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Electronic Supplementary Material

Offline two-dimensional liquid chromatography coupled with ion mobility-quadrupole time-of-flight mass spectrometry enabling four-dimensional separation and characterization of the multicomponents from white ginseng and red ginseng

Contents

reference compound, ginsenoside Ro; an unknown saponin **114**#) by UNIFI^{TM} that incorporates an in-house ginsenoside library.

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Asterisk equations for evaluation of orthogonality.

$t_{R,\mathrm{norm}(i)} = \frac{t_I - t_D}{t_G - t_D}$ Eq.**1**

$Sz_{-} = \sigma\{{}^{1}t_{R,\mathrm{norm}(i)} - {}^{2}t_{R,\mathrm{norm}(i)}\}$ Eq. **2**

$Sz_{+} = \sigma\{{}^{2}t_{R,\mathrm{norm}(i)} - (1 - {}^{1}t_{R,\mathrm{norm}(i)})\}$ Eq.**3**

$Sz_{1} = \sigma\{{}^{1}t_{R,\mathrm{norm}(i)} - 0.5\}$ Eq.**4**

$Sz_{2} = \sigma\{{}^{2}t_{R,\mathrm{norm}(i)} - 0.5\}$ Eq.**5**

$Z_{-} = |1 - 2.5|Sz_{-} - 0.4|\,|$ Eq.**6**

$Z_{+} = |1 - 2.5|Sz_{+} - 0.4|\,|$ Eq.**7**

$Z_{1} = 1 - |2.5 \cdot Sz_{1} \cdot \sqrt{2} - 1\,|$ Eq.**8**

$Z_{2} = 1 - |2.5 \cdot Sz_{2} \cdot \sqrt{2} - 1|$ Eq.**9**

$$A_0 = \sqrt{Z_- \cdot Z_+ \cdot Z_1 \cdot Z_2}$$ Eq. **10**

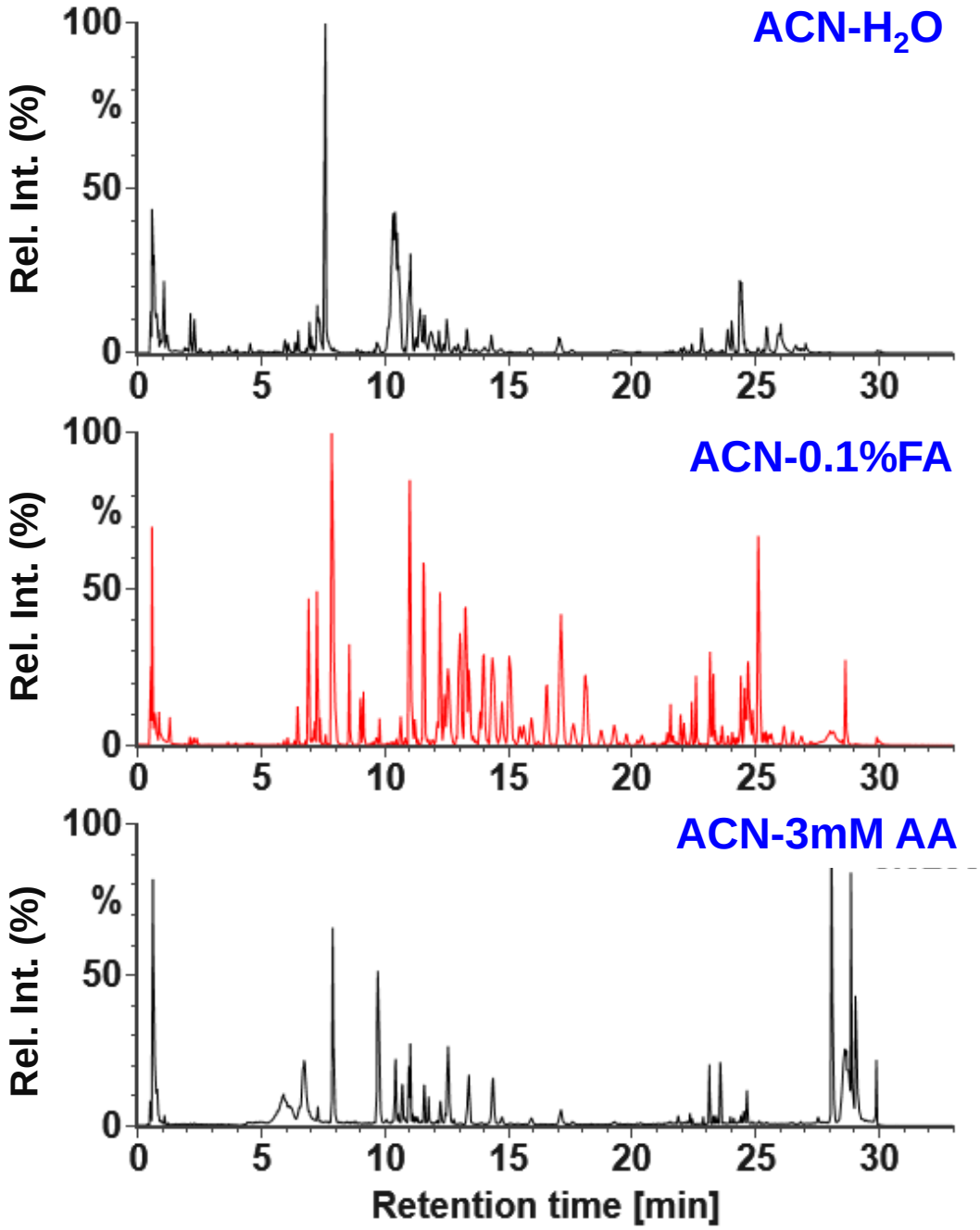

Fig. S1 Development of the offline 2D-LC system: comparison of different mobile phase in ^{2}D chromatography. Chromatographic separation was achieved on an HSS T3 column (2.1 × 100 mm, 1.8 μm). ACN: acetonitrile; FA: formic acid; AA: ammonium acetate.

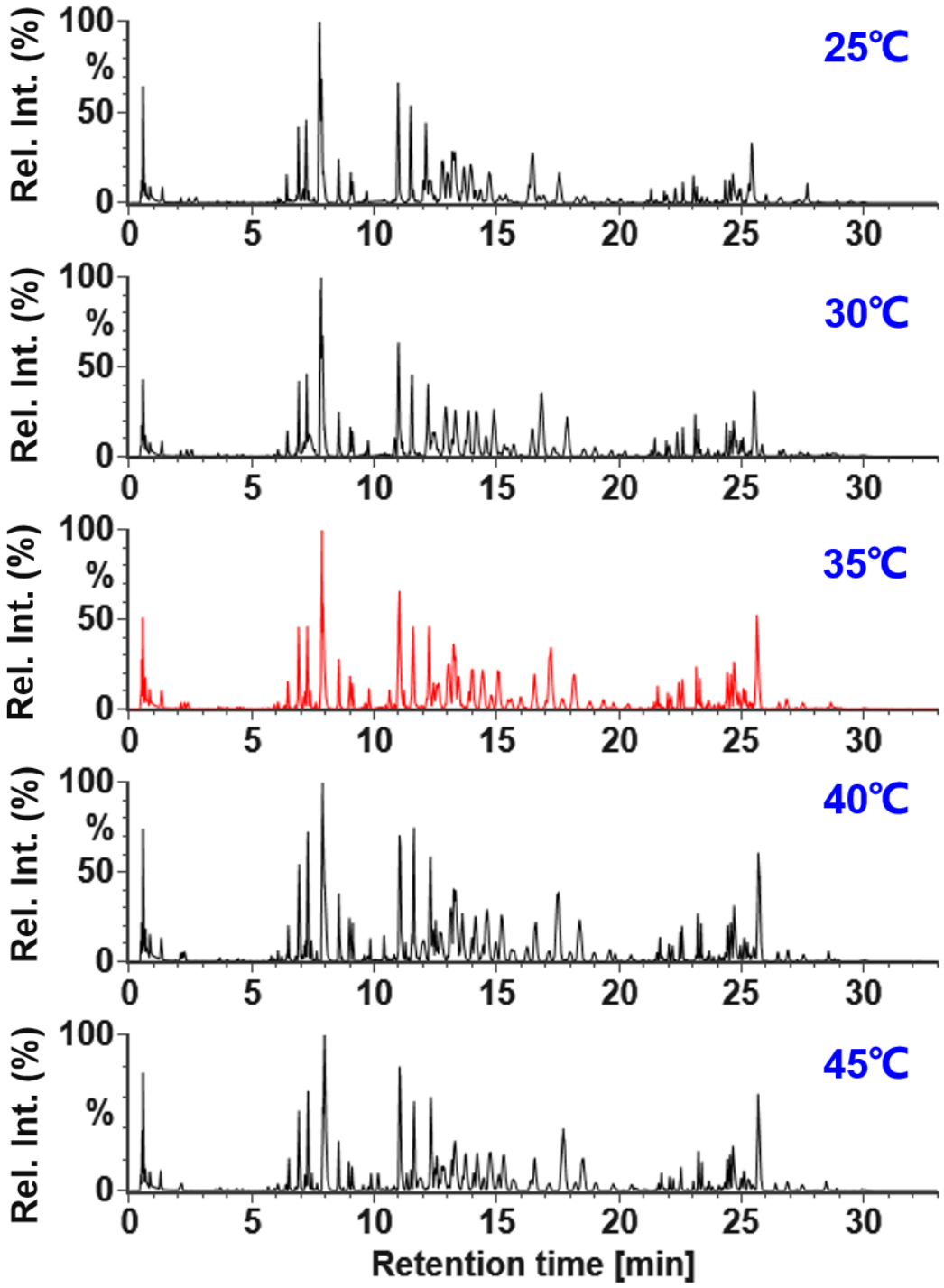

Fig. S2 Development of the offline 2D-LC system: comparison of the temperature of the HSS T3 column in ^{2}D chromatography.

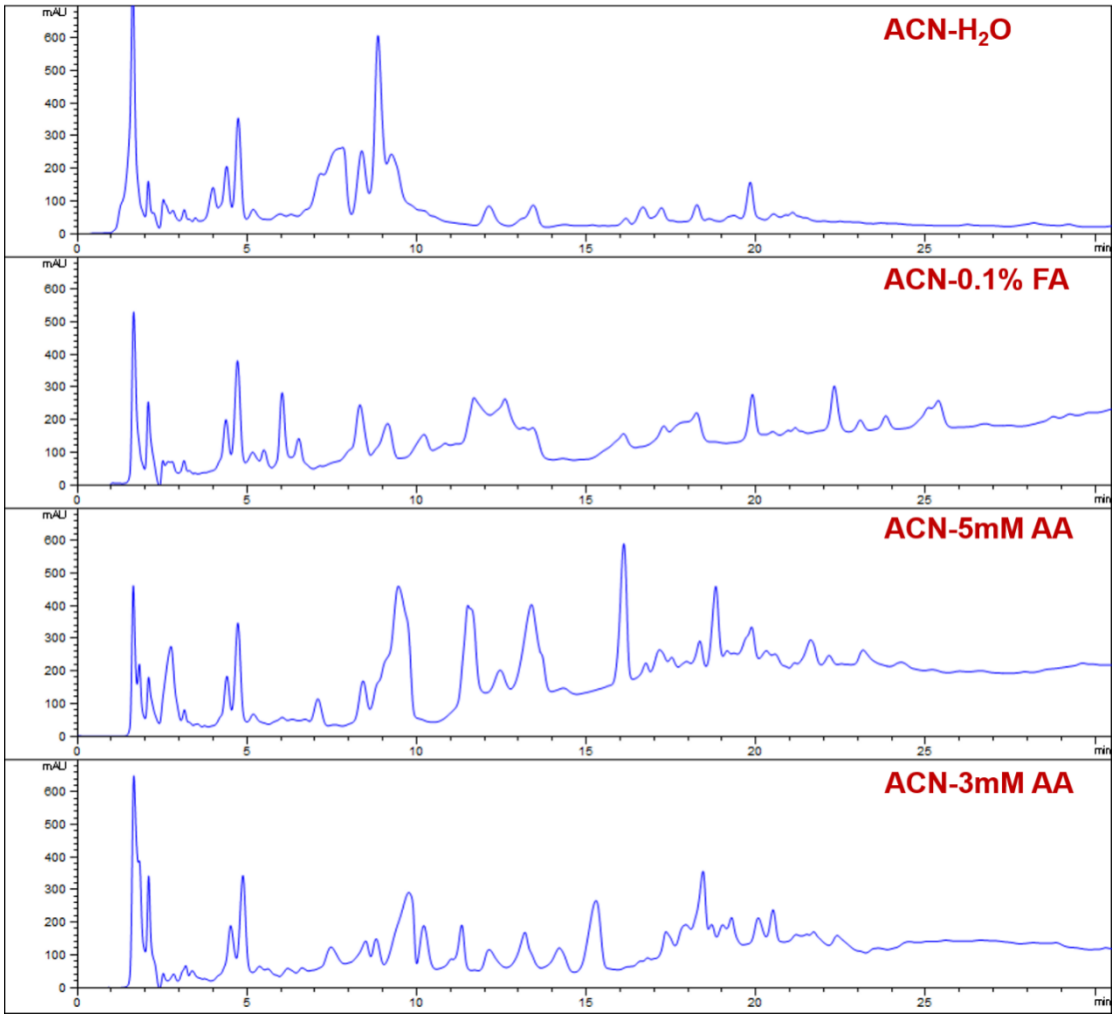

Fig. S3 Development of the offline 2D-LC system: comparison of different mobile phase on the Acchrom XAmide column in ^{1}D chromatography.

