

MACHEREY-NAGEL

NUCLEOSHELL[®] Bifenilo

Cromatografía



Basado en la tecnología core-shell

- Interacciones π - π potenciadas y eficiencia notable
- Excelente estabilidad en una fase móvil 100 % acuosa
- Adecuado para LC/MS gracias a sus propiedades de filtrado reducidas

MACHEREY-NAGEL

www.mn-net.com



Características principales

- Fase core-shell especial de bifenilpropilo con terminaciones múltiples
- Modo de separación basado en dos mecanismos de retención: interacciones π - π e interacciones hidrófobas
- Mayor retención de sustancias aromáticas e insaturadas
- Excelente rendimiento en condiciones altamente acuosas
- Adecuado para LC/MS gracias a sus propiedades de filtrado reducidas
- Mayor hidrofobia en comparación con otras fases arílicas

Aplicaciones recomendadas

- Separaciones analíticas sofisticadas en general
- Compuestos aromáticos e insaturados
- Micotoxinas
- Ftalatos
- Plaguicidas
- Antibióticos
- Hormonas
- Productos farmacéuticos
- DNPH aldehídos

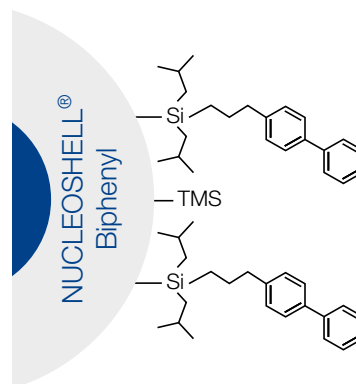
USP L11

Fases similares: Kinetex® Biphenyl, Raptor® Biphenyl, HALO® Biphenyl

Datos técnicos

Modificación con bifenilpropilo y terminación múltiple en partículas de estructura núcleo-corteza

- Estabilidad del pH: 1,5-8,5
- Tamaño de partículas: 2,7 μm (núcleo de 1,7 μm)
- Tamaño de poro: 90 Å
- Superficie específica: 130 m^2/g
- Contenido de carbono: 5,2 %



Batch-to-batch reproducibility

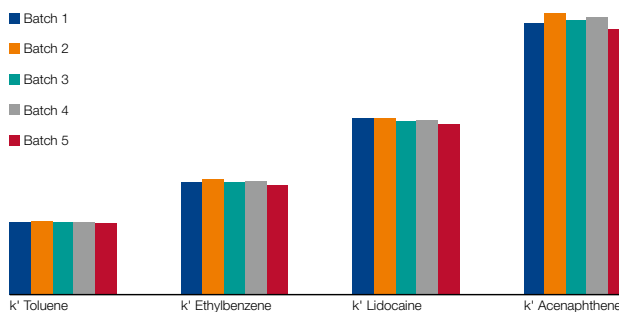
MN Appl. No. 128760

Chromatographic conditions

Column:	EC 50/4 NUCLEOSHELL® Biphenyl, 2.7 μm
MN REF:	763632.40
Eluent:	25 mM potassium dihydrogen phosphate solution – methanol (70:30, v/v), pH = 7.0
Flow rate:	1.0 mL/min
Run time:	10 min
Temperature:	30 °C
Detection:	UV, 254 nm
Injection:	1 μL

Concentration (in methanol)

Uracil	40 $\mu\text{g/mL}$ (void volume marker)
Toluene	1250 $\mu\text{g/mL}$
Ethylbenzene	1250 $\mu\text{g/mL}$
Lidocaine	500 $\mu\text{g/mL}$
Acenaphthene	230 $\mu\text{g/mL}$



Excelente reproducibilidad

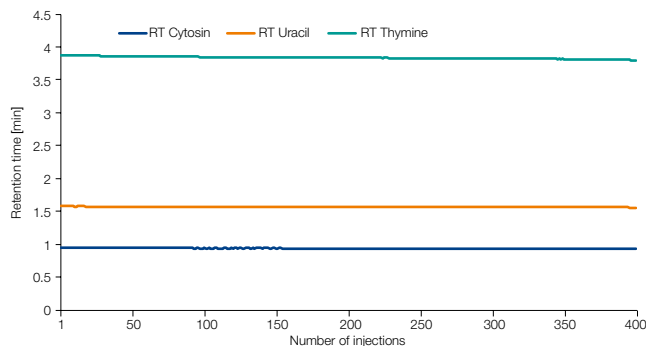
La elevada reproducibilidad interlotes de las columnas NUCLEOSHELL® Bifenilo garantiza resultados fiables para diferentes lotes.

Stability in 100 % aqueous eluent

MN Appl. No. 128770

Chromatographic conditions

Column:	EC 100/3 NUCLEOSHELL® Biphenyl, 2.7 µm
MN REF:	763634.30
Eluent:	20 mM potassium dihydrogen phosphate solution, pH = 3.1
Gradient:	isocratic
Flow rate:	0.56 mL/min
Run time:	10 min
Temperature:	20 °C
Detection:	UV, 220 nm and 254 nm
Injection:	0.5 µL
Test mix:	Cytosine, Uracil, Thymine in water



Estabilidad acuosa al 100 %

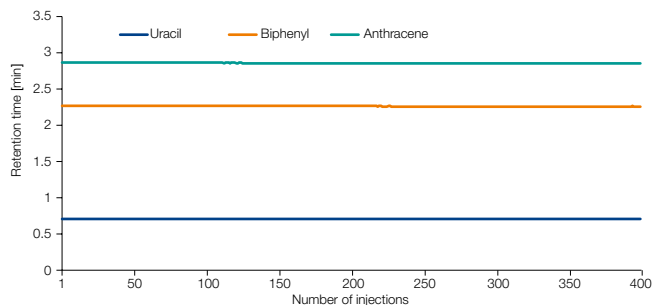
Excelente rendimiento y resistencia con una fase móvil 100 % acuosa.

