Foods & Flavors Applications

LAVENDER FLAVOR

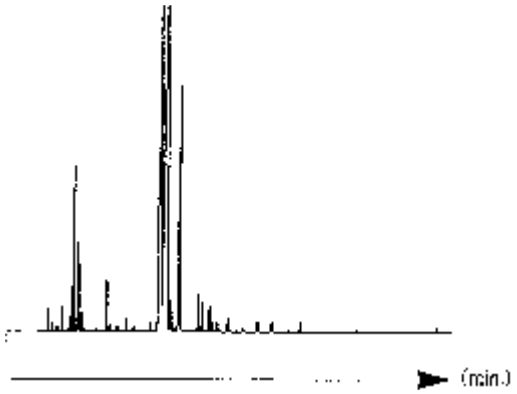
Column: HB-20Wax, P/N 204704
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1 µl, split
Carrier gas: He, 90 kPa
Oven temperature: 80°C @ 4°C/min to 230°C(20 min)
Detector: FID, 260°C



Chromatogram provided by C. Ibañez of Lucta, S.A, Barcelona.

FLAVORS (LAVENDER, ESSENTIAL OIL)

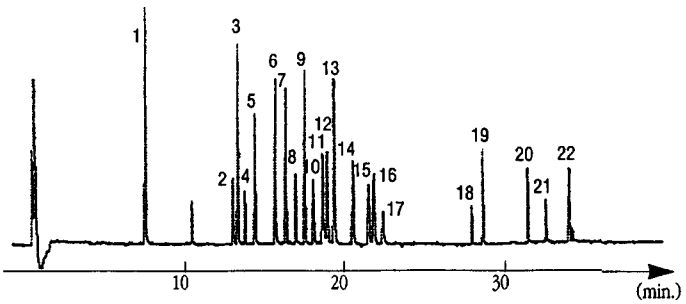
Column: HB-20Wax, P/N 204704
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1µlL, split
Carrier gas: He, 90 kPa
Oven temperature: 80°C @ 4°C/min to 230°C(20 min)
Detector: FID, 260°C



Chromatogram provided by C. Ibañez of Lucta, S.A, Barcelona.

ANALYSIS OF PESTICIDES

Column: HB-5, P/N 204681
Dimensions: 30m x 0.25mm x 0.25µm
Injection: split
Carrier gas: He
Oven temperature: 125°C(1 min) @ 8°C/min to 200°C(10 min) @ 20°C/min to 270°C(15 min)
Detector: FPD, 280°C



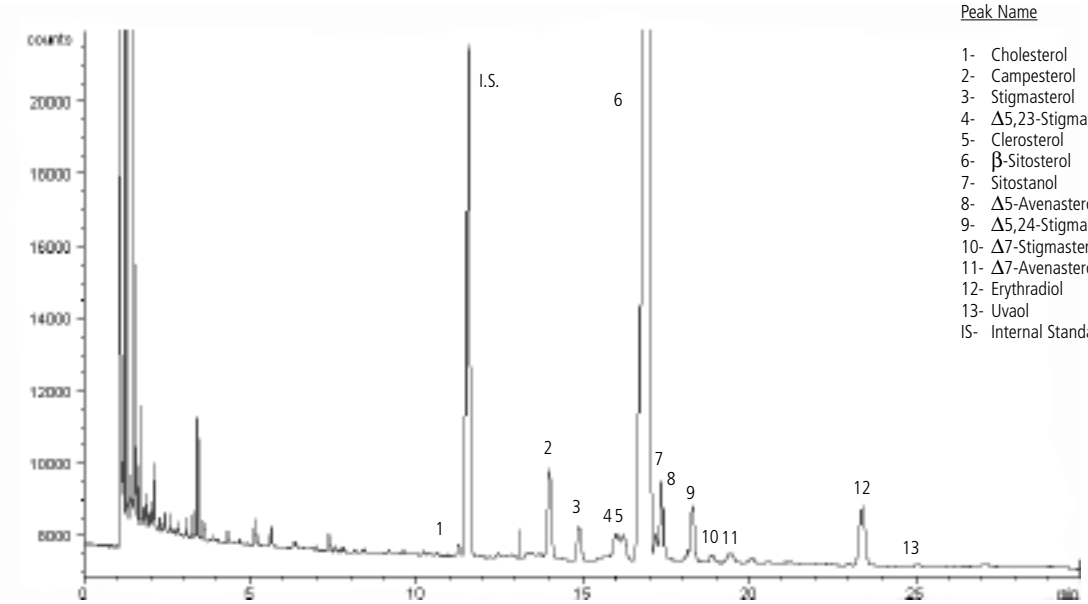
Peak Name

1- Metacriphos
2- Dioxathion
3- Fonofos
4- Diazinon
5- Etrimfos
6- Methyl parathion
7- Fenclorphos
8- Fenitrothion
9- Malathion
10- Ethyl parathion
11- Ruelene
12- Methyl bromophos
13- Ethyl pirymiphos
14- Isofenphos
15- Meditathion
16- Ethyl bromophos
17- Gardona
18- Ethion
19- Trithion
20- Fosalon
21- Cumaphos

Chromatogram provided by E. Casado of Laboratorio de Plagicidas, Centro Nacional de Alimentación y Nutrición, Madrid.

ANALYSIS OF STEROLS IN REFINED OLIVE OIL

Column: HB-Sterol, P/N 204766
Dimensions: 30m x 0.22mm x 0.22µm
Injection: split
Carrier gas: H_2, 20 psi (137.8 kPa)
Oven temperature: 275°C (Isothermal)
Detector: FID, 300°C



Peak Name

1- Cholesterol
2- Campesterol
3- Stigmasterol
4- Δ5,23-Stigmastadienol
5- Clerosterol
6- β-Sitosterol
7- Sitostanol
8- Δ5-Avenasterol
9- Δ5,24-Stigmastadienol
10- Δ7-Stigmastenol
11- Δ7-Avenasterol
12- Erythradiol
13- Uvaol
IS- Internal Standard

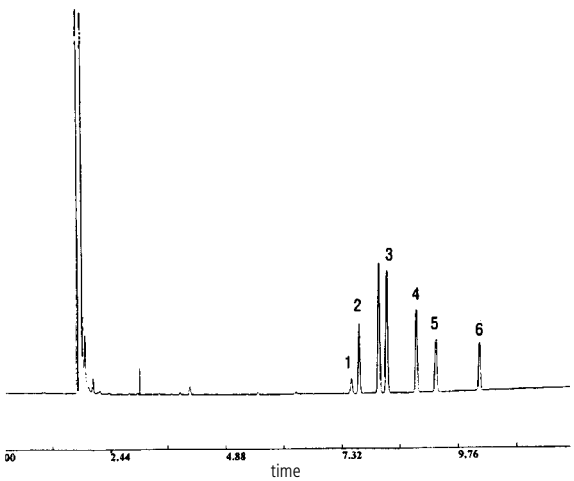
Chromatogram provided by Dr. Manuel León of Instituto de la Grasa, Sevilla

ANALYSIS OF CIS-TRANS ISOMERS

Column: HB-2340. P/N 205540
Dimensions: 30m x 0.32mm x 0.20mm
Injection: 1 µl isomers standard, split
Carrier gas: H_2, 4.5 psi (31 kPa)
Oven temperature: 140°C @ 4°C/min to 190°C
Detector: FID, 250°C

Peak Name

1- C18:0
2- C18:1 trans
3- C18:1 cis
4- C18:2 trans
5- C18:2 cis
6- C20:0

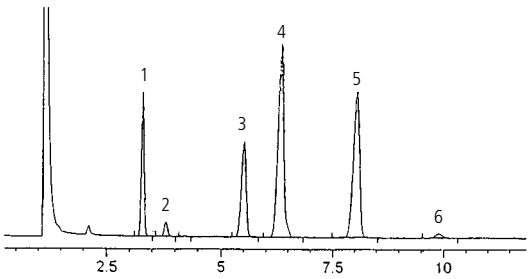


ANALYSIS OF METHYL ESTERS

Column: HB-2340. P/N 205541
Dimensions: 30m x 0.53mm x 0.20µm
Injection: 2 µl FAMES standard, split
Carrier gas: He, 20 kPa
Oven temperature: 130°C(5 min) @ 3°C/min to 160°C
Detector: FID, 250°C

Peak Name

1- C16:0
2- C16:1
3- C18:0
4- C18:1
5- C18:2
6- C20:0

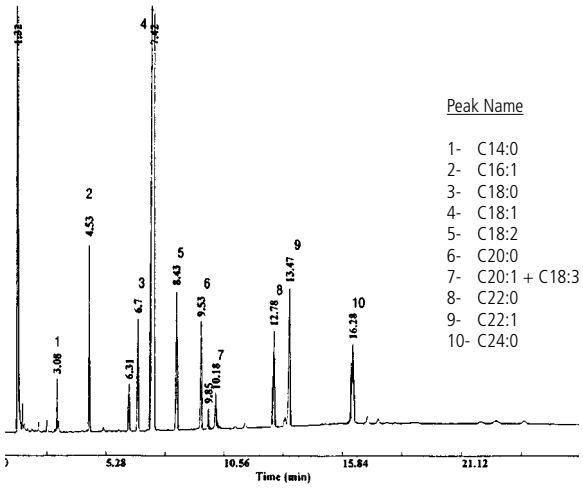


Chromatogram provided by Dr. R. Garcés of Instituto de la Grasa, Sevilla.

Foods & Flavors Applications

ANALYSIS OF METHYL ESTERS

Column: HB-2340. P/N 204778
Dimensions: 15m x 0.32mm x 0.20µm
Injection: 1 µl FAMES standard, split
Carrier gas: H_2, 2.4 psi (16.6 kPa)
Oven temperature:140°C@ 3°C/min to 185°C
Detector: FID, 250°C

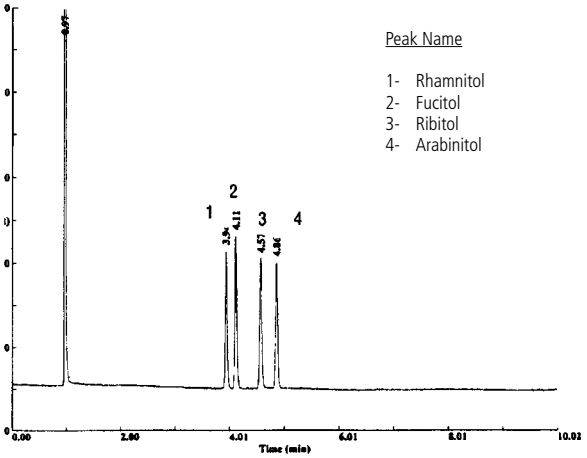


Peak Name

1- C14:0
2- C16:1
3- C18:0
4- C18:1
5- C18:2
6- C20:0
7- C20:1 + C18:3
8- C22:0
9- C22:1
10- C24:0

SEPARATION OF SUGARS (AS ALDITOL ACETATES)

Column: HB-2340. P/N 204778
Dimensions: 15m x 0.32mm x 0.20µm
Injection: 1 µl Sugars standard, split
Carrier gas: H_2, 11 psi (75.8 kPa)
Oven temperature: 220°C (Isothermal)
Detector: FID, 250°C

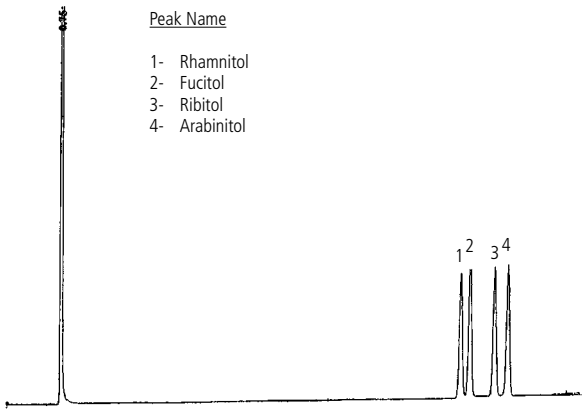


Peak Name

1- Rhamnitol
2- Fucitol
3- Ribitol
4- Arabinitol

SEPARATION OF SUGARS (AS ALDITOL ACETATES)

Column: HB-1701, P/N 204750
Dimensions: 15m x 0.25mm x 0.25µm
Injection: 1 µl Sugars standard, split
Carrier gas: H_2, 6 psi (41.3 kPa)
Oven temperature: 180°C @ 4°C/min to 215°C
Detector: FID, 250°C



Peak Name

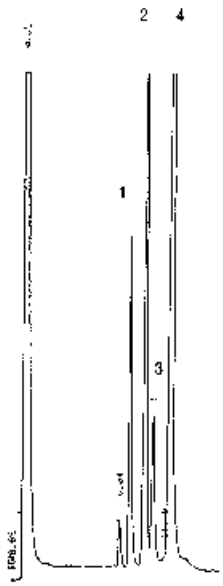
1- Rhamnitol
2- Fucitol
3- Ribitol
4- Arabinitol

SEPARATION OF STEROLS

Column: HB-5, P/N 204692
Dimensions: 30m x 0.53mm x 0.50µm
Injection: 0.1 µl Sterols standard, direct injection
Carrier gas: H_2, 4 psi (27.6 kPa)
Oven temperature: 275°C (Isothermal)
Detector: FID, 300°C

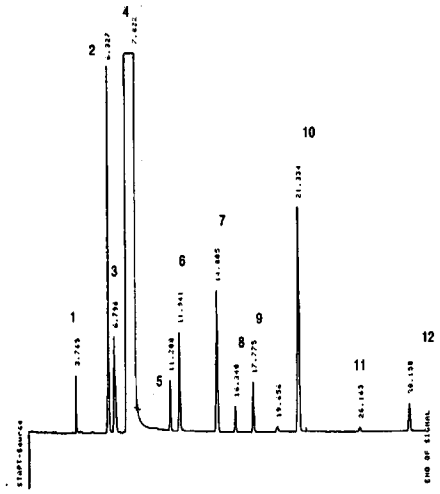
Peak Name

1- Brassicasterol
2- Campesterol
3- Stigmasterol
4- β-Sitosterol



SEPARATION OF VOLATILES IN ALCOHOLIC BEVERAGES

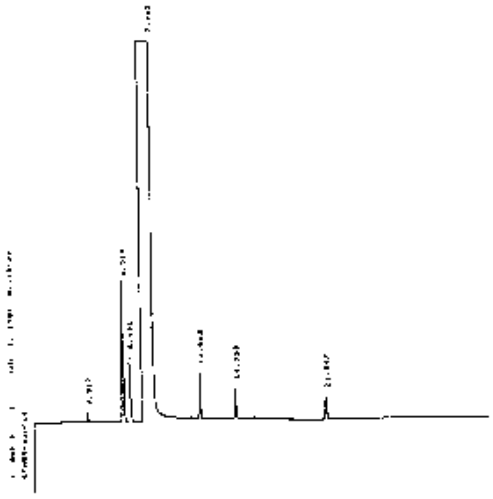
Column: HB-20Wax, P/N 204715
Dimensions: 30m x 0.53mm x 1.0µm
Injection: 0.3 µl standard, direct injection (injector of packed columns)
Carrier gas: N_2, 4.5 mL/min
Oven temperature: 40ºC @ 2ºC/min to 110ºC
Detector: FID, 250ºC



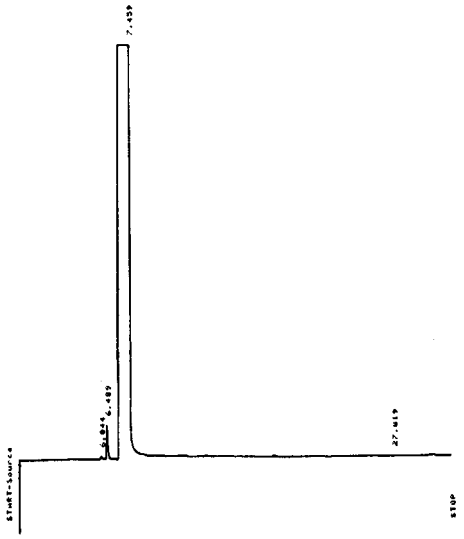
Peak Name

1- Acetaldehyde
2- Ethyl acetate
3- Methanol
4- Ethanol
5- 2-Butanol
6- 1-Propanol
7- Isobutanol
8- Allyl alcohol
9- 1-Butanol
10- Isoamyl alcohols
11- Acetoin
12- Ethyl lactate

DISTILLED ALCOHOL

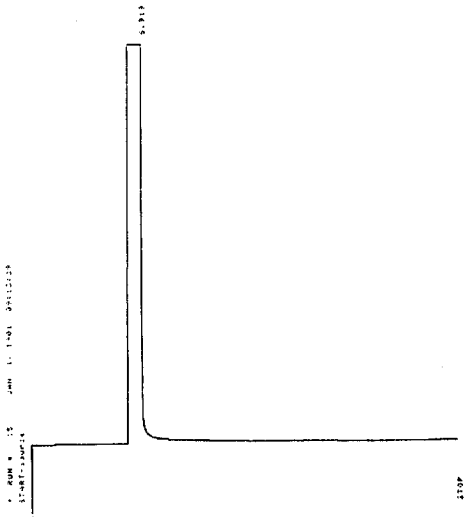


RECTIFIED ALCOHOL

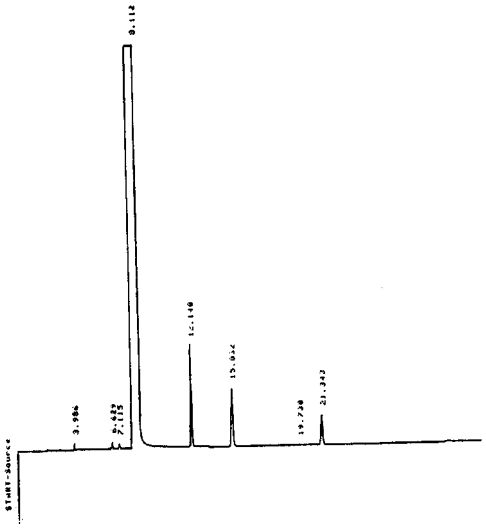


Foods & Flavors Applications

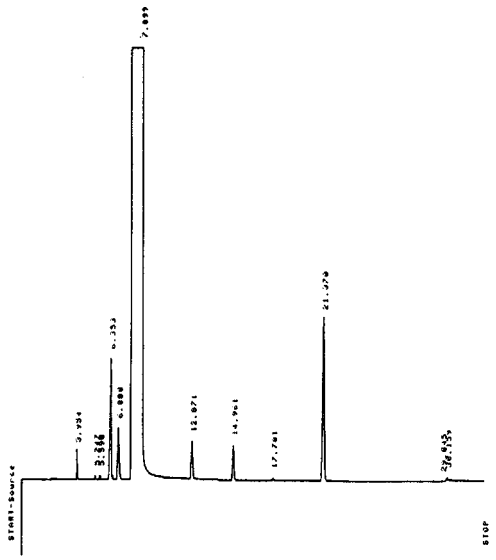
ALCOHOL FROM MOLASSES



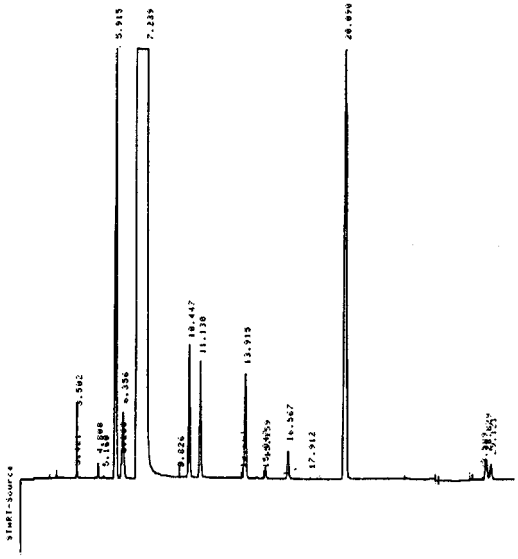
SCOTCH WHISKY



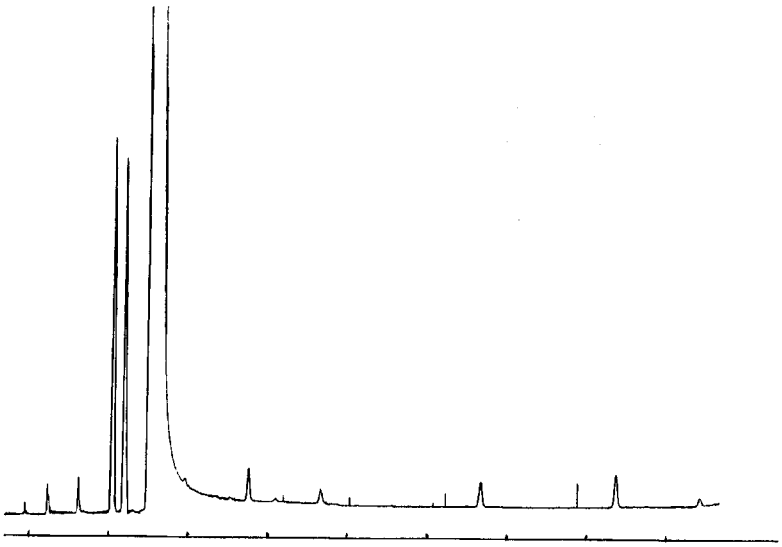
BRANDY 63°



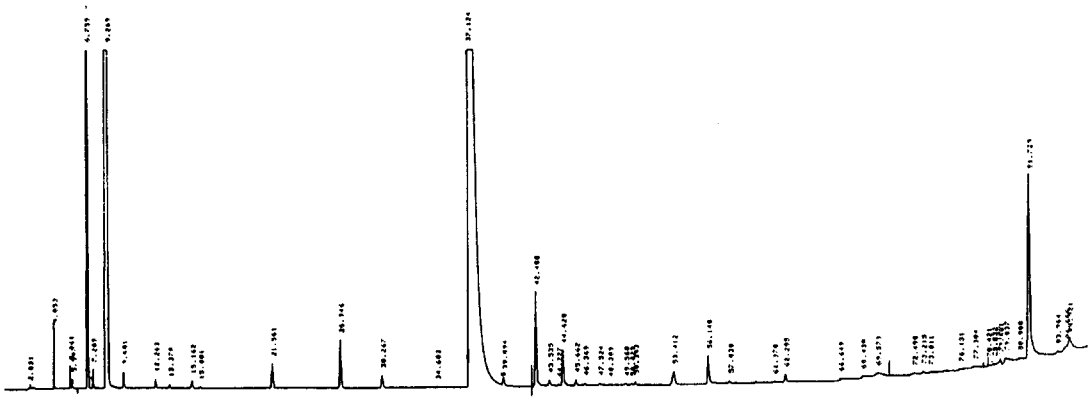
LIQUOR



GIN



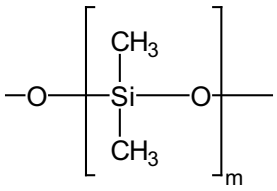
JEREZ VINEGAR



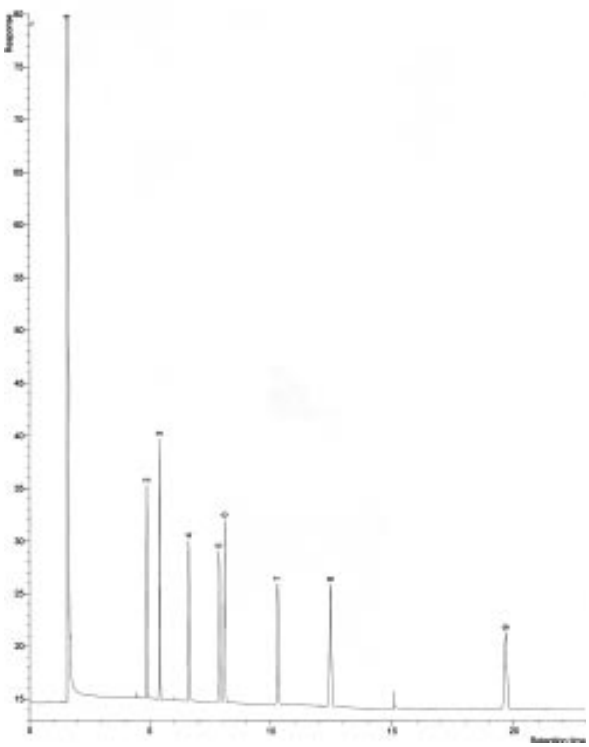
HB-1

100% Dimethylpolysiloxane, bonded and crosslinked phase

- 100% Dimethylpolysiloxane
- Non-polar phase
- Column for general use
- High thermal stability
- Ideal column for the analysis of petrochemical products and industrial solvents



Structure of Poly(dimethyl)siloxane



HB-1

Column: HB-1, P/N 204656
Dimensions: 25m x 0.15mm x 1.2µm
Injection: 1µl Test SP-4-7300. split 1:100. 280ºC
Carrier gas: H_2, constant pressure 22 psi (151.6 kPa).
Oven program: 145ºC (isothermal)
Detector: FID, 300ºC

Peak Name

1- Ethylene chloride
2- 2-Octanone
3- C-10
4- 1-Octanol
5- 2,6-Dimethylphenol
6- C-11
7- 2,6-Dimethylaniline
8- C-12
9- C-13

