Antibacterial Activity of *Ginkgo biloba* Extracts against *Clavibacter michiganensis* subsp. michiganensis, *Pseudomonas* spp., and *Xanthomonas vesicatoria*

Eva Sánchez-Hernández [1,*], Vicente González-García [2], Ana Palacio-Bielsa [2], Belén Lorenzo-Vidal [3], Laura Buzón-Durán [1], Jesús Martín-Gil [1] and Pablo Martín-Ramos [1]

[1] Department of Agricultural and Forestry Engineering, ETSIIAA, Universidad de Valladolid, Avda. Madrid 44, 34004 Palencia, Spain
[2] Department of Agricultural, Forest and Environmental Systems, Agrifood Research and Technology Centre of Aragón, Instituto Agroalimentario de Aragón—IA2 (CITA-Universidad de Zaragoza), Avda. Montañana 930, 50059 Zaragoza, Spain
[3] Servicio de Microbiología, Hospital Universitario Rio Hortega, Calle Dulzaina 2, 47012 Valladolid, Spain
* Correspondence: eva.sanchez.hernandez@uva.es

SUPPORTING INFORMATION

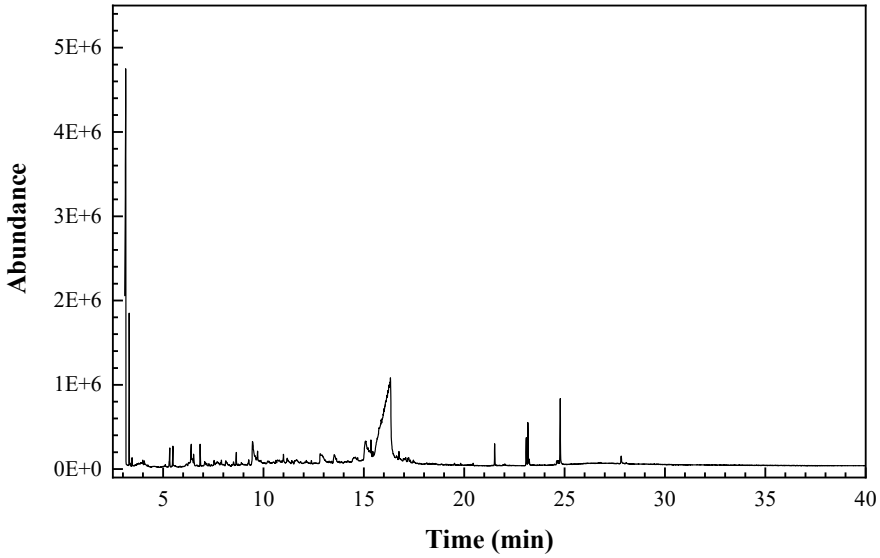

Figure S1. GC–MS chromatogram of *G. biloba* leaf hydromethanolic extract.

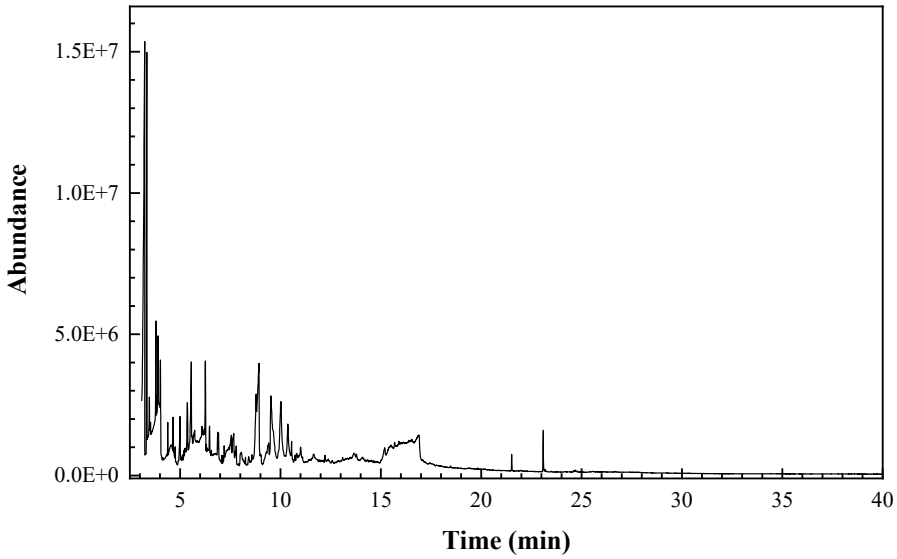

Figure S2. GC–MS chromatogram of *G. biloba* sarcotesta hydromethanolic extract.