Stability in acidic medium (isocratic method)

MN Appl. No. 128790

Chromatographic conditions

Column:	EC 100/3 NUCLEOSHELL® Biphenyl, 2.7 µm
MN REF:	763634.30
Eluent:	acetonitrile – water (60:40, v/v), 1 % TFA (pH = 0.8)
Gradient:	isocratic
Flow rate:	0.56 mL/min
Run time:	10 min
Temperature:	60 °C
Detection:	UV, 254 nm
Injection:	0.2 µL
Test mix:	Uracil, Biphenyl, Anthracene in acetonitrile



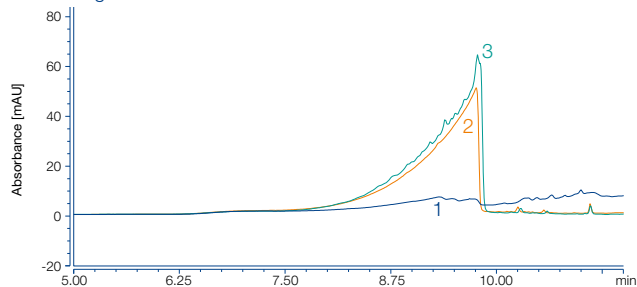
Stability in acidic medium (gradient method)

MN Appl. No. 128780

Chromatographic conditions

Column:	EC 100/3 NUCLEOSHELL® Biphenyl, 2.7 µm
MN REF:	763634.30
Eluent:	A) 1 % H ₃ PO ₄ (pH = 1.2) B) acetonitrile
Gradient:	equilibration 10 min 10 % B, hold 10 % B for 5 min, from 10 % to 90 % B in 5 min, hold 90 % B for 3 min, in 1.0 min to 10 % B
Flow rate:	0.56 mL/min
Temperature:	40 °C
Detection:	UV, 254 nm
1.	NUCLEOSHELL® Biphenyl, 2.7 µm
2.	Kinetex® Biphenyl, 2.6 µm
3.	Raptor® Biphenyl, 2.7 µm

Chromatogram



Mayor estabilidad a valores de pH bajos

Características de filtración muy reducidas en las mediciones UV-VIS frente a otras fases de bifenilo de estructura núcleo-corteza en medio ácido.

Disperse dyes

MN Appl. No. 128800

Chromatographic conditions

 Column: EC 100/3 NUCLEOSHELL® Biphenyl, 2.7 µm
 MN REF: 763634.30
 Eluent: A) 0.1 % formic acid in water
 B) 0.1 % formic acid in acetonitrile
 Gradient: hold 5 % B for 2.0 min, in 6.0 min to 95 % B, hold 95 % B for 2.0 min, in 0.1 min to 5 % B, hold 5 % B for 4.9 min
 Flow rate: 0.56 mL/min
 Temperature: 30 °C
 Detection: MS, SMRM
 Injection: 2 µL

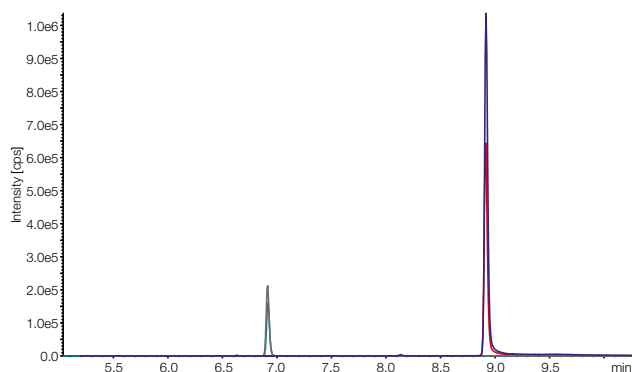
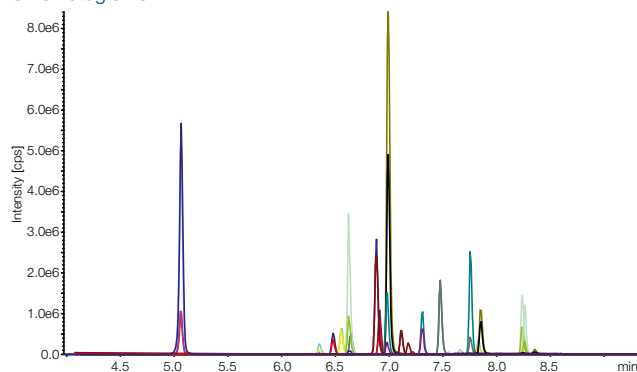
Concentration