HB-1

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.10	10	0.10	-60 to 325/350	205019
	10	0.40	-60 to 320/340	205038
	20	0.10	-60 to 325/350	205027
	20	0.40	-60 to 320/340	205039
0.20	12	0.33	-60 to 325/350	205090
	15	0.15	-60 to 325/350	205071
	15	0.35	-60 to 325/350	205034
	15	0.50	-60 to 325/350	205043
	25	0.15	-60 to 325/350	205072
	25	0.33	-60 to 325/350	205089
	25	0.35	-60 to 325/350	205035
	25	0.50	-60 to 325/350	205047
	30	0.15	-60 to 325/350	205073
	30	0.35	-60 to 325/350	205036
	30	0.50	-60 to 325/350	205049
	50	0.15	-60 to 325/350	205074
	50	0.33	-60 to 325/350	204649
	50	0.35	-60 to 325/350	205037
	50	0.50	-60 to 325/350	205053
	50	0.50	-60 to 325/350	204775
	60	0.15	-60 to 325/350	205075
	60	0.50	-60 to 325/350	205059
0.25	15	0.10	-60 to 325/350	205010
	15	0.25	-60 to 325/350	204652
	15	0.50	-60 to 325/350	205041
	15	1.00	-60 to 325/340	205062
	25	0.10	-60 to 325/350	205013
	25	0.25	-60 to 325/350	204651
	25	0.50	-60 to 325/350	205044
	25	1.00	-60 to 320/340	205064
	30	0.10	-60 to 325/350	205016
	30	0.25	-60 to 325/350	204653
	30	0.50	-60 to 325/350	205048
	30	1.00	-60 to 320/340	204655
	50	0.10	-60 to 325/350	205021
	50	0.25	-60 to 325/350	205031
	50	0.50	-60 to 325/350	205050
	50	1.00	-60 to 320/340	204666
	60	0.10	-60 to 325/350	205024
	60	0.25	-60 to 325/350	204657
	60	0.50	-60 to 325/350	205056
	60	1.00	-60 to 325/350	205067
	100	1.00	-60 to 325/350	205069
	105	1.00	-60 to 325/350	205070
0.32	15	0.10	-60 to 325/350	205011
	15	0.25	-60 to 325/350	205029
	15	0.50	-60 to 325/350	205042
	15	1.00	-60 to 325/350	205063
	15	3.00	-60 to 280/300	205080
	25	0.10	-60 to 325/350	205014
	25	0.25	-60 to 325/350	205030
	25	0.50	-60 to 325/350	205045
	25	1.00	-60 to 325/350	205065
	25	3.00	-60 to 280/300	205082
	30	0.10	-60 to 325/350	205017
	30	0.25	-60 to 325/350	204658

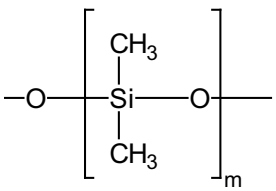
HB-1

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.32	30	0.50	-60 to 325/350	204659
	30	1.00	-60 to 325/350	204660
	30	3.00	-60 to 280/300	204661
	50	0.10	-60 to 325/350	205022
	50	0.25	-60 to 325/350	205032
	50	0.50	-60 to 325/350	205051
	50	1.00	-60 to 325/350	205066
	50	3.00	-60 to 280/300	205084
	60	0.10	-60 to 325/350	205025
	60	0.25	-60 to 325/350	205033
	60	0.50	-60 to 325/350	205057
	60	1.00	-60 to 325/350	205068
	60	3.00	-60 to 280/300	205086
	60	5.00	-60 to 260/280	204664
0.53	10	2.65	-60 to 300/310	204665
	15	0.10	-60 to 320/340	205012
	15	0.50	-60 to 320/340	204667
	15	1.50	-60 to 310/330	205076
	15	3.00	-60 to 270/290	205081
	15	5.00	-60 to 270/290	205093
	15	7.00	-60 to 260/280	205096
	25	0.10	-60 to 320/340	205015
	25	0.50	-60 to 320/340	205046
	25	1.50	-60 to 310/330	205077
	25	3.00	-60 to 270/290	205083
	25	5.00	-60 to 270/290	205094
	30	0.10	-60 to 320/340	205018
	30	0.50	-60 to 320/340	204668
	30	0.88	-60 to 310/330	205061
	30	1.50	-60 to 310/330	204669
	30	2.65	-60 to 270/290	204670
	30	3.00	-60 to 270/290	204671
	30	5.00	-60 to 270/290	204672
	30	7.00	-60 to 260/280	205097
	50	0.10	-60 to 320/340	205023
	50	0.50	-60 to 320/340	205052
	50	1.50	-60 to 310/330	205078
	50	3.00	-60 to 270/290	205085
	50	5.00	-60 to 270/290	205095
	60	0.10	-60 to 320/340	205026
	60	0.50	-60 to 320/340	205058
	60	1.50	-60 to 310/330	205079
	60	3.00	-60 to 270/290	204673
	60	5.00	-60 to 270/290	204675
	60	7.00	-60 to 240/260	204674
	100	3.00	-60 to 270/290	205087
	105	3.00	-60 to 270/290	205088

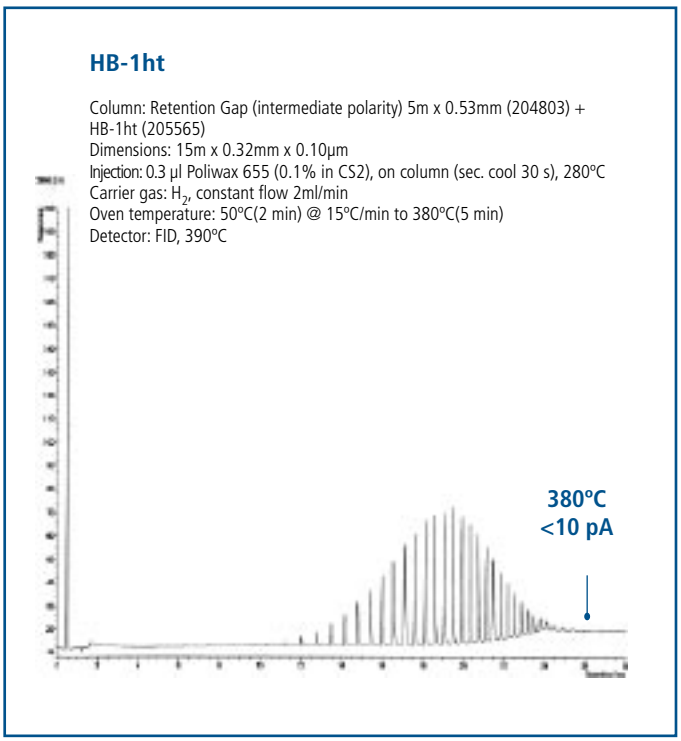
HB-1ht

100% Dimethylpolysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane
- Non-polar phase
- For high temperature analysis (Max.temp. 400ºC)
- Fused silica tubing with polyimide coating for high temperatures
- Fields of application: Analysis of compounds with a high boiling point such as triglycerides, waxes, etc.



Structure of Poly(dimethyl)siloxane



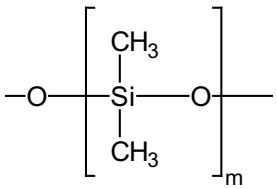
HB-1ht

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	15	0.10	-60 a 395	205565
	30	0.10	-60 a 395	205564
0.32	15	0.10	-60 a 390	205565
	30	0.10	-60 a 390	205566

HB-1ms

100% Dimethylpolysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane
- Identical selectivity as HB-1
- Very suitable for trace analysis
- Bleed below 4 pA at 325 °C for the 30m x 0.25mm x 0.25 µm column
- Great chemical inertness towards active constituents and excellent thermal stability.
- Less column bleed means less detectors contamination and greater speed in conditioning columns



Structure of Poly(dimethyl)siloxane

HB-1ms

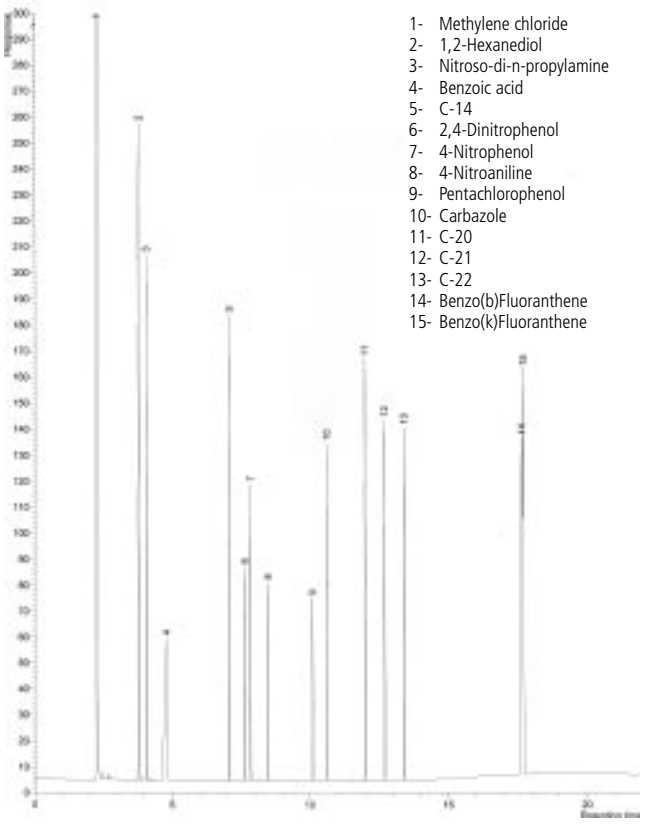
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.20	12	0.33	-60 to 325/350	205389
	15	0.33	-60 to 325/350	205384
	25	0.33	-60 to 325/350	205385
	30	0.33	-60 to 325/350	205386
	50	0.33	-60 to 325/350	205387
	60	0.33	-60 to 325/350	205388
0.25	15	0.10	-60 to 325/350	205377
	15	0.25	-60 to 325/350	205380
	15	1.00	-60 to 325/350	205381
	30	0.10	-60 to 325/350	205378
	30	0.25	-60 to 325/350	204676
	30	1.00	-60 to 325/350	205382
	60	0.10	-60 to 325/350	205379
	60	0.25	-60 to 325/350	204677
	60	1.00	-60 to 325/350	205383

HB-1ms

Column: HB-1ms, P/N 204677
Dimensions: 60m x 0.25mm x 0.25µm
Injection: 1µl Test MX5 (10 to 20 ng/comp. on column), split 1:100. 280ºC
Carrier gas: H_2, constant pressure 25 psi (172 kPa).
Oven temperature: 100ºC @ 6ºC/min to 325ºC(5 min)
Detector: FID, 340ºC

Peak Name

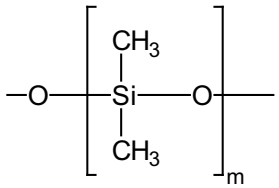
1- Methylene chloride
2- 1,2-Hexanediol
3- Nitroso-di-n-propylamine
4- Benzoic acid
5- C-14
6- 2,4-Dinitrophenol
7- 4-Nitrophenol
8- 4-Nitroaniline
9- Pentachlorophenol
10- Carbazole
11- C-20
12- C-21
13- C-22
14- Benzo(b)Fluoranthene
15- Benzo(k)Fluoranthene



HB-Sulfur

100% Dimethylpolysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane
- Column specially designed for the analysis of sulphurous compounds (in natural gas, petrol derivates, wines, beer, etc.)
- Guaranteed thermal stability, with low column bleed



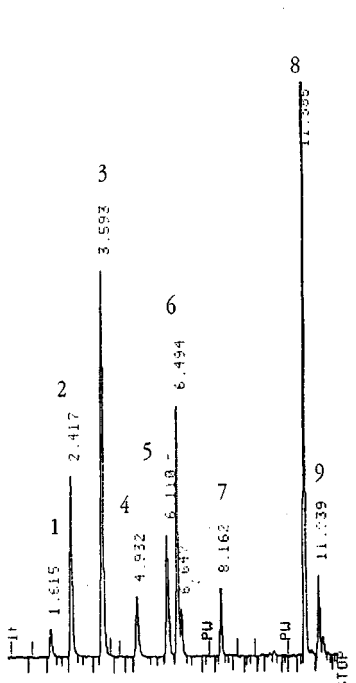
Structure of Poly(dimethyl)siloxane

HB- Sulfur

Column: HB-Sulfur, 30 m x 0.32 mm x 4.0 µm
Mercaptans

Peak Names

1- SH_2
2- Methyl mercaptan
3- Ethyl mercaptan
4- 2-Propylmercaptan
5- Terbutyl mercaptan
6- Methyl ethyl sulfide
7- 1-propylmercaptan
8- 2-Butyl mercaptan
9- T.H.T.



HB-Sulfur

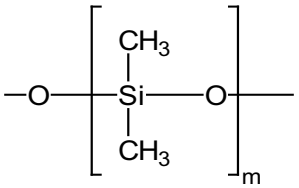
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.32	30	4.00	-60 to 270/290	205091

HB-Petrol

HB-Petrol

100% Dimethylpolysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane
- Column for analysing complex mixtures of hydrocarbons according to the ASTM regulations (American Society for Testing and Materials)
- Very suitable for PNA, PONA and PIANO analysis

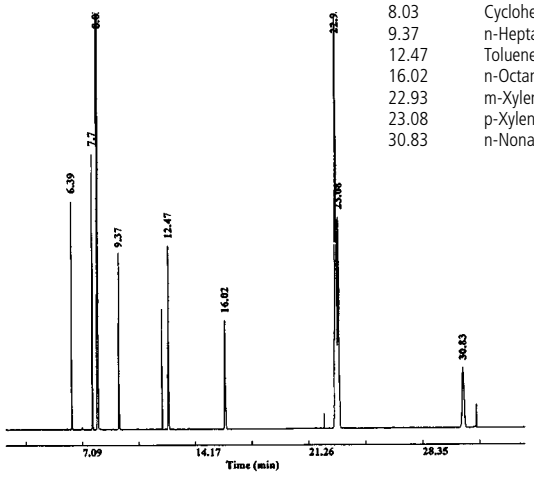


Structure of Poly(dimethyl)siloxane

HB-Petrol

Column: HB-Petrol, 100m x 0.25mm x 0.50µm P/N 204768
Temperature: 60ºC (isothermal)
Injector: 260ºC
Carrier gas: H_2, 34 psi
Injection: Test for hydrocarbons, split (1:100)
Detector: FID, 260º

R.T.	Compound
6.39	n-Hexane
7.70	Benzene
8.03	Cyclohexane
9.37	n-Heptane
12.47	Toluene
16.02	n-Octane
22.93	m-Xylene
23.08	p-Xylene
30.83	n-Nonane



HB-Petrol

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	100	0.50	-60 to 300/320	204768

HB-Petrocol

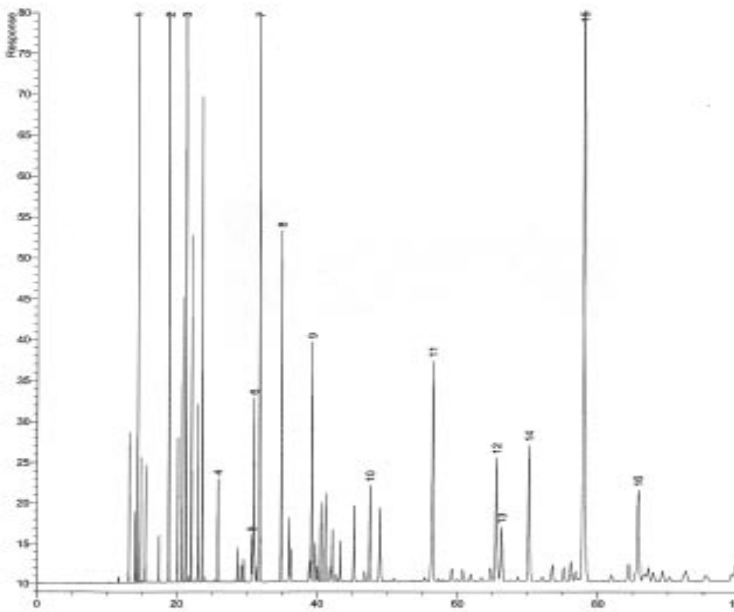
HB-Petrocol

100% Dimethylpolysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane
- Maximum resolution for the analysis of hydrocarbons

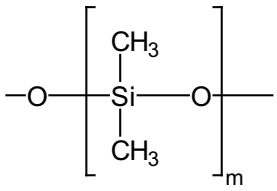
HB-Petrocol

Column: HB-Petrocol. P/N 204765
Dimensions: 150m x 0.25mm x 1.0µm
Injection: 0.1µl unleaded gasoline,split 100:1 @ 280°C
Carrier gas: He, 75psi (517 kPa) @ 35°C
Oven program: 35°C(hold 135 min.) to 200°C @ 2°C/min. (hold 20 min)
Detector: FID @ 280°C



1- n-Butane
2- Isopentane
3- n-Pentane
4- 2,2-Dimethylbutane
5- Cyclopentane
6- 2,3-Dimethylbutane
7- 2-Methylpentane
8- 3-Methylpentane
9- n-Hexane
10- 2,4-Dimethylpentane
11- Benzene
12- 2-Methylhexane
13- 2,3-Dimethylpentane
14- 3-Methylhexane
15- 2,2,4- Trimethylpentane
16- n-Heptane
17- 2,5-Dimethylhexane
18- 2,4-Dimethylhexane
19- 2,3,4-Trimethylpentane
20- Toluene

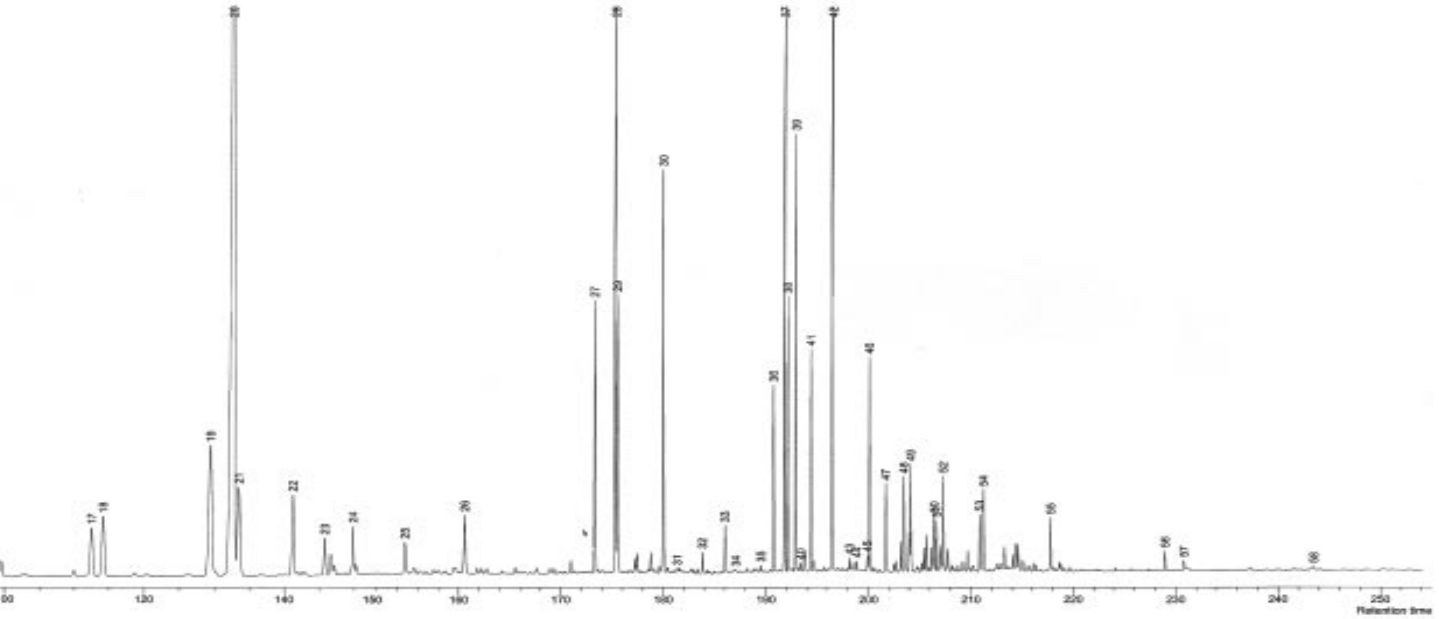
HB-Petrocol



Structure of Poly(dimethyl)siloxane

HB-Petrocol

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	150	1.00	-60 to 300/320	204765



21- 2,3,3- Trimethylpentane
22- 2,3-Dimethylhexane
23- 2-Methylheptane
24- 3-Methylheptane
25- 2-Methyl-1-Heptene
26- n-Octane
27- Ethylbenzene
28- m-Xylene
29- p-Xylene
30- o-Xylene
31- 1-Nonene
32- n-Nonane
33- Isopropylbenzene
34- 3,3,5- Trimethylheptane
35- 2,4,5- Trimethylheptane
36- n-Propylbenzene
37- 1-Methyl-3-Ethylbenzene
38- 1-Methyl-4-Ethylbenzene
39- 1,3,5-Trimethylbenzene
40- 3,3,4- Trimethylheptane
41- 1-Methyl-2-Ethylbenzene
42- 1,2,4- Trimethylbenzene
43- Isobutylbenzene
44- sec-Butylbenzene
45- n-Decane
46- 1,2,3- Trimethylbenzene
47- Indane
48- 1,3-Diethylbenzene
49- n-Butylbenzene
50- 1,4-Dimethyl-2-Ethylbenzene
51- 1,3- Dimethyl-4-ethylbenzene
52- 1,2-Dimethyl-4-ethylbenzene
53- 1,2,4,5- Tetramethylbenzene
54- 1,2,3,5-Tetramethylbenzene
55- Naphthalene
56- 2-Methylnaphthalene
57- 1-Methylnaphthalene
58- Dimethylnaphthalenes

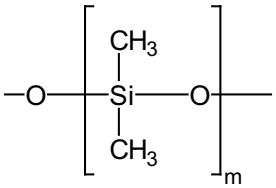
HB-Pona

HB-2887

HB-Pona

100% Dimethylpolysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane
- Column designed for the complete analysis of PONA hydrocarbons (P-Paraffins, O-Olefins, N-Naphthenes and A-Aromatics) in petrol-derived products according to the ASTM regulations, method D5134

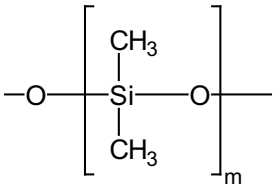


Structure of Poly(dimethyl)siloxane

HB-2887

100% Dimethylpolysiloxane, bonded and crosslinked phase.

- 100% Dimethylpolysiloxane
- Designed specifically for simulated distillation according to the ASTM method D2887



Structure of Poly(dimethyl)siloxane

HB-Pona

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.20	50	0.50	-60 to 320/340	204775

HB-2887

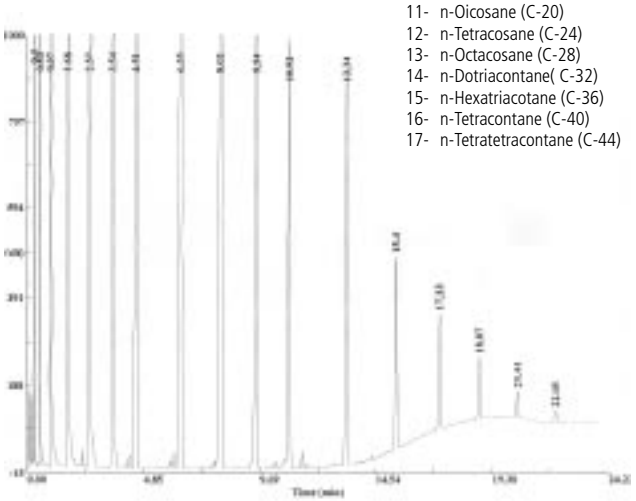
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.53	10	2.65	-60 to 340/360	204764

HB-2887

Column: HB-2887, P/N 204764
Dimensions: 10m x 0.53mm x 2.65µm
Injection: 1µl standard RS-31222, split 1:10. 300°C
Carrier gas: H_2, constant pressure 5 psi (34.4 kPa)
Oven temperature: 40°C @ 15°C/min to 350°C(5 min)
Detector: FID, 360°C. No baseline compensation

Peak Name

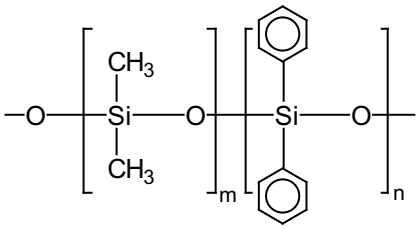
1- n-Hexane (C-6)
2- n-Heptane (C-7)
3- n-Octane (C-8)
4- n-Nonane (C-9)
5- n-Decane (C-10)
6- n-Undecane (C-11)
7- n-Dodecane (C-12)
8- n-Tetradecane (C-14)
9- n- (C-16)
10- n-Octadecane (C-18)
11- n-Oicosane (C-20)
12- n-Tetracosane (C-24)
13- n-Octacosane (C-28)
14- n-Dotriacontane(C-32)
15- n-Hexatriacotane (C-36)
16- n-Tetracontane (C-40)
17- n-Tetratetracontane (C-44)



HB-5

(95%) Dimethyl-(5%) diphenylpolysiloxane, bonded and crosslinked phase.

