

Biphenyl

Leading Resolution in LC
for Clinical and Forensic Applications



Includes
synthetic
cannabinoid
applications!

RESTEK®

Chromatography Products

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Biphenyl Columns

Greater Versatility—Increased Method Performance



- Optimized for a wider range of compound chemistries compared to a C18 or phenyl column.
- Perfect for drugs of abuse, pharmaceuticals, metabolites, and more.
- Ultra Biphenyl columns are lot tested with a comprehensive drug panel to ensure confidence in method reproducibility.

Biphenyl columns are unique as they combine the performance of a traditional alkyl phase (C8 or C18) with that of a phenyl phase, providing unmatched versatility for clinical and forensic applications. This new phase offers excellent retention for both polar and nonpolar compounds because of the innovative end-to-end bonding of phenyl groups using an aryl linker instead of a straight chain hexyl linker. The overall result is a phase that offers the highest degree of aromatic selectivity and hydrophobic retention of any phenyl phase. To ensure reproducibility for demanding LC/MS/MS methods, each bonded lot of Ultra Biphenyl phase is tested by LC/MS with a multiclass drug panel as part of our rigorous QA process. Get optimal performance for clinical and forensic applications with versatile Biphenyl columns—**no other phase can provide both C18- and phenyl-like performance in a single column.**

Benzodiazepines in Hydrolyzed Urine on Ultra Biphenyl

Analyze 19 benzodiazepines
in 4.5 minutes on a
robust, cost-effective
5 μ m column!

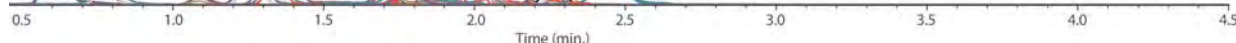
Peaks	RT (min.)	MRM1	MRM2	MRM3
1. 7-Aminoclonazepam	0.59	286.0/250.3	286.0/222.2	286.0/121.0
2. 7-Aminoflunitrazepam	0.77	284.2/135.2	284.2/240.2	284.2/226.1
3. Bromazepam	1.10	315.9/182.0	315.9/209.1	315.9/260.9
4. N-Desmethyflunitrazepam	1.71	300.0/254.1	300.0/225.2	300.0/198.0
5. Nitrazepam	1.69	282.1/236.1	282.1/207.2	282.1/180.0
6. Lorazepam	1.71	321.0/302.9	321.0/275.1	321.0/229.1
7. 2-Hydroxyethylflurazepam	1.79	333.1/246.1	333.1/166.0	333.1/109.1
8. Nordiazepam	1.78	271.0/140.0	271.0/208.0	271.0/225.9
9. Estazolam	1.88	294.9/267.1	294.9/241.0	294.9/138.0
10. Desalkylflurazepam	1.90	289.0/140.0	289.0/165.1	289.0/226.0
11. Clonazepam	1.92	315.9/270.2	315.9/214.1	315.9/207.1
12. Alprazolam	1.99	309.4/281.1	309.4/205.0	309.4/274.1
13. Midazolam	1.26	326.1/291.2	326.1/244.2	326.1/209.0
14. Triazolam	2.06	343.1/315.0	343.1/308.2	343.1/239.2
15. Temazepam	2.13	301.2/283.1	301.2/255.1	301.2/228.1
16. Flurazepam	1.34	388.1/315.1	388.1/288.2	388.1/317.1
17. Flunitrazepam	2.24	314.4/211.0	314.4/239.1	314.4/268.1
18. Clobazam	2.26	301.1/259.1	301.1/224.0	301.1/181.1
19. Diazepam-D5 (IS)	2.42	290.0/154.1	—	—
20. Diazepam	2.45	284.8/193.1	284.8/222.2	284.8/257.1

Column: Ultra Biphenyl (cat. # 9109552); Dimensions: 50 mm x 2.1 mm ID; Particle Size: 5 μ m; Pore Size: 100 Å; Temp.: 40 °C; **Sample:** Diluent: Starting mobile phase + 30 ng/mL IS; Conc.: 100 ng/mL sample was diluted 20x prior to injection; Inj. Vol.: 30 μ L

Mobile Phase: A: Water + 2 mM ammonium formate + 0.2% formic acid
B: Acetonitrile + 10% water + 2 mM ammonium formate + 0.2% formic acid

Time (min.)	Flow (mL/min.)	%A	%B
0	0.6	70	30
3.0	0.6	40	60
3.1	0.6	5	95
3.5	0.6	5	95
3.6	0.6	70	30
4.5	stop		

Detector: AB SCIEX API 4000 MS/MS; Model #: API 4000; Ion Source: TurboIonSpray®; Ion Mode: ESI+; Ion Spray Voltage: 2 kV; Curtain Gas: 40 psi (275.8 kPa); Gas 1: 40 psi (275.8 kPa); Gas 2: 40 psi (275.8 kPa); Source Temp.: 600 °C; **Instrument:** Applied Biosystems/MDS Sciex LC/MS/MS System; **Notes:** MS/MS instrument was operated in scheduled MRM mode.