10 ng/mL for each analyte in water

MRM transitions

Analyte	Polarity	RT [min]	[M+H] ⁺	Q ₁ (Quantifier)	Q ₂ (Qualifier)
Basic Red 9	positive	5.0	288.2	195.0	167.0
Disperse Blue 3	positive	6.2	297.1	281.0	252.0
Disperse Red 11	positive	6.3	268.0	224.9	252.9
Basic Violet 1	positive	6.3	358.2	342.2	326.1
Disperse Yellow 9	positive	6.4	275.1	239.9	182.0
Disperse Blue 102	positive	6.4	366.1	208.0	147.1
Disperse Red 17	positive	6.5	345.1	164.0	177.0
Crystal Violet	positive	6.7	372.2	356.1	340.2
Disperse Yellow 39	positive	6.7	265.1	249.0	250.0
Disperse Yellow 3	positive	6.9	270.1	107.1	108.1
Disperse Blue 106	positive	6.9	336.1	178.1	147.0
Victoria Blue B	positive	7.1	470.3	454.3	349.1
Disperse Orange 3	positive	7.1	243.1	122.0	75.1
Disperse Brown 1	positive	7.1	433.0	197.0	357.0
Disperse Blue 35	positive	7.5	285.1	270.0	192.9
Disperse Blue 124	positive	7.6	378.1	220.0	87.1
Disperse Yellow 49	positive	7.6	375.1	238.1	223.0
Disperse Orange 11	positive	7.7	238.1	222.9	165.0
Disperse Yellow 23	positive	7.9	303.1	77.1	105.1
Disperse Blue 1	positive	8.1	269.1	237.0	161.1
Disperse Blue 26	positive	8.1	299.2	283.9	267.2
Disperse Orange 1	positive	8.2	319.1	169.0	122.0
Disperse Orange 37	positive	8.2	392.1	351.0	133.1
Analyte	Polarity	RT [min]	[M-H] ⁻	Q ₁ (Quantifier)	Q ₂ (Qualifier)
Disperse Yellow 1	negative	6.8	274.0	244.0	227.0
Disperse Orange 149	negative	8.7	457.2	265.9	121.0

Chromatograms



Mycotoxins

MN Appl. No. 128810

Chromatographic conditions

Column:	EC 100/3 NUCLEOSHELL® Biphenyl, 2.7 µm
MN REF:	763634.30
Eluent:	A) 0.1 % formic acid in water B) 0.1 % formic acid in acetonitrile
Gradient:	hold 5 % B for 1.0 min, in 3.0 min to 40 % B, in 1.0 min to 95 % B, hold 95 % B for 1.0 min, in 1.0 min to 5 % B, hold 5 % B for 3.0 min
Flow rate:	0.56 mL/min
Temperature:	40 °C
Detection:	MS, SMRM
Injection:	20 µL

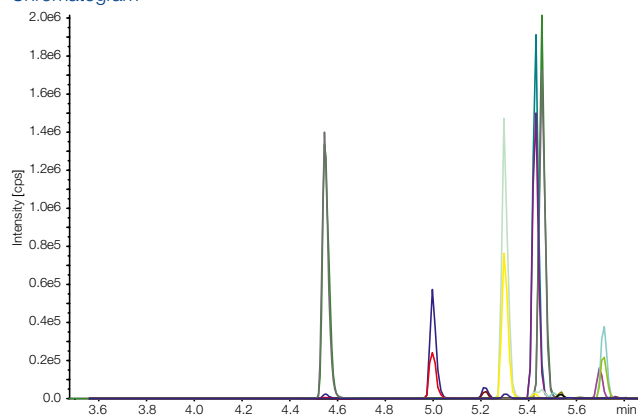
Concentration

0.5 ng/mL fumonisin B₁ in water, 5.0 ng/mL for each other analyte in water

MRM transitions

Analyte	RT [min]	[M+H] ⁺	Q ₁ (Quantifier)	Q ₂ (Qualifier)
Fumonisin B ₁	4.55	722.2	334.2	352.3
Fumonisin B ₂	5.00	706.2	336.3	318.1
HT-2 toxin	5.22	425.2	263.0	215.0
Aflatoxin G ₂	5.30	331.1	313.0	244.9
Aflatoxin B ₁	5.31	313.0	285.0	241.0
Aflatoxin G ₁	5.43	329.0	242.9	311.0
Aflatoxin B ₂	5.46	315.1	287.0	258.9
T-2 toxin	5.53	467.2	305.0	244.9
Deoxynivalenol	5.65	297.1	280.2	248.8
Zearalenone	5.70	319.1	187.1	185.0
Ochratoxin A	5.72	404.0	238.8	358.0

Chromatogram



Pesticides

MN Appl. No. 128820

Chromatographic conditions

Column: EC 50/4.6 NUCLEOSHELL® Biphenyl, 2.7 µm
 MN REF: 763632.46
 Eluent: A) 0.1 % formic acid in water
 B) 0.1 % formic acid in methanol
 Gradient: in 5 min from 5 % to 100 % B, hold for 1.0 min,
 in 0.1 min to 5 % B, hold 5 % B for 3.9 min
 Flow rate: 0.70 mL/min
 Temperature: 30 °C
 Detection: MS, SMRM
 Injection: 20 µL