- It is the most versatile and universal stationary phase in GC
- Very suitable for aromatic compounds
- Excellent inertness for active compounds including acidic and basic compounds
- It is ideal for environmental analysis such as the analysis of dioxins, PCBs, PCTs, polyaromatic compounds, phenols, herbicides, organochlorinated and organophosphorus pesticides, aromatic hydrocarbons, solvents, drugs, oils, etc.



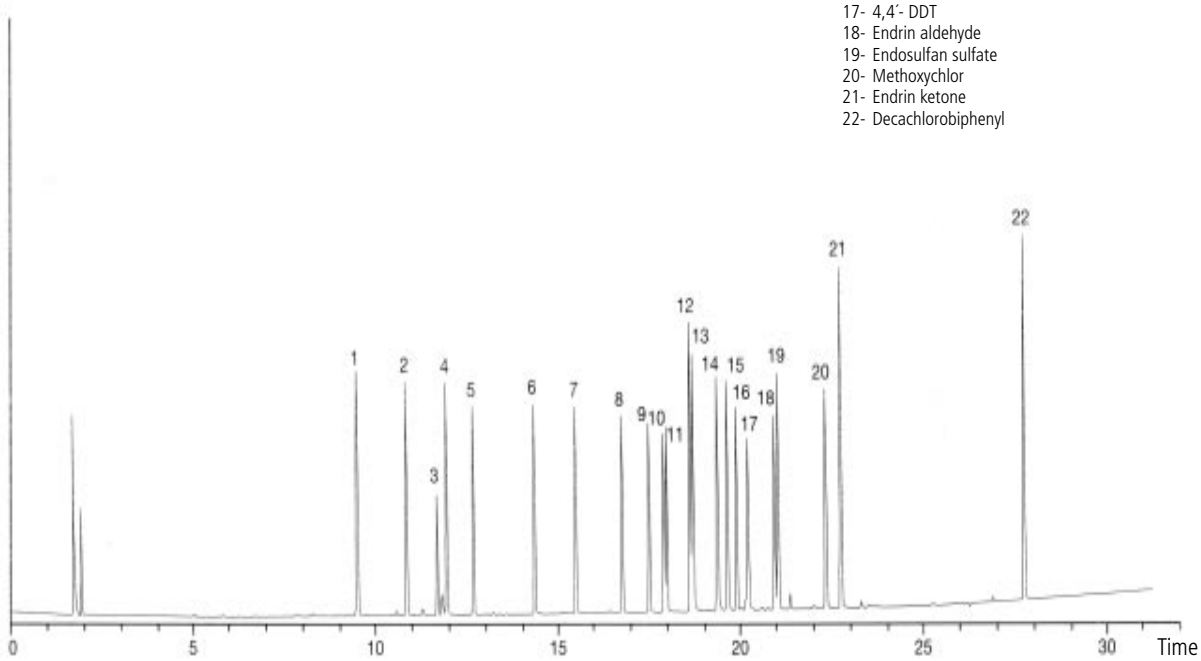
Structure of Poly(dimethyldiphenyl)siloxane

HB-5

Column: HB-5, P/N 204681
Dimensions: 30m x 0.25mm x 0.25µm
Injection: 1µl chlorinated pesticides mixture, splitless @230°C (25-270 ppb on column)
Carrier gas: H_2, constant pressure 12 psi (87.7 kPa) 150°C
Oven temperature: 150°C to 225°C@ 2°C/min (10 min.)
Detector: ECD, 310°C

Peak Name

1- 2,4,5,6-Tetrachloro-m-Xylene
2- γ-BHC
3- δ-BHC
4- Heptachlor
5- Aldrin
6- β-BHC
7- δ-BHC
8- Heptachlor epoxide
9- Endosulfan I
10- γ-Chlordane
11- α-Chlordane
12- 4,4´- DDE
13- Dieldrin
14- Endrin
15- 4,4´- DDD
16- Endosulfan II
17- 4,4´- DDT
18- Endrin aldehyde
19- Endosulfan sulfate
20- Methoxychlor
21- Endrin ketone
22- Decachlorobiphenyl



HB-5

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.10	10	0.10	-60 to 325/350	205106
	10	0.40	-60 to 320/350	205126
	20	0.10	-60 to 325/350	205114
	20	0.40	-60 to 320/350	205128
0.20	12	0.33	-60 to 325/350	205175
	15	0.15	-60 to 325/350	205155
	15	0.35	-60 to 325/350	205121
	15	0.50	-60 to 325/350	205132
	25	0.15	-60 to 325/350	205156
	25	0.33	-60 to 325/350	205173
	25	0.35	-60 to 325/350	205122
	25	0.50	-60 to 325/350	205136
	30	0.15	-60 to 325/350	205157
	30	0.35	-60 to 325/350	205123
	30	0.50	-60 to 325/350	205138
	50	0.15	-60 to 325/350	205158
	50	0.33	-60 to 325/350	205174
	50	0.35	-60 to 325/350	205124
	50	0.50	-60 to 325/350	205142
	60	0.15	-60 to 325/350	205159
	60	0.35	-60 to 325/350	205125
	60	0.50	-60 to 325/350	205146
	15	0.25	-60 to 325/350	204679
	15	0.50	-60 to 325/350	205130
	15	1.00	-60 to 320/350	205148
	25	0.10	-60 to 325/350	205100
	25	0.25	-60 to 325/350	204680
	25	0.50	-60 to 325/350	205133
	25	1.00	-60 to 320/350	205150
	30	0.10	-60 to 325/350	205103
	30	0.25	-60 to 325/350	204681
	30	0.50	-60 to 325/350	205137
	30	1.00	-60 to 320/350	204682
	50	0.10	-60 to 325/350	205108
	50	0.25	-60 to 325/350	205118
	50	0.50	-60 to 325/350	205139
	50	1.00	-60 to 320/350	205152
	60	0.10	-60 to 325/350	205111
	60	0.25	-60 to 325/350	204684
	60	0.50	-60 to 325/350	205143
	60	1.00	-60 to 325/350	205154
0.32	15	0.10	-60 to 325/350	204685
	15	0.25	-60 to 325/350	205116
	15	0.50	-60 to 325/350	205131
	15	1.00	-60 to 325/350	205149
	15	3.00	-60 to 280/350	205164
	25	0.10	-60 to 325/350	205101
	25	0.25	-60 to 325/350	205117
	25	0.50	-60 to 325/350	205134
	25	1.00	-60 to 325/350	205151
	25	3.00	-60 to 280/350	205166
	30	0.10	-60 to 325/350	205104
	30	0.25	-60 to 325/350	204686
	30	0.50	-60 to 325/350	204687
	30	1.00	-60 to 325/350	204688
	30	3.00	-60 to 280/350	205168

HB-5

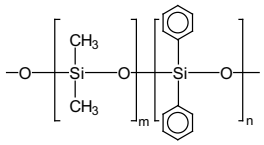
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.32	50	0.10	-60 to 325/350	205109
	50	0.25	-60 to 325/350	205119
	50	0.50	-60 to 325/350	205140
	50	1.00	-60 to 325/350	205153
	50	3.00	-60 to 280/350	205169
	60	0.10	-60 to 325/350	205112
	60	0.25	-60 to 325/350	205120
	60	0.50	-60 to 325/350	205144
	60	1.00	-60 to 325/350	204689
	60	3.00	-60 to 280/350	205171
0.53	10	2.65	-60 to 270/290	205163
	15	0.10	-60 to 320/340	205099
	15	0.50	-60 to 320/340	204690
	15	1.50	-60 to 310/330	204691
	15	3.00	-60 to 270/290	205165
	15	5.00	-60 to 270/290	205176
	25	0.10	-60 to 320/340	205102
	25	0.50	-60 to 320/340	205135
	25	1.50	-60 to 310/330	205160
	25	3.00	-60 to 270/290	205167
	25	5.00	-60 to 270/290	205177
	30	0.10	-60 to 320/340	205105
	30	0.50	-60 to 320/340	204692
	30	0.88	-60 to 310/330	205147
	30	1.50	-60 to 310/330	204694
	30	2.65	-60 to 270/290	204695
	30	3.00	-60 to 270/290	204696
	30	5.00	-60 to 270/290	204697
	50	0.10	-60 to 320/340	205110
	50	0.50	-60 to 320/340	205141
	50	1.50	-60 to 310/330	205161
	50	3.00	-60 to 270/290	205170
	50	5.00	-60 to 270/290	205178
	60	0.10	-60 to 320/340	205113
	60	0.50	-60 to 320/340	205145
	60	1.50	-60 to 310/330	205162
	60	3.00	-60 to 270/290	205172
	60	5.00	-60 to 270/290	205179

HB 5ht

HB-5ht

(95%) Dimethyl-(5%) diphenylpolysiloxane, bonded and crosslinked phase.

- For high temperature analysis up to 400 °C
- Fused silica tube covered with polyimide, resistant to high temperatures, or stainless steel tube (specially deactivated)
- Excellent symmetry for compounds with high boiling points
- For the analysis of waxes, triglycerides, sterol esters, polyoxyethylenated alcohols, etc.



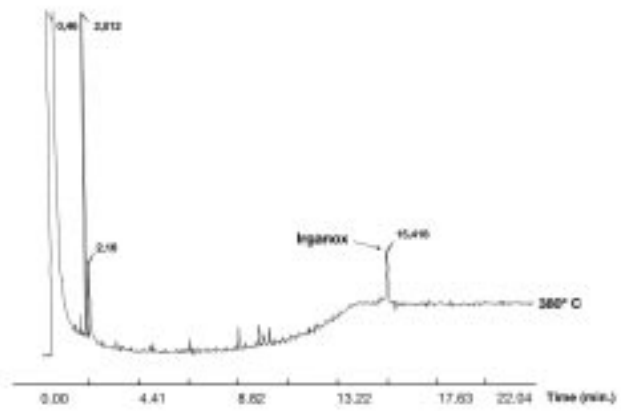
Structure of Poly(dimethyldiphenyl)siloxane

HB-5ht

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	15	0.10	-60 to 395	204767
	30	0.10	-60 to 395	205464
0.32	15	0.10	-60 to 390	205463
	30	0.10	-60 to 390	205465

IRGANOX 1010

Column: HB-5ht, 15m X 0.25 mm X 0.10 µm, P/N 204767
Injection: 1µl (Irganox 1010. 12mg/ml chloroform), split (1:60), 370°C
Carrier gas: H_2, 6psi (41,3 kPa)
Oven temp.: 150°C to 380°C (10 min.) @ 30°C/min.
Detector: FID to 390°C

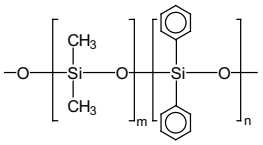


HB-Sterol

HB-Sterol

(95%) Dimethyl-(5%) diphenylpolysiloxane, bonded and crosslinked phase.

- Special column for the analysis of complex mixtures of sterols, from animal or plant origin
- Proprietary deactivation method to ensure a high chemical inertness and the analysis of sterols without derivatization
- The column is specifically tested for sterols



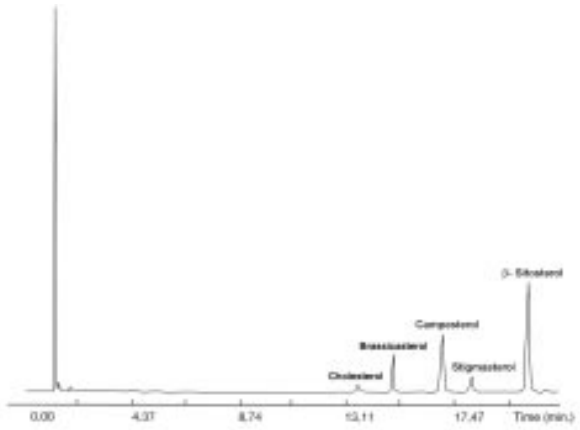
Structure of Poly(dimethyldiphenyl)siloxane

HB-Sterol

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.22	30	0.22	-60 to 325-350	204766

STEROLS

Column: HB-Sterol, 30m X 0.22 mm X 0.22 µm, P/N 204766
Oven Temp.: 265°C
Injector: 280°C
Carrier gas: H_2, 18 psi (124 kPa)
Injection: 0.5 µl sterol standard mixture, (25 mg/ml.) split(1:100)
Detector: FID 300°C



HB-5ms

The HB-5ms column exhibits excellent resolution and symmetry for neutral acidic and basic compounds.

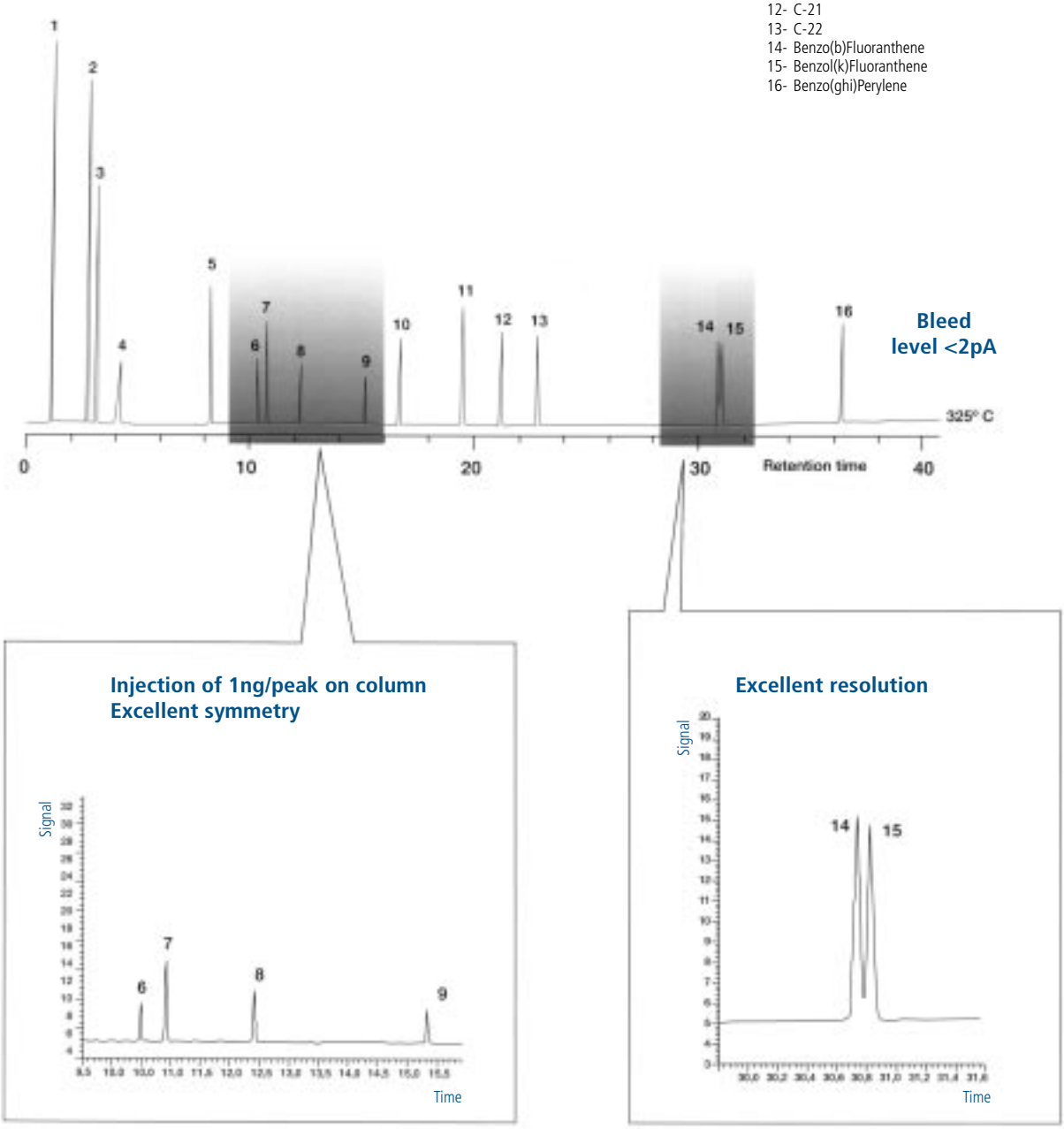
All substances that appear in the analysis of semivolatile traces (for example EPA official methods) can be analyzed with just one column.

Test MX5

Column: HB-5ms, P/N 204698
Dimensions: 30 m x 0.25 mm x 0.25 µm
Injection: 1µl, split (1:100), 5 to 10 ng/comp. on column, 280ºC
Carrier gas: H_2, 12 psi (87,7 kPa)
Oven temp.: 100°C to 325ºC (5 min.) @ 6°C/min.
Detector: FID to 300°C
Sample: Test MX5

Peak Name

1- Methylene chloride
2- 1,2-Hexanediol
3- Nitroso-di-n-propylamine
4- Benzoic acid
5- C-14
6- 2,4-Dinitrophenol
7- 4-Nitrophenol
8- 4-Nitroaniline
9- Pentachlorophenol
10- Carbazole
11- C-20
12- C-21
13- C-22
14- Benzo(b)Fluoranthene
15- Benzol(k)Fluoranthene
16- Benzo(ghi)Perylene



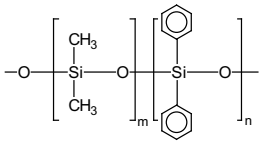
HB 5ms

HB-5ms

(95%) Dimethyl-(5%) diphenylpolysiloxane, bonded and crosslinked phase.

- The HB-5ms column has the same stationary phase as the HB-5, but the polymer synthesis process, the capillary deactivation technique and the bonding and crosslinking procedures have been optimized to obtain the minimum possible bleed level and an excellent chemical inertness
- The HB-5ms column 30m x 0.25mm x 0.25µm (P/N 204698) is specified for a bleed level lower than 4pA at 325°C
- Suitable in conjunction with any selective detector
- Ideal column for GC/MS. Its ultra-low bleed level and chemical inertness results in a better signal-to-noise ratio and therefore lower detection limits can be achieved

Structure of Poly(dimethyldiphenyl)siloxane



HB-5ms

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.20	12	0.33	-60 to 325-350	205420
	15	0.33	-60 to 325-350	205415
	25	0.33	-60 to 325-350	205416
	30	0.33	-60 to 325-350	205417
	50	0.33	-60 to 325-350	205418
	60	0.33	-60 to 325-350	205419
0.25	15	0.10	-60 to 325-350	205390
	15	0.25	-60 to 325-350	205396
	15	1.00	-60 to 325-350	205405
	30	0.10	-60 to 325-350	205392
	30	0.25	-60 to 325-350	204698
	30	1.00	-60 to 325-350	205408
	60	0.10	-60 to 325-350	205394
	60	0.25	-60 to 325-350	204699
	60	1.00	-60 to 325-350	205411
0.32	15	0.10	-60 to 325-350	205391
	15	0.25	-60 to 325-350	205397
	15	0.50	-60 to 325-350	205400
	15	1.00	-60 to 325-350	205406
	30	0.10	-60 to 325-350	205393
	30	0.25	-60 to 325-350	205398
	30	0.50	-60 to 325-350	205402
	30	1.00	-60 to 325-350	205409
	60	0.10	-60 to 325-350	205395
	60	0.25	-60 to 325-350	205399
	60	0.50	-60 to 325-350	205404
	60	1.00	-60 to 325-350	205412
0.53	15	0.50	-60 to 320-340	205401
	15	1.00	-60 to 320-340	205407
	15	1.50	-60 to 310-330	205413
	30	0.50	-60 to 320-340	205403
	30	1.00	-60 to 320-340	205410
	30	1.50	-60 to 310-330	205414

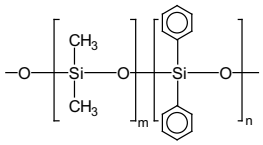
HB-5Amine

HB-5Amine

95% Dimethyl-(5%) diphenylpolysiloxane, bonded and crosslinked phase.

- Special column for the analysis of amines
- A proprietary base deactivation method minimises the absorption and tailing of basic compounds like alkylamines, alcoholamines, basic pharmaceuticals, aromatic amines, etc.
- Selectivity and thermal stability equivalent to the HB-5 column

Structure of Poly(dimethyldiphenyl)siloxane

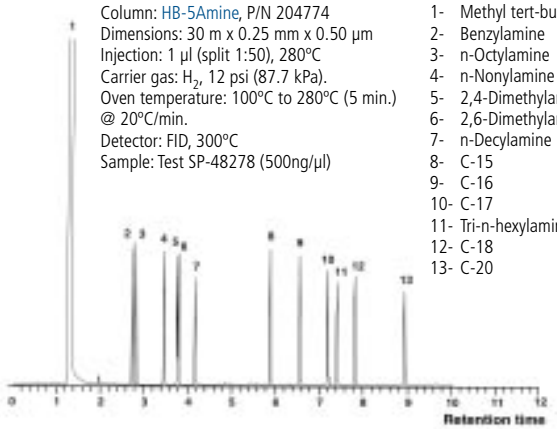


HB-5Amine

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	15	0.50	-60 to 300/315	205257
	15	1.00	-60 to 300/315	205261
	30	0.50	-60 to 300/315	204774
	30	1.00	-60 to 300/315	205264
	60	0.50	-60 to 300/315	205259
	60	1.00	-60 to 300/315	205266
0.32	15	0.50	-60 to 300/315	205258
	15	1.00	-60 to 300/315	205262
	15	1.50	-60 to 290/305	205269
	30	0.50	-60 to 300/315	204773
	30	1.00	-60 to 300/315	205265
	30	1.50	-60 to 290/305	205270
	60	0.50	-60 to 300/315	205260
	60	1.00	-60 to 300/315	205267
	60	1.50	-60 to 290/305	205271
0.53	15	1.00	-60 to 290/305	205263
	15	3.00	-60 to 280/295	205272
	30	1.00	-60 to 290/305	204772
	30	3.00	-60 to 280/295	205273
	60	1.00	-60 to 290/305	205268
	60	3.00	-60 to 280/295	205274

Amine Test

Column: HB-5Amine, P/N 204774
Dimensions: 30 m x 0.25 mm x 0.50 µm
Injection: 1 µl (split 1:50), 280°C
Carrier gas: H_2, 12 psi (87.7 kPa).
Oven temperature: 100°C to 280°C (5 min.) @ 20°C/min.
Detector: FID, 300°C
Sample: Test SP-48278 (500ng/µl)



Peak Name

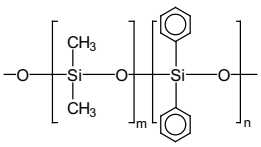
1- Methyl tert-butyl ether
2- Benzylamine
3- n-Octylamine
4- n-Nonylamine
5- 2,4-Dimethylaniline
6- 2,6-Dimethylaniline
7- n-Decylamine
8- C-15
9- C-16
10- C-17
11- Tri-n-hexylamine
12- C-18
13- C-20

HB-5.625

HB-5.625

95% Dimethyl-(5%) diphenylpolysiloxane, bonded and crosslinked phase.

- Fulfills the requirements of the EPA methods for the analysis of semivolatile compounds, designed for methods 625, 1625, 8270 and CLP protocols
- Inertness and minimum absorption of acidic, basic and neutral compounds



Structure of Poly(dimethyldiphenyl)siloxane

HB-5.625

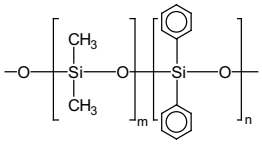
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.20	12	0.33	-60 to 325/350	205309
	25	0.33	-60 to 325/350	205307
	50	0.33	-60 to 325/350	205308
0.25	15	0.10	-60 to 325/350	205284
	15	0.25	-60 to 325/350	205290
	15	0.50	-60 to 325/350	205296
	15	1.00	-60 to 325/350	205301
	30	0.10	-60 to 325/350	205286
	30	0.25	-60 to 325/350	205292
	30	0.50	-60 to 325/350	205298
	30	1.00	-60 to 325/350	205303
	60	0.10	-60 to 325/350	205288
	60	0.25	-60 to 325/350	205294
0.32	15	0.10	-60 to 325/350	205285
	15	0.25	-60 to 325/350	205291
	15	0.50	-60 to 325/350	205297
	15	1.00	-60 to 325/350	205302
	30	0.10	-60 to 325/350	205287
	30	0.25	-60 to 325/350	205293
	30	0.50	-60 to 325/350	205299
	30	1.00	-60 to 325/350	205304
	60	0.10	-60 to 325/350	205289
0.53	15	1.50	-60 to 320/340	205306
	30	0.50	-60 to 320/340	205300
	30	1.00	-60 to 310/330	205305
	60	0.25	-60 to 325/350	205295

HB-G27

HB-G27

95% Dimethyl-(5%) diphenylpolysiloxane, bonded and crosslinked phase.