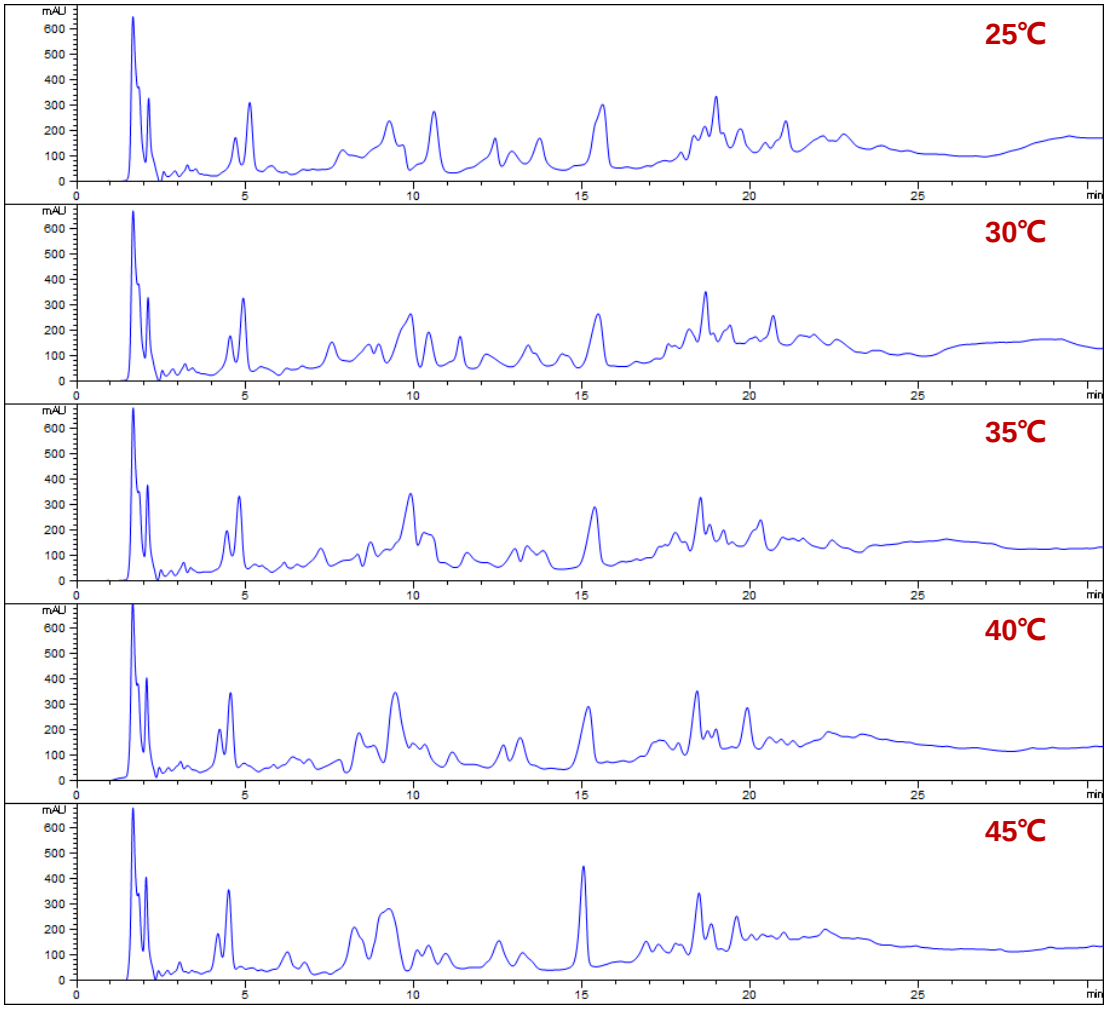

Fig. S4 Development of the offline 2D-LC system: comparison of the temperature of the Acchrom XAmide column in ^{1}D chromatography.

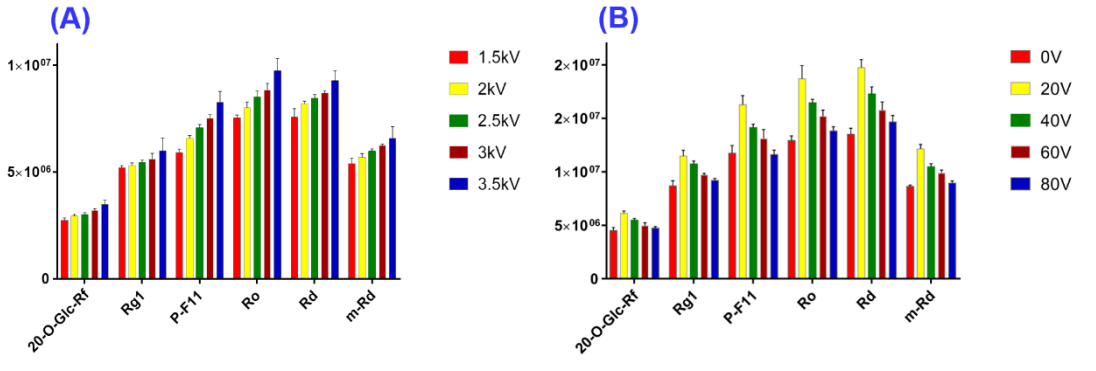

Fig. S5 Comparison of capillary voltage (**A**: 1.5–3.5 kV) and cone voltage (**B**: 0–80 V) on the ionization of six representative ginsenosides.

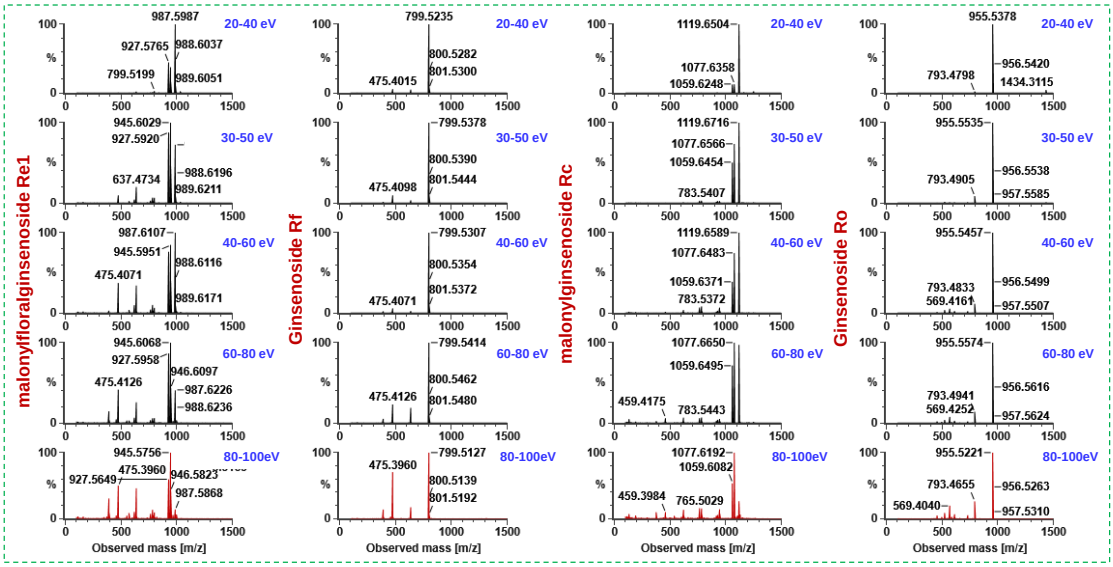

Fig. S6 Optimization of ramp collision energy of the VION IMS-QTOF mass spectrometer in the negative mode using four ginsenoside compounds.

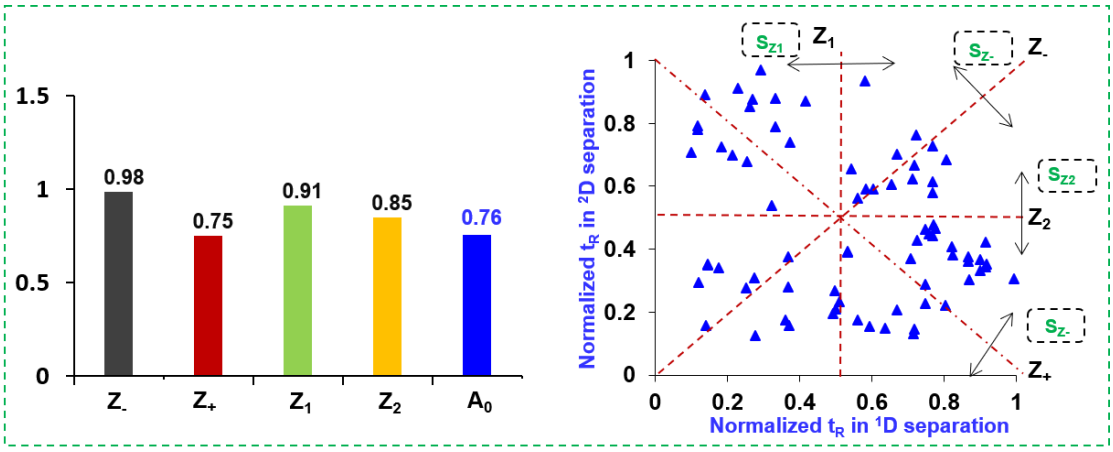

Fig. S7 Orthogonality evaluation of the developed offline 2D-LC system by asterisk equations.

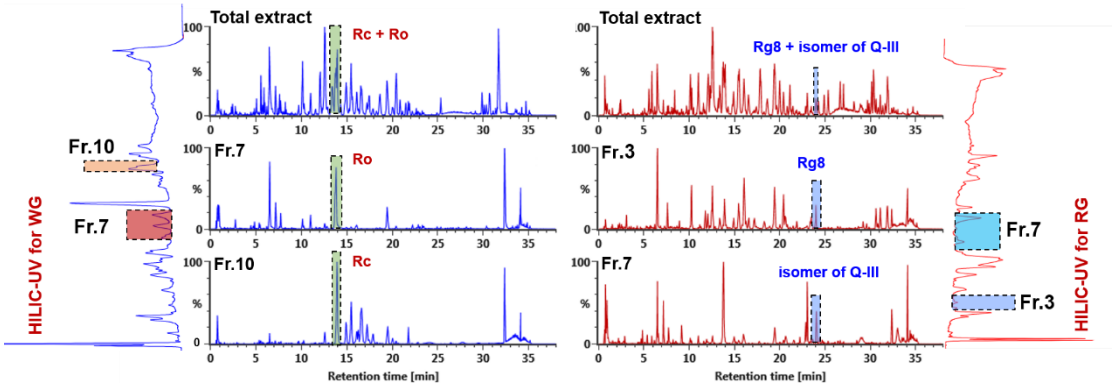

Fig. S8 Illustration for the superiority of offline 2D-LC/MS over one-dimensional UHPLC-MS with two cases. The ^{1}D HILIC could separate easily co-eluting compounds from the total extract into different fractions, thus better analysis of ginsenosides was achieved by ^{2}D RP-UHPLC-MS.