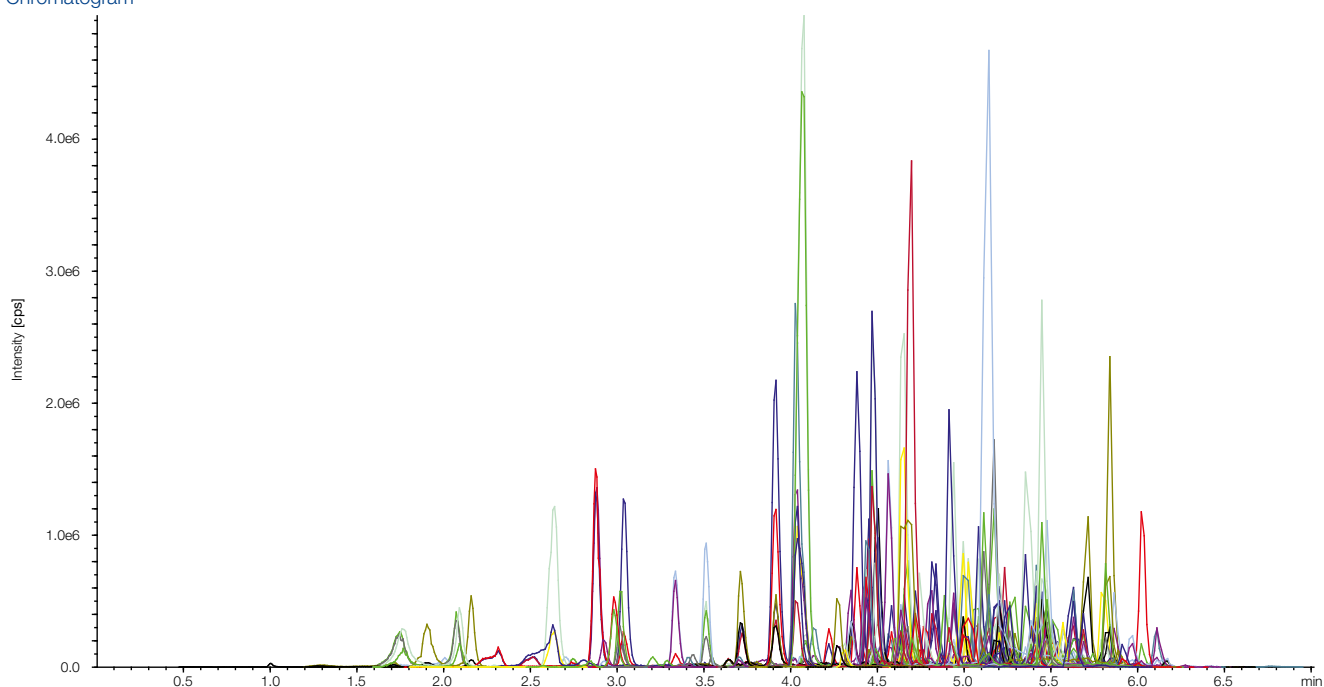
Concentration

0.4 ng/mL in water – QuEChERS mix extract (4:1, v/v)

Sample matrix:

2 g black tea (spiked with 50 µg/kg for each pesticide)

Chromatogram



Retention times / relative retention times / recovery rates

Analyte	RT [min]	Relative RT [%]†	Recovery rate [%]	Standard deviation [%]
Cyromazine	0.98	103.2	18	4.1
Methamidophos	1.70	118.9	67	10.1
Aminocarb	2.07	147.9	78	7.2
Propamocarb	2.10	161.5	26	5.8
Formetanate	2.15	158.1	68	2.5
Omethoate	2.30	119.2	81	5.1
Pymetrozine	2.31	152.0	8	17.0
Aldicarb sulfoxide	2.49	124.5	88	9.1
Carbendazim	2.62	142.4	69	6.4
Aldicarb sulfone	2.74	129.9	78	12.6
Nitenpyram	2.81	152.7	53	14.4
Mexacarbate	2.90	136.2	85	3.3
Monocrotophos	3.00	112.4	85	3.7
Flonicamid	3.01	124.9	83	4.7
Methomyl	3.01	123.4	83	4.3
Fuberidazole	3.03	132.3	72	3.2
Dicrotophos	3.31	118.2	80	2.4

Analyte	RT [min]	Relative RT [%]†	Recovery rate [%]	Standard deviation [%]
Ethirimol	3.51	135.0	41	2.8
Fenuron	3.51	115.8	85	4.9
3-Hydroxycarbofuran	3.56	114.8	87	6.2
Dimethoate	3.70	116.7	87	2.3
Imidacloprid	3.86	131.3	83	6.0
Mevinphos isomer 1	3.90	112.7	93	12.0
Mevinphos isomer 2	3.90	112.7	83	9.2
Pyrimicarb	3.96	137.5	79	2.6
Cymoxanil	4.00	122.0	86	11.3
Prometon	4.06	120.5	82	2.4
Simetryn	4.07	123.7	81	2.7
Butocarboxim	4.07	120.8	91	5.7
Carbetamide	4.07	109.7	94	5.5
Aldicarb	4.08	114.9	90	6.3
Sebumeeton	4.09	121.4	83	2.3
Acetamiprid	4.12	129.6	88	5.1
Imazalil	4.19	130.1	72	6.8