- Fulfills the specifications of the American Pharmacopea (USP), for the test of organic volatile impurities (OVI) in pharmaceutical products methods USP 467



Structure of Poly(dimethyldiphenyl)siloxane

HB-G27

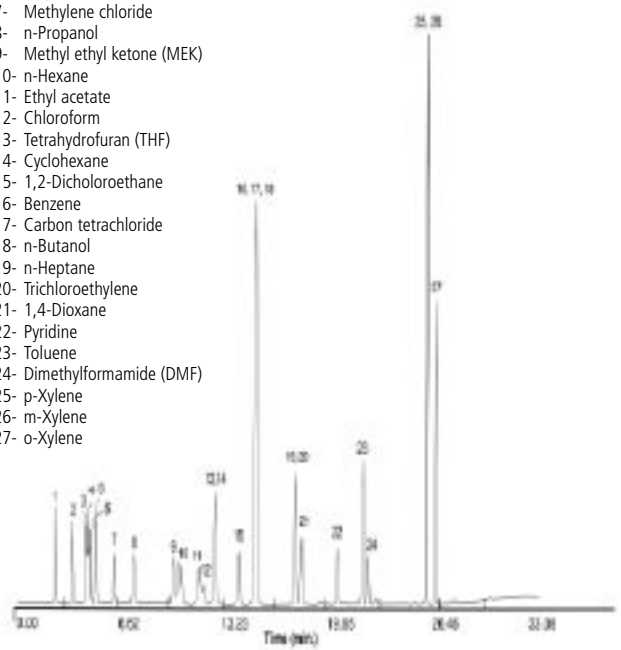
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.53	30	5.00	-60 to 270/290	204701

RESIDUAL SOLVENTS IN PHARMACEUTICAL PRODUCTS

Column: HB-G27, 30 m x 0.53 mm x 5,0 µm, P/N 204701
Injection: 220°C, (split 1:80), 5 m phenylmethyl deactivated retention gap
Carrier Gas: He, 4,5 psi (31kPa), 35 cm/s. to 35°C
Oven Temp: 35°C (10 min.) to 100°C @ 5° C/min. to 240°C (5 min.) @ 25°C/min.
Detector: FID@ 250°C
Sample: 0.02 µl solvent mixture

Peak Name

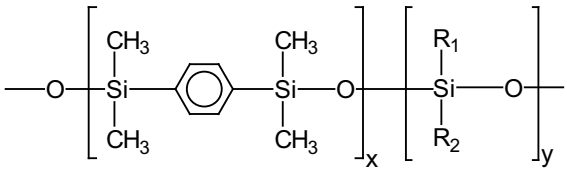
1- Methanol
2- Ethanol
3- Acetonitrile
4- Acetone
5- Isopropanol
6- Ethyl ether
7- Methylene chloride
8- n-Propanol
9- Methyl ethyl ketone (MEK)
10- n-Hexane
11- Ethyl acetate
12- Chloroform
13- Tetrahydrofuran (THF)
14- Cyclohexane
15- 1,2-Dicholoroethane
16- Benzene
17- Carbon tetrachloride
18- n-Butanol
19- n-Heptane
20- Trichloroethylene
21- 1,4-Dioxane
22- Pyridine
23- Toluene
24- Dimethylformamide (DMF)
25- p-Xylene
26- m-Xylene
27- o-Xylene



HB-5TA

Silphenylene phase, selectivity similar to HB-5, bonded and crosslinked phase.

- Column of choice for the analysis of semivolatile compounds with GC/MS
- Selectivity similar to HB-5
- The arylene groups in the polymer structure, which improves the thermal stability, reduces the bleed level and results in an optimal resolution for aromatic compounds
- Quality control test (MX5) that guarantees total inertness and optimal signal-to-noise ratio (S/N) for the more active compounds that have a tendency to adsorb like 2,4-dinitrophenol, 4 nitroaniline and pentachlorophenol



Structure of Polysiloxane containing p-silphenylene

HB-5TA

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.20	12	0.33	-60 to 325/350	205535
	25	0.33	-60 to 325/350	205533
	50	0.33	-60 to 325/350	205534
0.25	15	0.10	-60 to 325/350	205509
	15	0.25	-60 to 325/350	205515
	15	0.50	-60 to 325/350	205520
	15	1.00	-60 to 325/350	205525
	30	0.10	-60 to 325/350	205511
	30	0.25	-60 to 325/350	204759
	30	0.50	-60 to 325/350	204761
	30	1.00	-60 to 325/350	205528
	60	0.10	-60 to 325/350	205513
	60	0.25	-60 to 325/350	205518
0.32	15	0.10	-60 to 325/350	205510
	15	0.25	-60 to 325/350	205516
0.32	15	0.50	-60 to 325/350	205521
	15	1.00	-60 to 325/350	205526
	30	0.10	-60 to 325/350	205512
	30	0.25	-60 to 325/350	205517
	30	0.50	-60 to 325/350	205523
	30	1.00	-60 to 325/350	205529
	60	0.10	-60 to 325/350	205514
	60	0.25	-60 to 325/350	205519
0.53	15	0.50	-60 to 320/340	205522
	15	1.00	-60 to 320/340	205527
	15	1.50	-60 to 320/340	205531
	30	0.50	-60 to 320/340	205524
	30	1.00	-60 to 320/340	205530
	30	1.50	-60 to 310/330	205532

Comparison of bleed levels of different manufacturers

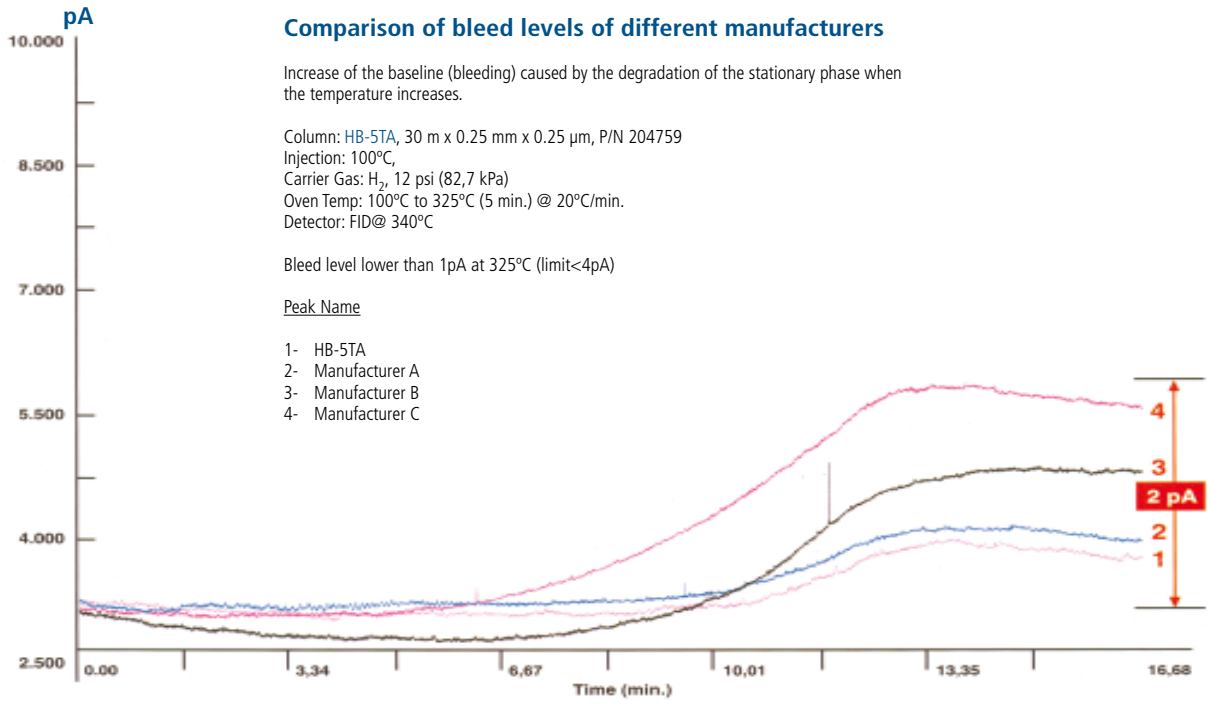
Increase of the baseline (bleeding) caused by the degradation of the stationary phase when the temperature increases.

Column: HB-5TA, 30 m x 0.25 mm x 0.25 µm, P/N 204759
Injection: 100°C,
Carrier Gas: H_2, 12 psi (82,7 kPa)
Oven Temp: 100°C to 325°C (5 min.) @ 20°C/min.
Detector: FID@ 340°C

Bleed level lower than 1pA at 325°C (limit<4pA)

Peak Name

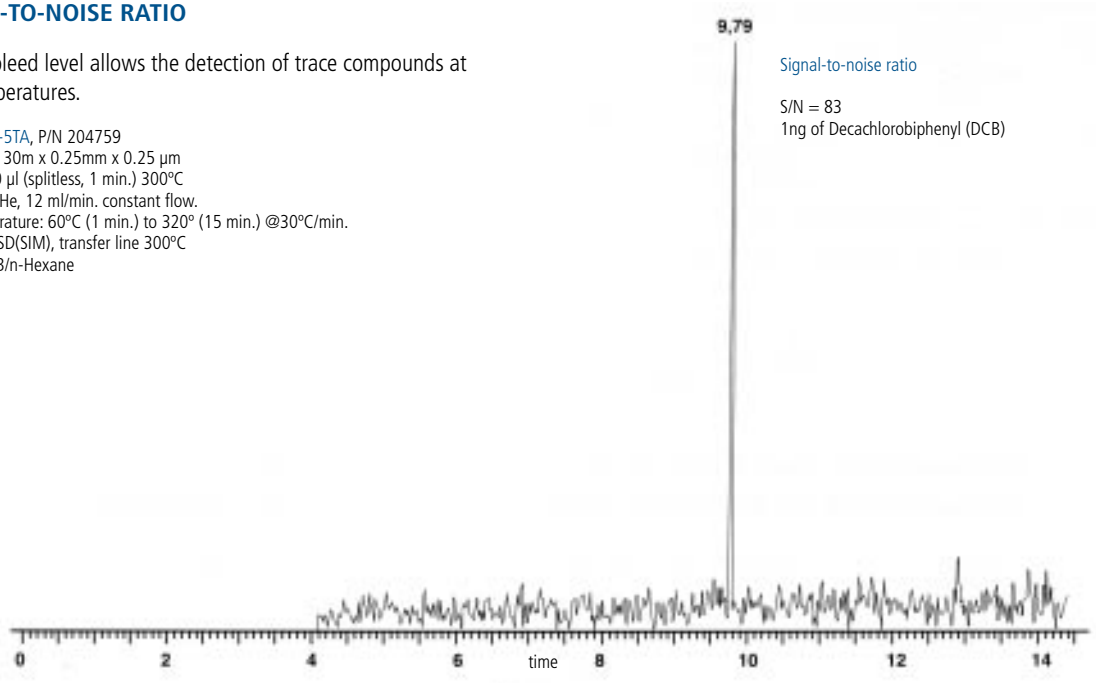
1- HB-5TA
2- Manufacturer A
3- Manufacturer B
4- Manufacturer C



SIGNAL-TO-NOISE RATIO

The low bleed level allows the detection of trace compounds at high temperatures.

Column: HB-5TA, P/N 204759
Dimensions: 30m x 0.25mm x 0.25 µm
Injection:1,0 µl (splitless, 1 min.) 300ºC
Carrier gas: He, 12 ml/min. constant flow.
Oven temperature: 60ºC (1 min.) to 320º (15 min.) @30ºC/min.
Detector: MSD(SIM), transfer line 300ºC
Sample: DCB/n-Hexane

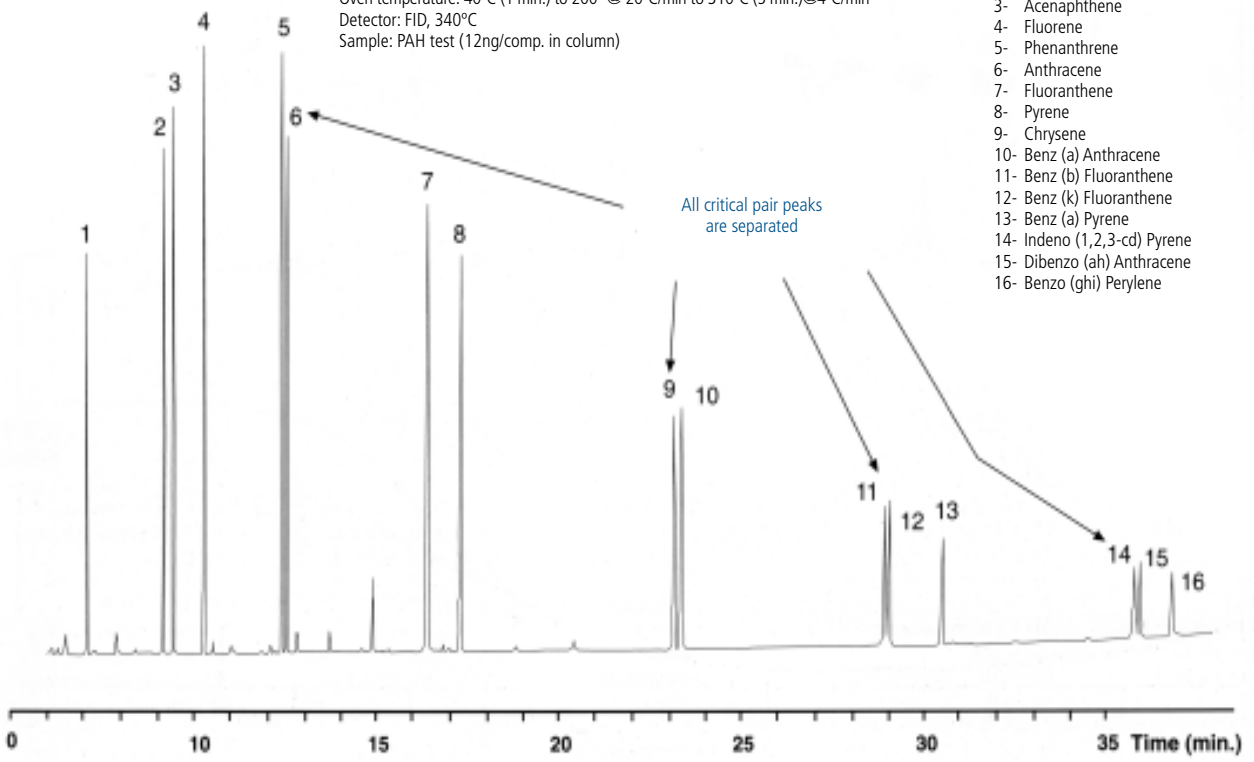


Signal-to-noise ratio

S/N = 83
1ng of Decachlorobiphenyl (DCB)

SEPARATION OF AROMATIC POLYCYCLIC HYDROCARBONS (EPA METHOD 610)

Column: HB-5TA, P/N 204761
Dimensions: 30m x 0.25mm x 0.50 µm
Injection: 0.3 µl (splitless, 1´) 300ºC
Carrier gas: H_2, 16 Psi (110.2 kPa). Cte.
Oven temperature: 40ºC (1 min.) to 200º @ 20ºC/min to 310ºC (5 min.)@4ºC/min
Detector: FID, 340ºC
Sample: PAH test (12ng/comp. in column)



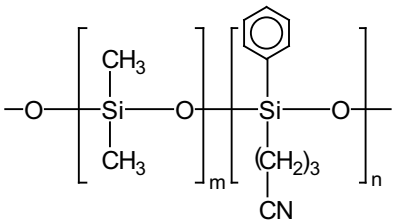
Peak Name

1- Naphathalene
2- Acenaphthylene
3- Acenaphthene
4- Fluorene
5- Phenanthrene
6- Anthracene
7- Fluoranthene
8- Pyrene
9- Chrysene
10- Benz (a) Anthracene
11- Benz (b) Fluoranthene
12- Benz (k) Fluoranthene
13- Benz (a) Pyrene
14- Indeno (1,2,3-cd) Pyrene
15- Dibenzo (ah) Anthracene
16- Benzo (ghi) Perylene

HB-1301

94% Dimethyl-(6%) cyanopropylphenyl polysiloxane, bonded and crosslinked phase.

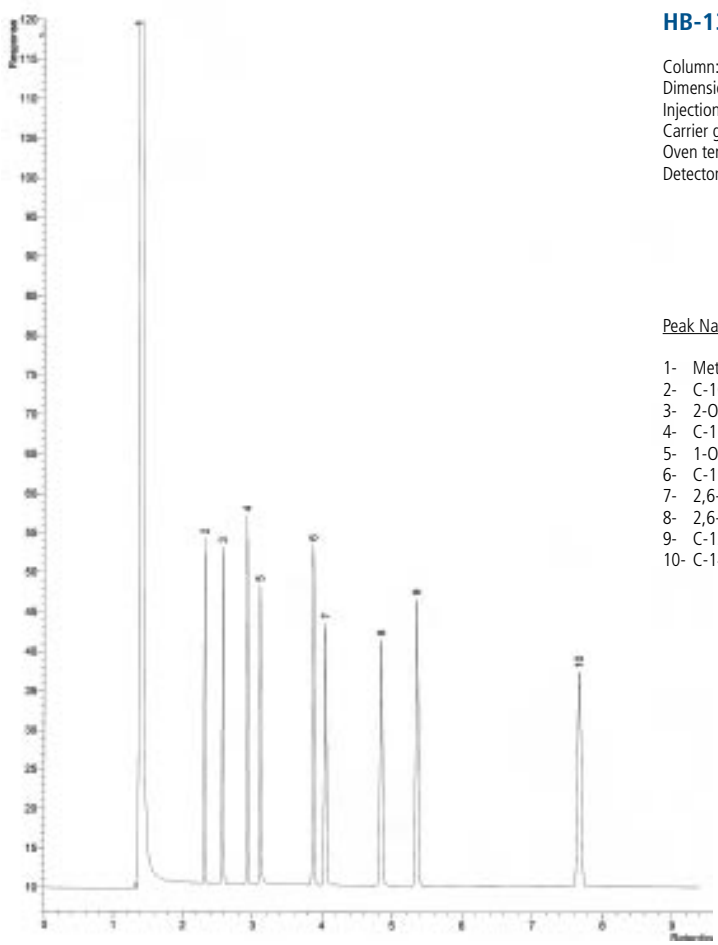
- (6%)Cyanopropyl-phenyl-(94%)dimethylpolysiloxane
- Ideal column for analysing mixtures of acidic and basic compounds with a wide range of polarity
- This column of intermediate polarity is very suitable for analysing pesticides and herbicides



Structure of Poly(dimethylcyanopropylphenyl)siloxane

HB-1301

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	15	0.25	-20 to 280/300	205445
	15	1.00	-20 to 260/280	205451
	30	0.25	-20 to 280/300	205447
	30	1.00	-20 to 260/280	204737
	60	0.25	-20 to 280/300	205449
	60	1.00	-20 to 260/280	205455
0.32	15	0.25	-20 to 280/300	205446
	15	1.00	-20 to 260/280	205452
	30	0.25	-20 to 280/300	205448
	30	1.00	-20 to 260/280	205454
	60	0.25	-20 to 280/300	205450
	60	1.00	-20 to 260/280	205456
0.53	15	1.00	-20 to 260/280	205453
	30	1.00	-20 to 260/280	204736
	60	1.00	-20 to 260/280	205457



HB-1301

Column: HB-1301, P/N 204737
Dimensions: 30m x 0.25mm x 1.0µm
Injection: 0.5µl standard SP-4-7301 (500 ng/ml), split 1:50. 260ºC
Carrier gas: H_2, constant pressure 12 psi (82.7 kPa).
Oven temperature: 165ºC
Detector: FID, 280ºC

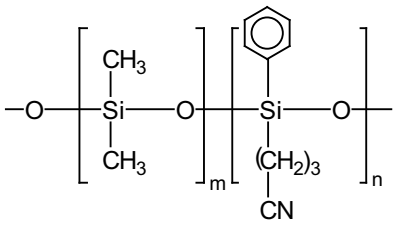
Peak Name

1- Methylene chloride
2- C-10
3- 2-Octanone
4- C-11
5- 1-Octanol
6- C-12
7- 2,6-Dimethylphenol
8- 2,6-Dimethylaniline
9- C-13
10- C-14

HB-624

94% Dimethyl-(6%) cyanopropylphenyl polysiloxane, bonded and crosslinked phase.

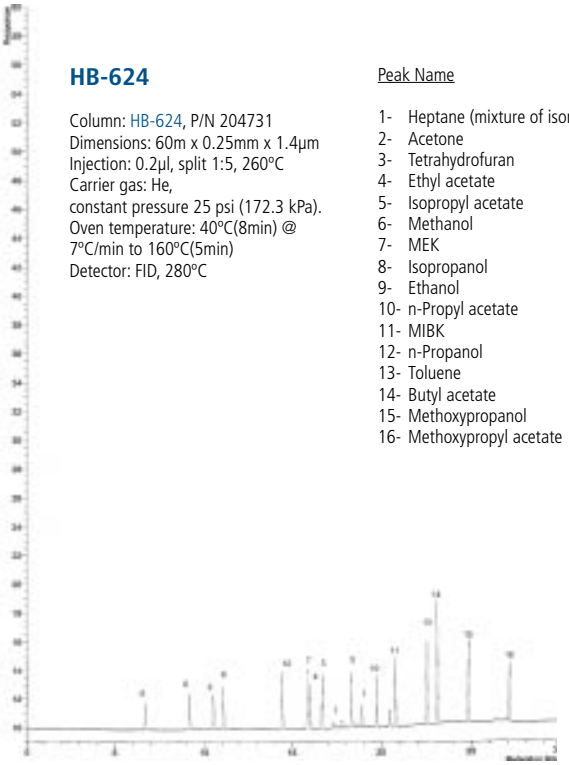
- (6%) Cyanopropyl-phenyl - (94%) dimethylpolysiloxane
- Column specially developed for the analysis of volatile compounds ("Volatile Priority Pollutants")
- Column is compatible with EPA methods 501.3, 502.2, 524.2, 601, 602, 8010. 8015, 8020. 8221, 8240 and 8260
- Excellent inertness against active compounds



Structure of Poly(dimethylcyanopropylphenyl)siloxane

HB-624

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.20	25	1.12	-20 to 240/260	205458
0.25	30	1.40	-20 to 240/260	205459
	60	1.40	-20 to 240/260	204731
0.32	30	1.80	-20 to 240/260	204732
	60	1.80	-20 to 240/260	205460
0.53	30	3.00	-20 to 240/260	204733
	60	3.00	-20 to 240/260	205461
	75	3.00	-20 to 240/260	204734
	105	3.00	-20 to 240/260	205462

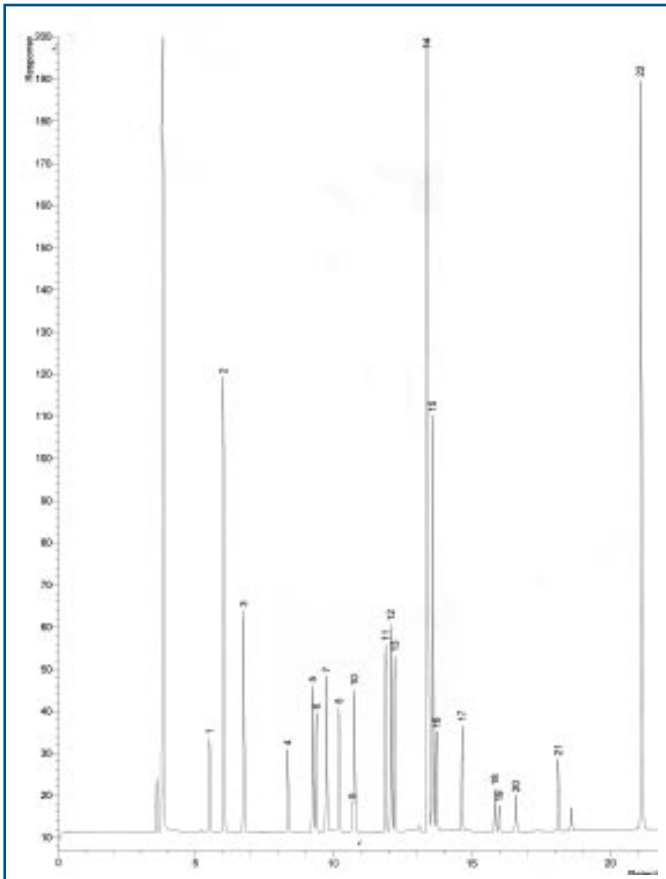


HB-624

Column: HB-624, P/N 204731
Dimensions: 60m x 0.25mm x 1.4µm
Injection: 0.2µl, split 1:5, 260°C
Carrier gas: He,
constant pressure 25 psi (172.3 kPa).
Oven temperature: 40°C(8min) @ 7°C/min to 160°C(5min)
Detector: FID, 280°C

Peak Name

1- Heptane (mixture of isomers)
2- Acetone
3- Tetrahydrofuran
4- Ethyl acetate
5- Isopropyl acetate
6- Methanol
7- MEK
8- Isopropanol
9- Ethanol
10- n-Propyl acetate
11- MIBK
12- n-Propanol
13- Toluene
14- Butyl acetate
15- Methoxypropanol
16- Methoxypropyl acetate



HB-624

Column: HB-624, P/N 204731
Dimensions: 60m x 0.25mm x 1.4µm
Injection: 1µl solvents mixture, split 1:100 (20-600 ng/comp.), 260°C
Carrier gas: H_2, constant pressure 25 psi (172.3 kPa).
Oven temperature: 50°C(5min) @ 6°C/min to 220°C
Detector: FID, 280°C

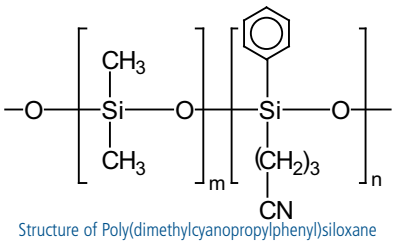
Peak Name

1- Diethylether
2- Acetone
3- Methyl acetate
4- Vinyl acetate
5- MEK
6- Ethyl acetate
7- Tetrahydrofuran
8- Cyclohexane
9- Benzene
10- Isopropyl acetate
11- 2-Pentanone
12- 3-Pentanone
13- Propyl acetate
14- Pyridine
15- Toluene
16- Isobutyl acetate
17- Butyl acetate
18- Ethyl benzene
19- m-Xylene/p-Xylene
20- o-Xylene
21- Diisobutylketone
22- Nitrobenzene

HB-G43

94% Dimethyl-(6%) cyanopropylphenyl polysiloxane, bonded and crosslinked phase.