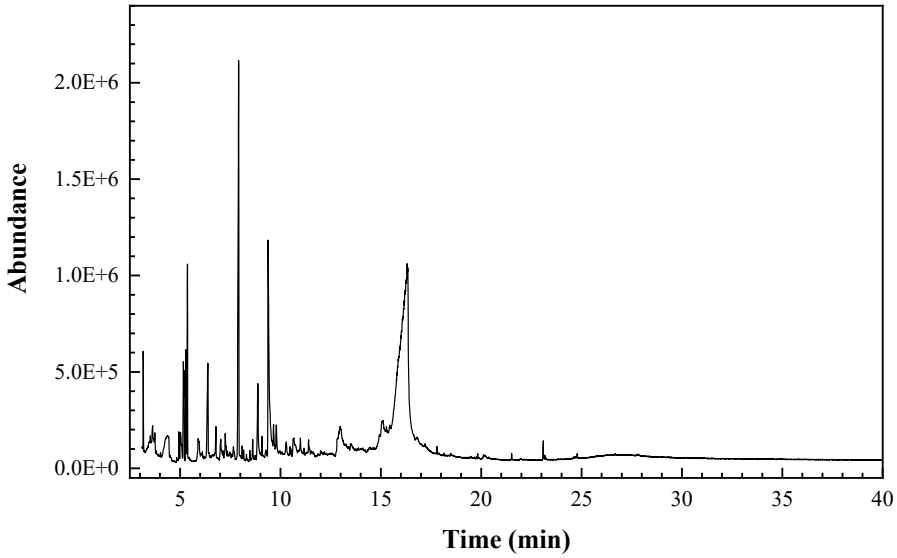

Figure S3. GC–MS chromatogram of *G. biloba* sclerotesta hydromethanolic extract.

Table S1. Constituents of *G. biloba* leaf hydromethanolic extract.

RT (min)	Area (%)	Assignment	Qual
3.1403	16.196	Acetic acid	91
3.3124	2.376	2-Propanone, 1-hydroxy-	72
3.4608	0.174	Acetic acid, hydroxy-, methyl ester	90
3.7813	0.168	N-Acetylethylenediamine	17
3.8882	0.229	(3-Methyl-oxiran-2-yl)-methanol	27
3.9891	0.213	2,3-Butanediol	47
4.0721	0.289	2,3-Butanediol	47
5.1108	0.177	Oxime-, methoxy-phenyl-_	92
5.3304	0.644	Butyrolactone	87
5.4907	0.550	2-Cyclopenten-1-one, 2-hydroxy-	86
6.1495	0.130	Phenol	91
6.2801	0.321	Glycerin	72
6.3988	1.222	2-Hydroxy-gamma-butyrolactone	32
6.4641	0.437	1,2-Cyclohexanedione	64
6.5234	0.494	1,3-Cyclopentanedione	59
6.8499	0.651	3,4Dehydro-dl-proline	58