† in relation to NUCLEOSHELL® Bluebird RP 18

Continued from page 6

Analyte	RT [min]	Relative RT [%]†	Recovery rate [%]	Standard deviation [%]
Thidiazuron	4.26	108.7	19	16.7
Bendiocarb	4.34	111.6	93	4.5
Propoxur	4.35	113.3	84	4.2
Ametryn	4.41	116.1	83	2.9
Fluometuron	4.42	108.9	95	5.6
Carbofuran	4.43	117.5	95	5.5
Spiroxamine isomer 1	4.45	126.4	98	5.2
Spiroxamine isomer 2	4.45	126.4	107	3.2
Carbaryl 1	4.45	109.9	92	8.4
Fenpropimorph	4.47	125.9	115	2.7
Metribuzin	4.49	116.6	89	6.2
Monolinuron	4.51	110.0	92	8.0
Thiophanate-methyl	4.53	117.1	46	19.3
Propham	4.54	107.1	75	25.2
Chlorotoluron	4.55	108.3	76	8.8
Isoprocab	4.57	107.8	86	10.3
Oxadixyl	4.60	127.8	81	10.7
Methoprottryne	4.60	121.1	84	2.8
Metobromuron	4.63	102.9	79	12.7
Forchlorfenuron	4.64	106.7	68	4.4
Isoproturon	4.66	108.1	85	9.4
Thiofanox	4.69	115.0	63	28.5
Diuron	4.69	102.0	71	12.9
Prometryne	4.70	116.6	83	6.1
Flutriafol	4.73	112.6	82	4.1
Desmedipham	4.74	107.7	119	11.4
Pyrimethanil	4.76	113.6	82	8.3
Cycluron	4.77	109.9	89	10.5
Phenmedipham	4.78	110.4	99	6.6
Methabenzthiazuron	4.81	112.4	83	8.5
Fenobucarb	4.82	109.8	97	9.4
Linuron	4.90	107.0	87	20.4
Diethofencarb	4.91	109.8	87	12.3
Promecarb	4.92	106.5	104	22.7
Halofenozide	4.93	108.1	82	21.8
Hydramethylnon	4.94	113.8	140	10.8
Metalaxyl	4.97	115.9	89	4.8
Ethiprole	4.97	110.9	87	12.7
Paclobutrazol	4.99	108.5	88	5.0
Methiocarb	5.00	108.9	94	11.6
Flutolanil	5.01	108.0	90	6.2
Chlorantraniliprole	5.03	114.1	79	19.3
Fenamidone	5.05	110.5	82	7.1
Iprovalicarb isomer 1	5.06	106.1	96	4.4
Iprovalicarb isomer 2	5.08	106.5	96	3.6
Nuarimol	5.09	113.9	63	10.0
Ethofumesate	5.11	112.8	66	15.0
Mepronil	5.11	108.7	89	11.7
Methoxyfenozide	5.12	108.2	93	10.4
Thiacloprid	5.13	149.6	83	3.5
Furalaxyl	5.14	113.7	89	3.8
Cyproconazole isomer 1	5.14	110.5	87	4.5
Cyproconazole isomer 2	5.14	109.6	90	4.0
Cyprodinil	5.15	111.0	83	14.0
Boscalid	5.16	114.7	95	10.2
Chloroxuron	5.16	108.9	84	14.7
Triadimefon	5.18	111.4	88	12.0
Bifenazate	5.19	110.4	119	16.2
Bupirimate	5.20	117.4	86	11.3
Tetraconazole	5.20	109.7	101	13.2
Mepanipyrim	5.20	107.4	77	11.5
Neburon	5.21	105.7	93	11.5
Carfentrazone-ethyl	5.22	115.7	97	13.2

† in relation to NUCLEOSHELL® Bluebird RP 18

Analyte	RT [min]	Relative RT [%]†	Recovery rate [%]	Standard deviation [%]
Diclobutrazol	5.25	108.9	93	11.3
Tebufenozide	5.26	109.4	92	11.7
Diflubenzuron	5.27	108.7	90	11.4
Fenarimol	5.33	112.9	89	8.7
Azoxystrobin	5.34	116.8	95	4.5
Tebuconazole	5.35	108.1	85	8.4
Hexaconazole	5.35	107.0	91	12.0
Fenoxycarb	5.36	109.2	114	13.0
Acibenzolar-S-methyl	5.38	114.7	77	14.4
Spirotetramat	5.39	113.2	55	18.7
Flusilazole	5.39	111.4	92	10.3
Picoxystrobin	5.39	108.5	110	8.7
Prothioconazole	5.40	109.5	54	23.3
Penconazole	5.40	109.3	91	6.4
Dimoxystrobin	5.41	109.5	103	8.4
Epoxiconazole	5.43	112.7	86	6.9
Diniconazole	5.43	106.7	105	15.3
Mefenacet	5.44	114.8	89	9.9
Bitteranol	5.44	109.7	91	16.9
Metconazole	5.45	109.0	76	16.7
Butafenacil	5.46	114.9	114	12.5
Etaconazole isomer 1	5.47	115.6	89	8.8
Dimethomorph isomer 2	5.48	118.4	88	6.7
Fluquinconazole	5.48	116.8	90	14.6
Fenbuconazole	5.48	113.7	94	13.1
Dimethomorph isomer 1	5.49	118.6	89	6.1
Kresoxim-methyl	5.49	109.8	78	17.2
Fluoxastrobin	5.50	114.6	117	25.8
Mandipropamid	5.53	114.0	84	11.7
Famoxadone	5.53	112.4	125	24.5
Thiobencarb	5.56	108.4	90	13.7
Ipcconazole isomer 1	5.56	107.5	96.4	11.2
Ipcconazole isomer 2	5.56	107.5	104	14.8
Amitraz	5.59	111.6	92	19.9
Benalaxyl	5.59	111.1	98	11.4
Pencycuron (Monceren)	5.60	109.8	90	6.7
Bromucanazole isomer 2	5.62	119.6	99	12.1
Clofentezine	5.62	108.9	92	14.4
Propiconazole isomer 1	5.64	113.0	93	8.9
Propiconazole isomer 2	5.64	113.0	86	8.2
Benzoximate	5.65	109.5	99	10.9
Pyraclastrobin	5.68	111.4	96	10.8
Prochloraz	5.69	116.8	96	8.0
Tebufenpyrad	5.69	107.6	132	7.5
Bromucanazole isomer 1	5.70	121.3	89	25.4
Buprofezin	5.70	110.3	114	4.6
Difenoconazole isomer 1	5.78	113.8	101	11.5
Piperonyl butoxide	5.81	108.0	111	3.7
Pyriproxyfen	5.82	107.4	112	3.5
Furathiocarb	5.85	110.4	113	6.4
Quinoxifen	5.97	110.1	95	4.8
Hexythiazox	5.98	110.5	121	10.7
Rotenone	6.00	121.2	100	19.7