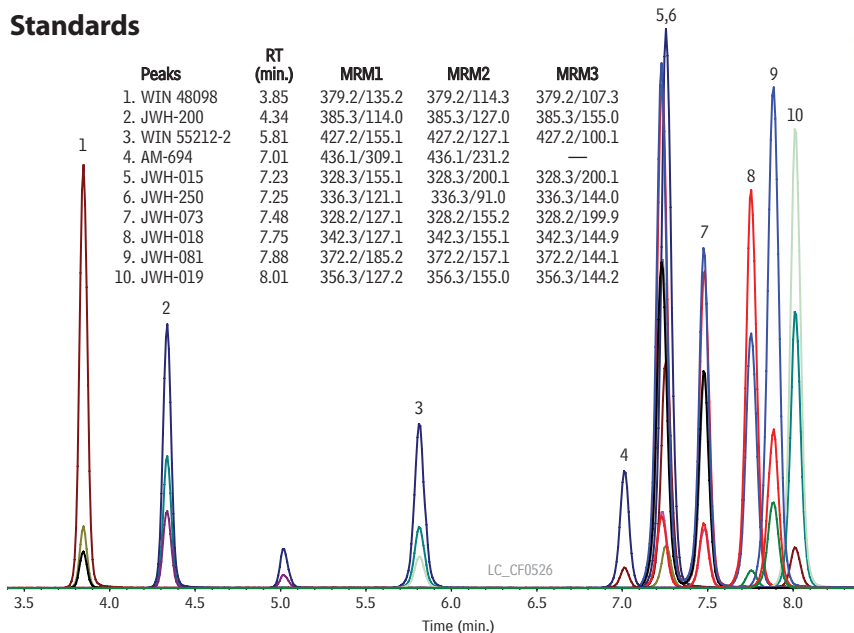


LC_CF0525



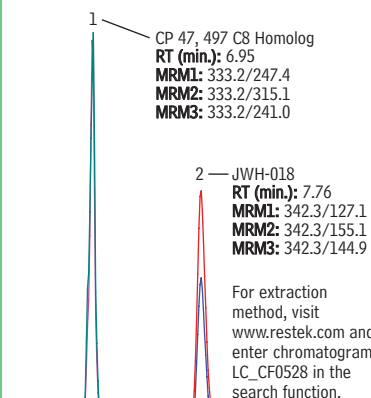
Synthetic Cannabinoids on Ultra Biphenyl