7.0813	0.242	Pyrollidine, 2,5-bis(imino)-	47
7.1288	0.088	Pantolactone	38
7.2832	0.127	2,5-Dimethyl-4-hydroxy-3(2H)-furanone	41
7.5443	0.374	2-Pyrrolidinone	58
7.6333	0.124	4-Aminopyrimidine	38
7.6986	0.400	Mequinol	70
7.8589	0.130	But-3-enyl (E)-2-methylbut-2-enoate	59
7.9063	0.231	l-Guanidinosuccinimide	47
8.1260	0.326	N-Methylallylamine	35
8.1972	0.115	Cyclohexanone, 2,3-dimethyl-	18
8.5117	0.173	Ethyldiethanolamine	46
8.6483	0.476	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-	91
8.9035	0.234	Cyclopentanone, 2-(1-methylpropyl)-	47
9.2715	0.238	4,6-Dimethyl-2-pyrimidone	41
9.4614	2.481	Catechol	97
9.5801	0.567	Catechol	95
9.6632	0.301	Catechol	70
9.7107	0.652	Benzofuran, 2,3-dihydro-	58
10.2271	0.304	2-Ethylacridine	38
10.6247	0.246	2-Propen-1-one, 1-(2-hydroxy-3-methoxy-6-methylphenyl)-	25
10.7137	0.431	4-(4-Methyl-[1,3,2]dioxaborinan-2-yloxy)-phenol	59
10.8028	0.317	4-(4-Methyl-[1,3,2]dioxaborinan-2-yloxy)-phenol	43
10.9987	0.535	2-Methoxy-4-vinylphenol	76
11.1827	0.399	2,2-Dimethyl-1-aza-spiro[2.4]heptane	14
11.4082	0.125	2-Methoxy-6-methylaniline	45
11.5863	0.186	1,3-Benzenediamine, 4-methyl-	49
11.6515	0.514	1,3-Benzenediamine, 4-methyl-	76
12.1382	0.064	N,N-Diethylaniline	45
12.3935	0.097	2-Pyridinamine, 3,6-dimethyl-	30
12.8386	0.634	1,2-Ethanediol, 1-phenyl-	25
12.9157	0.357	1,3:2,5-Dimethylene-l-rhamnitol	37
12.9395	0.511	Urea, N,N'-dibutyl-N,N'-dimethyl-	38
13.5271	0.926	D-Allose	64
13.6399	0.240	1,2-Bis(3-oxobutyl)-3,3-dimethyldiaziridine	45
14.5183	0.632	β-D-Glucopyranoside, methyl	64
14.5836	0.634	β-D-Glucopyranoside, methyl	64
14.6964	0.375	Dodecanoic acid, 1-methylethyl ester	43
15.0881	3.772	Ethanone, 1-cyclopentyl-	35
15.2127	0.966	D-Fucose	30
15.2780	0.505	α-D-glucopyranosyl-(1->3)-α-D-fructofuranosyl α-D-galactopyranoside	35
15.3136	0.422	Butanoic acid, 3-methyl-, 1-methylethyl ester	27
15.3611	1.194	1,5,5-Trimethyl-6-methylene-cyclohexene	49
15.4501	0.558	2-Azidomethyl-1,3,3-trimethyl-cyclohexene	83
15.8656	11.302	D-Fructose, 3-O-methyl-	50
15.9072	1.188	D-Fructose, 3-O-methyl-	50
15.9665	2.939	D-Fructose, 3-O-methyl-	50
16.0140	2.681	D-Fructose, 3-O-methyl-	38
16.1505	9.919	3-Hexanol, 2,4-dimethyl-	35
16.2039	3.590	3-Hexanol, 2,4-dimethyl-	38
16.2633	4.537	3-Hexanol, 2,4-dimethyl-	38
16.3226	9.749	3-Methylmannoside	43
16.7559	0.638	α-Methyl 4-O-methyl-D-mannoside	38
16.9755	0.216	(-)-R-Phenethanamine, 1-methyl-N-vanillyl-	27
17.0883	0.279	Benzenemethanamine, 4-fluoro-	18
17.1951	0.248	1,1-Diethyl-4-phenylsemicarbazide	38
17.2367	0.204	Bicyclo[2.2.1]heptane-2-carboxylic acid, methyl ester	27
17.4741	0.106	Dipropyl propylphosphonate	25
21.5220	0.658	Phenol, 3-pentadecyl-	80
23.0889	0.830	Acetic acid, 4-methylphenyl ester	52
23.1779	1.294	Acetic acid, 4-methylphenyl ester	59

23.2432	0.226	Phenol, 3-pentadecyl-	93
24.6083	0.123	Phenol, 2-methyl-	46
24.6499	0.153	Acetic acid, 4-methylphenyl ester	46
24.7033	0.138	Phenol, 3-pentadecyl-	50
24.7864	2.089	Acetic acid, 4-methylphenyl ester	43
27.8193	0.404	Cyclohexane, 1,1'-(2-methyl-1,3-propanediyl)bis-	49

The appearance of several peaks for the same compound (e.g., for catechol, 3-*O*-methyl-D-fructose, 3-2,4-dimethyl-hexanol, etc.) is tentatively ascribed to matrix-induced retention shifts.