Análisis rápidos para separaciones complejas

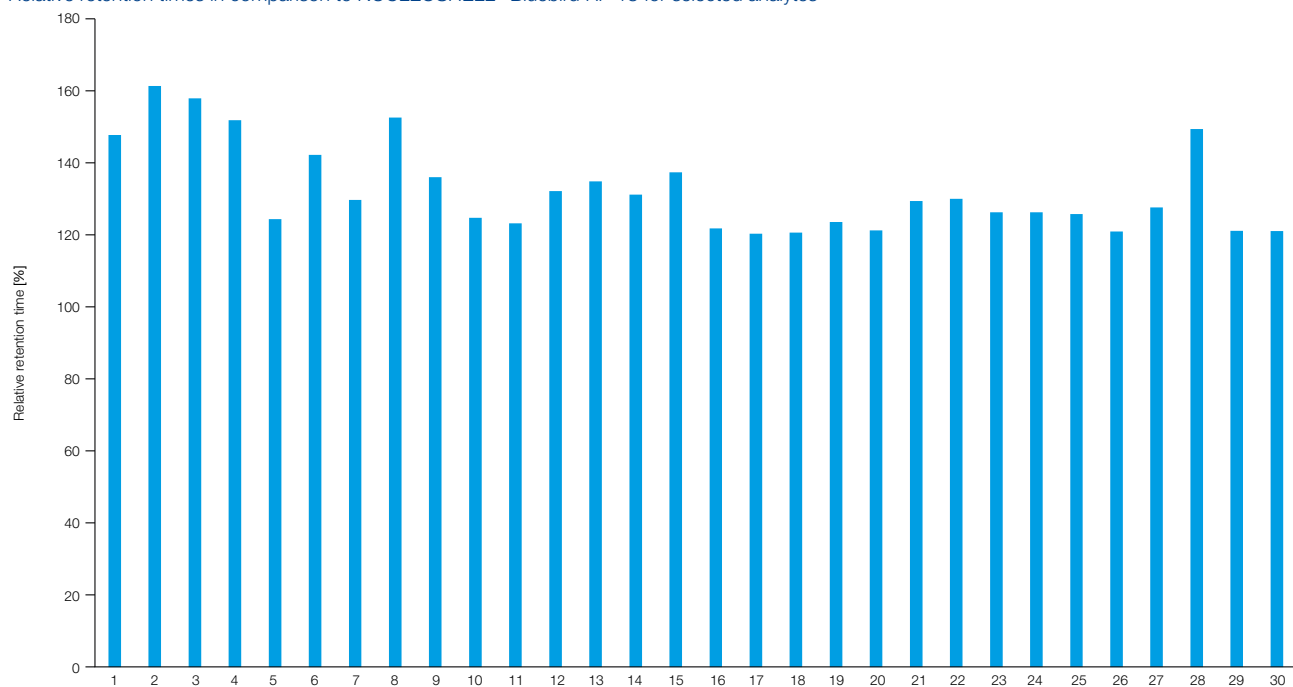
Análisis LC/MS de más de 150 plaguicidas en menos de 6,5 minutos en NUCLEOSHELL® Bifenilo.



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Relative retention times in comparison to NUCLEOSHELL® Bluebird RP 18 for selected analytes



1 Aminocarb	9 Mexacarbate	17 Cymoxanil	25 Fenpropimorph
2 Propamocarb	10 Flonicamid	18 Butocarboxim	26 Methoprotrotryne
3 Formetanate HCl	11 Methomyl	19 Simetryn	27 Oxadixyl
4 Pymetrozine	12 Fuberidazole	20 Secbumeton	28 Thiacloprid
5 Aldicarb sulfoxide	13 Ethirimol	21 Acetamiprid	29 Bromucanazole isomer 1
6 Carbenidazim	14 Imidacloprid	22 Imazalil	30 Rotenone
7 Aldicarb sulfone	15 Primicarb	23 Spiroxamine isomer 1	
8 Nitenpyram	16 Prometon	24 Spiroxamine isomer 2	



Selectividad alternativa e hidrofobia elevada

Retención considerablemente mayor (selectividad alternativa) de determinados compuestos arílicos en comparación con una modificación de tipo núcleo-corteza con octadecilsililo en metanol. La comparación con NUCLEOSHELL® Bluebird RP 18 también demuestra su elevada hidrofobia frente a otras fases arílicas.