- (6%) Cyanopropyl-phenyl - (94%) dimethylpolysiloxane (USP G43)
- Fulfills the specifications of the American (USP) and European (EP) Pharmacopeia for the analysis of residual solvents (OVI) in pharmaceutical products, USP method 467 and EP method 2.4.24
- Column with chemical inertness and low bleed guaranteed
- Specially tested for complete separation of the five solvents regulated by USP Method 467
- For this analysis, Pharmacopeia recommends the use of a guard column of 5m (P/N TR-200055) to trap the non-volatile impurities in the sample



Structure of Poly(dimethylcyanopropylphenyl)siloxane

HB-G43

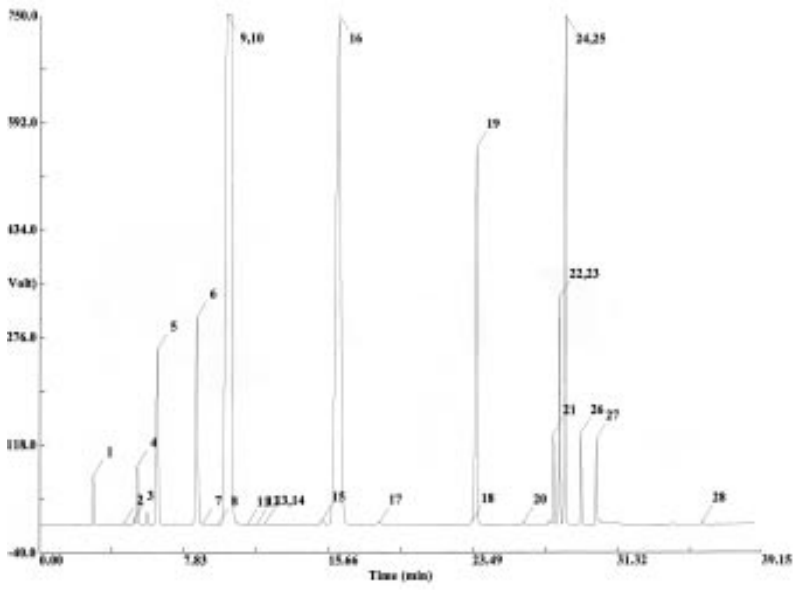
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.53	30	3.00	-20 to 240/260	204738

HB-G43

Column: HB-G43, P/N 204738
Dimensions: 30m x 0.53mm x 3.0µm
Injection:, split 1:2, 250°C, 5m x 0.53mm intermediate polarity column (204803)
Sample: 0.5 ml headspace 80°C (2t static head space sampler) 28 Class 1 Mix and Class 2 Mix A, Mix B residual solvents at the regulatory limit concentration.
Carrier gas: He, constant pressure 4.8 psi (33.1 kPa), 35 cm/s (40°C)
Oven temperature: 40°C(20min) @ 10°C/min to 240°C(10min)
Detector: FID, 250°C

Peak Name

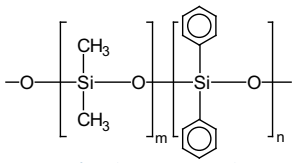
1- Methanol
2- 1,2-Dichloroethene
3- Acetonitrile
4- Methylene chloride
5- n-Hexane
6- Cis-1,2-dichloroethene
7- Nitromethane
8- Chloroform
9- Cyclohexane
10- 1,1,1-Trichloroethane
11- Carbon tetrachloride
12- Benzene
13- 1,2-Dimethoxyethane
14- 1,2-Dichloroethane
15- Trichloroethylene
16- Methylcyclohexane
17- 1,4-Dioxane
18- Pyridine
19- Toluene
20- 2-Hexanone
21- Chlorobenzene
22- Dimethylformamide
23- Ethylbenzene
24- m-Xylene
25- p-Xylene
26- o-Xylene
27- N,N-dimethylacetamide
28- 1,2,3,4-Tetrahydronaphthalene



HB-13

(14%) Diphenyl -(86%) dimethylpolysiloxane, bonded and crosslinked phase.

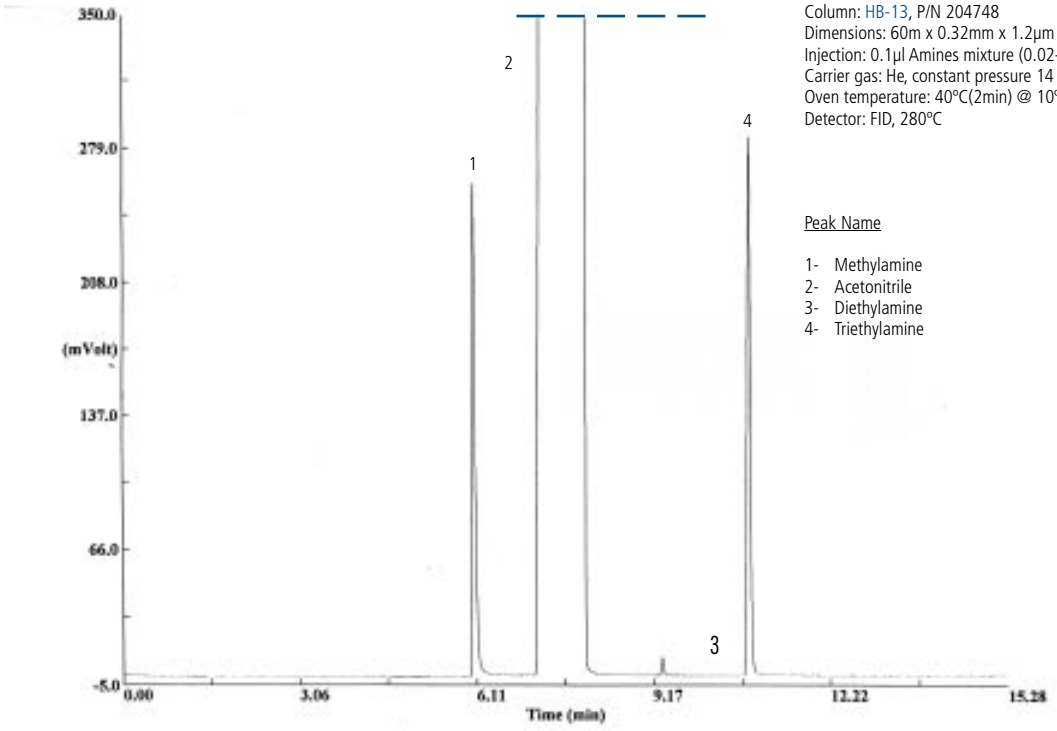
- (14%) Diphenyl- (86%) dimethylpolysiloxane
- Column of intermediate polarity without cyanopropyl groups in its structure
- Chemical inertness and low bleed guaranteed
- Confirmation column alongside HB-1 and HB-5



Structure of Poly(dimethyldiphenyl)siloxane

HB-13

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	15	0.20	-20 to 300/330	205484
	15	0.40	-20 to 300/330	205467
	15	1.20	-20 to 300/330	205476
	30	0.20	-20 to 300/330	205486
	30	0.40	-20 to 300/330	205469
	30	1.20	-20 to 300/330	205478
	60	0.20	-20 to 300/330	205488
	60	0.40	-20 to 300/330	205471
	60	1.20	-20 to 300/330	205480
0.32	15	0.20	-20 to 300/330	205485
	15	0.40	-20 to 300/330	205468
	15	1.20	-20 to 300/330	205477
	30	0.20	-20 to 300/330	205487
	30	0.40	-20 to 300/330	205470
	30	1.20	-20 to 300/330	205479
	60	0.20	-20 to 300/330	205489
	60	0.40	-20 to 300/330	205472
	60	1.20	-20 to 300/330	204748
0.53	15	1.00	-20 to 300/330	205473
	15	2.00	-20 to 300/330	205481
	30	1.00	-20 to 300/330	205474
	30	2.00	-20 to 300/330	205482
	60	1.00	-20 to 300/330	205475
	60	2.00	-20 to 300/330	205483



HB-13

Column: HB-13, P/N 204748
Dimensions: 60m x 0.32mm x 1.2µm
Injection: 0.1µl Amines mixture (0.02-0.2% in Acetonitrile), split 1:25, 200°C
Carrier gas: He, constant pressure 14 psi (96.5 kPa)
Oven temperature: 40°C(2min) @ 10°C/min to 250°C
Detector: FID, 280°C

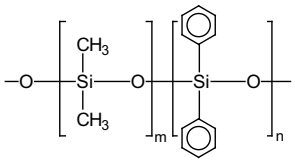
Peak Name

1- Methylamine
2- Acetonitrile
3- Diethylamine
4- Triethylamine

HB-20

(20%) Diphenyl-(80%) Dimethylpolysilioxane, bonded and crosslinked phase.

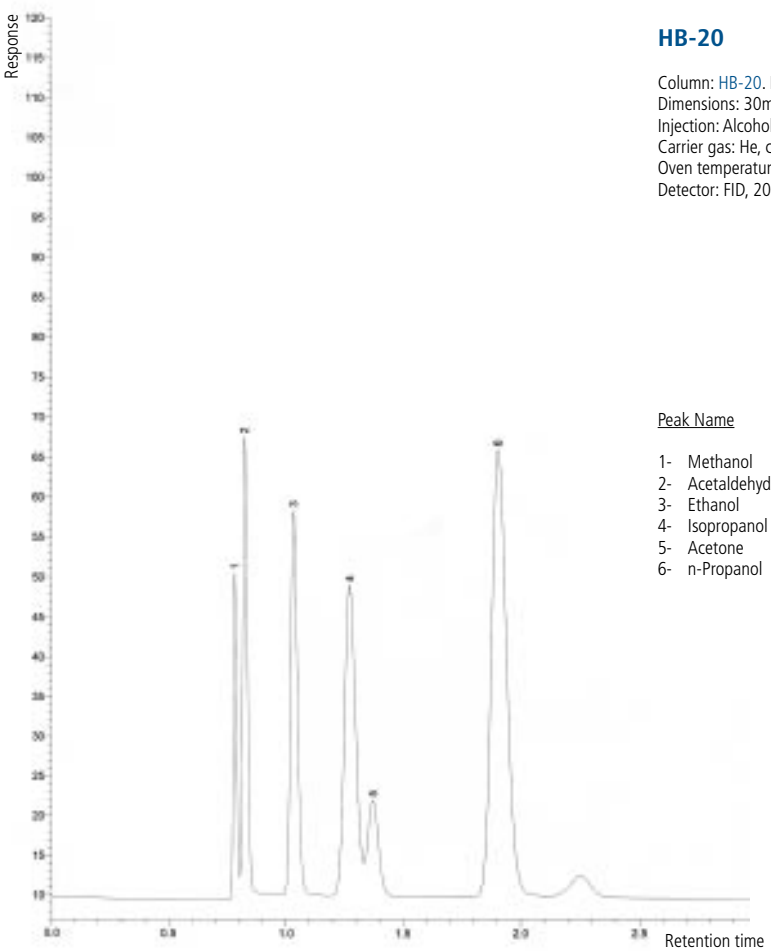
- (20%) Diphenyl-(80%) dimethylpolysiloxane
- Column of intermediate polarity without cyanopropyl groups in its structure
- Excellent confirmation column



Structure of Poly(dimethyldiphenyl)siloxane

HB-20

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	15	0.25	-20 to 300/320	205239
	15	1.00	-20 to 280/300	205248
	30	0.25	-20 to 300/320	205241
	30	1.00	-20 to 280/300	205251
	60	0.25	-20 to 300/320	205243
	60	1.00	-20 to 280/300	205254
0.32	15	0.25	-20 to 300/320	205240
	15	1.00	-20 to 280/300	205249
	30	0.25	-20 to 300/320	205242
	30	1.00	-20 to 280/300	205252
	60	0.25	-20 to 300/320	205244
	60	1.00	-20 to 280/300	205255
0.53	15	0.50	-20 to 260/280	205245
	15	1.00	-20 to 260/280	205250
	30	0.50	-20 to 260/280	205246
	30	1.00	-20 to 260/280	205253
	60	0.50	-20 to 260/280	205247
	60	1.00	-20 to 260/280	205256



HB-20

Column: HB-20. P/N 204749
Dimensions: 30m x 0.53mm x 3.0µm
Injection: Alcohols in blood, 0.5 µl Head Space, split 5:1, 200°C
Carrier gas: He, constant pressure 10 psi (69 kPa)
Oven temperature: 40°C (isothermal)
Detector: FID, 200°C

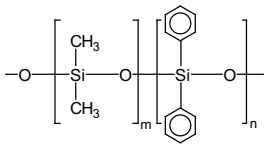
Peak Name

1- Methanol
2- Acetaldehyde
3- Ethanol
4- Isopropanol
5- Acetone
6- n-Propanol

HB-35

(35%) Diphenyl (65%) Dimethylpolysilioxane, bonded and crosslinked phase.

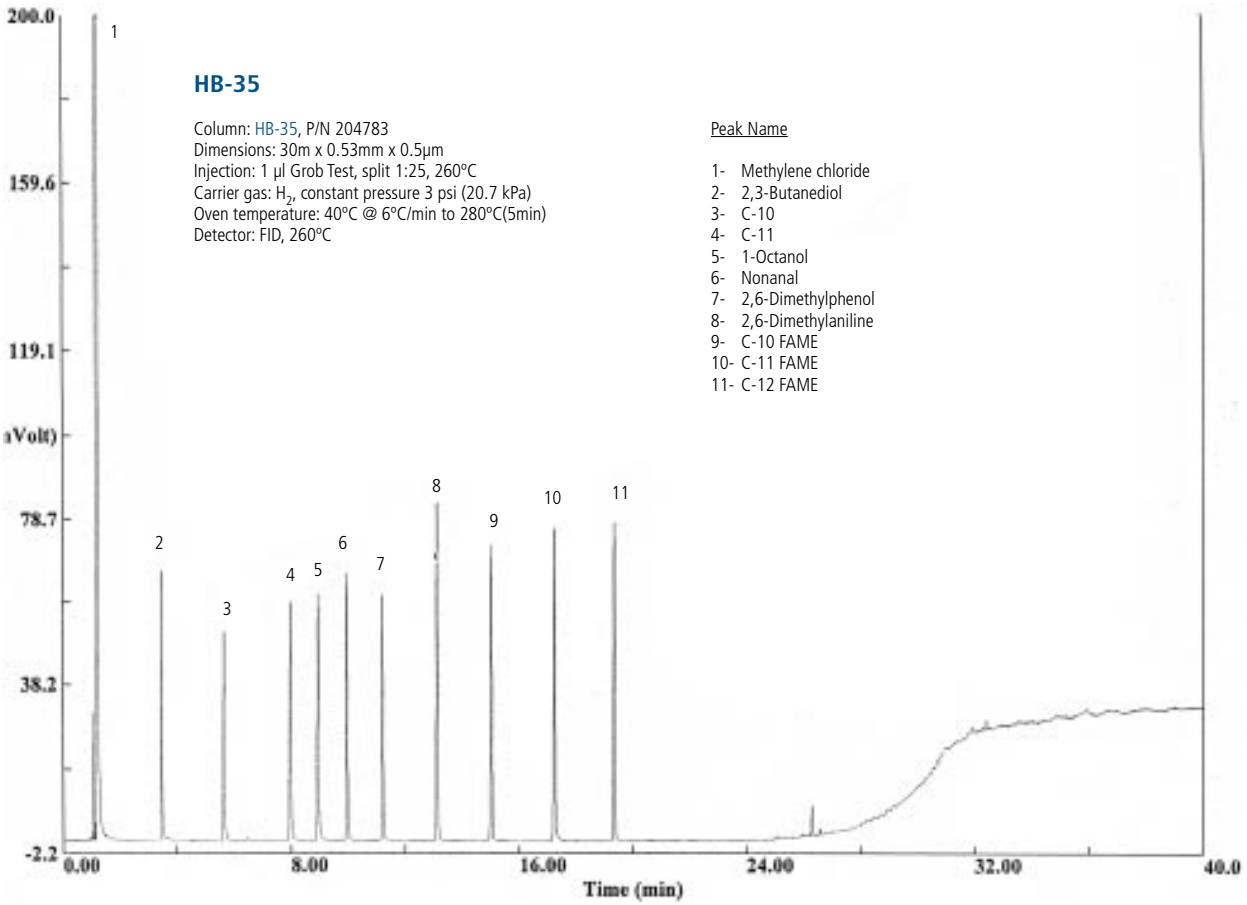
- (35%) Diphenyl-(65%) dimethylpolysiloxane
- Column of intermediate polarity without cyanopropyl groups in its structure
- Excellent confirmation column



Structure of Poly(dimethyldiphenyl)siloxane

HB-35

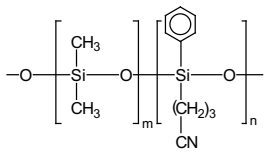
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	15	0.15	-20 to 300/320	205349
	15	0.25	-20 to 300/320	204781
	30	0.15	-20 to 300/320	204780
	30	0.25	-20 to 300/320	204782
	60	0.15	-20 to 300/320	205352
	60	0.25	-20 to 300/320	205339
0.32	15	0.15	-20 to 300/320	205350
	15	0.25	-20 to 300/320	205337
	15	0.50	-20 to 290/310	205341
	30	0.15	-20 to 300/320	205351
	30	0.25	-20 to 300/320	205567
	30	0.50	-20 to 290/310	205343
	60	0.15	-20 to 300/320	205353
	60	0.25	-20 to 300/320	205340
	60	0.50	-20 to 290/310	205344
0.53	15	0.50	-20 to 260/280	205342
	15	1.00	-20 to 260/280	205346
	30	0.50	-20 to 260/280	204783
	30	1.00	-20 to 260/280	205347
	60	0.50	-20 to 260/280	205345
	60	1.00	-20 to 260/280	205348



HB-1701

(14%) Cyanopropyphenyl-(86%) dimethyl polysiloxane, bonded and crosslinked phase.

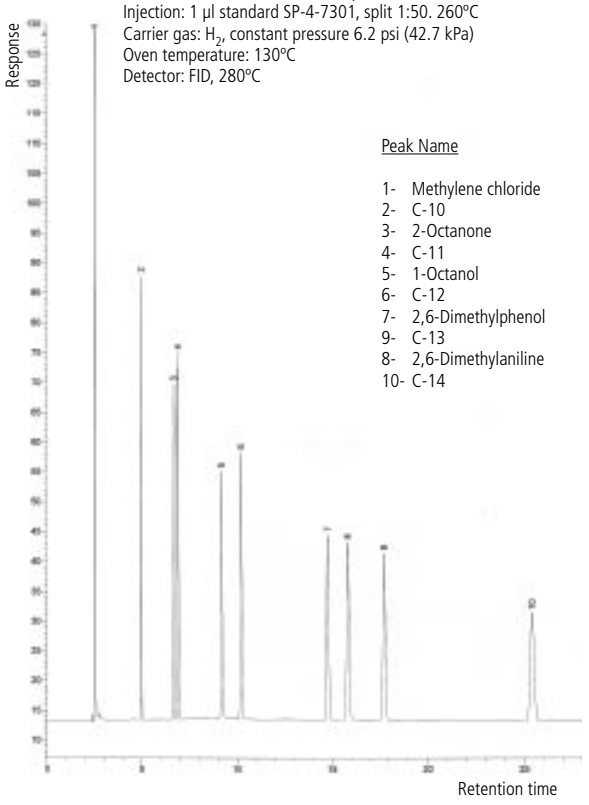
- (14%) Cyanopropyl-phenyl- (86%)dimethylpolysiloxane
- Intermediate polarity column of wide use
- Historically used in the analysis of pesticides



Structure of Poly(dimethylcyanopropylphenyl)siloxane

HB-1701

Column: HB-1701, P/N 205589
Dimensions: 60m x 0.53mm x 1.5µm
Injection: 1 µl standard SP-4-7301, split 1:50. 260ºC
Carrier gas: H_2, constant pressure 6.2 psi (42.7 kPa)
Oven temperature: 130ºC
Detector: FID, 280ºC



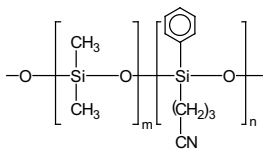
HB-1701

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.20	15	0.20	-20 to 280/280	205189
	30	0.20	-20 to 280/280	205190
	60	0.20	-20 to 280/280	205191
0.25	15	0.25	-20 to 280/280	204750
	15	0.50	-20 to 270/280	205183
	15	1..00	-20 to 260/280	205186
	30	0.10	-20 to 280/280	205180
	30	0.25	-20 to 280/280	204751
	30	0.50	-20 to 270/280	205184
	30	1.00	-20 to 260/280	205187
	60	0.10	-20 to 280/280	205181
	60	0.25	-20 to 280/280	205182
	60	0.50	-20 to 270/280	205185
	60	1.00	-20 to 260/280	205188
0.32	15	0.10	-20 a 280/280	205567
	15	0.25	-20 a 280/280	205568
	15	0.50	-20 a 270/280	205569
	15	1.00	-20 a 260/280	205570
	30	0.25	-20 a 280/280	205571
	30	0.50	-20 a 270/280	205572
	30	1.00	-20 a 260/280	205573
	60	0.10	-20 a 280/280	205574
	60	0.25	-20 a 280/280	205575
	60	0.50	-20 a 270/280	205576
	60	1.00	-20 a 260/280	205577
0.53	15	0.10	-20 a 270/280	205578
	15	0.50	-20 a 260/270	205579
	15	1.00	-20 a 250/270	205580
	15	1.50	-20 a 240/260	205581
	30	0.10	-20 a 270/280	205582
	30	0.50	-20 a 260/270	205583
	30	1.00	-20 a 250/270	205584
	30	1.50	-20 a 240/260	205585
	60	0.10	-20 a 270/280	205586
	60	0.50	-20 a 260/270	205587
	60	1.00	-20 a 250/270	205588
	60	1.50	-20 a 240/260	205589

HB-225

(50%) Cyanopropylphenyl-(50%) dimethyl polysiloxane, bonded and crosslinked phase.

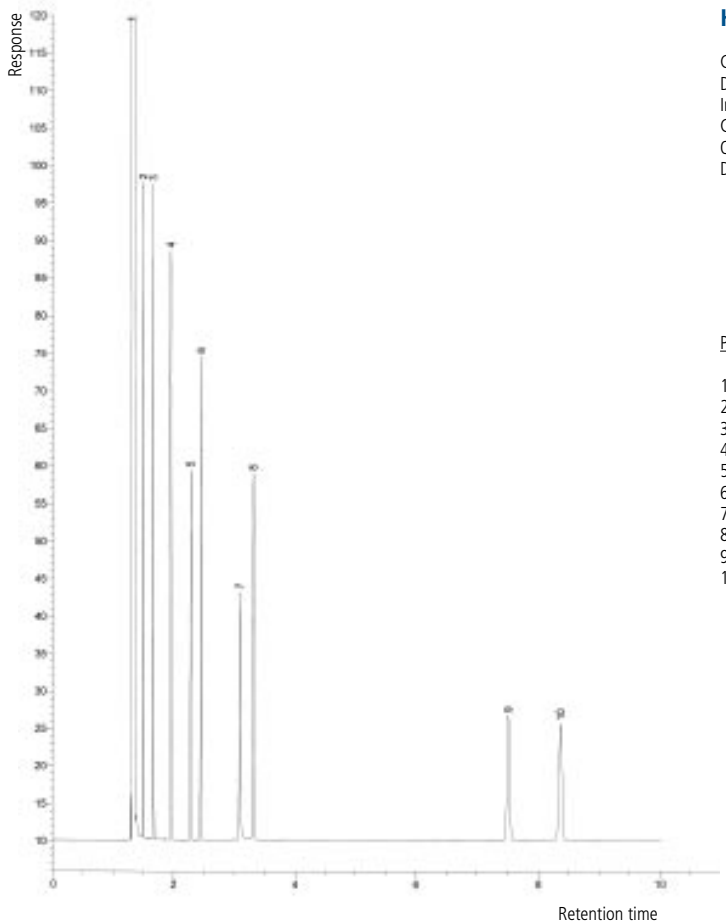
- (50%) Cyanopropylphenyl - (50%) dimethyl polysiloxane
- Medium/high polarity column
- Excellent for separating cis-trans isomers of FAMES and sugar derivatives



Structure of Poly(dimethylcyanopropylphenyl)siloxane

HB-225

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.20	15	0.20	40 to 220/240	205282
	30	0.20	40 to 220/240	205283
0.25	15	0.15	40 to 220/240	205279
	15	0.25	40 to 220/240	205275
	30	0.15	40 to 220/240	204791
	30	0.25	40 to 220/240	204788
0.32	15	0.15	40 to 220/240	205280
	15	0.25	40 to 220/240	205276
	30	0.15	40 to 220/240	205281
	30	0.25	40 to 220/240	204789
0.53	15	1.00	40 to 200/220	205277
	30	1.00	40 to 200/220	205278



HB-225

Column: HB-225, P/N 204791
Dimensions: 30m x 0.25mm x 0.15µm
Injection: 1 µl standard SP-4-7301, split 1:50. 260°C
Carrier gas: H_2, constant pressure 12 psi (82.7 kPa)
Oven temperature: 110°C
Detector: FID, 280°C

Peak Name

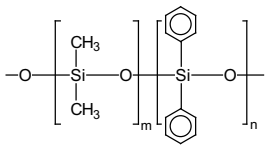
1- Methylene chloride
2- C-10
3- C-11
4- C-12
5- 2-Octanone
6- C-13
7- 1-Octanol
8- C-14
9- 2,6-Dimethylphenol
10- 2,6-Dimethylaniline

HB-50

HB-50

(50%) Diphenyl-(50%) dimethylpolysiloxane, bonded and crosslinked phase.