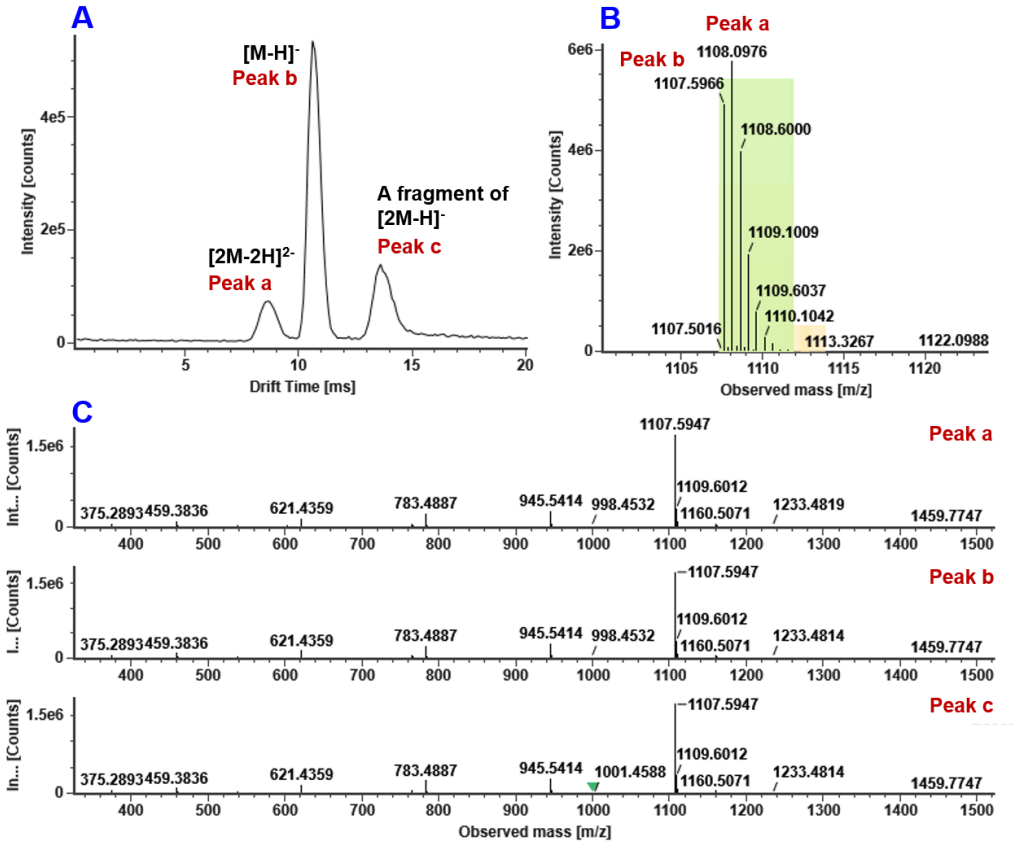

Fig. S9 The ion-mobility features of a reference compound Rb1. (**A**) the mobility trace of three ions with *m/z* 1107.5966 identified by UNIFI; (**B**) enlarged MS^1 spectrum showing the complex ion clusters containing the precursor ions $[M–H]^–$ and $[2M–2H]^{2–}$; (**C**) the MS^2 spectra of peaks a-c matched by UNIFI. Peak c was putatively characterized as a fragment of the dimeric precursor $[2M–H]^–$ with *m/z* 1107.5966.

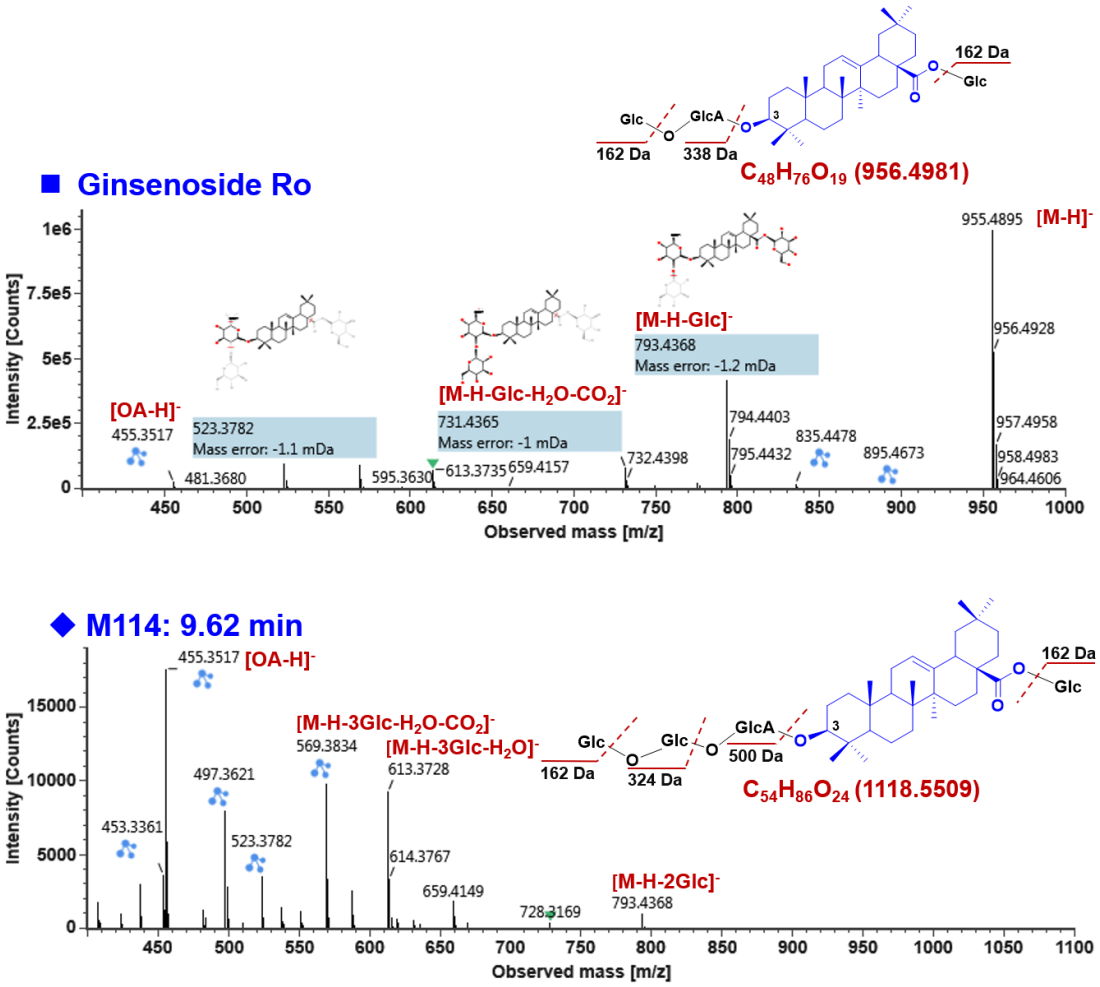

Fig. S10 Automated annotation of the MS^2 spectra of two OA-type ginsenosides (a reference compound, ginsenoside Ro; an unknown saponin **114**#) by UNIFI™ that incorporates an in-house ginsenoside library.

Table S1 Information of the chromatographic columns examined in ^{1}D and ^{2}D separation.

No	Type	Specifications / Manufacturer	Separation characteristics	PH	^{1}D or ^{2}D Separation
1	HSS T3	2.1×100 mm, 1.8 μm; Waters	It is a silica-based C18 column with triple bond bonding to reduce carbon density and enhance polar molecular retention, also compatible with 100% aqueous phase.	2–8	^{2}D
2	BEH C18	2.1×100 mm, 1.7 μm; Waters	The ethylene bridge hybrid particles are bonded to C18, which is suitable for the retention of medium or weakly polar compounds; the pH tolerance range is wide.	1–12	^{2}D
3	CORTECS C18	2.1×100 mm,1.6 μm; Waters	It is a solid particle column with reversed-phase column and HILIC column function, it can increase sample throughput with similar efficiency.	2–8	^{2}D
4	CSH C18	2.1×100 mm, 1.7 μm; Waters	On the basis of ethylene bridge hybrid particles (BEH), a small amount of charge is controlled on the surface; it is the preferred column for alkaline drug and peptide analysis; the balance of column is faster.	1–11	^{2}D
5	BEH Shield RP18	2.1×100mm, 1.7 μm; Waters	It has a C18 bonded phase embedded in a polar functional group, is compatible with 100% aqueous phase and has unique selectivity to phenolic acids, macrolides and other structures.	2–11	^{2}D
6	ZORBAX Extend C18	2.1×100 mm, 1.8 μm; Agilent	It is a bidentate C18-C18 bond column, it has higher efficiency and better peak shape than polymer-based columns; improving retention, resolution and peak shape of basic compounds, having high sensitivity when separate the peptide and proteins.	2–11.5	^{2}D
7	ZORBAX Eclipse plus C18	2.1×100 mm, 1.8 μm; Agilent	It is a silica-based C18 column with excellent peak shape for basic compound analysis.	2–9	^{2}D
8	Luna Omaga Polar C18	2.1×100 mm, 1.6 μm; Phenomenex	It is a silica-based C18 column that enhances the retention of polar and non-polar compounds, its C18 ligand	1.5–8.5	^{2}D

			provides a stable hydrophobic interaction in aqueous solution.		
9	ZORBAX SB-Aq	2.1×100 mm,1.8 µm; Agilent	It is a silica matrix C18 column embedded in a polar group octadecyl chain, suitable for difficult to separate acidic, basic and polar compounds, with a hydrophilic surface, 100% aqueous solution is stable.	1–8	^{2}D
10	ZORBAX SB-C18	2.1×100 mm,1.8 µm; Agilent	It has an octadecyl chain with a polar group embedded in it. It is suitable for acidic, basic and polar compounds that are difficult to separate. It has a hydrophilic surface, is stable for 100% aqueous solution.	1–8	^{2}D
11	XCharge C18	4.6×150 mm, 5 µm; Acchrom	It uses a surface electrostatically controlled bonding technique to introduce a positive charge on the surface of the reverse-phase bonded silica and improves the peak shape and separation selectivity of the basic compound.	1–9	^{1}D
12	Kinetex Biphhenyl	2.1×100 mm, 1.7 µm; Phenomenex	It is a phenyl shell core column that is stable in 100% aqueous solution and provides excellent reverse hydrophobic retention and polar selectivity for aromatic.	1.5–8.5	^{1}D
13	Xbridge Amide	4.6×150 mm, 3.5 µm; Waters	It is an ethylene bridge hybrid particle triple bond amide column and used for hydrophilic interaction chromatography.	2–11	^{1}D
14	HSS Cyano	2.1×100 mm, 1.8 µm; Waters	It is a high-strength silica gel with a sterically hindered single-bonded propyl cyanide column, also can be used for both reverse phase separation and normal phase separation.	2–8	^{1}D
15	XAmide	4.6×150 mm, 5 µm; Acchrom	It is a neutral amido column for hydrophilic interaction chromatography, retaining highly polar analytes.	1–9	^{1}D
16	CSH Phenyl-Hexyl	2.1×100 mm, 1.7 µm; Waters	It is a phenylhexyl column with a surface-charged hybrid matrix that has unique selectivity for aromatic compounds, especially for aromatic or amine-based aromatic compounds.	1–11	^{1}D

Table S2 Parameter settings for UNIFI used for data processing and characterization of ginsenosides from white ginseng (WG) and red ginseng (RG).

Parameters	Detailed settings
Find 4D Peaks	High energy Intensity threshold: 5.0 counts
	Low energy Intensity threshold: 1000.0 counts
Target by Mass	Target match tolerance: 10.0 ppm
	√ Screen on all isotopes in a candidate
	√ Generate predicted fragments from structure
	Fragment match tolerance: 10.0 ppm
	√ Look for in-source fragments
Adducts	Negative adducts: $+CH_3COO$, +Cl, +HCOO, -H, +e
Lock Mass	Combine width: 3 scans
	Mass Window: 0.5 m/z
	Reference Mass: 554.2620
	Reference Charge: -1

Table S3 Information of 323 compounds identified from white ginseng and red ginseng.