Table S2. Constituents of *G. biloba* sarcotesta hydromethanolic extract.

RT (min)	Area (%)	Assignment	Qual
3.2353	10.223	Acetic acid	91
3.3422	3.273	2-Propanone, 1-hydroxy-	50
3.3837	0.305	Formic acid, 2-methylpropyl ester	42
3.4668	1.319	Acetic acid, hydroxy-, methyl ester	72
3.5321	0.699	Acetamide, N-(2-hydroxyethyl)-	43
3.7933	4.465	1-Hepten-4-ol	9
3.9060	3.138	Formic acid, 2-methylpropyl ester	37
3.9594	0.892	Butanoic acid	58
4.0188	1.718	Acetic acid	43
4.1434	0.171	Formic acid, propyl ester	10
4.3393	0.627	2-Furanmethanol	83
4.3868	0.460	1.2-diacetylhydrazine	40
4.5470	0.996	4-Cyclopentene-1,3-dione	38
4.5767	0.427	3(2H)-Pyridazinone	35
4.6539	0.788	2-Furanmethanol	98
4.7548	0.368	2-Propanone, 1-(acetyloxy)-	47
4.9981	0.896	Ethanamine, 2-methoxy-N-(2-methoxyethyl)-N-methyl-	40
5.0456	0.146	Acetamide, N,N'-carbonylbis-	53
5.1228	0.257	1-(2-Hydroxyethoxy)-2-(vinylthio)ethane	50
5.1880	0.255	Pentanoic acid, 3-hydroxy-4-methyl-, methyl ester	37
5.2474	0.231	1,2-Propanediol, 3-methoxy-	45
5.2652	0.239	(3-Methyl-oxiran-2-yl)-methanol	50
5.3661	1.332	1H-Imidazole, 4,5-dihydro-2-methyl-	40
5.5620	3.104	2-Cyclopenten-1-one, 2-hydroxy-	86
5.6688	0.450	Dihydroxyacetone	64
5.7282	1.275	Dihydroxyacetone	53
5.8172	0.191	Dihydroxyacetone	56
5.8469	0.661	Dihydroxyacetone	59
5.9121	0.326	Dihydroxyacetone	64
6.0309	1.026	Dihydroxyacetone	56
6.0961	1.409	Formic acid, 2-methylpropyl ester	42
6.2030	0.783	Ethyl α-d-glucopyranoside	53
6.2623	1.311	2,4-Dihydroxy-2,5-dimethyl-3(2H)-furan-3-one	64
6.3098	0.285	2-Butanone, 4-hydroxy-3-methyl-	55
6.3573	0.348	Acetic acid, ethoxy-	50
6.4048	0.179	Methyl-4-azido-4-desoxyβl-arabinopyranoside	72
6.4701	0.722	1H-1,2,4-Triazol-5-amine, 1-ethyl-	47
6.5176	0.179	Formic acid, 2-methylpropyl ester	50
6.5591	0.368	Glyceraldehyde	47
6.6600	0.292	d-Glycero-d-galacto-heptose	37
6.7075	0.169	Glyceraldehyde	53
6.7609	0.571	Glyceraldehyde	43
6.8737	0.468	3-Butyn-2-amine, 2-methyl-	50
6.9211	0.579	1,2-Cyclopentanedione, 3-methyl-	87
7.0933	0.156	Acetamide, N-(aminoiminomethyl)-	38
7.2001	0.305	Propanoic acid, ethyl ester	38
7.3069	0.465	d-Glycero-d-galacto-heptose	37
7.3366	0.142	d-Mannitol, 1,4-anhydro-	35
7.4316	0.700	5,9-Dodecadien-2-one, 6,10-dimethyl-, (E,E))-	38
7.5562	1.024	2,5-Dimethyl-4-hydroxy-3(2H)-furanone	87
7.6275	0.516	1-Hydroxy-2-pentanone	30
7.6749	0.631	2-Furanmethanol, tetrahydro-	50
7.7462	0.236	Furyl hydroxymethyl ketone	58
7.7996	0.318	2,5-Dimethyl-4-hydroxy-3(2H)-furanone	32
8.0073	0.206	N-Methoxy-1-ribofuranosyl-4-imidazolecarboxylic amide	50
8.0489	0.423	1-Propanamine, N,2-dimethyl-	50
8.1260	0.154	l-Alanine, N-(3-methyl-1-oxobutyl)-, methyl ester	50
8.4228	0.306	2-Cyclohexen-1-ol, 4-amino-5,6-dimethoxy-	50