- (50%) Diphenyl-(50%) dimethylpolysiloxane
- Medium polarity column
- Excellent column for the confirmation of HB-5 analyses



Structure of Poly(dimethyldiphenyl)siloxane

HB-50

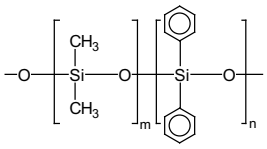
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	15	0.15	0 to 300/320	205371
	15	0.25	0 to 300/320	205356
	15	0.50	0 to 290/310	205360
	30	0.15	0 to 300/320	205373
	30	0.25	0 to 300/320	204784
	30	0.50	0 to 290/310	205363
	60	0.15	0 to 300/320	205375
	60	0.25	0 to 300/320	205358
	60	0.50	0 to 290/310	205365
0.32	15	0.15	0 to 300/320	205372
	15	0.25	0 to 300/320	205357
	15	0.50	0 to 290/310	205361
	30	0.15	0 to 300/320	205374
	30	0.25	0 to 300/320	204785
	30	0.50	0 to 290/310	205364
	60	0.15	0 to 300/320	205376
	60	0.25	0 to 300/320	205359
	60	0.50	0 to 290/310	205366
0.53	15	0.50	0 to 270/290	205362
	15	1.00	0 to 260/280	205368
	30	0.50	0 to 270/290	204786
	30	1.00	0 to 260/280	205369
	60	0.50	0 to 270/290	205367
	60	1.00	0 to 260/280	205370

HB-50ht

HB-50ht

(50%) Diphenyl-(50%) dimethylpolysiloxane, bonded and crosslinked phase

- (50%) Diphenyl-(50%) dimethylpolysiloxane
- Medium polarity column with high thermal stability
- Best column for triglycerides analysis



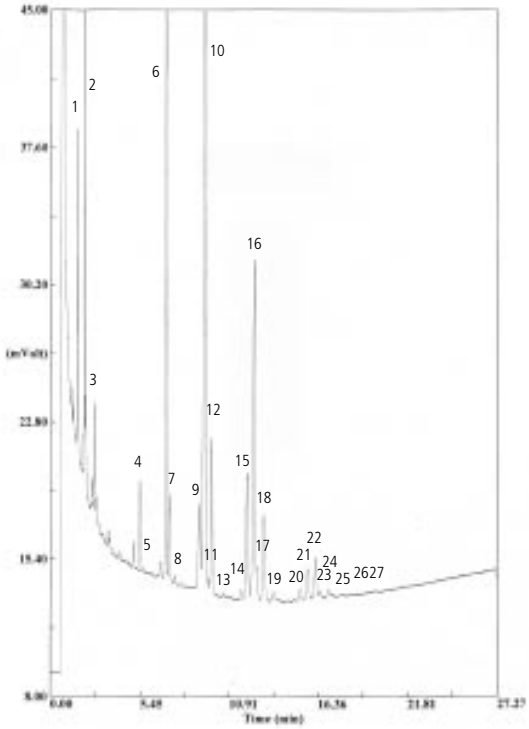
Structure of Poly(dimethyldiphenyl)siloxane

HB-50ht

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	15	0.10	50 to 370	205421
	15	0.15	50 to 370	205423
	30	0.10	50 to 370	205422
	30	0.15	50 to 370	205424

HB-50ht

Column: HB-50ht, P/N 205423
Dimensions: 15m x 0.25mm x 0.15mm
Injection: 0.2ml Triglycerides Palm Oil in Isooctane(50 mg/ml), split 1:12
Carrier gas: H_2, constant pressure, 9psi (56 kPa)
Oven temperature: 340°C(1min)@0.5°C/min to 355°C(5min)
Injector: 380°C (high temperature septum)
Detector: FID, 380°C



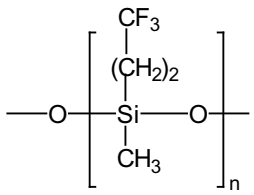
Peak Name

1- D32
2- D34
3- D36
4- MPP
5- MOM
6- PPP
7- MOP
8- MLP
9- PPS
10- POP
11- MOO
12- PLP
13- MLO
14- PSS
15- POS
16- POO
17- PLS
18- PLO
19- PLL
20- SOS
21- SOO
22- OOO
23- SLO
24- OLO
25- OLL
26- SOA
27- AOO

HB-210

(50%) Trifluoropropyl-(50%) Methylpolysiloxane, bonded and crosslinked phase.

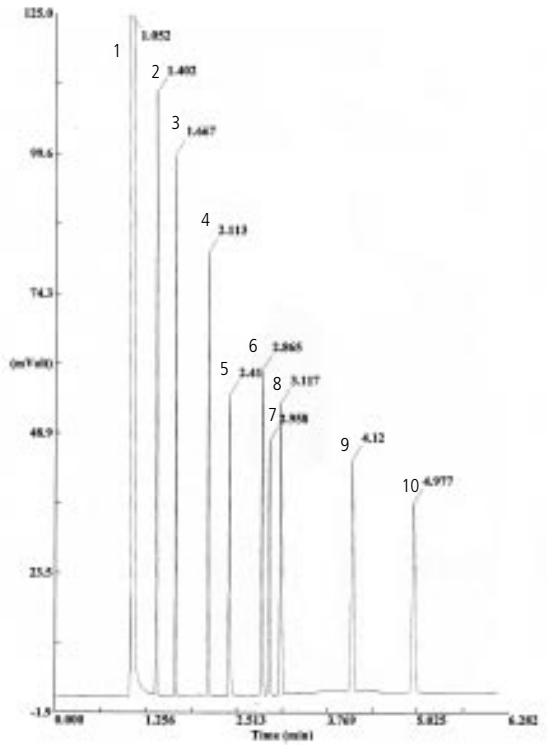
- (50%) Trifluoropropyl-(50%) Methylpolysiloxane
- High polarity column
- Column designed for the EPA 609 and 8140 methods



Structure of Poly(methyltrifluoroproyl)siloxane

HB-210

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	15	0.15	45 to 240/260	205441
	15	0.25	45 to 240/260	205433
	15	0.50	45 to 240/260	205437
	30	0.15	45 to 240/260	205443
	30	0.25	45 to 240/260	205435
	30	0.50	45 to 240/260	205439
0.32	15	0.15	45 to 240/260	205442
	15	0.25	45 to 240/260	205434
	15	0.50	45 to 240/260	205438
	30	0.15	45 to 240/260	205444
	30	0.25	45 to 240/260	205436
	30	0.50	45 to 240/260	204723
0.53	15	1.00	45 to 220/240	204724
	30	1.00	45 to 220/240	205440



HB-210

Column: HB-210. P/N 204723
Dimensions: 30m x 0.32mm x 0.5µm
Injection: 1µl standard SP-4-7301 (500 ng/ml comp), split 1:50. 260°C
Carrier gas: H_2, constant pressure, 7psi (48.2 kPa)
Oven temperature: 100°C
Detector: FID, 280°C

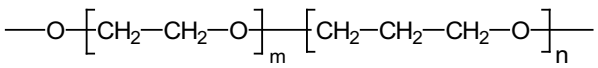
Peak Name

1- Methylene chloride
2- C-10
3- C-11
4- C-12
5- 1-Octanol
6- C-13
7- 2-Octanone
8- 2,6-Dimethylphenol
9- C-14
10- 2,6-Dimethylaniline

HB-PAG

50% Polyethylene -50% polypropylene glycol, bonded and crosslinked phase.

- (50%) Polyethylene-(50%) polypropylene glycol
- Phase polarity slightly lower than HB-20Wax due to the propylene oxide groups
- Polarity similar to the UCON phase



Structure of Poly(ethylenepropylene)glycol

HB-PAG

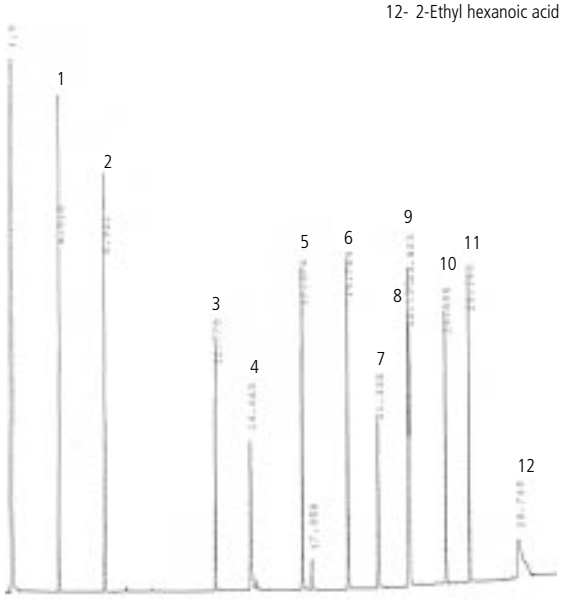
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	15	0.25	30 to 220/230	205425
	30	0.25	30 to 220/230	204725
	60	0.25	30 to 220/230	205428
0.32	15	0.25	30 to 220/230	205426
	30	0.25	30 to 220/230	205427
	60	0.25	30 to 220/230	205429
0.53	15	0.50	30 to 220/230	205430
	30	0.50	30 to 220/230	205431
	60	0.50	30 to 220/230	205432

HB-PAG

Column: HB-PAG, P/N 204725
Dimensions: 30m x 0.25mm x 0.25µm
Injectionn: 1 µl Test Grob, split 1:25, 260°C
Carrier gas: H_2, constant pressure 11 psi (75.8 kPa)
Oven temperature: 40°C @ 6°C/min to 230°C(5min)
Detector: FID, 260°C

Peak Name

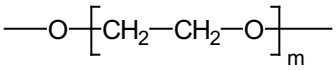
1- C-10
2- C-11
3- Nonanal
4- 2,3-Butanediol
5- 1-Octanol
6- C-10 FAME
7- Dicyclohexylamine
8- 2,6-Dimethylaniline
9- C-11 FAME
10- 2,6-Dimethylphenol
11- C-12 FAME
12- 2-Ethyl hexanoic acid



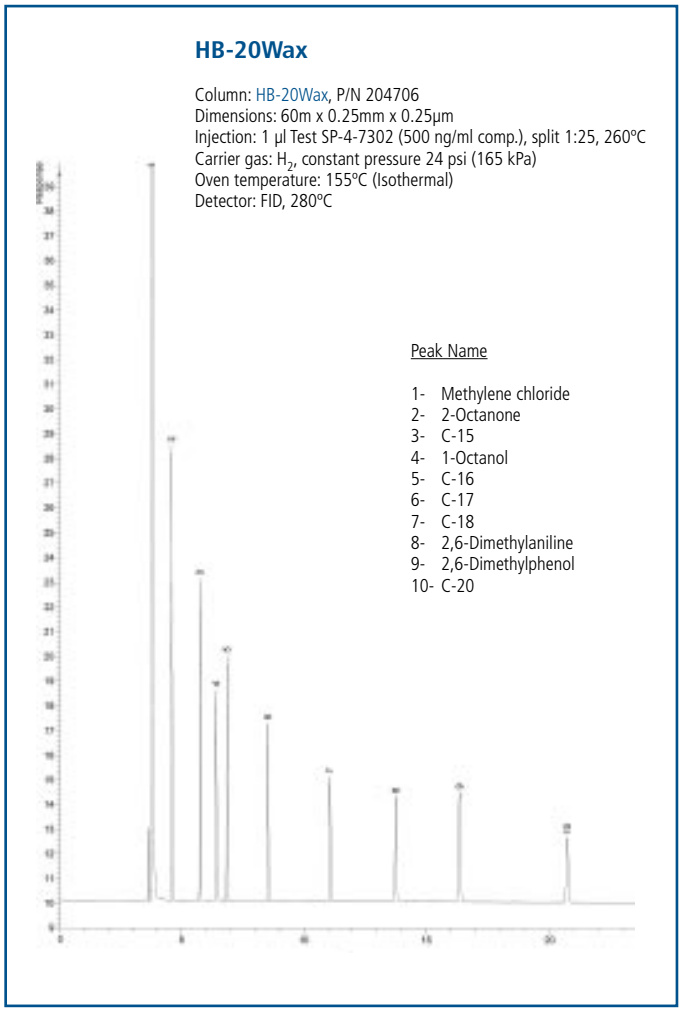
HB-20Wax

(100%) polyethylene glycol, bonded and cross-linked phase.

- 100% Polyethylene glycol (PEG)
- High polarity column
- Wide range of working temperatures and high thermal stability (270ºC)
- Ideal for separating alcohols, aldehydes, ketones and aromatic isomers (BTX)



Structure of Polyethylene glycol



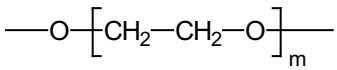
HB-20Wax

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.10	10	0.10	40 to 260/270	204719
	10	0.20	40 to 260/270	205216
	20	0.10	40 to 260/270	205199
	20	0.20	40 to 260/270	205218
0.20	15	0.20	40 to 260/270	205214
	15	0.40	40 to 260/270	205202
	30	0.20	40 to 260/270	205215
	30	0.40	40 to 260/270	205203
	60	0.20	40 to 260/270	204702
	60	0.40	40 to 260/270	205204
0.25	15	0.10	40 to 260/270	205192
	15	0.25	40 to 260/270	204703
	15	0.50	40 to 260/270	205205
	30	0.10	40 to 260/270	205194
	30	0.25	40 to 260/270	204704
	30	0.50	40 to 260/270	204705
	30	1.00	40 to 260/270	205209
	60	0.10	40 to 260/270	205197
	60	0.25	40 to 260/270	204706
	60	0.50	40 to 260/270	205207
0.32	15	0.10	40 to 260/270	205193
	15	0.25	40 to 260/270	205201
	15	0.50	40 to 260/270	205206
	30	0.10	40 to 260/270	205195
	30	0.25	40 to 260/270	204708
	30	0.50	40 to 260/270	204707
	50	1.20	40 to 230/240	204709
	60	0.10	40 to 260/270	205198
	60	0.25	40 to 260/270	204710
	60	0.50	40 to 260/270	204711
	60	1.00	40 to 230/240	205211
	60	1.20	40 to 230/240	205590
	100	1.00	40 to 230/240	205213
0.53	10	1.00	40 to 240/250	205210
	15	1.00	40 to 240/250	205208
	30	1.00	40 to 240/250	204715
	30	1.33	40 to 240/250	204716
	30	2.00	40 to 240/250	204717
	60	1.00	40 to 240/250	205212
	60	2.00	40 to 240/250	204718

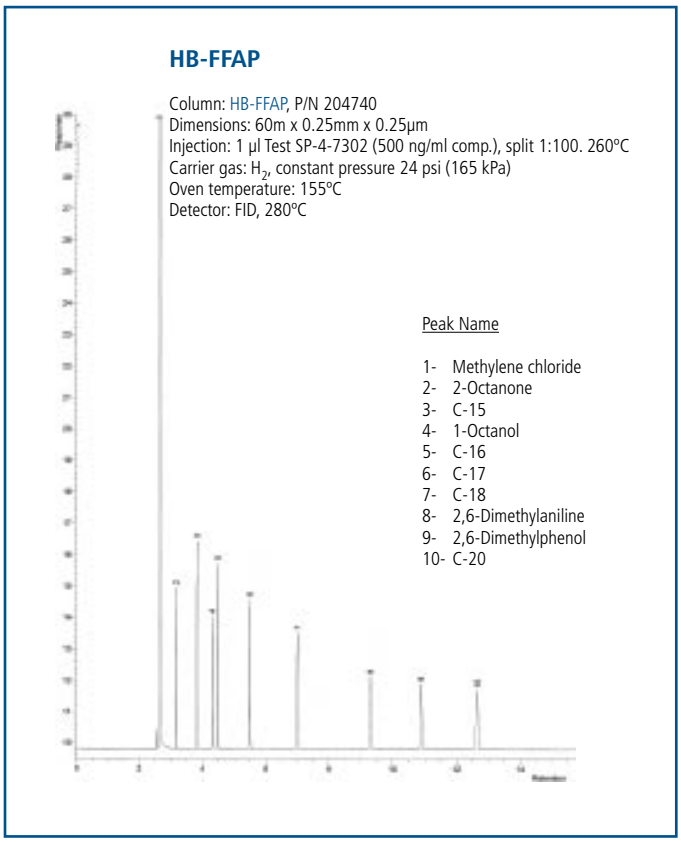
HB-FFAP

Polyethylene glycol esterified with nitroterephtalic acid, bonded and crosslinked phase.

- 100% Polyethylene glycol (PEG) esterified with nitroterephthalic acid
- Ideal for analysis of free acids (without derivatization), phenols and glycols
- High thermal stability (250°C)



Structure of Polyethylene glycol



HB-FFAP

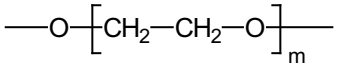
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.20	15	0.30	40 to 240/250	205227
	30	0.30	40 to 240/250	205228
	60	0.30	40 to 240/250	205229
0.25	15	0.25	40 to 240/250	205219
	30	0.25	40 to 240/250	204739
	60	0.25	40 to 240/250	204740
0.32	15	0.25	40 to 240/250	205220
	15	0.50	40 to 240/250	205222
	30	0.25	40 to 240/250	204741
	30	0.50	40 to 240/250	204743
	60	0.25	40 to 240/250	205221
	60	0.50	40 to 240/250	205223
0.53	15	0.50	40 to 240/250	204745
	15	1.00	40 to 230/240	205225
	30	0.50	40 to 240/250	204746
	30	1.00	40 to 230/240	204747
	60	0.50	40 to 240/250	205224
	60	1.00	40 to 230/240	205226

HB-BasicWax

(100%) Polyethylene glycol, nonbonded phase.

- 100% basic deactivated Polyethylene glycol (PEG)
- Excellent for analysing basic nonderivatized compounds
- Ideal for separating amines and nitrosamines

Structure of Polyethylene glycol



HB-BasicWax

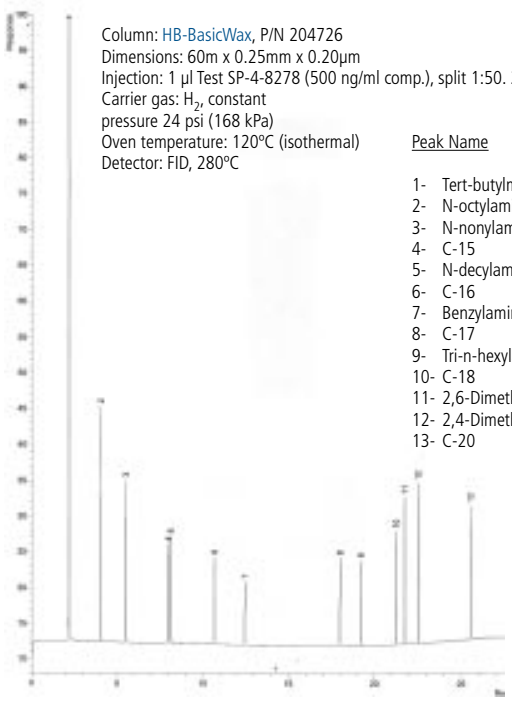
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	15	0.20	60 to 210/220	204728
	15	0.25	60 to 210/220	205544
	30	0.20	60 to 210/220	205556
	30	0.25	60 to 210/220	205546
	30	0.50	60 to 210/220	205548
	60	0.20	60 to 210/220	204726
0.32	15	0.25	60 to 210/220	205545
	30	0.25	60 to 210/220	205547
	30	0.50	60 to 210/220	205549
	30	1.00	60 to 210/220	205552
	60	1.00	60 to 210/220	205553
0.53	15	1.00	60 to 210/220	205551
	30	0.50	60 to 210/220	205550
	30	1.00	60 to 210/220	204727
	30	1.50	60 to 210/220	205555
	60	1.00	60 to 210/220	205554

HB-BasicWax

Column: HB-BasicWax, P/N 204726
Dimensions: 60m x 0.25mm x 0.20µm
Injection: 1 µl Test SP-4-8278 (500 ng/ml comp.), split 1:50. 260°C
Carrier gas: H_2, constant
pressure 24 psi (168 kPa)
Oven temperature: 120°C (isothermal)
Detector: FID, 280°C

Peak Name

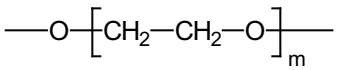
1- Tert-butylmethylether
2- N-octylamine
3- N-nonylamine
4- C-15
5- N-decylamine
6- C-16
7- Benzylamine
8- C-17
9- Tri-n-hexylamine
10- C-18
11- 2,6-Dimethylaniline
12- 2,4-Dimethylaniline
13- C-20



HB-OmegaWax

(100%) Polyethylene glycol, bonded and crosslinked phase.

- 100% Polyethylene glycol (PEG)
- High polarity column
- Specially designed for analysis of Omega-3 and Omega-6 fatty acids methyl esters



Structure of Polyethylene glycol

HB-OmegaWax

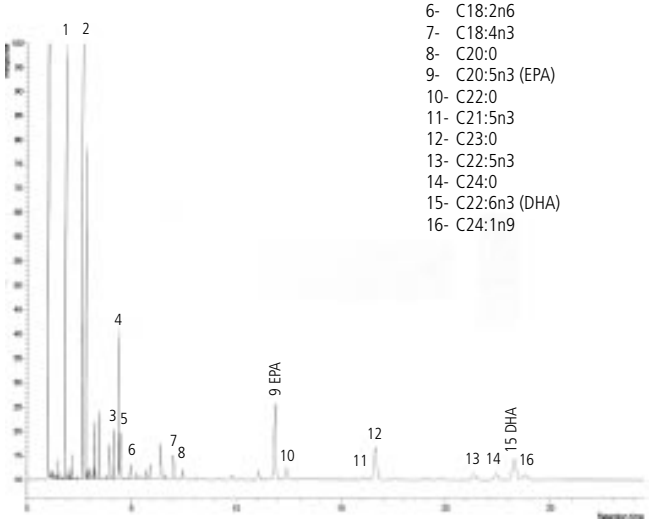
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	30	0.25	40 to 260/270	204729
0.32	30	0.25	40 to 260/270	204730
0.53	30	0.50	40 to 260/270	205536

HB-OmegaWax

Column: HB-OmegaWax, P/N 204730
Dimensions: 30m x 0.32mm x 0.25µm
Injection: 1µl test SP-4-8476, split 1:90. 250°C
Carrier gas: H_2, 9.5 psi (65.4 kPa)
Oven temperature: 200°C (isothermal)
Detector: FID, 260°C

Peak Name

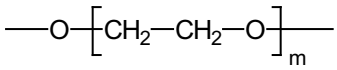
1- C14:0
2- C16:0
3- C18:0
4- C18:1n9
5- C18:1n7
6- C18:2n6
7- C18:4n3
8- C20:0
9- C20:5n3 (EPA)
10- C22:0
11- C21:5n3
12- C23:0
13- C22:5n3
14- C24:0
15- C22:6n3 (DHA)
16- C24:1n9



HB-Wax

(100%) Polyethylene glycol, bonded and cross-linked phase.