No.	Observed m/z	Formula	Observed t_R (min)	Mass error (ppm)	Observed CCS (Å²)	Adducts	ESI-MS²	Identification	From WG	From RG
1	1025.5556[b]	$C_{48}H_{84}O_{20}$	1.96	1.8	323.45	+HCOO,-H	979.5498,665.2304,509.3837,403.3110,391.2826	Vinaginsenoside R13 or isomer	WG-11	RG-12
2	965.4976	$C_{45}H_{76}O_{19}$	1.97	1.3	308.20	+HCOO,-H,+Cl	919.4920,433.2955,403.3203,391.2839	Floralginsenoside Kb or isomer	WG-6	RG-11
3	1039.5349	$C_{48}H_{82}O_{21}$	2.58	1.8	323.96	+HCOO,-H,+Cl	781.4332,709.3437,457.3304,391.2841	Floralginsenoside K or isomer	WG-6	RG-11
4	1007.5441	$C_{48}H_{82}O_{19}$	2.90	0.8	323.72	+HCOO,+Cl	961.5392,781.4709,707.3451,391.2840	PPT+3Glc	WG-6	RG-10
5	877.4816[b]	$C_{42}H_{72}O_{16}$	3.06	1.6	298.99/238.71	+HCOO,+Cl	866.3772,814.3452,625.2692,609.1462,501.2375,525.2676,501.2375,453.3363,391.2841	Compound I or isomer	WG-6	RG-6
6	859.4711[b]	$C_{40}H_{70}O_{15}$	3.06	1.6	291.69	+HCOO,-H	609.1463,453.3363,391.2841	Vinaginsenoside R25 or isomer	WG-6	RG-6
7	877.4815	$C_{42}H_{72}O_{16}$	3.22	1.5	300.92/236.21	+HCOO,+Cl	831.476,643.2304,445.2030,391.2844	Compound I or isomer	WG-6	RG-9
8	1023.5395	$C_{48}H_{82}O_{20}$	3.36	1.3	325.65	+HCOO,-H,+Cl	977.5339,853.3663,797.4686,765.4439,457.3310,391.2845	Floralginsenoside I or isomer	WG-6	RG-6
9	1169.5984[b]	$C_{54}H_{92}O_{24}$	4.04	2.3	335.46	+HCOO,-Cl	1123.5881,637.4297,475.3775,391.2839.	PPT+4Glc	WG-11	RG-10
10	863.5020[b]	$C_{42}H_{74}O_{15}$	4.25	1.2	293.45	+HCOO	509.3826,403.3211,391.2838	Quinquenoside L9 or isomer	WG-2	RG-6
11	1169.5975[b]	$C_{54}H_{92}O_{24}$	4.44	1.3	346.26	+HCOO,+Cl	1123.5936,943.5225,750.3642,475.3772,391.2839	PPT+4Glc	WG-11	RG-10
12	861.4862	$C_{42}H_{72}O_{15}$	4.44	1.0	288.84	+HCOO,-H, Cl	815.4808,707.3410,553.3349,463.2161,391.2837	Floralquinquenoside B or isomer	WG-7	RG-6

13	863.5016	$C_{42}H_{74}O_{15}$	4.49	0.7	287.05	+HCOO,-H, Cl	817.4957,477.3572,417.3355,373.2740	Quinquenoside L9 or isomer	WG-7	RG-7
14	861.4862	$C_{42}H_{72}O_{15}$	4.69	1.1	289.30	+HCOO, -H.	815.4790,653.4255,491.3720,391.2840	PPT-OH+2Glc	WG-7	RG-6
15	1159.5691[b]	$C_{54}H_{92}O_{24}$	4.83	1.6	347.04	+Cl,-H	1123.5914,943.5254,751.3697,751.3697, 637.4301,475.3775,391.2838	PPT+4Glc	WG-11	
16	861.4863	$C_{42}H_{72}O_{15}$	4.84	1.1	290.42	+HCOO,-H, Cl	815.4788,491.3732,391.2839,373.2735.	PPT-OH+2Glc	WG-7	RG-6
17	1039.5349[b]	$C_{48}H_{82}O_{21}$	4.86	1.7	329.07	+HCOO,-H, Cl	815.4778,637.4315,475.3520,391.2842	Floralginsenoside K or isomers	WG-7	RG-11
18	1315.6573[b]	$C_{60}H_{102}O_{28}$	5.08	2.5	364.22	+HCOO, -H.	1269.6519,637.4308,475.3783,391.2840	PPT+4Glc+Rha	WG-11	
19	1007.5446	$C_{48}H_{82}O_{19}$	5.07	1.4	323.82/258.96	+HCOO,-H,+Cl	961.5386,709.3592,475.3777,391.2844	Notoginsenoside-N	WG-7	RG-10
20	1123.5926[b]	$C_{54}H_{92}O_{24}$	5.12	1.8	333.37	-H,+HCOO.	1107.5923,863.4429,691.3507,637.4310, 475.3777,391.2843	Notoginsenoside A or it isomer	WG-11	
21	831.4759	$C_{41}H_{70}O_{14}$	5.15	1.3	284.70	+HCOO, -H.	785.4701,391.2843,389.2685,373.2751	Yesanchinoside R2 or isomer.	WG-6	RG-6
22	1153.6029[b]	$C_{54}H_{92}O_{23}$	5.18	1.5	337.07	+HCOO,+Cl.	1107.5964,638.4353,553.3349,475.3781, 391.2842	PPT+3Glc+Rha	WG-11	RG-11
23	1169.5983[b]	$C_{54}H_{92}O_{24}$	5.29	1.9	338.18	+HCOO,+Cl.	1123.5896,961.5350,853.4017,637.4294, 475.3785	PPT+4Glc	WG-11	
24	877.4809[b]	$C_{42}H_{72}O_{16}$	5.31	0.8	292.12	+HCOO, -H, +C	831.4753,677.4957,489.3575,391.2838	Floralginsenoside A or isomer	WG-6	RG-6
25	859.4705	$C_{42}H_{70}O_{15}$	5.31	0.9	295.77	+HCOO, -H.	743.4126,716.4742,489.3575,453.3362	Vinaginsenoside R25 or isomer	WG-6	RG-10
26	877.4815	$C_{42}H_{72}O_{16}$	5.44	1.3	291.50	+HCOO, -H, +Cl	831.4736,715.3896,657.3483,553.3370,3 91.2839,373.2736	Floralginsenoside A or isomer	WG-6	RG-6
27	977.5343	$C_{47}H_{80}O_{18}$	5.44	1.7	310.62	+HCOO, -H	931.5266,637.4310,475.3785,391.2840	PPT+2Glc+Xyl	WG-7	RG-6
28	1123.5924	$C_{53}H_{90}O_{22}$	5.48	1.8	326.42	+HCOO, -H.	1077.5816,945.5384,784.4897,637.4321,	PPT+2Glc+Rha+Xyl	WG-10	RG-10

							475.3778,391.2842.			
29	831.4752	$C_{41}H_{70}O_{14}$	5.49	0.5	286.4770	+HCOO,-H,+Cl	831.4752,491.3732,455.3523,389.2676	Notoginsenoside Rw2 or isomer	WG-11	RG-13
30	845.4911	$C_{42}H_{72}O_{14}$	5.52	0.8	285.24	+HCOO,+Cl	799.4835,637.4305,475.3784,391.2834	PPT+2Glc	WG-2	RG-1
31	1007.5456[a]	$C_{48}H_{82}O_{19}$	5.55	2.4	321.98/255.28	+HCOO, -H.	961.5364,799.4841,637.4308,475.3781,391.2842	20-*O*-glucosyl-ginsenoside Rf	WG-9	RG-6
32	1093.5815	$C_{53}H_{90}O_{23}$	5.56	1.3	330.70	-H,+HCOO.	961.5370,637.4300,475.3777,391.2838	PPT+3Glc+Xy	WG-11	RG-11
33	977.5345	$C_{47}H_{80}O_{18}$	5.69	1.9	372.74/253.18	+HCOO,-H,+Cl	931.5252,799.4849,637.4322,475.3785,373.2741	PPT+2Glc+Xyl	WG-9	RG-6
34	1007.5458[a]	$C_{48}H_{82}O_{19}$	5.74	2.5	320.78	+HCOO, -H.	961.5376,637.4322,475.3786,391.2847	Ginsenoside Re3	WG-9	RG-9
35	1153.6032	$C_{54}H_{92}O_{23}$	5.74	1.8	341.73	+HCOO,-H, Cl	1107.5963,961.5388,945.5384,799.4869,783.4891,637.4306,475.3781,391.2838	PPT+3Glc+Rha	WG-11	RG-11
36	1007.5452	$C_{48}H_{82}O_{19}$	5.77	1.9	313.99	+HCOO,-H, Cl	961.5376,783.4852,619.4176.	PPT+3Glc	WG-11	RG-11
37	903.4962[b]	$C_{44}H_{74}O_{16}$	5.80	0.3	300.25	+HCOO, -H.	815.4784,707.3449,545.2929,491.3733,371.2576	PPT-OH+2Glc+Ac	WG-8	RG-8
38	699.4330	$C_{36}H_{62}O_{10}$	5.82	0.8	260.61	+HCOO, -Cl	554.3413,493.3882	Notoginsenoside R8 or isomer	WG-11	RG-11
39	1187.6086	$C_{54}H_{94}O_{25}$	5.86	1.7	358.12	+HCOO, -H.	1141.6027,493.3879,391.2843	Quinquenoside L16 or isomer	WG-11	RG-11
40	977.534[a]	$C_{47}H_{80}O_{18}$	5.90	1.4	319.37	+HCOO,-H,+Cl	931.5251,799.4835,637.4302,475.3776,391.2838	Notoginsenoside R1	WG-8	RG-6
41	859.4709[b]	$C_{42}H_{70}O_{15}$	5.95	1.5	295.03	+HCOO, -H.	543.2778,491.3719,391.2838.	Vinaginsenoside R25 or isomer	WG-6	RG-6
42	1007.5460[a]	$C_{48}H_{82}O_{19}$	5.97	2.8	312.78	+HCOO, -H	961.5371,799.4842,637.4312,475.3781,391.2841	Ginsenoside Re2	WG-9	RG-6

43	1157.5974	$C_{53}H_{92}O_{24}$	5.99	1.2	349.94	+HCOO, -H	493.3880.399.3233,375.2893	Chikusetsusaponin FM1 or isomer	WG-11	RG-10
44	977.5335	$C_{47}H_{80}O_{18}$	6.16	0.9	382.47	+HCOO	931.5276,475.3787,391.2843	PPT+2Glc+Xyl	WG-7	RG-7
45	1153.6034[b]	$C_{54}H_{92}O_{23}$	6.17	2.0	340.26	+HCOO,-H,+Cl	1107.5974,945.5411,783.4865,637.4305, 475.3777,391.2841	PPT+3Glc+Rha	WG-11	
46	1167.5820	$C_{54}H_{90}O_{24}$	6.18	1.3	340.96	+HCOO,-H,+Cl	1121.5722,1012.4310,851.3842,689.3336,473.3633,389.2678	Quinquenoside IV or isomer	WG-11	RG-10
47	847.4307	$C_{41}H_{70}O_{15}$	6.18	0.8	286.09	+HCOO,-H,+Cl	801.4596,685.3806,553.3355,391.2836	Floralginsenoside C or isomer	WG-5	RG-13
48	1007.5455	$C_{48}H_{82}O_{19}$	6.19	2.2	314.70	+HCOO, -H	961.5365,799.4826,637.4311,475.3783.391.2842	PPT+3Glc	WG-9	RG-9
49	861.4871	$C_{42}H_{72}O_{15}$	6.20	2.0	300.99	+HCOO, -H, +Cl	815.4794,693.3335,553.3355,459.3481,392.2870	Floralquinquenoside B or isomer	WG-7	RG-7
50	1049.5556	$C_{50}H_{84}O_{20}$	6.22	-0.8	327.24	+HCOO, -H	637.4298,475.3782,391.2840	PPT+3Glc+Ac	WG-10	RG-7
51	1157.5984[b]	$C_{53}H_{92}O_{24}$	6.27	2.3	357.85	+HCOO	972.4045,861.4292,799.4941,655.4405,493.3884,375.2895	Chikusetsusaponin FM1 or isomer	WG-11	RG-13
52	1169.5975[b]	$C_{54}H_{92}O_{24}$	6.27	1.3	350.90	+HCOO, -H	1123.5880,637.4302,475.3775	PPT+4Glc	WG-11	RG-13
53	1187.6084[b]	$C_{54}H_{94}O_{25}$	6.40	1.8	357.36	+HCOO,-H, +Cl	1141.6033,799.9658,655.4418,493.3891, 375.22902	Quinquenoside L16 or isomer	WG-11	RG-12
54	991.5492[a]	$C_{48}H_{82}O_{18}$	6.49	0.9	323.77/253.95	+HCOO,-H, +Cl	945.5408,637.4310,475.3781,391.2838	Ginsenoside Re	WG-11	RG-7
55	845.4936[a]	$C_{42}H_{72}O_{14}$	6.50	1.4	294.55/239.05	+HCOO, +Cl	799.4833,637.4305,475.3778,391.2839	Ginsenoside Rg1	WG-6	RG-6
56	1025.5551[b]	$C_{48}H_{84}O_{20}$	6.57	1.3	329.87	+HCOO, -H, +Cl	979.5497,593.2775,493.3870,375.2893	Vinaginsenoside R13 or isomer	WG-10	RG-9