8.5118	0.147	1-Undecene, 4-methyl-	38
8.5831	0.186	2-Methyl-4,5-pyrimidinediamine	37
8.7908	2.076	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-	45
8.9332	3.859	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-	91
9.0104	0.184	Benzoic acid	96
9.0401	0.171	Benzoic acid	92
9.3072	0.735	2(3H)-Furanone, dihydro-4-hydroxy-	68
9.3784	0.401	4H-Pyran-4-one, 3,5-dihydroxy-2-methyl-	64
9.4140	0.436	4H-Pyran-4-one, 3,5-dihydroxy-2-methyl-	78
9.5267	4.145	Catechol	94
10.0253	3.569	5-Hydroxymethylfurfural	91
10.2331	0.253	Butane, 1-(1-methylethoxy)-	22
10.3696	1.908	4H-Pyran-4-one, 2,6-dimethyl-	9
10.5536	0.477	Benzenethiol, o-isopropyl-,	74
10.7316	0.312	Ethanone, 1-cyclopentyl-	35
10.8028	0.474	Isobutyl-2-heptenone	12
10.9216	0.220	3-(1-Chloroethenyl)-3-methyl-1,2,4-trioxolane	10
11.0106	0.716	5H-Cyclohepta-1,4-dioxin, 2,3,4a,6,7,9a-hexahydro-, cis-	14
11.0937	0.263	E-8-Methyl-7-dodecen-1-ol acetate	27
11.2243	0.159	α-D-Glucopyranoside, methyl-2,3,4-tri-O-acetyl-6-O-heptyl-	38
11.4261	0.256	1,1-Dodecanediol, diacetate	38
11.5032	0.199	5-Aminovaleric acid	50
11.5744	0.197	Butane, 1-(1-methylethoxy)-	38
11.6575	0.799	Ethanol, 2-bromo-	25
11.8178	0.224	Formic acid, 1-methylethyl ester	35
12.0315	0.140	2-(2-Methylcyclopropyl)thiophene	43
12.1324	0.161	Pentanol, 5-amino-	27
12.2214	0.299	2-Norbornyl acetate	38
12.3816	0.255	2-Butyne, 4-acetoxy-1-(9-borabicyclo[3.3.1]non-9-yl)oxy-	32
12.5775	0.266	1,4-Diacetyl-3-acetoxymethyl-2,5-methylene-l-rhamnitol	45
12.8268	0.184	p-Menthane-1,3-diol	38
12.8802	0.195	2-Propenoic acid, 2-(acetylamino)-	11
13.0286	0.149	7-Octene-2,4-dione	11
13.0998	0.308	Ethanone, 1-(2,3,4-trihydroxyphenyl)-	38
13.2482	0.295	β-L-Lyxo-Hexopyranose, 3-(acetylamino)-2,3,6-trideoxy-, 1,4-diacetate	27
13.4322	0.217	Decane, 1-fluoro-	18
13.4797	0.240	Butanoic acid, 3-oxo-, 2-hydroxyethyl ester	22
13.6815	0.892	Benzoic acid, 3-hydroxy-	90
13.7883	0.452	Acetic acid, 2-(4-methylphenyl)-hydrazide	38
14.0554	0.349	Tetraacetyl-d-glucosamine	25
14.0969	0.190	2-[1,2-Dihydroxyethyl]-9-[β-d-ribofuranosyl]hypoxanthine	25
14.1385	0.264	Trichloroacetic acid, hexadecyl ester	20
14.2513	0.185	trans-2-Dodecenoic acid	22
14.5124	0.362	Methane, phenoxypropoxy-	25
14.6549	0.153	1,2-Cyclohexanedimethanol, 3-(acetyloxy)-1,2-dimethyl-, diacetate	14
14.8151	0.207	2H-Pyran-5-carboxylic acid, 6-methyl-2-oxo-, methyl ester	22
15.0169	0.177	Isosorbide Dinitrate	10
15.1950	1.082	Azelaic acid	87
15.4087	0.993	D-Fucose	35
15.4739	0.353	D-Fucose	27
15.5036	1.112	Galacto-heptulose	38
15.6935	0.767	D-erythro-Pentose, 2-deoxy-	27
15.7766	0.432	3-Hydroxy-N,N-dimethylpropanamide	46
15.8063	0.141	3-Deoxy-d-mannoic lactone	58
15.8657	0.453	exo-1,2-O-Ethylidene-α-d-erythrofuranose	27
15.9013	0.603	Oxirane, 2,3-dimethyl-, trans-	27
15.9547	0.236	3-Hydroxy-N,N-dimethylpropanamide	46
16.0141	0.615	3-Hydroxy-N,N-dimethylpropanamide	35
16.0556	0.277	3-Deoxy-d-mannoic lactone	53
16.1268	0.582	2R,3S-9-[1,3,4-Trihydroxy-2-butoxymethyl]guanine	49