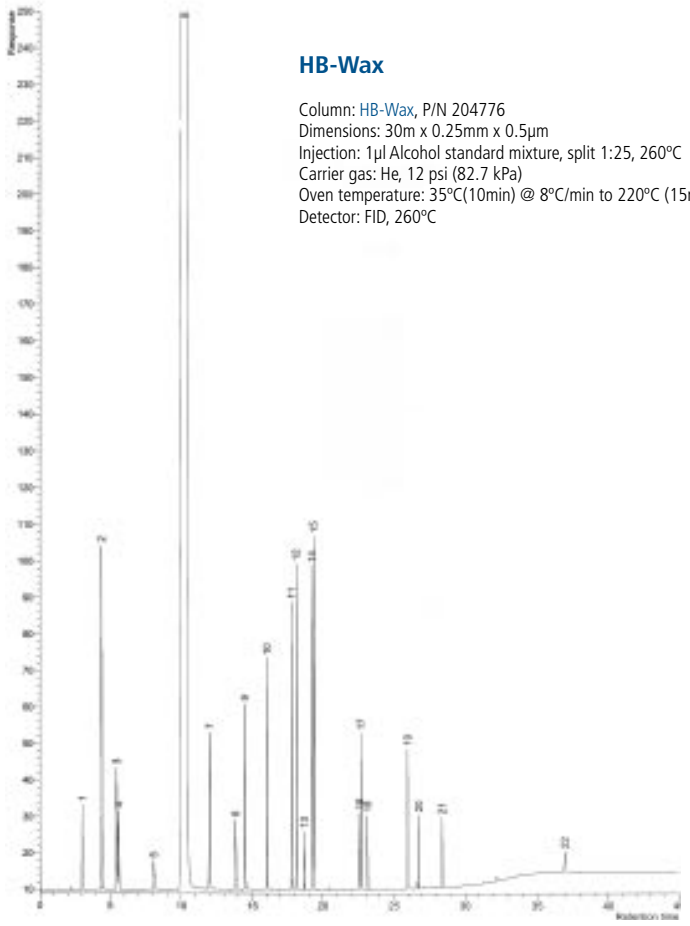
- 100% Polyethylene glycol (PEG)
- High polarity column
- Minimum operating temperature 20°C
- Designed for analysing volatiles in alcoholic beverages
- Excellent symmetry for aldehyde and glycol peaks



Structure of Polyethylene glycol

HB-Wax

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	15	0.10	20 to 240/250	205490
	15	0.25	20 to 240/250	205492
	15	0.50	20 to 240/250	205498
	30	0.10	20 to 240/250	205491
	30	0.25	20 to 240/250	205494
	30	0.50	20 to 240/250	204776
	60	0.20	20 to 240/250	205507
	60	0.25	20 to 240/250	205496
0.32	15	0.25	20 to 240/250	205493
	15	0.50	20 to 240/250	205499
	15	1.00	20 to 230/240	205502
	30	0.25	20 to 240/250	205495
	30	0.50	20 to 240/250	205500
	30	1.00	20 to 230/240	205503
	60	0.25	20 to 240/250	205497
	60	0.50	20 to 240/250	205501
	60	0.64	20 to 240/250	205508
	60	1.00	20 to 230/240	205504
0.53	15	1.20	20 to 230/240	205505
	30	1.20	20 to 230/240	205506



HB-Wax

Column: HB-Wax, P/N 204776
Dimensions: 30m x 0.25mm x 0.5µm
Injection: 1µl Alcohol standard mixture, split 1:25, 260°C
Carrier gas: He, 12 psi (82.7 kPa)
Oven temperature: 35°C(10min) @ 8°C/min to 220°C (15min)
Detector: FID, 260°C

Peak Name

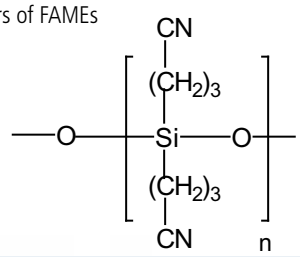
1- Acetaldehyde
2- Methyl acetate
3- Acetal
4- Ethyl acetate
5- Methanol
6- Ethanol
7- Ethyl butyrate
8- 2-Butanol
9- n-Propanol
10- Isobutanol
11- 1-Butanol
12- 4-Methyl-2-pentanol (IS)
13- Ethyl hexanoate
14- 2-Methyl-1-butanol
15- 3-Methyl-1-butanol
16- Hexanol
17- Ethyl lactate
18- Ethyl octanoate
19- Benzaldehyde
20- Ethyl nonanoate
21- Ethyl decanoate
22- 4-Ethylphenol

HB-2340

(100%) Cyanopropyl polysiloxane, nonbonded phase

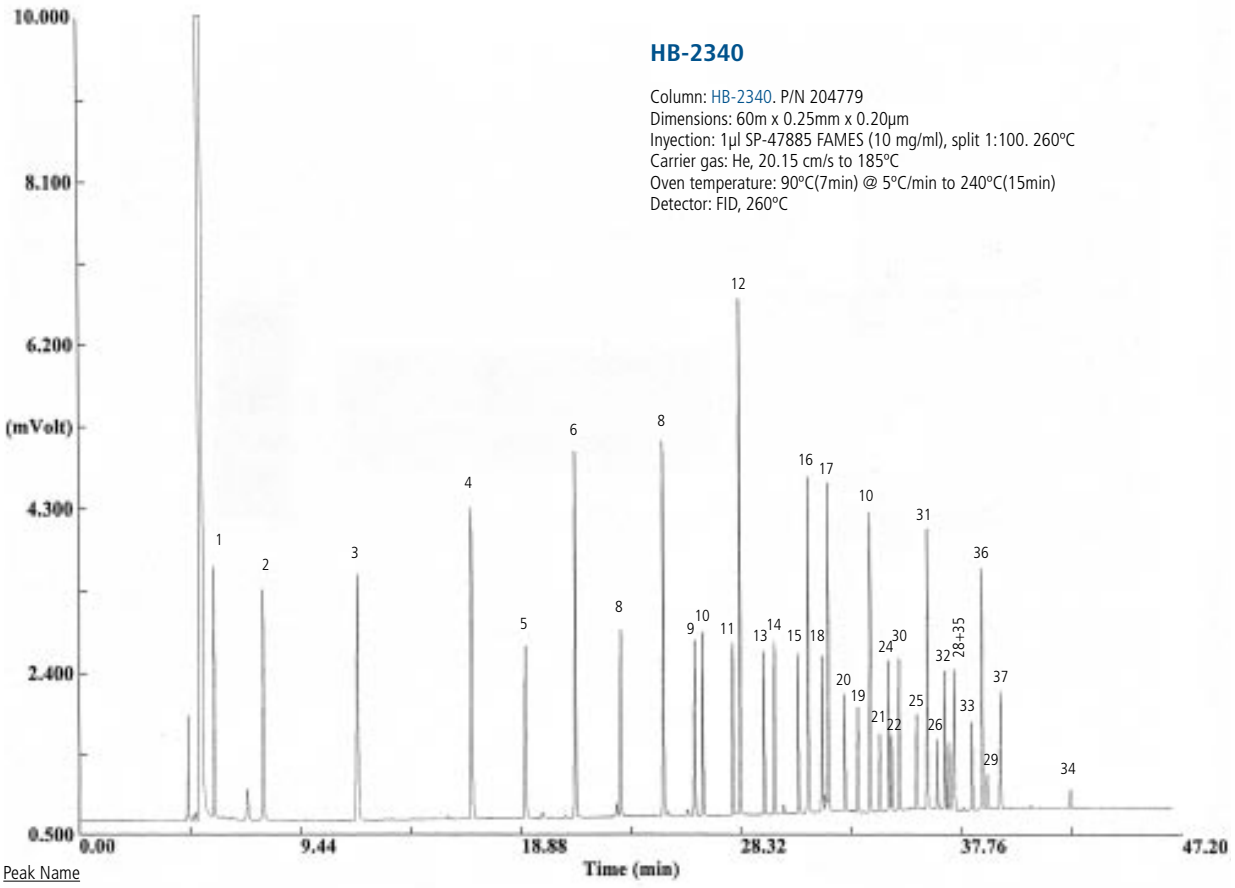
- 100% Cyanopropyl polysiloxane
- Column of maximum polarity
- Designed for separating fatty acids methyl esters (FAMEs)
- High selectivity towards cis-trans isomers of FAMEs

Structure of Poly(biscyanopropyl)siloxane



HB-2340

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	15	0.20	0 to 240/250	205537
	30	0.20	0 to 240/250	205539
	60	0.20	0 to 240/250	204779
0.32	15	0.20	0 to 240/250	204778
	30	0.20	0 to 240/250	205540
	60	0.20	0 to 240/250	205542
0.53	15	0.20	0 to 225/250	205538
	30	0.20	0 to 225/250	205541
	60	0.20	0 to 225/250	205543



HB-2340

Column: HB-2340. P/N 204779
Dimensions: 60m x 0.25mm x 0.20µm
Inyection: 1µl SP-47885 FAMES (10 mg/ml), split 1:100. 260ºC
Carrier gas: He, 20.15 cm/s to 185ºC
Oven temperature: 90ºC(7min) @ 5ºC/min to 240ºC(15min)
Detector: FID, 260ºC

Peak Name

1- Butyric acid methyl ester (C4:0)
2- Caproic acid methyl ester (C6:0)
3- Caprylic acid methyl ester (C8:0)
4- Capric acid methyl ester (C10:0)
5- Undecanoic acid methyl ester (C11:0)
6- Lauric acid methyl ester (C12:0)
7- Tridecanoic acid methyl ester (C13:0)
8- Myristic acid methyl ester (C14:0)
9- Myristoleic acid methyl ester (C14:1)
10- Pentadecanoic acid methyl ester (C15:0)
11- Cis-10-Pentadecenoic acid methyl ester (C15:1)
12- Palmitic acid methyl ester (C16:0)
13- Palmitoleic acid methyl ester (C16:1)
14- Heptadecanoic acid methyl ester (C17:0)
15- Cis-10-Heptadecenoic acid methyl ester (C17:1)
16- Stearic acid methyl ester (C18:0)
17- Oleic acid methyl ester (C18:1n9c)
18- Elaidic acid methyl ester (C18:1n9t)
19- Linoleic acid methyl ester (C18:2n6c)
20- Linolelaidic acid methyl ester (C18:2n6t)
21- γ-Linolenic acid methyl ester (C18:3n6)
22- Linolenic acid methyl ester (C18:3n3)
23- Arachidic acid methyl ester (C20:0)
24- Cis-11-Eicosenoic acid methyl ester (C20:1)
25- Cis-11,14-Eicosadienoic acid methyl ester (C20:2)
26- Cis-8,11,14-Eicosatrienoic acid methyl ester (C20:3n6)
27- Cis-11,14,17-Eicosatrienoic acid methyl ester (C20:3n3)
28- Arachidonic acid methyl ester (C20:4n6)
29- Cis-5,8,11,14,17-Eicosapentaenoic acid methyl ester (C20:5n3)
30- Heneicosanoic acid methyl ester (C21:0)
31- Behenic acid methyl ester (C22:0)
32- Erucic acid methyl ester (C22:1n9)
33- Cis-13,16-Docosadienoic acid methyl ester (C22:2)
34- Cis-4,7,10.13,16,19-Docosahexaenoic acid methyl ester (C22:6n3)
35- Tricosanoic acid methyl ester (C23:0)
36- Lignoceric acid methyl ester (C24:0)
37- Nervonic acid methyl ester (C24:1)

HB-Cresol

HB-17

HB-Cresol

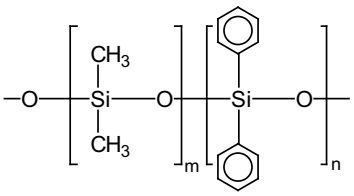
Proprietary nonbonded phase.

- Stationary phase of perfectly defined purity
- Column specially designed for analysis of phenolic compounds (phenols, cresylic acids)
- Derivatization of phenolic compounds is not required to obtain suitable resolution
- Resolves m-cresol/p-cresol and 2.4-xylenol/2.5-xylenol pairs, which are not separated with other columns used for this analysis such as HB-5 and HB-Wax

HB-17

Polymethylphenylsiloxane

- Polymethylphenylsiloxane
- Recommended by Pharmacopeia for determining the impurities of sodium saccharin (o-p-toluenesulphonamides).



Structure of Poly(dimethyldiphenyl)siloxane

HB-Cresol

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	30	0.20	130	205466
	60	0.20	130	204792

HB-17

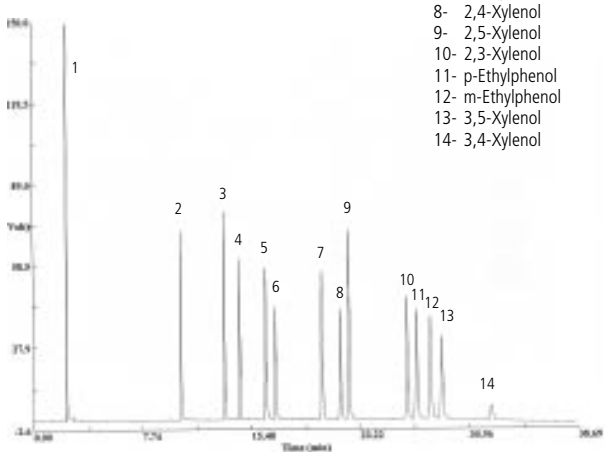
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.53	10	2.0	0 to 220/240	204787

HB-Cresol

Column: HB-Cresol, P/N 204792
Dimensions: 60m x 0.25mm x 0.20µm
Injection: 1 µl standard Cresols (5000 ng/ml comp.), split 1:25, 150°C
Carrier gas: H_2, constant pressure 24 psi (165 kPa)
Oven temperature: 130°C
Detector: FID, 150°C

Peak Name

1- Methylene chloride
2- Phenol
3- o-Cresol
4- 2,6-Xylenol
5- p-Cresol
6- m-Cresol
7- o-Ethylphenol
8- 2,4-Xylenol
9- 2,5-Xylenol
10- 2,3-Xylenol
11- p-Ethylphenol
12- m-Ethylphenol
13- 3,5-Xylenol
14- 3,4-Xylenol

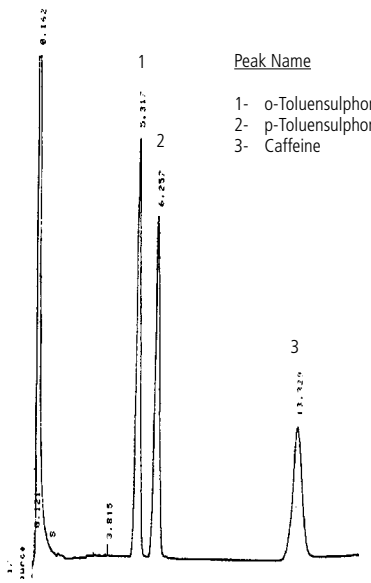


HB-17

Column: HB-17 P/N 204787
Dimensions: 10m X 0.53 mm X 2.0 µm
Injector: 260°C
Carrier gas: He, 6.5 psi
Injection: 1ml standard, split (1:4)
Oven Temperature: 180°C
Detector: FID, 280°C

Peak Name

1- o-Toluensulphonamide
2- p-Toluensulphonamide
3- Caffeine



HB-VOC

HB-VOC

Proprietary bonded and crosslinked phase.

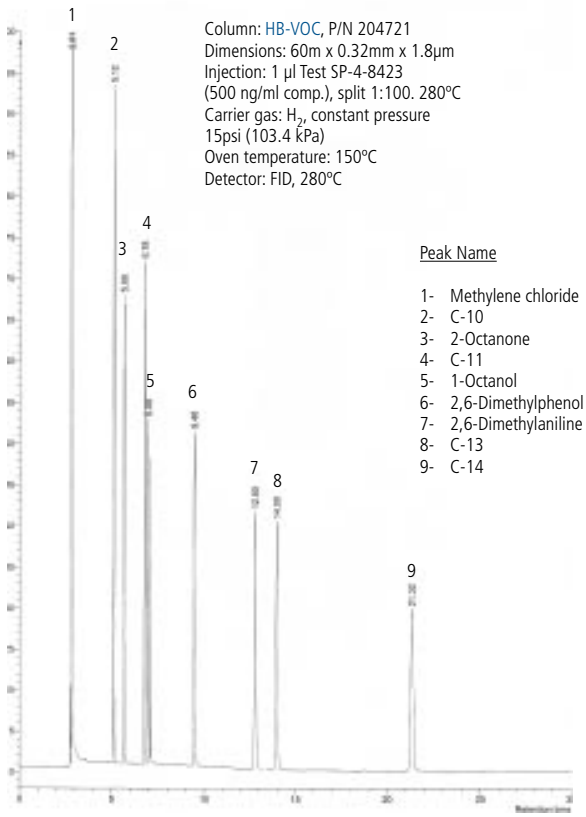
- Developed for analysis of volatile organic compounds (VOC)
- Intermediate polarity column

HB-VOC

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.20	10	1.20	-20 to 240/250	205557
0.25	30	1.50	-20 to 240/250	205558
	60	1.50	-20 to 240/250	205559
0.32	60	1.80	-20 to 240/250	204721
	60	3.00	-20 to 230/240	205560
0.53	30	3.00	-20 to 230/240	204722
	60	3.00	-20 to 230/240	205561
	105	3.00	-20 to 230/240	205562

HB-VOC

Column: HB-VOC, P/N 204721
Dimensions: 60m x 0.32mm x 1.8µm
Injection: 1 µl Test SP-4-8423
(500 ng/ml comp.), split 1:100. 280°C
Carrier gas: H_2, constant pressure
15psi (103.4 kPa)
Oven temperature: 150°C
Detector: FID, 280°C



Peak Name

1- Methylene chloride
2- C-10
3- 2-Octanone
4- C-11
5- 1-Octanol
6- 2,6-Dimethylphenol
7- 2,6-Dimethylaniline
8- C-13
9- C-14

HB-608

HB-608

Proprietary bonded and crosslinked phase.

- Specifically designed for analysing chlorinated pesticides and PCBs
- Designed for the EPA 508, 608 and 8080 methods

HB-608

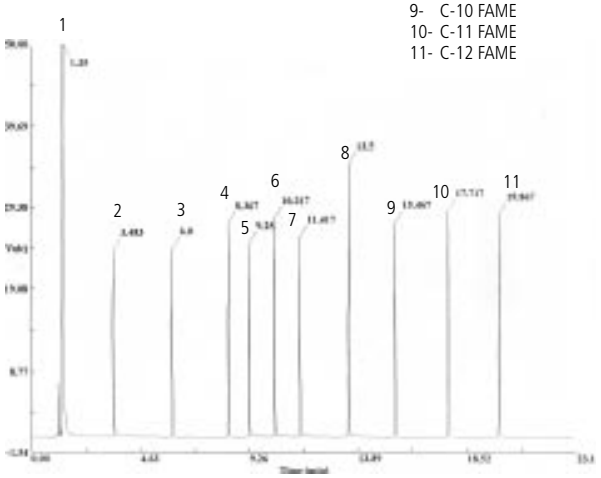
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	30	0.25	-20 to 300/310	204770
0.53	15	0.50	-20 to 290/300	205354
	30	0.50	-20 to 290/300	205355

HB-608

Column: HB-608, P/N 204770
Dimensions: 30m x 0.25mm x 0.25mm
Injection: 1 µl Grob Test, split 1:100. 280°C
Carrier gas: H_2, constant pressure
11 psi (75.8 kPa)
Oven temperature: 40°C @ 6°C/min
to 300°C(5min)
Detector: FID, 340°C

Peak Name

1- Methylene chloride
2- 2,3-Butanediol
3- C-10
4- C-11
5- 1-Octanol
6- Nonanal
7- 2,6-Dimethylphenol
8- 2,6-Dimethylaniline
9- C-10 FAME
10- C-11 FAME
11- C-12 FAME



HB-TCEP

HB-Carbowax400

HB-TCEP

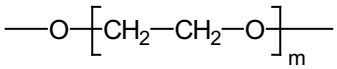
1, 2, 3-tris (2-cyanoethoxy) propane, nonbonded phase

- High polarity column
- Column for analysis of alcohols in gasoline
- Separation of the aliphatic hydrocarbons up to C12 in aromatics

HB-Carbowax400

100% Polyethylene glycol (PEG), nonbonded phase.

- Column designed for analysis of volatiles in alcoholic beverages and solvents
- Maximum resolution of amylic alcohols
- High plate number even at low temperature (<20ºC)



Structure of Polyethyleneglycol

HB-TCEP

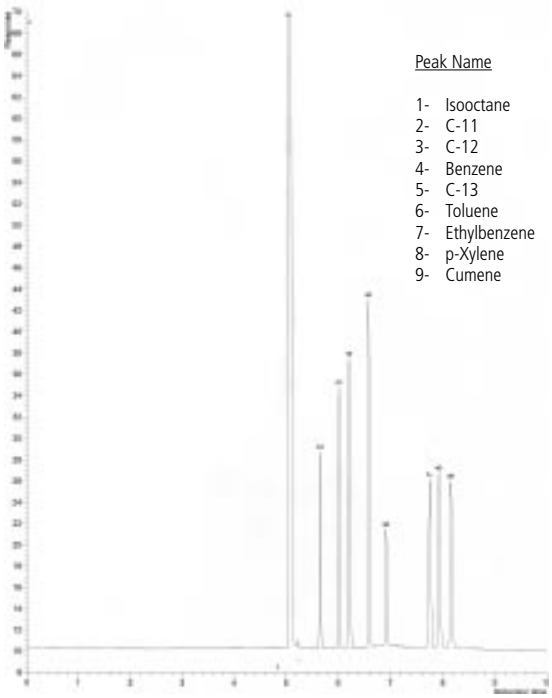
Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.25	30	0.40	0 to 135	205563
	60	0.40	0 to 135	204769

HB-Carbowax400

Internal Diam.(mm)	Length (m)	Film Thickness (µm)	Temp limits (°C)	P/N
0.32	50	0.20	0 to 60/80	204771

HB-TCEP

Column: HB-TCEP, P/N 204769
Dimensions: 60m x 0.25mm x 0.40µm
Injection: 1 µl standard (20 ng/ml comp.), split 1:50. 170ºC
Carrier gas: H_2, constant pressure 24 psi (165 kPa)
Oven temperature: 110ºC
Detector: FID, 170ºC

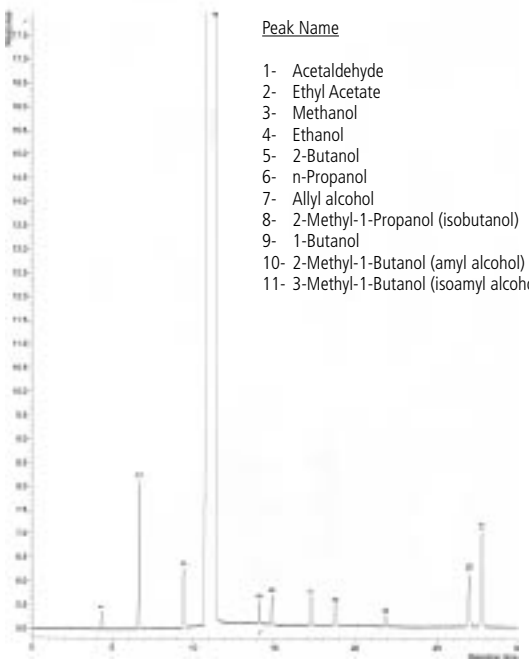


Peak Name

1- Isooctane
2- C-11
3- C-12
4- Benzene
5- C-13
6- Toluene
7- Ethylbenzene
8- p-Xylene
9- Cumene

HB-Carbowax400

Column: HB-Carbowax400. P/N 204771
Dimensions: 50m x 0.32mm x 0.20µm
Injection: 1µl standard (split 1:50), 175ºC
Carrier gas: He, 11 psi (75.8 kPa)
Oven Temperature: 30ºC(5 min.) @ 4ºC/min to 60ºC(10 min.)
Detector Temperature: FID, 175ºC



Peak Name

1- Acetaldehyde
2- Ethyl Acetate
3- Methanol
4- Ethanol
5- 2-Butanol
6- n-Propanol
7- Allyl alcohol
8- 2-Methyl-1-Propanol (isobutanol)
9- 1-Butanol
10- 2-Methyl-1-Butanol (amyl alcohol)
11- 3-Methyl-1-Butanol (isoamyl alcohol)

HB-Microbore Columns (0.1mm ID)

- MINIMUM BLEED LEVEL (approximately 10 times less than that of a conventional column of 0.25 mm ID).
- SHORT ANALYSIS TIME (approximately 3 times faster than a conventional column of 0.25 mm ID).

These columns of 100 µm internal diameter can be connected to a conventional chromatograph fitted with a split/splitless injector. Due to their great efficiency (~7,000-10.000 plates/m) and their reduced diameter, the analysis is faster compared to standard capillary columns, without loss of resolution. This makes them ideal for the analysis of complex mixtures. The standard length is 10 meters. (Fig. 8 & 9)

Fig. 8. Lemon oil in a conventional column
Column HB-1, 50m x 0.25 mm ID X 0.33 µm

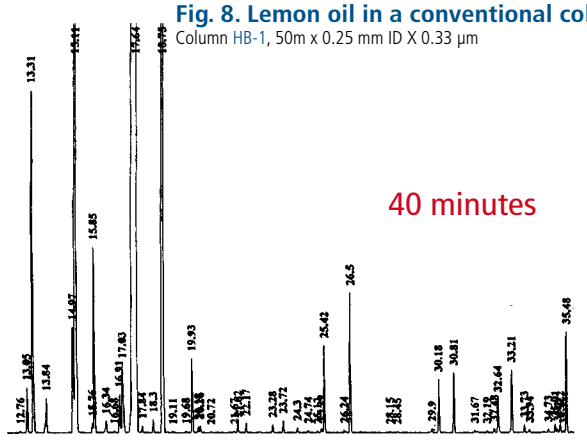
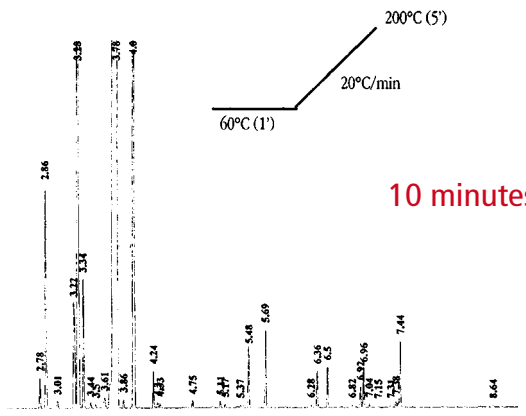


Fig. 9. Lemon oil in a 100 µm column
Column HB-5, 10m x 0.1 mm ID X 0.33 µm



Limiting factors

1. WORKING PRESSURE (GAS FLOW)

With microbore columns the working pressures are higher so that more precautions should be taken regarding gas leaks from the injector cavity or with ferrules.