57	1157.5974[b]	$C_{53}H_{92}O_{24}$	6.63	1.1	352.55	+HCOO, -H	1111.5917,656.4467,493.3890	Chikusetsusaponin FM1or isomer	WG-11	RG-13
58	1049.5534[b]	$C_{50}H_{84}O_{20}$	6.77	-0.4	327.95	+HCOO, -H	1003.5498,962.5401,637.4326,475.3782, 391.2840	PPT+3Glc+Ac	WG-10	RG-11
59	1049.5535[b]	$C_{50}H_{84}O_{20}$	6.97	-0.3	327.24	+HCOO, -H	961.5359,493.3891,475.3782,391.2840	PPT+3Glc+Ac	WG-10	RG-9
60	1211.6019[b]	$C_{58}H_{96}O_{24}$	6.80	2.8	352.49	-Cl	972.4032,853.3991,799.4823,655.4418,4 93.3888,475.3779,375.2893	PPT+3Glc+Rha+Butenoyl (Ginsenoside Ra6 or isomer)	WG-11	
61	695.4385	$C_{36}H_{60}O_9$	6.93	1.3	262.06	+CH3COO,+H COO	635.4232,491.3749,389.2694	Notoginsenoside ST14 or isomer	WG-6	
62	1019.5427[b]	$C_{49}H_{82}O_{19}$	7.03	-0.6	324.88	+HCOO, -H	973.5373,931.5230,621.4023,577.2662,5 53.3385,475.3790,457.3672,437.3416,39 1.2838	PPT+2Glc+Xyl+Ac		RG-10
63	1025.5556	$C_{48}H_{48}O_{20}$	7.11	1.8	331.68	+HCOO, -H, +Cl	979.5481,799.4853,655.4390,593.2793,4 93.3890,375.2892.	Vinaginsenoside R13 or isomer	WG-10	RG-10
64	903.4983[b]	$C_{44}H_{74}O_{16}$	7.12	2.6	316.40	+HCOO, -H	857.4929,781.4733,637.4308,619.4203,4 75.3780,391.2843	PPT-OH+2Glc+Ac	WG-7	
65	665.4287	$C_{37}H_{62}O_{10}$	7.15	2.6	265.57	+HCOO,+CH3 COO	637.4308,619.4203,475.3780,391.2843	PPT+Glc+COH	WG-7	Rg-7
66	683.4382	$C_{36}H_{62}O_6$	7.15	1.0	272.65	+HCOO, -H	637.4309,475.3776,391.2838.	PPT+Glc	WG-7	RG-7
67	887.5015[a]	$C_{44}H_{74}O_{15}$	7.16	0.6	306.14	+HCOO, -H.	821.4662,637.4312,475.3789,391.2841	Notoginsenoside Rt	WG-6	RG-7
68	845.4940	$C_{42}H_{72}O_{14}$	7.16	4.3	294.01	+HCOO, -H.	637.4308619.4203,475.3780,391.2843	PPT+2Glc	WG-7	
69	1049.5544[b]	$C_{50}H_{84}O_{20}$	7.16	0.7	318.25	+HCOO, -H	799.4851,553.3334,493.3891,475.3787,3 91.28404	PPT+3Glc+Ac	WG-10	

70	1033.5580	$C_{50}H_{84}O_{19}$	7.23	-0.9	329.70	+HCOO, -H.	945.5421,637.4310,553.3372,475.3782,391.2840	PPT+Rha+2Glc+Ac	WG-9	RG-9
71	1031.5456	$C_{51}H_{84}O_{21}$	7.23	2.3	315.90	-H	919.4927,945.5444,619.4202,475.3780,391.2845	PPT+2Glc+Rha+Mal		RG-9
72	845.494	$C_{42}H_{72}O_{14}$	7.29	1.1	297.56	+HCOO, -H	799.4860,653.4245,392.2875,371.2583	Ginsenoside Rh20 or isomer		RG-3
73	965.4982[b]	$C_{45}H_{76}O_{19}$	7.27	2.0	246.79	+HCOO,-H,+Cl	757.4383,537.3420,387.3256,375.2898	Floralginsenoside Kb or isomer		RG-11
74	1065.5503	$C_{50}H_{84}O_{21}$	7.52	1.5	339.00	+HCOO	1021.5603,973.4038,853.4015,709.3602,661.4497,493.3889,375.2890	Floralginsenoside H or Floralginsenoside G or isomer	WG-10	RG-11
75	887.5017[b]	$C_{44}H_{74}O_{15}$	7.56	0.8	304.92	+HCOO, -H.	841.4970,783.4976,554.3405,457.3681,391.2844	PPT+2Glc+Ac	WG-7	RG-7
76	1139.5871	$C_{53}H_{90}O_{23}$	7.57	1.4	343.11	+HCOO,-H,+Cl	1093.5776,945.4382799.4838,637.4297,621.4004,553.3362,475.3781	PPT+3Glc+Xyl	WG-11	RG-10
77	991.5516	$C_{48}H_{82}O_{18}$	7.59	3.3	323.06	+HCOO, -H.	945.5416,927.5310,783.4888,637.4310,619.4203,475.3781,391.2840	PPT+2Glc+Rha	WG-9	
78	1031.5451[a]	$C_{51}H_{84}O_{21}$	7.59	1.8	319.52/243.27	-H	945.5417,927.5310,799.4845,783.4881,637.4310,475.3781,391.2840	Malonylfloralginsenoside Re1	WG-9	RG-7
79	1033.5591	$C_{50}H_{84}O_{19}$	7.59	0.2	334.30/243.61	+HCOO, -H.	945.5416,799.4840,553.3381,457.3678	PPT+Rha+2Glc+Ac	WG-9	RG-7
80	961.6388[b]	$C_{47}H_{80}O_{17}$	7.68	1.1	318.29	+HCOO,-H,+Cl	781.4727,637.4307,475.3778,392.2877	PPT+Glc+Xyl+Rha	WG-7	RG-7
81	683.4385	$C_{36}H_{62}O_6$	7.72	1.4	273.23	+HCOO, -H	619.4204,475.3778,355.2227	PPT+Glc	WG-7	RG-7
82	887.5015	$C_{44}H_{74}O_{15}$	7.72	0.6	307.60	+HCOO,-H,+Cl	841.4938,781.4734,637.4307,619.4203,475.3779,391.2841	PPT+2Glc+Ac	WG-7	RG-7
83	1139.5870	$C_{53}H_{90}O_{23}$	7.73	1.3	353.36	+HCOO,-H,+Cl	1093.5779,984.4368,852.3973,782.4773,691.3496,609.2726,445.1120	Yesanchinoside H or isomer	WG-11	RG-7

84	1033.5595[b]	$C_{50}H_{84}O_{19}$	7.73	0.6	332.10	+HCOO, -H.	781.4733,637.4307,619.4202,475.3780	PPT+Rha+2Glc+Ac	WG-7	RG-8
85	1005.5291	$C_{48}H_{80}O_{19}$	7.78	1.5	328.56	+HCOO,-H,+Cl	959.5243,629.3035,473.3634,439.3205,389.2684	7-OH-5-ene-PPD-Glc-Glc-Glc	WG-9	RG-7
86	1139.5876	$C_{52}H_{88}O_{21}$	7.98	1.8	359.57	+HCOO,-H	1014.4503,781.4721,691.3494,609.2728,475.3774,391.2839	Yesanchinoside H or isomes.	WG-11	RG-7
87	1169.5981[b]	$C_{54}H_{92}O_{24}$	8.00	1.8	356.01	+HCOO,+Cl,+H_3COO	1123.5892,961.5369,799.4815,477.3922,375.2879	PPT+4Glc	WG-total	RG-total
88	1139.5868	$C_{54}H_{92}O_{25}$	8.07	1.1	359.44	-H,+HCOO	984.4349,765.4431,673.3398,609.2711,537.3416,387.3247.	Notoginsenoside C or isomer	WG-9	RG-6
89	847.4752	$C_{42}H_{70}O_{14}$	8.07	0.4	316.12	+HCOO,-H	765.4421,755.4217,537.3423,391.2829	Ginsenoside SL3 or isomer		RG-13
90	1139.5876[b]	$C_{53}H_{90}O_{23}$	8.13	1.8	348.40	+HCOO,-H,+Cl	1093.5813,985.4441,609.2735,537.3408,475.3778,375.2897	PPT+3Glc+Xyl	WG-10	RG-10
91	1167.5834	$C_{54}H_{90}O_{24}$	8.20	2.6	350.04	+HCOO,-H,+Cl	1121.5731,797.4678,635.4145,455.3508,375.2890	Notoginsenoside B or isomer	WG-11	RG-6
92	961.5384[b]	$C_{47}H_{80}O_{17}$	8.22	0.7	319.33	+HCOO,-H,+Cl	915.5282,621.4007,459.3470,391.2836	PPT+Glc+Rha+Xyl	WG-7	RG-7
93	1049.5554[b]	$C_{50}H_{84}O_{20}$	8.27	1.5	328.55	+HCOO,-H	1003.5479,853.3987,553.3369,475.3778,459.3476	PPT+3Glc+Ac		RG-9
94	1155.5923	$C_{53}H_{90}O_{24}$	8.32	1.9	347.68	+HCOO,-H,+Cl	765.4446,603.3871,441.3352	Floralginsenoside Td or isomer	WG-6	RG-8
95	815.4819[a]	$C_{41}H_{70}O_{13}$	8.35	2.3	291.63,234.11	+HCOO,+Cl	637.4298,475.3758,391.2840	(20S)-sanchinoside A3	WG-5	RG-13
96	887.5025[b]	$C_{44}H_{74}O_{15}$	8.42	1.7	300.49	+HCOO,+Cl	721.3485,637.4331,619.4179,476.3827,407.3294,391.2844	PPT+2Glc+Ac	WG-8	RG-11
97	1033.5600[b]	$C_{50}H_{84}O_{19}$	8.52	1.1	329.14	+HCOO,+Cl	945.5431,637.4308,621.4000,475.3778,391.2846	PPT+2Glc+Rha+Ac		RG-7

98	1155.5834	$C_{53}H_{90}O_{24}$	8.50	2.6	357.60	+HCOO,-H,+Cl	1109.5782,765.4444,442.3394	Floralginsenoside Td or isomer	WG-6	RG-8
99	1007.5449	$C_{84}H_{82}O_{19}$	8.61	1.7	327.87	+HCOO, -H	961.5392,799.4811,673.3404,537.3416,375.2891.	PPT+3Glc	WG-9	RG-9
100	1155.5822	$C_{53}H_{90}O_{24}$	8.66	1.5	362.98	+HCOO,-H,+Cl	968.4069,765.4435,609.2729,537.3414,441.3357	floralginsenoside Td or isomer	WG-9	RG-8
101	1139.5873[b]	$C_{54}H_{92}O_{25}$	8.68	1.6	353.68	-H,+HCOO	781.4726,673.3405,475.3777,441.3365,375.2892	Notoginsenoside C or isomer	WG-7	RG-7
102	771.4184[b]	$C_{38}H_{62}O_{13}$	8.77	1.5	280.67	+HCOO,-H,+Cl	725.4121,593.3673,559.3659,455.3520,389.1834.	Notoginsenoside ST10 or isomer	WG-11	RG-11
103	1007.5449[a]	$C_{48}H_{82}O_{19}$	8.92	1.7	328.29	+HCOO,-H,+Cl	961.5379,799.4833,637.4302,475.3783,391.2848	vinaginsenoside R4	WG-6	RG-9
104	861.4865[b]	$C_{42}H_{72}O_{15}$	8.93	1.4	301.72	+HCOO,-H,+Cl	815.4786,653.4256,491.3721.415.3207,403.3222,401.3025	OT+2Glc (majonoside R1 or isomer)	WG-6	RG-6
105	1137.5723	$C_{53}H_{88}O_{23}$	8.97	2.2	343.63	+HCOO,-H,+Cl	1091.5633,765.4449,699.3924,635.4138,455.3528,387.3252	Yesanchinoside G or isomer	WG-11	RG-11
106	1139.5845	$C_{53}H_{90}O_{23}$	8.98	-1.0	354.75	+HCOO,-H,+Cl	1093.5863,1051.5294,961.5353,799.4809,779.4573,617.4056,538.3440,439.3534,391.2836	PPT+3Glc+Xyl	WG-13	RG-13
107	1049.5524[b]	$C_{50}H_{84}O_{20}$	8.99	-1.3	337.36	+HCOO, -H	1003.5498,781.781.4729,609.2725,537.3438,457.3673,375.2894	PPT+3Glc+Ac	WG-10	RG-10
108	829.4951[b]	$C_{42}H_{72}O_{13}$	9.15	-0.5	298.86	+HCOO, -H	783.4875,675.3572,475.3776,391.2835	PPT+Glc+Rha	WG-4	
109	1033.5610[b]	$C_{50}H_{84}O_{19}$	9.16	2.1	332.26	+HCOO,-H,+Cl	945.5420,783.4886,637.4312,475.3783,391.2840	PPT+2Glc+Rha+Ac	WG-7	RG-7
110	1023.5401	$C_{48}H_{82}O_{20}$	9.23	1.9	329.92	+HCOO,-H, Cl	977.5349,797.4683,765.4434,603.3893,441.3366,375.2901	Yesanchinoside B or isomer	WG-6	RG-6