Phthalates

MN Appl. No. 128830

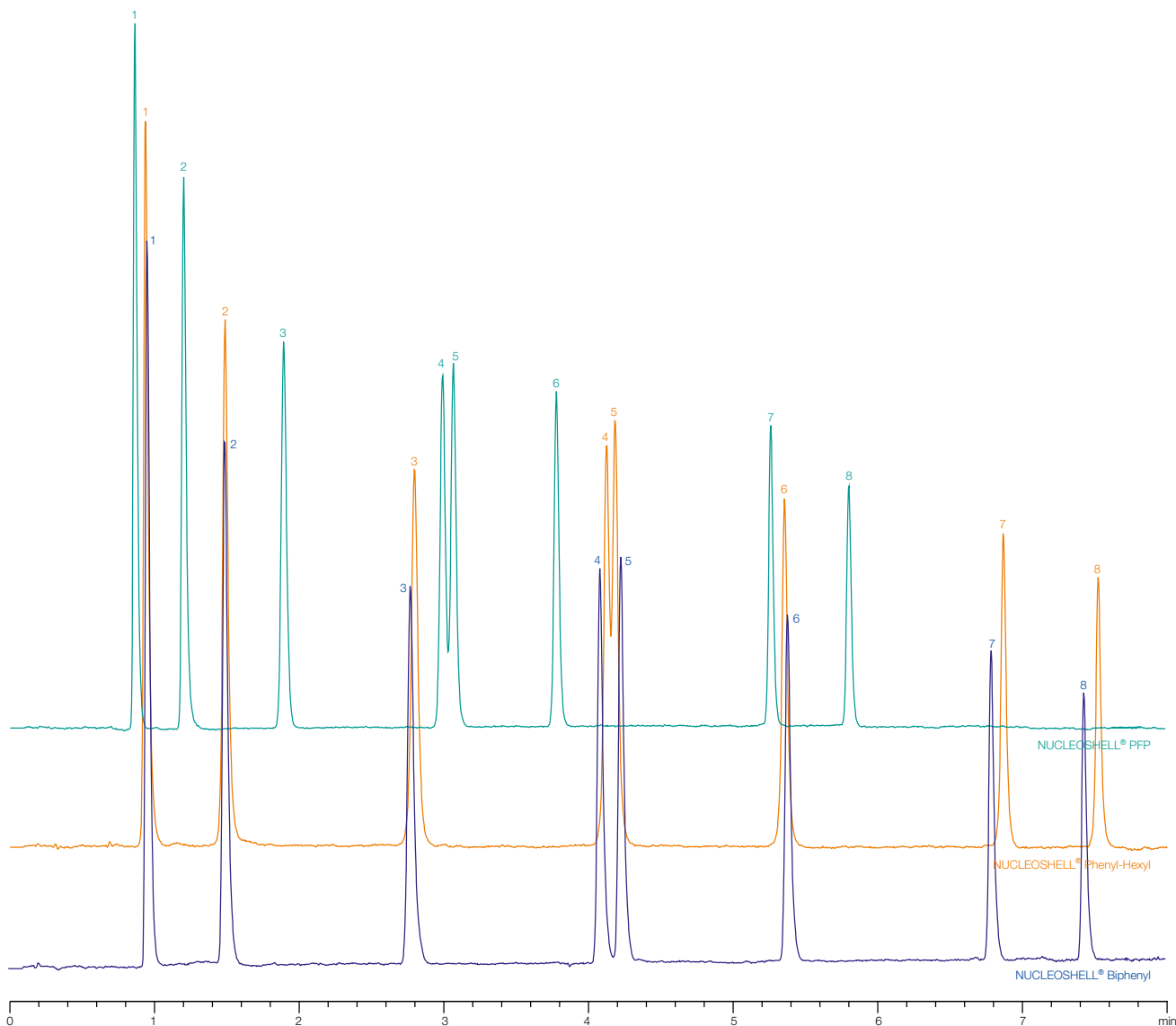
Chromatographic conditions

	Column:	EC 100/3 NUCLEOSHELL® Biphenyl, 2.7 µm EC 100/3 NUCLEOSHELL® Phenyl-Hexyl, 2.7 µm EC 100/3 NUCLEOSHELL® PFP, 2.7 µm
	MN REF:	763634.30, 763734.30, 763534.30
	Eluent:	A) water B) 0.1 % water in acetonitrile
	Gradient:	hold 50 % B for 1.5 min, in 6.0 min to 95 % B, hold 95 % B for 3.5 min, in 2.0 min to 50 % B, hold 50 % B for 4.5 min
	Flow rate:	1.0 mL/min
	Temperature:	30 °C
	Detection:	UV, 228 nm
	Injection:	5 µL

Concentration

10.0 ng/mL for each analyte in water – acetonitrile (1:1, v/v)

Chromatograms



Retention times

Analyte	Biphenyl RT [min]	Phenyl-Hexyl RT [min]	PFP RT [min]
1 Dimethyl phthalate	0.96	0.94	0.86
2 Diethyl phthalate	1.50	1.49	1.20
3 Dipropyl phthalate	2.87	2.80	1.89
4 Dibutyl phthalate	4.09	4.13	2.99
5 Benzyl butyl phthalate	4.24	4.19	3.07
6 Dicyclohexyl phthalate	5.39	5.36	3.78
7 Diheptyl phthalate	6.80	6.87	5.26
8 Dioctyl phthalate	7.44	7.53	5.80

Selectividad aromática superior

NUCLEOSHELL® Bifenilo es capaz de la separación inicial del par crítico ftalato de dibutilo / ftalato de bencilo y butilo, mientras que otras fases arílicas no pueden lograrlo.

Estrogens

MN Appl. No. 128850

Chromatographic conditions

Column:	EC 50/2 NUCLEOSHELL® Biphenyl, 2.7 µm
MN REF:	REF 763632.20
Eluent:	A) 0.01 mM ammonium fluoride in water B) acetonitrile
Gradient:	from 10 % to 50 % B in 15 min, in 1.0 min to 99 % B, hold 99 % B for 1.5 min, in 0.5 min to 10 % B, hold 10 % B for 3.0 min
Flow rate:	0.30 mL/min
Temperature:	30 °C
Detection:	MS, MRM
Injection:	20 µL

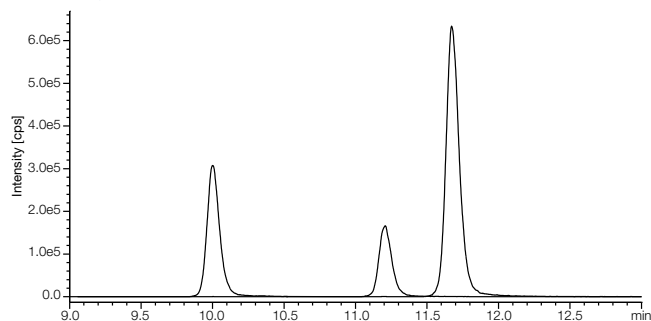
Concentration

10.0 ng/mL for each analyte in eluent A – methanol (9:1, v/v)

MRM transitions

Analyte	RT [min]	[M-H] ⁺	Q ₁ (Quantifier)	Q ₂ (Qualifier)
Estradiol	10.0	271.3	183.3	145.3
Estrone	11.2	295.3	145.2	143.3
Ethinylestradiol	11.7	269.3	145.2	267.2