At optimised pressure the carrier gas flow is low (H_2~0.2cc/min, He ~0.1cc/min), which is advantageous for working with mass detectors. Not optimising these parameters may cause loss of resolution.

2. SAMPLE CAPACITY

In microbore columns the maximum sample mass is much lower than with a column with a conventional diameter. The sample capacity is about ten times smaller than that of a 0.25 mm ID column.

3. INJECTOR

Microbore columns are compatible with the injection techniques in the split/splitless mode. It is not recommended to work with direct or on-column injection.

Glass liners with internal diameters of 2-4 mm are not suitable. Their large dead volume and the fact that one is working with low gas flows results in band broadening with the subsequent loss of resolution (especially for liners of 4 mm). It is highly recommended to work with liners of 0.75-1.00 mm diameter.

Working with small volume liners and microbore columns means that sample purity is critical. The sample must be clean and the non-volatile residues must be minimised in order to avoid contaminations that cause absorption of analytes, decompositions, ghost peaks, etc.

4. DETECTOR

The gas flow of the detector must be optimised for microbore columns. In some cases the auxiliary gas flow (make up) must be increased.

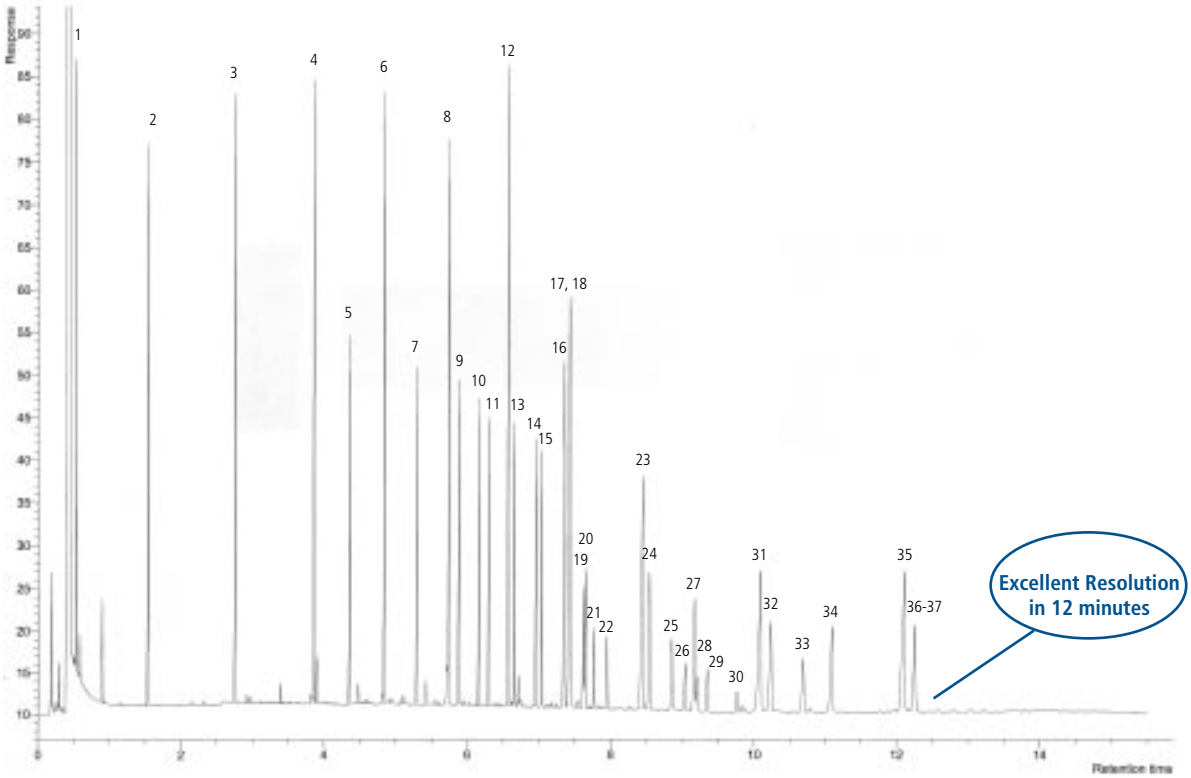
Since the peaks elute very fast and are very narrow (the peak widths are generally less than 1 s) high data sampling rates are essential in order to ensure correct quantification.

HB-Microbore Columns

Phase	Length (m)	(df µm)	P/N
HB-1	10	0.10	205019
	10	0.40	205038
	20	0.10	205027
	20	0.40	205039
HB-5	10	0.10	205106
	10	0.40	205126
	20	0.10	205114
	20	0.40	205128
HB-20Wax	10	0.10	205196
	10	0.20	205216
	20	0.10	205199
	20	0.20	205218

HB-20Wax

Column: HB-20Wax, P/N 205196
Dimensions: 10m x 0.10mm x 0.10µm
Injection: 1µl standard FAMES, (200ng/comp), split 1:50. 280°C
Carrier gas: H_2, constant pressure 50 psi (344.5 kPa)
Oven temperature: 40°C(1min) @ 25°C/min to 195°C @ 3°C/min to 205°C @ 8°C/min to 230°C(1min)
Detector: FID, 280°C



Peak Name

1- Butyric acid methyl ester (C4:0)
2- Caproic acid methyl ester (C6:0)
3- Caprylic acid methyl ester (C8:0)
4- Capric acid methyl ester (C10:0)
5- Undecanoic acid methyl ester (C11:0)
6- Lauric acid methyl ester (C12:0)
7- Tridecanoic acid methyl ester (C13:0)
8- Myristic acid methyl ester (C14:0)
9- Myristoleic acid methyl ester (C14:1)
10- Pentadecanoic acid methyl ester (C15:0)
11- Cis-10-Pentadecenoic acid methyl ester (C15:1)
12- Palmitic acid methyl ester (C16:0)
13- Palmitoleic acid methyl ester (C16:1)
14- Heptadecanoic acid methyl ester (C17:0)
15- Cis-10-Heptadecenoic acid methyl ester (C17:1)
16- Stearic acid methyl ester (C18:0)
17- Oleic acid methyl ester (C18:1n9c)
18- Elaidic acid methyl ester (C18:1n9t)
19- Linoleic acid methyl ester (C18:2n6c)
20- Linolelaidic acid methyl ester (C18:2n6t)
21- γ-Linolenic acid methyl ester (C18:3n6)
22- Linolenic acid methyl ester (C18:3n3)
23- Arachidic acid methyl ester (C20:0)
24- Cis-11-Eicosenoic acid methyl ester (C20:1)
25- Cis-11,14-Eicosadienoic acid methyl ester (C20:2)
26- Cis-8,11,14-Eicosatrienoic acid methyl ester (C20:3n6)
27- Heneicosanoic acid methyl ester (C21:0)
28- Cis-11,14,17-Eicosatrienoic acid methyl ester (C20:3n3)
29- Arachidonic acid methyl ester (C20:4n6)
30- Cis-5,8,11,14,17-Eicosapentaenoic acid methyl ester (C20:5n3)
31- Behenic acid methyl ester (C22:0)
32- Erucic acid methyl ester (C22:1n9)
33- Cis-13,16-Docosadienoic acid methyl ester (C22:2)
34- Tricosanoic acid methyl ester (C23:0)
35- Lignoceric acid methyl ester (C24:0)
36- Cis-4,7,10.13,16,19-Docosahexaenoic acid methyl ester (C22:6n3)
37- Nervonic acid methyl ester (C24:1)

HB-Custom Capillary Columns

HAMILTON also provides you with nonbonded and bonded custom capillary columns. If you need a column with a special film thickness, inner diameter or length: Let us know! For example:

HB-101 - 100% polydimethylsiloxane phase("silicone fluid")

HB-SE-30 - 100% polydimethylsiloxane phase

HB-SE-52 - 5% phenyl -95% dimethylpolysiloxane phase

HB-SE-54 - 5% phenyl-1% vinyl-94% dimethylpolysiloxane phase

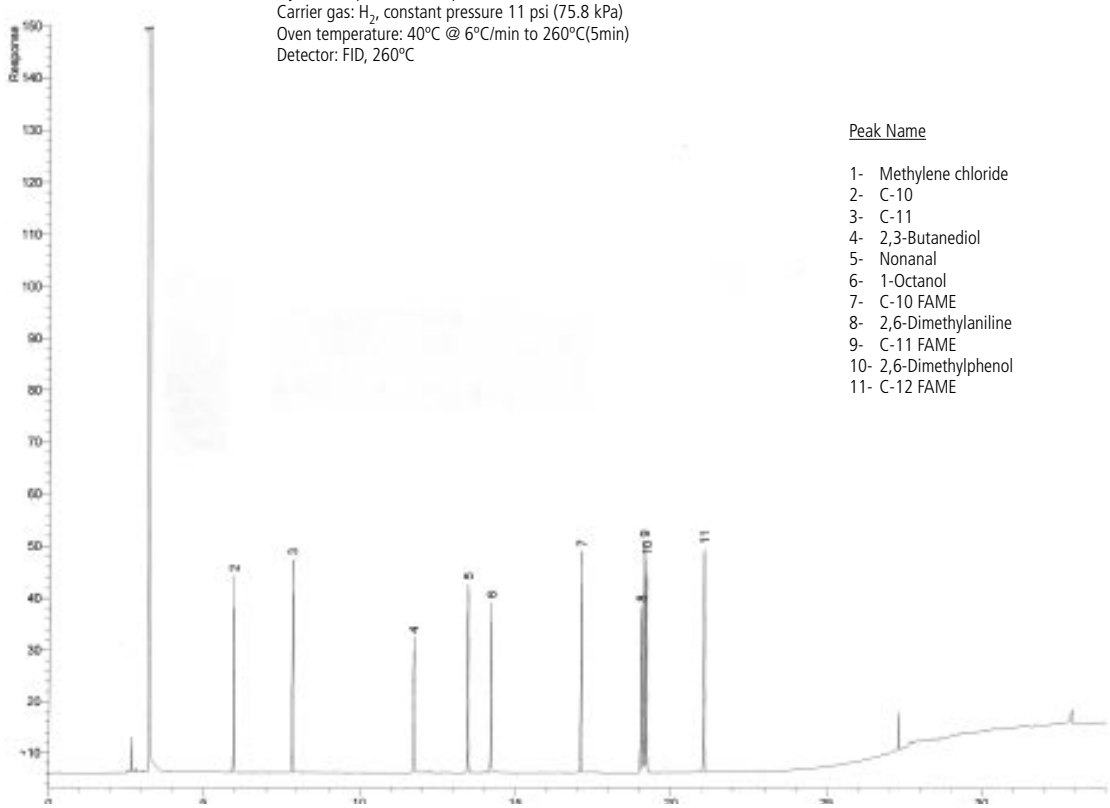
HB-20M - polyethylene glycol 100% (Carbowax 20M) phase

We can also supply columns for inverse gas chromatography used for the characterisation of polymers. HAMILTON can coat your polymer in our fused silica column.

For other phases that are not included in this list, please contact us.

HB-240

Column: HB-240 (OV-240-OH),
Dimensions: 60m x 0.25mm x 0.25µm
Injection: 1 µl Grob Test, split 1:25, 260°C
Carrier gas: H_2, constant pressure 11 psi (75.8 kPa)
Oven temperature: 40°C @ 6°C/min to 260°C(5min)
Detector: FID, 260°C



Peak Name

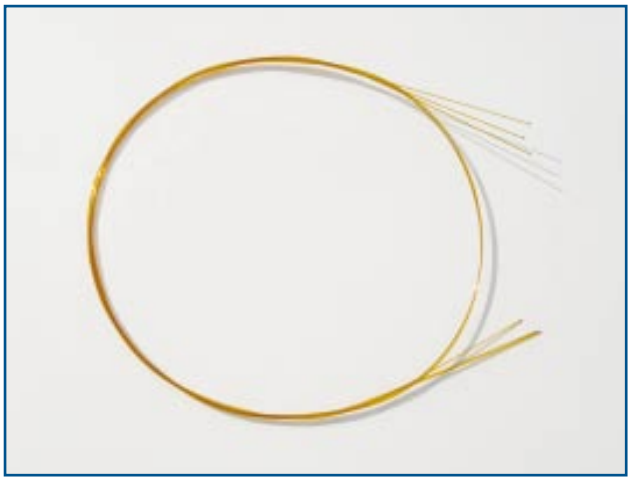
1- Methylene chloride
2- C-10
3- C-11
4- 2,3-Butanediol
5- Nonanal
6- 1-Octanol
7- C-10 FAME
8- 2,6-Dimethylaniline
9- C-11 FAME
10- 2,6-Dimethylphenol
11- C-12 FAME

HB-Guard Columns (Retention Gap)

Universal Press Fit Connectors

Universal Press Fit Connectors

Deactivated Universal	Description
204793	Universal Press Fit 12pk
204794	Universal Press Fit Angled Y/unit



Guard Columns

MEDIUM POLAR

Phenyl-methyl deactivated, USP (467) suitable for methylene chloride, hexane, toluene, and a wide range of similar solvents

Internal Diameter (mm)	Length (m)	P/N
0.25	3x1	205230
	1x5	204801
	1x10	205233
	1x20	205236
0.32	3x1	205231
	1x5	204802
	1x10	205234
	1x20	205237
0.53	3x1	205232
	1x5	204803
	1x10	205235
	1x20	205238

NON-POLAR

Methyl deactivated, suitable for pentane/hexane and other non polar solvents

Internal Diameter (mm)	Length (m)	P/N
0.25	3x1	205001
	1x5	204798
	1x10	205004
	1x20	205007
0.32	3x1	205002
	1x5	204799
	1x10	205005
	1x20	205008
0.53	3x1	205003
	1x5	204800
	1x10	205006
	1x20	205009

POLAR

Polyethylene glycol deactivated, suitable for methanol, water and a wide range of similar polar solvents

Internal Diameter (mm)	Length (m)	P/N
0.25	3x1	205310
	1x5	204795
	1x10	205313
	1x20	205316
0.32	3x1	205311
	1x5	204796
	1x10	205314
	1x20	205317
0.53	3x1	205312
	1x5	204797
	1x10	205315
	1x20	205318

AQUASAFE

Proprietary deactivation suitable for aqueous injections

Internal Diameter (mm)	Length (m)	P/N
0.25	3x1	205319
	1x5	204804
	1x10	205322
	1x2	205325
0.32	3x1	205320
	1x5	204805
	1x10	205323
	1x20	205326
0.53	3x1	205321
	1x5	204806
	1x10	205324
	1x20	205327

BASE-DEACTIVATED

Deactivation suitable for the analysis of amines and other basic compounds

Internal Diameter (mm)	Length (m)	P/N
0.25	3x1	205328
	1x5	204807
	1x10	205331
	1x20	205334
0.32	3x1	205329
	1x5	204808
	1x10	205332
	1x20	205335
0.53	3x1	205330
	1x5	204809
	1x10	205333
	1x20	205336

HAMILTON Stainless Steel Columns

- Chemical inertness comparable to that of fused silica
- Bonded and crosslinked
- Ideal in industrial control processes
- Practically unbreakable
- Enables the use of high analysis temperatures

HAMILTON offers stainless steel columns with 0.53 mm internal diameter and with an external diameter similar to that of fused silica semi-capillary columns, enabling you to use the same standard ferrules of 0.8 mm ID.

These columns are available with our most popular stationary phases. To order a metallic column simply add the word INOX at the end of the corresponding reference to the column in the catalog.

Example:

HB-2887 10m x 0.53 mm x 2.65µm P/N 204764
Stainless steel, 10m x 0.53 mm x 2.65µm P/N 204764-INOX

Columns for the Agilent GC 6850

5-inch column cage

Columns that are placed in the oven of the Agilent GC 6850 come in a 5 inch cage.

To order a column in a 5 inch cage you just need to add a 5 at the end of the P/N of the corresponding column.

Example:

HB-5 30m x 0.25mm x 0.25µm P/N 204681
With 5 inch cage: P/N 2046815

HB-Packed Columns

Tubing	External Diameter (OD)	Internal Diameter (ID)
Glass	1/4"	2mm, 3mm and 4 mm
Stainless Steel	1/4 " and 1/8"	4mm, 3mm and 2 mm
Silcosteel®	1/4" and 1/8"	5.2mm and 2 mm
	1/16"	0.75mm and 1 mm
Nickel, Teflon and Copper	1/8"	2 mm

Columns can be delivered pre-conditioned or conditioned.

Please mention the following parameters when you order:

GC Type	Configuration	Tubing	Dimension	Phase (%)	Support (mesh)
Agilent 5890	ON-Column	Glass	1.8m x 1/4" OD x 2mm ID	3% SE-30	Chromosorb W-HP 80/100 mesh

DESCRIPTION	T (°C)	USP CODE
Alltech AT™-1000	50/250	G35
ApiezonÒ L	50/300	-
ApiezonÒ M	50/300	-
Bentone 34	0/180	-
N,N-bis-(2-Cyanoethyl)formamide (BCEF)	20/125	-
N,N-bis-(p-Methoxybenzylidene)-a,a'-bi-p-toluidine (BMBT)	150	-
Bis-(2-ethoxyethyl) Adipate (BEEA)	150	-
Bis-(2-methoxyethyl) Adipate (BMEA)	150	-
Carbowax® 400	20/100	G20
Carbowax® 540	40/175	G39
Carbowax® 600	20/125	-
Carbowax® 1000	40/150	G14
Carbowax® 1450	50/175	-
Carbowax® 3350	60/200	G15
Carbowax® 6000	60/200	-
Carbowax® 20M	60/225	G16
Carbowax® 20M-TPA	60/250	G25
DC-200. 350cstk (Methyl)	20/250	-
DC-200. 500cstk (Methyl)	20/250	-
DC-550. (25%-Phehyl)	20/225	G28
Dexsil® 300GC	50/400	G33
Di-n-butyl Maleate	20/50	-
Di-n-decyl phthalate	10/175	-
Di(2-ethylhexyl)sebacate	0/125	G11
Diethyleneglycol Adipate	20/210	-
Diethyleneglycol Succinate	20/200	G4
Diglycerol	20/100	-
2,4-Dimethylsulfonate	0/50	-
Dinonyl Phthalate	20/150	-
Diisodecyl Phthalate	20/150	G24
Ethyleneglycol Adipate	100/210	-
Ethyleneglycol Succinate	100/210	-
Fluorad FC-431	40/200	-
FFAP	50/250	G35
Halocarbon oil 14-25	150	-
Igepal® CO-630	30/200	-
Igepal® CO-880 (Nonoxynol)	100/200	G31
Igepal® CO-990	100/200	-
Kel-F® Oil No.10	100	-
Neopentylglycol Succinate	50/230	G21
OV™-1 (Methyl gum)	100/350	G2

HB-Packed Columns

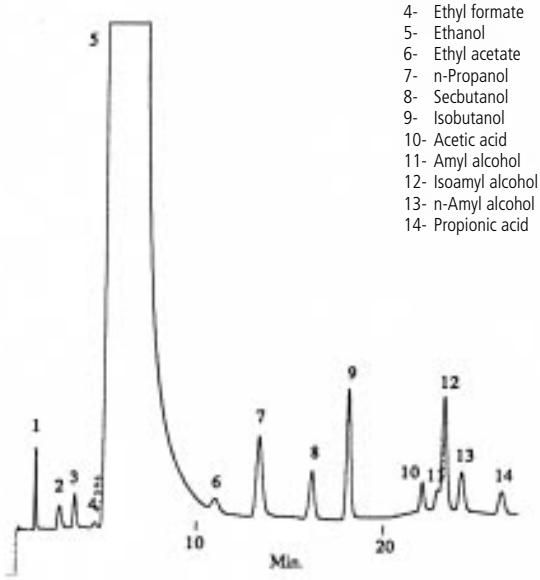
DESCRIPTION	T (°C)	USP CODE
OV™-17 (50% phenyl)	20/350	G3
OV™-17-Vinyl (50% phenyl)	300+	-
OV™-25 (75% phenyl)	300	G17
OV™-101 (Methyl fluid)	20/350	G1
OV™-210 (50% Trifluoropropyl)	20/275+	G6
OV™-225 (25% phenyl, 25% cyanopropyl methyl)	20/250+	G19
OV™-275 (Dicyanoallyl)	250+	-
OV™-1701	0/250	-
β,β-Oxydipropionitrile	0/75	-
Phenyldiethanolamine Succinate	0/230	G12
Polyethylene glycol adipate	0/225	G23
Polyethyleneimine	0/175	-
Polyphenyl ether (5 rings) OS-124	0/200	-
Polyphenyl ether (6 rings) OS-138	0/225	-
Polypropylene glycol	0/150	-
Polypropyleneimine	0/200	-
QF-1 (50% Trifluoropropyl)	20/250	-
SE-30 (Methyl gum)	75/300	-
SE-30 (GC grade)	75/300	G2
SE-52 (5% Phenyl)	50/300	G27
SE-54 (5% Phenyl, 1% Vinyl)	50/300	G36
Sebaconitrile	150	-
Silar® 5CP (50% Cyanopropyl Phenyl Silicone)	50/250	G7
Silar® 9CP (90% Cyanopropyl Phenyl Silicone)	50/250	G8
Silar® 10C (100% Cyanopropyl Silicone)	50/250	G5
Sorbitol	100/150	G13
SP-1200	25/200	-
SP-2100 (Methyl silicone)	0/350	G1
SP-2300 (Polycyanopropylphenylsiloxane)	20/275	G7
SP-2330 (Poly(80%-biscyanopropyl-20%-cyanopropylphenyl)siloxane	25/275	G8
SP-2340 (Polybiscyanopropylsiloxane)	25/275	G5
Squalene	20/150	-
SUPEROX® 4 (4.000.000 MW)	300	-
SUPEROX® 20M (20.000 MW)	60/250	-
Tetracyanoethylated Pentaerythritol (TCEPE)	30/150	-
Tetrahydroxyethylethylene Diamine (THEED)	125	-
1,2,3-Tris-(2-cyanoethoxy)propane (TCEP)	20/180	-
Triton® X-100	0/200	
Triton® X-305 (Octylphenoxy Polyethoxyethanol)	20/250	-
UC W-98 (UC-W982)	80/300+	G9
UCON LB-1800-X (Polyalkylene Glycol)	200	G18
Versamid® 900	275	-

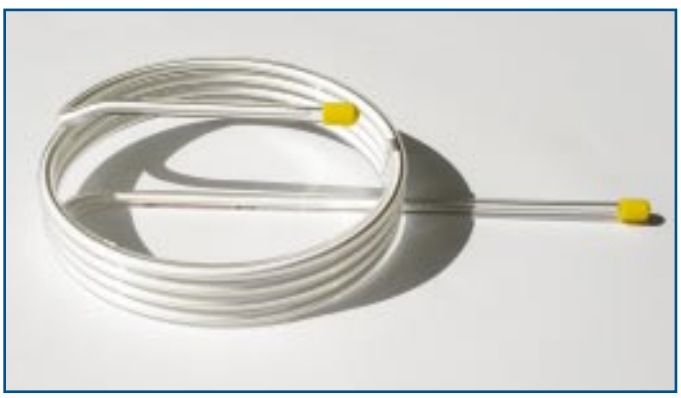
PACKED COLUMNS

Column: 5% Carbowax 20M CarboBlack B/AW, 80/120 mesh
Dimensions: 2m x 1/8" OD X 2mm ID, (Silcosteel)
Injection: 1 µl standard, 175ºC
Carrier Gas: He, 15mL/min
Oven temperature: 60ºC(6min) @ 10ºC/min to 150ºC(7min)
Detector: FID, 175ºC

Peak Name

1- Acetaldehyde
2- Methanol
3- Acetone
4- Ethyl formate
5- Ethanol
6- Ethyl acetate
7- n-Propanol
8- Secbutanol
9- Isobutanol
10- Acetic acid
11- Amyl alcohol
12- Isoamyl alcohol
13- n-Amyl alcohol
14- Propionic acid





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Serving the analytical community for over 50 years

For over 50 years, the name HAMILTON has been associated with uncompromised quality in precision fluid measurement and analytical products, as well as in fully automated analytical processes.

Today HAMILTON is a world-wide operating company with two headquarters in Reno, USA and Bonaduz, Switzerland. In these two facilities approximately 1000 employees are engaged in satisfying our customers' demands.

When it comes to analytical chemistry HAMILTON products are a viable choice:

HPLC	GC	Liquid Handling	pH Measurement
- Polymeric columns	- Capillary columns	- Syringes	- pH sensors
- Syringes	- Inlet liners	- Pipettes	- Dissolved oxygen sensors
- Tubing and fittings	- Syringes	- Bottle top dispensers	- pH buffers
- Vials and caps	- Septa and ferrules	- Diluters and dispensers	- Conductivity standards

Selling products is not just enough for us. At HAMILTON we want to understand our customers' issues and help them to resolve them. Just call our product specialists and challenge them!

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