16.1565	0.575	d-Mannitol, 1,4-anhydro-	38
16.2337	0.449	3-Deoxy-d-mannitol	49
16.3405	0.734	3-Deoxy-d-mannoic lactone	46
16.3939	0.622	Hydroperoxide, 1,4-dioxan-2-yl	47
16.4295	0.265	N,N-Dimethylvaleramide	47
16.4770	0.483	Butanoic acid, 3-chloro-	46
16.5363	0.888	2-Butenoic acid, 4-hydroxy-, methyl ester	43
16.6847	0.322	Thiophene, tetrahydro-2-methyl-	50
16.8153	1.256	α-Methyl mannofuranoside	38
16.8984	1.554	4,6-Di-O-methyl-α-d-galactose	59
17.4504	0.212	(1R,2S)-2-Acetyl-1-methylcyclobutaneacetic acid	30
21.5220	0.144	Phenol, 3-pentadecyl-	72
23.0949	0.384	Phenol, 3-pentadecyl-	59

The appearance of several peaks for the same compound (e.g., for 2,3-dihydro-3,5-dihydroxy-6-methyl-4H-pyran-4-one, dihydroxyacetone, etc.) is tentatively ascribed to matrix-induced retention shifts.

Table S3. Constituents of *G. biloba* sclerotesta hydromethanolic extract.