Chromatogram



DNPH aldehydes

MN Appl. No. 128840

Chromatographic conditions

Column:	EC 50/3 NUCLEOSHELL® Biphenyl, 2.7 µm
MN REF:	REF 763632.30
Eluent:	A) water B) acetonitrile
Gradient:	in 5.0 min from 10 % to 72 % B, hold 72 % B for 1.0 min, in 1.0 min to 10 % B, hold 10 % B for 5.0 min
Flow rate:	2.0 mL/min
Temperature:	40 °C
Detection:	UV, 360 nm
Injection:	10 µL

Concentration

0.5 µg/mL for each analyte in water – acetonitrile (95:5, v/v)

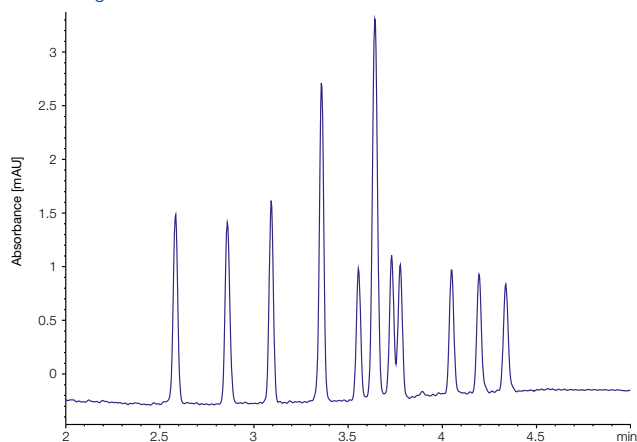
Retention times

Analyte	RT [min]
Formaldehyde	2.58
Acetaldehyde	2.86
Acetone	3.09
Isobutyraldehyde + <i>p</i> -Tolualdehyde	3.36
Hexanal	3.55
Butanal + <i>o</i> -/ <i>m</i> -Tolualdehyde	3.64
Pentanal	3.73
2,5-Dimethylbenzaldehyde	3.77
Octanal	4.05
Nonanal	4.19
Decanal	4.36

For further analytes the following retention times have been determined (not presented in the chromatogram):

Analyte	RT [min]
Propanal	3.14
Acrolein	3.23
Isovaleraldehyde	3.56
Benzaldehyde	3.59
Crotonaldehyde	3.17
Cyclohexanon	3.77

Chromatogram



Algal toxins in mussels

MN Appl. No. 128860

Chromatographic conditions

Column:	EC 150/3 NUCLEOSHELL® Biphenyl, 2.7 µm EC 250/2 NUCLEODUR® π ² , 5 µm
MN REF:	763636.30, 760625.20
Eluent:	A) 50 mM formic acid B) methanol
Gradient:	hold 79 % B for 4.0 min, in 0.1 min to 83 % B, in 10.9 min to 86 % B, in 0.1 min to 98 % B, hold 98 % B for 2.9 min, in 0.1 min to 79 % B
Flow rate:	0.30 mL/min
Temperature:	40 °C
Detection:	MS, MRM
Injection:	10 µL

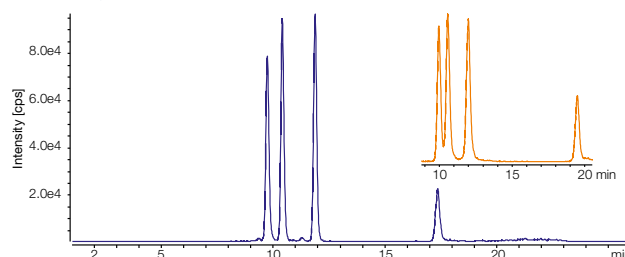
Concentration

10.0 ng/mL for each analyte

MRM transitions

Analyte	RT [min]	[M+H] ⁺	Q ₁ (Quantifier)	Q ₂ (Qualifier)
Okadaic acid	9.5	827.5	809.4	723.4
Dinophysistoxin-2	10.3	827.5	809.4	723.4
Dinophysistoxin-1	11.7	841.5	823.4	737.4
Pectenotoxin-2	17.3	881.3	837.4	539.3

Chromatograms



Ventajas de las partículas de estructura core-shell frente a las partículas totalmente porosas

Mejor forma de los picos y mayor separación inicial con NUCLEOSHELL® Bifenilo frente a NUCLEODUR® π².

We thank TeLA GmbH for the cooperation and for the method development of this application.



Información de pedido

Longitud	50 mm	100 mm	150 mm
NUCLEOSHELL® Bifenilo, 2,7 µm			
Columnas EC (envase de 1)			
■ DI 2 mm	763632.20	763634.20	763636.20
■ DI 3 mm	763632.30	763634.30	763636.30
■ DI 4 mm	763632.40	763634.40	763636.40
■ DI 4,6 mm	763632.46	763634.46	763636.46



Prolongue la vida útil de sus columnas con nuestra selección de columnas de protección

Para columna EC con DI de		REF columna de protección	Soporte de columna de protección obligatorio (sistema de protección de columnas)
■ 2 mm	EC 4/2 (envase de 3)	763638.20	718966
■ 3 / 4 / 4.6 mm	EC 4/3 (envase de 3)	763638.30	718966



Marcas registradas

NUCLEOSHELL® MACHEREY-NAGEL GmbH & Co. KG (Alemania)
Kinetex® Phenomenex (EE. UU.)
Raptor® Restek (EE. UU.)
HALO® Advanced Materials Technology (EE. UU.)

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Su distribuidor local

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