111	1137.5725	$C_{53}H_{88}O_{23}$	9.39	2.3	353.14	+HCOO,-H	1091.4648,617.4027,473.2623,455.3523, 375.2895	Notoginsenoside I or Yesanchinoside G or isomer	WG-11	RG-11
112	1007.5446[b]	$C_{48}H_{82}O_{19}$	9.49	1.5	309.48	+HCOO,-H, Cl	961.5359,750.3650,475.3776,391.2840	PPT+3Glc	WG-7	RG-9
113	1371.6833[a]	$C_{64}H_{108}O_{31}$	9.50	2.3	387.94	-H,+HCOO	1239.6442,1107.5894,945.5444,783.4902 ,621.4354,459.3834,375.2887	Notoginsenoside T	WG-9	RG-7
114	1117.5452	$C_{53}H_{84}O_{22}$	9.62	1.4	347.97	-H	793.4368,613.3728,569.3834,455.3517,4 53.3361	OA+3Glc+GlcA	WG-10	RG-10
115	1065.5471[b]	$C_{50}H_{84}O_{21}$	9.65	-1.5	340.10	+HCOO, -H	797.4672,765.4428,613.3728,455.3510,4 41.3353	Floralginsenoside G or isomer	WG-6	RG-10
116	1007.5446	$C_{48}H_{82}O_{19}$	9.68	1.4	316.09	+HCOO, -H	961.5362,799.4798,475.377,391.2840	PPT+3Glc	WG-9	RG-9
117	1049.5538[b]	$C_{50}H_{84}O_{20}$	9.70	0.0	336.51	+HCOO, -H	1003.5448,783.4857,569.3837,537.3503, 475.3786,391.2845	PPT+3Glc+Ac	WG-10	RG-10
118	1417.6886	$C_{64}H_{108}O_{31}$	9.93	2.1	376.01	+HCOO,-H,+C H_3COO	1107.5962,945.5448,783.4890,621.4367, 537.3425,459.3833	PPD+4Glc+2Xyl	WG-12	RG-11
119	1315.6570	$C_{60}H_{102}O_{28}$	9.95	2.3	361.99	+HCOO,-H,+Cl	1269.6512,1108.6015,945.5448,783.4889 ,621.4367,459.3833,375.2890	PPD+5GLc	WG-11	RG-11
120	977.5347	$C_{47}H_{80}O_{18}$	10.01	2.1	311.19	+HCOO,-H,+Cl	931.5280,751.3716,475.3782,391.2842	PPT+2Glc+Xyl	WG-8	RG-9
121	845.4921[a]	$C_{42}H_{72}O_{14}$	10.12	1.7	303.68	+HCOO,-H	799.4836,637.4310,475.3781,391.2842	Ginsenoside Rf	WG-6	RG-6
122	845.4921[a]	$C_{42}H_{72}O_{14}$	10.24	2.0	297.06	+HCOO,-H	799.4840,653.4258,491.3728,415.3207,3 64.9146	(24R)-Pseudoginsenoside F11	WG-9	RG-7
123	1285.6449[a]	$C_{59}H_{100}O_{27}$	10.29	1.2	366.16	+HCOO,-H,+Cl	1239.6362,1107.59109,998.4504,701.427 3,613.3732,551.3714	Notoginsenoside R4	WG-11	RG-7

124	845.4924	$C_{42}H_{72}O_{14}$	10.49	2.3	305.83	+HCOO,-H,+Cl	799.4847,637.4315,475.3786,391.2845	PPT+2Glc	WG-6	RG-6
125	1387.6779	$C_{63}H_{106}O_{30}$	10.49	2.0	376.85	+HCOO,-H,+Cl	1341.6709,1209.6289,1077.5855,945.5392,783.4888,621.4358,459.3830,375.2893	PPD+3Glc+3Xyl	WG-6	RG-11
126	1285.6461	$C_{59}H_{100}O_{27}$	10.50	2.1	360.82	+HCOO,-H	1239.6413,1077.5876,783.4888,621.4358,459.3834,375.2890	PPD+4Glc+Xyl	WG-12	
127	1087.5362[b]	$C_{53}H_{84}O_{23}$	10.54	2.9	341.64	-H	763.4290,613.3725,569.3844,455.3519,437.3417	OA+GlurA+2Glc+Xyl	WG-10	RG-10
128	699.4337[a]	$C_{36}H_{62}O_{10}$	10.57	1.8	273.90	+HCOO	637.4316,391.2845	Pseudoginsenoside Rt5	WG-6	RG-6
129	843.4759	$C_{42}H_{70}O_{14}$	10.62	1.3	299.44	-H,+HCOO,+Cl	797.4702,455.3501,389.2680	12,23-Eproxyginsenoside Rg1or isomer	WG-5	RG-10
130	1325.6409	$C_{62}H_{102}O_{30}$	10.81	2.0	369.02	-H	945.5412,783.4893,621.4356,459.3833,375.2892	PPD+4Glc+Xyl+Mal	WG-10	RG-10
131	1269.6511	$C_{60}H_{102}O_{28}$	10.92	2.1	362.08	-H,+HCOO,+Cl	1107.5959,945.5416,837.4978,783.4895,621.4359,459.3830,375.2892	PPD+5Glc	WG-12	RG-10
132	947.5236	$C_{46}H_{78}O_{17}$	10.94	1.6	316.77	+HCOO,-H,+Cl	901.5181,475.3777	PPT+Glc+2Xyl	WG-2	RG-3
133	887.5020[b]	$C_{44}H_{74}O_{15}$	11.00	1.2	314.19	+HCOO,-H	841.4945,799.4841,637.4309,619.4201,475.3781,391.2842	PPT+2Glc+Ac	WG-7	RG-7
134	815.4811[a]	$C_{41}H_{70}O_{13}$	11.01	1.5	296.57	+HCOO,-H,+Cl	769.4755,459.3465,391.2845	Notoginsenoside R2	WG-12	RG-6
135	1285.6463[b]	$C_{59}H_{100}O_{27}$	11.17	2.2	365.05	+HCOO,-H,+Cl	1239.6405,1107.5946,946.5455,537.3423,459.3833,375.2894	PPD+4Glc+Xyl	WG-9	RG-7
136	1341.6717[b]	$C_{61}H_{102}O_{28}$	11.21	1.5	377.06	+CH3COO	1077.5847,945.5430,783.4879,621.4349	PPT+4Glc+Xyl+Ac	WG-8	RG-8
137	1137.6093	$C_{54}H_{92}O_{22}$	11.23	2.7	342.01	+HCOO,-H	1077.5869,945.5382,783.4888,621.4361,	PPD+3Glc+Rha (Gypenoside	WG-9	RG-10

							459.3833,375.2892	V or isomer)		
138	815.4805	$C_{41}H_{70}O_{13}$	11.29	0.8	296.16	+HCOO,-H,+Cl	769.4722,637.4296,475.3780	PPT+Glc+Xyl	WG-4	RG-4
139	771.4191	$C_{38}H_{62}O_{13}$	11.51	1.1	285.12	+HCOO,-H,+Cl	725.4126,657.3634,496.0512,353.2840	Notoginsenoside ST10 or isomer		RG-11
140	887.5026[b]	$C_{44}H_{74}O_{15}$	11.55	-1.9	310.02	+HCOO,-H	841.4975,799.4856,637.4315,475.3782,391.2845	PPT+2Glc+Ac	WG-6	RG-6
141	1087.5363	$C_{53}H_{84}O_{23}$	11.56	3.0	331.81/259.87/211.69	-H	793.4385,613.3739,569.3847,455.3524,437.3418	OA+GlurA+2GlurA+Xyl (Stipuleanoside R2 or isomer		RG-10
142	1105.5828[a]	$C_{54}H_{90}O_{23}$	11.58	2.5	343.31	-H,+HCOO	945.5422,837.4066,766.4820,496.0513,460.3880,383.1183	5,6-Didehydroginsenoside Rb1	WG-11	RG-10
143	989.5343	$C_{48}H_{80}O_{18}$	11.60	1.7	328.92	+HCOO,-H,+Cl	943.5296,799.4863,457.3678,391.2839	Didehydro-PPT+2Glc	WG-7	RG-7
144	887.5023[b]	$C_{44}H_{74}O_{15}$	11.61	1.5	310.48	+HCOO,-H	799.4839,637.4306,475.3780,391.2845	PPT+2Glc+Ac	WG-7	RG-7
145	1255.6359	$C_{58}H_{98}O_{26}$	11.73	2.5	352.95	+HCOO,+Cl,+CH3COO	1209.6315,1100.4875,784.3861,537.3428,375.2900	PPD+3Glc+2Xyl	WG-11	RG-10
146	1315.6557	$C_{60}H_{102}O_{28}$	11.76	2.1	385.70	+HCOO,-H	1269.6537,945.5417,621.4366,459.3834,375.2894	PPD+5Glc	WG-12	RG-11
147	815.4805[a]	$C_{41}H_{70}O_{13}$	11.78	0.8	300.01	+HCOO,+Cl	783.4876,529.2978,391.2848	(20R)-Notoginsenoside R2	WG-4	RG-7
148	1285.6463	$C_{59}H_{100}O_{27}$	11.81	2.3	359.97	+HCOO,-H,+Cl	1239.6376,1077.5868,945.5417,717.3636,621.4366,459.3834	PPD+4Glc+Xyl	WG-12	RG-10
149	955.4988[b]	$C_{48}H_{76}O_{19}$	11.92	0.8	320.19	-H,+Cl	793.4376,731.62,455.3511,543.3368	OA+2Glc+GlurA (Spinasaponin A 28-O-glucoside or isomer)	WG-7	RG-7
150	1059.5761	$C_{52}H_{86}O_{19}$	12.01	1.5	338.67	+HCOO,-H,+Cl	945.5415,783.4871,553.3364,475.3780,3	PPD+3Glc+Butenoyl	WG-7	RG-8

							91.2844			
151	829.4975[a]	$C_{42}H_{72}O_{13}$	12.06	2.4	298.80	+HCOO,+H	783.4896,637.4316,475.37855,391.2846	20S-Ginsenoside Rg2	WG-4	RG-7
152	1255.6346[a]	$C_{58}H_{98}O_{26}$	12.11	2.4	353.94	+HCOO,-H,+Cl	1209.6265,1077.5853,945.5422,783.4880,621.4368,459.3833,375.2895	Ginsenoside Ra2	WG-11	RG-6
153	857.4917	$C_{43}H_{72}O_{14}$	12.24	1.6	305.68	+HCOO,+H	811.4861,637.4321,537.3430,475.3784,391.2841	PPT+Glc+Xyl+Ac (20(S)-Sanchirhinoside A2 or isomer)	WG-6	RG-6
154	1255..6455[b]	$C_{58}H_{98}O_{26}$	12.26	2.1	357.24	+HCOO,-H,+Cl	1077.5840,783.4886,621.4361,459.3829,375.2891	PPD+3Glc+2Xyl	WG-9	RG-7
155	843.4756	$C_{42}H_{70}O_{14}$	12.32	0.9	299.44	+HCOO,+H	473.3646,459.3825	12,23-Eproxyginsenoside Rg1 or isomer	WG-5	RG-6
156	683.4380[a]	$C_{36}H_{62}O_{9}$	12.34	0.7	275.26	+HCOO,+Cl	638.2065,459.3825,387.3274	Ginsenoside Rh1	WG-11	RG-11
157	1285.6557	$C_{59}H_{100}O_{27}$	12.42	1.80	361.41	+HCOO,+H	1239.6399,731.4388,659.4171,569.3836,497.3624,455.3506,423.3249	PPD+4Glc+Xyl	WG-1	RG-7
158	815.4801[a]	$C_{41}H_{70}O_{13}$	12.47	0.3	296.94	+HCOO,+Cl,+CH_3COO	783.4888,475.3779,391.2840	Ginsenoside F3	WG-4	RG-7
159	829.4971[b]	$C_{42}H_{72}O_{13}$	12.50	1.9	303.19	+HCOO,-H,+Cl	529.2969,475.3790,391.2842	PPT+Rha+Glc	WG-6	RG-9
160	1327.6497[b]	$C_{61}H_{102}O_{28}$	12.55	-3.2	369.75	+HCOO,+H	1281.6556,1239.6366,1107.5955,945.5422,783.4887,621.4360,537.3422,459.3833,375.2895	PPD+4Glc+Xyl+Ac (Yesanchinoside J or isomer)	WG-9	RG-10
161	1325.6417	$C_{62}H_{102}O_{30}$	12.55	2.6	368.02	-H	1091.5947,765.4780,605.4045,456.3538,391.2839	PPD+4Glc+Xyl+Mal	WG-10	RG-10
162	1153.6038[a]	$C_{54}H_{92}O_{23}$	12.59	2.3	350.76	+HCOO,-H,+Cl	1107.5952,945.5423,783.4891,621.4363,459.3833,375.2892.	Ginsenoside Rb1	WG-11	RG-6