RT (min)	Area (%)	Assignment	Qual
3.1700	0.796	Acetic acid, hydroxy-, methyl ester	91
3.5202	1.068	n-Capric acid isopropyl ester	43
3.6330	1.316	Hexane, 1-(ethenyloxy)-	25
3.7398	0.444	Ethanol, 2-(1-methylethoxy)-	39
4.3689	2.140	2-Furanmethanol	98
4.4402	0.308	2-Furanmethanol	98
4.9387	0.429	Oxime-, methoxy-phenyl-	91
5.0278	0.787	Dihydroxyacetone	83
5.0752	0.294	1,3-Dihydroxyacetone dimer	47
5.1702	1.502	2(5H)-Furanone	80
5.1939	0.981	Butyrolactone	87
5.2830	1.486	Cyclobutane, methyl-	47
5.3661	2.437	2-Cyclopenten-1-one, 2-hydroxy-	87
5.9062	0.574	Hexanoic acid	43
5.9418	0.601	Rhamnose	64
6.3810	2.749	2-Hydroxy-gamma-butyrolactone	42
6.7846	0.868	2-Cyclopenten-1-one, 2-hydroxy-3-methyl-	94
7.0279	0.926	1,2-Pyrrolidinedicarboxylic acid, 1-(phenylmethyl) ester, (S)-	38
7.1467	0.199	L-Talose, 6-deoxy-3-C-methyl-2-O-methyl-	37
7.2535	0.983	2,5-Dimethyl-4-hydroxy-3(2H)-furanone	50
7.3663	0.181	Ethanone, 1-(1H-pyrrol-2-yl)-	55
7.6571	0.382	3,5-Octadien-2-one, (E,E)-	58
7.9242	9.470	2(3H)-Furanone, dihydro-4-hydroxy-	56
8.0963	0.289	Maltol	70
8.1675	0.177	2-Cyclopenten-1-one, 3-ethyl-2-hydroxy-	92
8.3100	0.150	[1,3]Diazepan-2,4-dione	64
8.4762	0.229	2-Propanamine, N-methyl-N-nitroso-	49
8.6186	0.430	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-	87
8.7432	0.078	1,4-Butanediol	27
8.8798	2.218	2(3H)-Furanone, dihydro-4-hydroxy-	47
9.0163	0.082	1,4-Butanediamine, N-(3-aminopropyl)-	43
9.2834	0.226	Glycyl-L-valine, N-dimethylaminomethylene-, methyl ester	53
9.3902	7.911	Catechol	96
9.6573	0.816	Methanone, dicyclopropyl-	38
9.7938	0.776	5-Hydroxymethylfurfural	86
10.2924	0.446	1,2-Benzenediol, 3-methyl-	93
10.4764	0.144	3(2H)-Furanone, dihydro-2-methyl-	35
10.5238	0.108	Ethanone, 1-(2,5-dihydroxyphenyl)-	60
10.6366	0.267	Hydroquinone	76
10.6722	0.645	Hydroquinone	70
10.7494	0.443	Resorcinol	38

10.9927	0.634	2-Methoxy-4-vinylphenol	76
11.1767	0.103	2-Pyridinamine, 3-methyl-	35
11.4023	0.138	1-Phenylthio-3-acetoxy-2-butanone	22
12.0077	0.051	2-(1-Methylcyclopropyl)thiophene	49
12.9751	2.901	1,4-Dioxane-2,6-dimethanol	37
13.0938	0.555	Urea, N,N'-dibutyl-N,N'-dimethyl-	38
13.5034	0.184	Rhamnose	38
14.9338	0.548	Polygalitol	41
14.9575	0.212	D-erythro-Pentose, 2-deoxy-	38
15.0643	1.056	3-Methylmannoside	53
15.1178	1.272	2-Hydroxyethylphosphine	38
15.2187	0.303	L-Lyxose	46
15.2840	0.777	3-Deoxy-d-mannitol	43
15.4502	0.940	2R,3S-9-[[1,3-Dihydroxy-4-fluoro-3-butoxy]methyl]guanine	43
15.8715	8.384	4,6-Di-O-methyl-α-d-galactose	58
15.8953	1.220	9,11-Octadecadiynoic acid, 8-hydroxy-, methyl ester	53
15.9368	1.912	D-Fructose, 3-O-methyl-	47
16.0021	3.037	Thiophene, tetrahydro-2-methyl-	50
16.0793	4.221	D-Fructose, 3-O-methyl-	50
16.1980	7.962	α-D-Xylofuranoside, methyl 2-O-methyl-	38
16.2633	5.252	3-Methylmannoside	43
16.3167	4.208	α-D-Xylofuranoside, methyl 2-O-methyl-	38
16.3464	6.895	α-D-Xylofuranoside, methyl 2-O-methyl-	38
17.7946	0.085	2(1H)-Naphthalenone, octahydro-4a-methyl-7-(1-methylethyl)-, (4aα,7β,8aβ)-	53
21.5220	0.092	Carbamic acid, methyl-, 3-methylphenyl ester	53
23.0889	0.259	Phenol, 3-pentadecyl-	64

The existence of several peaks for the same compound (e.g., for *α*-D-xylofuranoside, methyl 2-*O*-methyl) is tentatively ascribed to matrix-induced retention shifts.