Standards



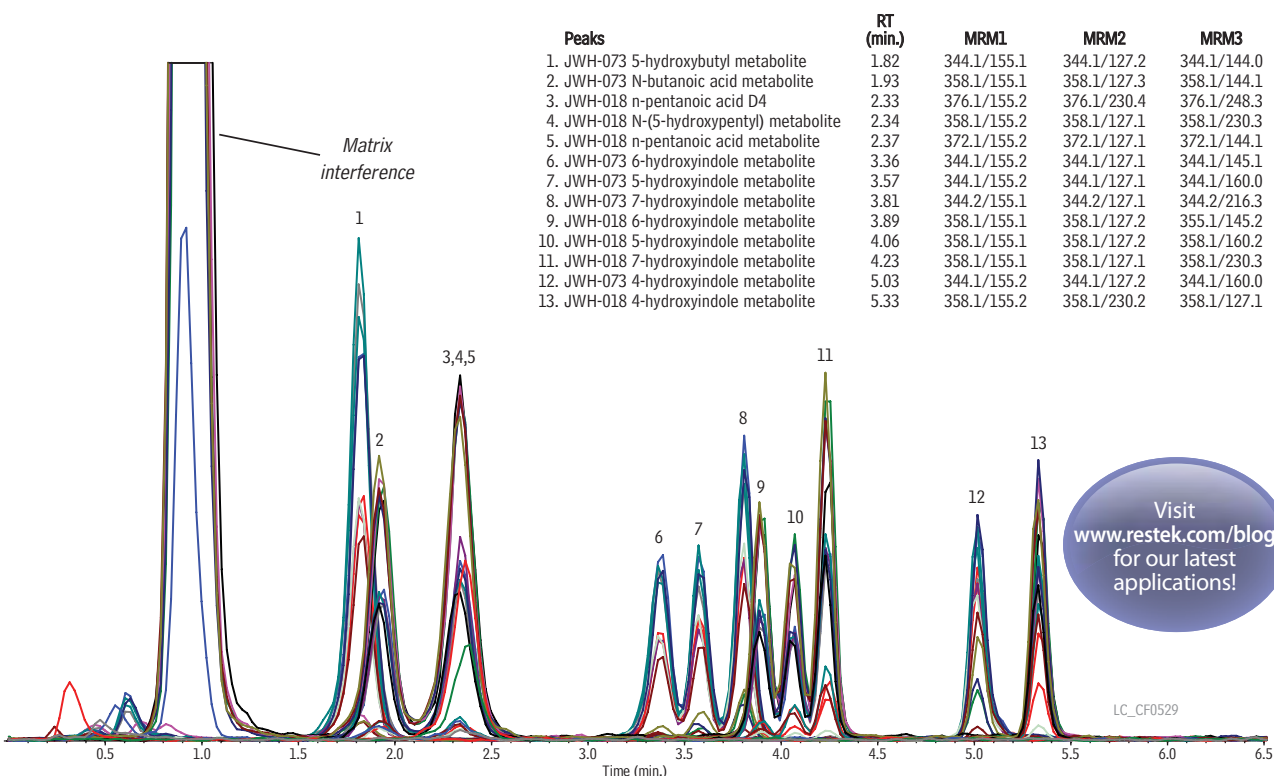
Spice Gold Sample

(Methanol Extract)



Column: Ultra Biphenyl (cat. # 9109552); Dimensions: 50 mm x 2.1 mm ID; Particle Size: 5 μ m; Pore Size: 100 Å; Temp.: 40 °C; **Sample:** Diluent: Methanol; Conc.: 50 ng/mL; Inj. Vol.: 5 μ L; **Detector:** AB SCIEX API 4000 MS/MS; Model #: API 4000; Ion Source: TurboIonSpray®; Ion Mode: ESI+; Ion Spray Voltage: 3000 kV; Curtain Gas: 40 psi (275.8 kPa); Gas 1: 40 psi (275.8 kPa); Gas 2: 40 psi (275.8 kPa); Interface Temp.: 600 °C; Mode: MRM; Dwell Time: 10 ms; **Instrument:** Applied Biosystems/MDS Sciex LC/MS/MS System

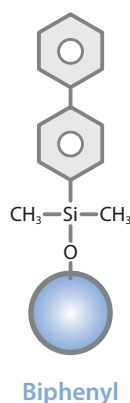
Synthetic Cannabinoid Metabolites in Hydrolyzed Urine on Pinnacle® DB Biphenyl



Column: Pinnacle® DB Biphenyl (cat. # 9409552); Dimensions: 50 mm x 2.1 mm ID; Particle Size: 5 μ m; Pore Size: 140 Å; Temp.: 25 °C
For complete conditions, visit www.restek.com and enter chromatogram LC_CF0529 in the search function.

Visit
www.restek.com/blog
for our latest
applications!





Ultra Biphenyl Columns (USP L11)

Physical Characteristics:

particle size: 3µm or 5µm, spherical
pore size: 100Å

carbon load: 15%
endcap: fully endcapped

pH range: 2.5 to 8
temperature limit: 80°C

Length	1.0mm ID cat. #	2.1mm ID cat. #	3.2mm ID cat. #	4.6mm ID cat. #
3µm Columns				
30mm	9109331	9109332	9109333	9109335
50mm	9109351	9109352	9109353	9109355
100mm	9109311	9109312	9109313	9109315
150mm	9109361	9109362	9109363	9109365
5µm Columns				
30mm	9109531	9109532	9109533	9109535
50mm	9109551	9109552	9109553	9109555
100mm	9109511	9109512	9109513	9109515
150mm	9109561	9109562	9109563	9109565
200mm	9109521	9109522	9109523	9109525
250mm	9109571	9109572	9109573	9109575

Ultra Biphenyl Guard Cartridges

Guard Cartridges	3-pk. (10 x 2.1mm)	3-pk. (10 x 4.0mm)	2-pk. (20 x 2.1mm)	2-pk. (20 x 4.0mm)
Ultra Biphenyl Guard Cartridge	910950212	910950210	910950222	910950220

Pinnacle® DB Biphenyl Columns (USP L11)

Physical Characteristics:

particle size: 1.9µm, 3µm, or 5µm, spherical
pore size: 140Å

carbon load: 8%
endcap: yes

pH range: 2.5 to 8
temperature limit: 80°C

Length	1.0mm ID cat. #	2.1mm ID cat. #	3.2mm ID cat. #	4.6mm ID cat. #
1.9µm Columns				
30mm		9409232		
50mm		9409252		
100mm		9409212		
3µm Columns				
30mm	9409331	9409332	9409333	9409335
50mm	9409351	9409352	9409353	9409355
100mm	9409311	9409312	9409313	9409315
150mm	9409361	9409362	9409363	9409365
5µm Columns				
30mm	9409531	9409532	9409533	9409535
50mm	9409551	9409552	9409553	9409555
100mm	9409511	9409512	9409513	9409515
150mm	9409561	9409562	9409563	9409565
200mm	9409521	9409522	9409523	9409525
250mm	9409571	9409572	9409573	9409575

Pinnacle® DB Biphenyl Guard Cartridges

Guard Cartridges	3-pk. (10 x 2.1mm)	3-pk. (10 x 4.0mm)	2-pk. (20 x 2.1mm)	2-pk. (20 x 4.0mm)
Pinnacle DB Biphenyl Guard Cartridge	940950212	940950210	940950222	940950220



for more information visit www.restek.com/biphenyl

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