163	1255.6366[b]	$C_{58}H_{98}O_{26}$	12.63	3.0	357.65	+HCOO,+H	803.4080,783.4889,621.4370,459.3833	PPD+3Glc+2Xyl	WG-2	RG-7
164	955.4917	$C_{48}H_{76}O_{19}$	12.82	0.9	253.00	-H	794.4403,623.3015,569.3835,497.3627,455.3515,409.3462	OA+2Glc+GlurA	WG-7	RG-8
165	1297.6395[b]	$C_{60}H_{99}O_{27}$	12.88	-3.0	358.41	+HCOO, -H	1209.6278,1077.5847,945.5436,783.4894,621.4363,459.3832,375.2893	PPD+3Glc+Xyl+Xyl+Ac (Ginsenoside Ra5 or isomer)	WG-11	RG-10
166	815.4815	$C_{41}H_{70}O_{13}$	13.12	2.1	295.97	+HCOO, -H	769.4752,475.3778,391.2844	PPT+Glc+Xyl		RG-6
167	683.4380[a]	$C_{36}H_{62}O_{9}$	13.23	0.7	278.39	+HCOO, -Cl	466.0403,407.0273,353.1068	(20R)-Ginsenoside Rh1	WG-11	RG-11
168	1193.5981[a]	$C_{57}H_{94}O_{26}$	13.39	1.7	346.20	-H	1107.5946,945.5393,783.4894,621.4359,459.3832,375.2894	Malonyl-ginsenoside Rb1	WG-9	RG-6
169	1195.6088	$C_{56}H_{94}O_{24}$	13.39	-2.4	351.00	+HCOO, -H	1149.6080,1107.5946,998.4545,621.4359,537.3423,459.3832,375.2894	PPD+4Glc+Ac	WG-9	RG-6
170	871.5071[b]	$C_{44}H_{74}O_{14}$	13.42	1.2	306.55	+HCOO, -H	783.4904,459.3832,391.2842	PPD+2Glc+Ac	WG-6	RG-6
171	1087.5349[b]	$C_{53}H_{84}O_{23}$	13.74	1.7	217.89	-H	955.4885,794.4393,723.4400,570.3863,455.3512,423.3251	OA+2Glc+Xyl+GlurA (Tipuleanoside R2 or isomer)	WG-7	RG-7
172	955.4981[a]	$C_{48}H_{76}O_{19}$	13.80	1.0	249.54/321.19/198.64	-H, +Cl	793.4360,613.3727,455.3513	Ginsenoside Ro	WG-7	RG-6
173	665.4282	$C_{36}H_{60}O_{8}$	13.83	1.8	265.12	+HCOO	457.3650,391.2852	Dedihydro-PPD+Glc	WG-4	RG-5
174	725.4492[b]	$C_{38}H_{64}O_{10}$	13.83	1.4	282.90	+HCOO, -H	679.4439,619.4186,475.3784,391.2852	PPT+Glc+Ac	WG-5	RG-5
175	1123.5919[a]	$C_{53}H_{90}O_{22}$	13.91	1.31.4	343.83/267.28	+HCOO,-H,+Cl	1077.5839,945.5413,783.4879,621.4355,459.3826,375.2889	Ginsenoside Rc	WG-10	RG-6
176	991.5491	$C_{48}H_{82}O_{18}$	13.91	0.8	327.24	+HCOO, -H	945.5412,783.4880,621.4354,459.3826	PPD+3Glc	WG-10	RG-7

177	1209.6346	$C_{58}H_{98}O_{26}$	13.94	1.6	352.33	-H,+HCOO,+Cl	1209.6276,1077.5844,945.5413,783.4889,621.4359,459.3826	Ginsenoside Ra1	WG-11	RG-7
178	1193.6051[b]	$C_{57}H_{94}O_{26}$	14.08	1.5	337.44	-H	1107.6000,799.4329,637.6524	PPD+4Glc+Mal	WG-7	RG-7
179	1195.6086[b]	$C_{56}H_{94}O_{24}$	14.08	-2.6	339.82	+HCOO, -H	1149.6082,1107.6000,799.4329,637.6524	PPD+4Glc+Ac	WG-7	RG-7
180	1193.5984[b]	$C_{57}H_{94}O_{26}$	14.32	2.0	346.19/266.99	-H	1107.5965,945.5418,783.4898,621.4356,459.3833375.2897	PPD+4Glc+Mal (m-Ginsenoside Rb1 or isomer)	WG-11	RG-7
181	1387.6782	$C_{63}H_{106}O_{30}$	14.51	2.2	375.73	+HCOO,-H,+Cl	1077.5866,945.5409,783.4892,621.4363,459.3831,375.2897	PPD+3Glc+3Xyl	WG-9	RG-7
182	887.5020[b]	$C_{44}H_{74}O_{15}$	14.58	1.2	312.05	+HCOO,-H,+Cl	799.4809,613.3743,475.3783,391.2847	PPT+2Glc+Ac	WG-11	RG-11
183	1255.6348	$C_{58}H_{98}O_{26}$	14.78	1.6	351.20	+HCOO,-H,+Cl	1209.5394,1191.6166,1077.5848,945.5419,783.4884,603.4252,441.3724,375.2895	PPD+3Glc+2Xyl	WG-11	RG-13
184	1297.6388	$C_{60}H_{99}O_{27}$	14.81	-3.5	365.55	+HCOO,-H,+Cl	1209.6276,1077.5844,945.5419,783.4884,621.4361,459.3832,375.2895	PPD+3Glc+2Xyl+Ac (Ginsenoside Ra5 or isomer)	WG-11	RG-10
185	1165.5989[b]	$C_{55}H_{92}O_{23}$	14.92	-1.9	348.25/262.28	+HCOO,-H	1119.5960,945.5422,783.4892,621.4363,459.3832,375.2893	PPD+3Glc+Xyl+Ac	WG-10	RG-10
186	925.4812	$C_{47}H_{74}O_{18}$	14.95	1.0	312.36/245.48/195.32	-H,+Cl	763.4263,497.3624,455.3514,437.3412	OA+Glc+Xyl+GlurA	WG-7	RG-7
187	1163.5878[a]	$C_{56}H_{92}O_{25}$	14.93	2.0	345.13/262.12	-H	1077.5847,945.5423,783.4892,621.4363,459.3835,375.2891	m-Ginsenoside Rc	WG-9	RG-6
188	1193.5982[b]	$C_{57}H_{94}O_{26}$	15.00	1.8	360.22	-H	1107.5951,945.5420,705.3493,459.3831,375.2893	PPD+4Glc+Mal	WG-10	RG-10

189	785.4700	$C_{40}H_{68}O_{12}$	15.20	1.0	286.97	+HCOO,-H	739.4645,391.2848	PPT+2Xyl	WG-3	RG-3
190	1209.6293	$C_{58}H_{98}O_{26}$	15.32	1.6	354.77	-H,+HCOO,+Cl	1047.5754,945.5421,843.4099,621.4356, 459.3833,375.2894	PPD+3Glc+2Xyl	WG-11	RG-13
191	1123.5925[a]	$C_{53}H_{90}O_{22}$	15.48	1.7	354.84	+HCOO,-H	1077.5844,945.5413,783.4892,621.4355, 459.3838,375.2892	Ginsenoside Rb2	WG-10	RG-6
192	725.4496	$C_{38}H_{64}O_{10}$	15.55	2.0	285.75	+HCOO,-H	475.3778	PPT+Glc+Ac (6'-acetyl Ginsenoside F1or isomer)	WG-3	RG-5
193	1195.6094[b]	$C_{56}H_{94}O_{24}$	15.60	-1.9	357.96	-H,+HCOO,+Cl	1149.6053,987.5559,783.4886,621.4358, 459.3831,375.2893	PPD+4Glc+Ac	WG-11	RG-8
194	1193.6033	$C_{57}H_{94}O_{26}$	15.60	1.5	359.30/296.93	-H	1107.5952,945.5418,783.4886,621.4358, 459.3831,375.2893	PPD+4Glc+Mal	WG-11	RG-8
195	1165.5995[b]	$C_{55}H_{92}O_{23}$	15.87	-1.4	351.53	+HCOO,-H	783.4908,621.4359,519.3334,459.3833,3 75.2897	PPD+3Glc+Xyl+Ac	WG-9	RG-8
196	1195.6134[b]	$C_{56}H_{94}O_{24}$	15.93	1.4	358.68	+HCOO,+Cl	1107.5950,927.5252,719.3727,459.3836	PPD+4Glc+Xyl+Ac		RG-10
197	925.4809[a]	$C_{47}H_{74}O_{18}$	15.99	0.7	313.13/246.29 /195.44	-H,+Cl	763.4263,613.3736,497.3623,455.3513,4 37.3413	Pseudoginsenoside Rt1	WG-7	RG-7
198	1123.5917[a]	$C_{53}H_{90}O_{22}$	16.09	1.0	351.36	+HCOO,-H,+Cl	1077.5838,945.5414,783.4882,621.4358, 459.3824,375.288	Ginsenoside Rb3	WG-11	RG-6
199	843.4766	$C_{42}H_{70}O_{14}$	16.15	2.2	305.61	+HCOO,-H	627.334,439.3517,391.2826	12,23-Eproxyginsenoside Rg1 or isomer	WG-11	RG-11
200	1195.6160[b]	$C_{56}H_{94}O_{24}$	16.25	-0.9	357.65	+HCOO,-H	1107.5957,945.5412,783.4870,621.4361, 459.3830,375.2893	PPD+4Glc+Ac	WG-10	RG-10
201	1193.5986	$C_{57}H_{94}O_{26}$	16.26	2.1	355.50/285.41	-H	1107.5958,1089.5844,945.5415,783.488 8,621.4366,459.3834,375.2892	PPD+4Glc+Mal (m-Ginsenoside Rb1 or isomer)	WG-10	RG-10

202	683.4380[a]	$C_{36}H_{62}O_9$	16.29	0.7	271.06	+HCOO	637.4306,475.3681,391.2841	20(S)-Ginsenoside F1		RG-6
203	1297.6402[b]	$C_{60}H_{100}O_{27}$	16.33	-2.5	364.49	+HCOO,-H	1077.5847,783.4884,621.4348,459.3833	PPD+3Glc+2Xyl+Ac	WG-9	RG-8
204	1165.6003[b]	$C_{55}H_{92}O_{23}$	16.59	-0.7	355.54	+HCOO,-H	783.4815,459.3835,375.2892	PPD+3Glc+Xyl+Ac	WG-12	RG-6
205	1163.5878[a]	$C_{56}H_{92}O_{25}$	16.62	2.0	354.48,264.96.	-H	1077.5842,945.5422,783.4891,621.4361, 459.3832,375.2896	m-Ginsenoside Rb2	WG-10	RG-6
206	1255.6356	$C_{58}H_{98}O_{26}$	16.67	2.2	358.85	+HCOO,-H,+Cl	1209.6266,1077.5853,783.48855,621.4365,460.3860	PPD+3Glc+2Xyl	WG-9	RG-7
207	925.4816	$C_{47}H_{74}O_{18}$	16.70	1.5	319.28/246.42 /200.232	-H, +Cl	745.3251,569.3838,497.3626,455.3521,437.3414	Chikusetsusaponin IV	WG-6	RG-6
208	989.5355	$C_{48}H_{80}O_{18}$	17.03	2.9	325.50	+HCOO,-H,+Cl	943.5294,673.3388,457.3694	5,6-Dedihydro-PPD+3Glc	WG-8	RG-10
209	1297.6465[b]	$C_{60}H_{100}O_{27}$	17.09	2.4	367.79	+HCOO,-H,+Cl	1251.6398,1077.5847,945.5426,783.4889,621.4366,537.3429,459.3836	PPD+3Glc+2Xyl+Ac	WG-11	RG-11
210	793.4393[b]	$C_{42}H_{66}O_{14}$	17.12	1.6	303.83	-H	455.3517	OA+Glc+GlurA		RG-9
211	1163.5873	$C_{56}H_{92}O_{25}$	17.22	1.6	349.12/266.11	-H	1077.5843,945.5419,783.4884,621.4359, 459.3830,375.2893	PPD+3Glc+Xyl+Mal (m-Ginsenoside Rb3 or isomer)	WG-10	RG-11
212	857.4915	$C_{43}H_{72}O_{14}$	17.22	1.3	304.65	+HCOO,-H,+Cl	811.4860,769.4738,619.4170,475.3780,391.2839	PPT+Glc+Xyl+Ac		RG-3
213	1251.6384[b]	$C_{60}H_{100}O_{27}$	17.39	0.4	358.13/236.30	-H,+HCOO	1077.5856,783.4884,621.4365,459.3830, 375.2894	PPD+3Glc+2Xyl+Ac	WG-11	RG-11
214	1163.5881	$C_{56}H_{92}O_{25}$	17.44	2.2	350.94/285.57	-H	1077.5857,945.5420,783.4895,621.4357, 459.3835,375.2897	PPD+3Glc+Xyl+Mal	WG-9	RG-11
215	1165.6006[b]	$C_{55}H_{92}O_{23}$	17.44	-0.4	351.92	+HCOO,-H,+Cl	1077.5857,945.5420,783.4895,621.4356,	PPD+3Glc+Xyl+Ac	WG-9	

							459.3835,375.2896			
216	1327.6557	$C_{61}H_{102}O_{28}$	17.58	1.3	370.61	+HCOO,-H,+Cl	1281.6500,1239.6394,1107.5947,945.5413621.4352,459	PPD+4Glc+Xyl+Ac	WG-11	RG-11
217	1165.6012[b]	$C_{55}H_{92}O_{23}$	17.80	0.1	355.97	+HCOO,-H,+Cl	537.3428,459.3833,375.2885	PPD+3Glc+Xyl+Ac		RG-8
218	1195.6135[b]	$C_{56}H_{94}O_{24}$	17.88	1.5	352.11	+HCOO,+Cl	1149.6085,1107.5939,945.5412,783.4894,621.4363,459.3931,375.2891	PPD+4Glc+Ac	WG-11	RG-11
219	1093.5825	$C_{52}H_{88}O_{21}$	18.00	2.3	334.89	+HCOO,-H	621.4364,459.3834	PPD+2Glc+2Xyl		RG-13
220	1163.5878[b]	$C_{56}H_{92}O_{25}$	18.30	2.0	339.96	-H	1077.5861,945.5423,783.4888,621.4359,459.3834,375.2895	PPD+3Glc+Xyl+Mal	WG-9	RG-11
221	1165.5985[b]	$C_{55}H_{92}O_{23}$	18.32	-2.2	365.41/337.27	+HCOO,-H	1119.5970,783.4848,621.4354,459.3828,375.2890	PPD+3Glc+Xyl+Ac	WG-8	RG-8
222	793.4382[a]	$C_{42}H_{66}O_{14}$	18.52	0.3	283.95/219.43 / 181.78	-H, +Cl	631.3833,455.3516	Chikusetsusaponin IVa	WG-6	RG-13
223	1029.5295[b]	$C_{51}H_{82}O_{21}$	18.57	1.8	330.69	+HCOO	943.5243,673.3392,457.3675,373.2735	Dedihydro-PPD+3Glc+Mal	WG-7	RG-8
224	793.4386	$C_{42}H_{66}O_{14}$	18.63	0.8	283.60/220.02 /182.24	-H	631.3834,455.3516,437.3409	OA+Glc+GlurA	WG-5	RG-6
225	1163.5878[b]	$C_{56}H_{92}O_{25}$	18.89	2.0	341.98	-H	1077.5853,945.5423,783.4887,621.4363,459.3829,375.2893	PPD+3Glc+Xyl+Mal	WG-9	RG-8
226	725.4487[b]	$C_{38}H_{64}O_{10}$	19.32	0.7	280.33	+HCOO, -H	679.4431,475.3768	PPT+Glc+Ac	WG-10	RG-10
227	991.5504	$C_{48}H_{82}O_{18}$	19.45	2.1	390.49	+HCOO, -H	945.5429,783.4900,621.4359,459.3834,375.2894	PPD+3Glc	WG-11	RG-6
228	1163.5868	$C_{56}H_{92}O_{25}$	19.49	1.1	361.72/285.76	-H	1077.5839,945.5407,783.4884,621.4359,459.3832,375.2888	PPD+3Glc+Xyl+Mal	WG-10	RG-11

229	1165.5987[b]	$C_{55}H_{92}O_{23}$	19.48	-2.1	360.77	+HCOO, -H	1077.5838,927.5308,765.4787,621.4356, 537.3419,459.3825,375.2891	PPD+3Glc+Xyl+Ac	WG-10	RG-10
230	991.5500[a]	$C_{48}H_{82}O_{18}$	19.45	1.7	327.83/262.56	+HCOO, -H	945.5415,783.4887,621.4354,459.3833,3 75.2893	Ginsenoside-Rd	WG-7	RG-11
231	1195.6123[b]	$C_{56}H_{94}O_{24}$	19.54	0.5	351.60	+HCOO,Cl	1107.5923,837.4094,459.3825	PPD+4Glc+Ac	WG-10	RG-10
232	1251.6391[b]	$C_{60}H_{100}O_{27}$	19.67	0.9	358.85/287.11 /236.84	-H,+HCOO,+Cl	1078.5875,784.4916,621.4358,537.3420, 459.3827	PPD+3Glc+2Xyl+Ac	WG-11	RG-11
233	725.4494[a]	$C_{38}H_{64}O_{10}$	19.87	1.84	283.10	+HCOO	603.4260	Compound II	WG-7	RG-6
234	1165.6026	$C_{55}H_{92}O_{23}$	20.03	1.3	348.02	+HCOO, -H	1077.5852,621.4353,537.3427,459.3828, 375.2892	PPD+3Glx+Xyl+Ac	WG-7	RG-7
235	1163.5877	$C_{56}H_{92}O_{25}$	20.10	1.9	348.68	-H	1077.5846,459.3830,375.2895	PPD+3Glc+Xyl+Mal	WG-9	RG-10
236	1031.5449[a]	$C_{51}H_{84}O_{21}$	20.43	1.6	335.11/258.12	-H	945.5412,783.4888,621.4357,459.3830,3 75.2892.	m-Ginsenoside Rd	WG-8	RG-8
237	1033.5569	$C_{50}H_{84}O_{19}$	20.45	-1.9	335.84	+HCOO, -H	945.5415,675.3576,537.3402,459.3837,3 75.2891	PPD+3Glc+Ac	WG-11	RG-12
238	1251.6382[b]	$C_{60}H_{100}O_{27}$	20.66	0.2	361.66	-H,+HCOO,+Cl	1209.6264,915.5365,783.4891,621.4355, 459.3833	PPD+3Glc+Xyl+Ac		RG-11
239	1297.6450	$C_{60}H_{100}O_{27}$	20.82	0.5	364.03	+HCOO, -H	1251.6360,945.5409,784.4948,717.3623, 621.4356,537.3417,459.3826,375.2891	PPD+3Glc+2Xyl+Ac	WG-10	RG-10
240	1031.5453	$C_{51}H_{84}O_{21}$	20.86	2.0	259.68	-H	945.5430,783.4895,621.4368,459.2832,3 75.2900	PPD+3Glc+Mal	WG-9	RG-9
241	1033.5592	$C_{50}H_{84}O_{19}$	20.86	0.3	337.96	+HCOO, -H	945.5432,747.3798,675.3538,537.3433,4 43.3517,375.2896	PPD+3Glc+Ac	WG-11	RG-9

242	1165.6027[b]	$C_{55}H_{92}O_{23}$	20.91	1.4	349.08	+HCOO, -H	969.4453,621.4370,459.3842,375.2898	PPD+3Glc+Xyl+Ac	WG-6	
243	1327.6567[b]	$C_{61}H_{102}O_{28}$	21.08	2.1	375.15	+HCOO,-H,+Cl	1239.6402,1077.5846,945.5432,783.4893,621.4359,459.3831	PPD+4Glc+Xyl+Ac	WG-11	RG-11
244	1165.6031	$C_{55}H_{92}O_{23}$	21.14	1.7	358.87	+HCOO, -H	1077.5947,783.4902,621.4356,459.3735,375.2891	PPD+3Glx+Xyl+Ac	WG-9	RG-9
245	1033.5569[b]	$C_{50}H_{84}O_{19}$	21.14	-2.0	339.58	+HCOO, -H	537.3425,459.3817,375.2895	PPD+3Glc+Ac	WG-2	RG-2
246	1195.6140	$C_{56}H_{94}O_{24}$	21.26	1.9	360.79	+HCOO,-H,+Cl	1107.5947,945.5431,783.4887,621.4359,537.3417,459.3835,375.2892	PPD+4Glc+Ac	WG-10	RG-10
247	1165.6031[b]	$C_{55}H_{92}O_{23}$	21.44	1.7	354.30	+HCOO, -H	1077.5861,945.5433,783.4890,621.4351,537.3420,375.2893	PPD+3Glx+Xyl+Ac		RG-9
248	1117.5450	$C_{54}H_{86}O_{24}$	21.50	1.2	334.35/255.43	-H	945.5415,927.5309,783.4892,621.4357,459.3829,375.2892	Malonylfloralginsenoside Rd6 or isomer	WG-9	RG-9
249	1033.5567[b]	$C_{50}H_{84}O_{19}$	21.60	-2.1	336.25	+HCOO, -H	945.5417,621.4347,537.3435,459.3829,375.2891	PPD+3Glc+Ac	WG-7	RG-9
250	1031.5445	$C_{51}H_{84}O_{21}$	21.60	1.2	333.26	-H	945.5417,621.4347,537.3435,459.3829	PPD+3Glc+Mal	WG-7	RG-9
251	1221.6292	$C_{58}H_{96}O_{24}$	21.77	1.5	360.71	+HCOO,-H,+Cl	1107.5957,945.5412,784.621.4348,459.3822	PPD+4Glc+Butenoyl (Ginsenoside Ra6 or isomer)	WG-10	RG-10
252	991.5501[a]	$C_{48}H_{82}O_{18}$	21.78	1.8	321.73	+HCOO,-H,+Cl	928.5363,784.4920,622.4385,459.3835,423.3245	Notoginsenoside K	WG-9	RG-10
253	1033.5599[b]	$C_{50}H_{84}O_{19}$	21.80	1.0	337.20	+HCOO,+Cl	945.5420,783.4918,621.4366,459.3835,375.2893	PPD+3Glc+Ac	WG-9	RG-7
254	1031.5449	$C_{51}H_{84}O_{21}$	21.89	1.7	334.20	-H	945.5425,783.4893,621.4361,459.3825,375.2891	PPD+3Glc+Mal	WG-8	RG-6

255	1251.6397[b]	$C_{60}H_{100}O_{27}$	21.95	1.4	358.87	-H,+HCOO,+Cl	1209.6266,1077.5858,945.5405,783.4904,621.4350,459.3829	PPD+3Glc+2Xyl+Ac		RG-11
256	827.4802	$C_{42}H_{70}O_{13}$	22.06	0.4	308.44	+HCOO,-H	781.4745,585.3789,437.3411,375.2888	Sanchirhinoside B or isomer	WG-6	RG-6
257	853.4607	$C_{43}H_{68}O_{14}$	22.08	1.8	316.93	+HCOO,-H	645.3994,537.3573,455.3525,437.3409	PPD+Glc+GlurA+CH_3 (chikusetsusaponin IVa methyl ester or isomer)	WG-6	RG-7
258	1165.6046[b]	$C_{55}H_{92}O_{23}$	22.13	3.0	355.82	+HCOO,-H,+Cl	1077.5854,945.5434,783.4920,621.4371,459.3834,375.2895	PPD+3Glc+Xyl+Ac	WG-8	RG-8
259	1031.5437	$C_{51}H_{84}O_{21}$	22.23	0.4	335.50/261.91	-H	621.4358,537.3415,459.3823	PPD+3Glc+Mal	WG-7	RG-7
260	1033.5568[b]	$C_{50}H_{84}O_{19}$	22.23	-2.0	337.56	+HCOO,-H	945.5431,783.4868,621.4358,537.3415,459.3823,375.2890	PPD+3Glc+Ac	WG-7	RG-7
261	961.5394	$C_{47}H_{80}O_{17}$	22.24	1.6	321.64	+HCOO	621.4352,459.3820,375.2885	PPD+2Glc+Xyl	WG-4	RG-7
262	1117.5457[b]	$C_{54}H_{86}O_{24}$	22.29	1.8	332.29/266.28	-H	998.45493,459.38348,375.2893	Malonyfloralginsenoside Rd6 or isomer	WG-9	RG-9
263	1277.6556	$C_{62}H_{102}O_{27}$	22.34	1.6	366.49/239.02	+HCOO,-H,+Cl	1077.5873,783.4866,459.3827,375.2887	PPD+3Glc+2Xyl+butenoyl (Ginsenoside Ra4 or isomer)	WG-11	RG-11
264	1033.5610[b]	$C_{50}H_{84}O_{19}$	22.51	2.1	333.82	+HCOO,-H,+Cl	987.5555,945.5430,537.3436,459.3834,375.2898	PPD+3Glc+Ac		RG-6
265	1117.5466[b]	$C_{54}H_{86}O_{24}$	22.56	2.7	346.27	-H	945.5408,537.3423,459.3832,375.2893	PPD+3Glc+2Mal (Malonyfloralginsenoside Rd6 or isomer)	WG-9	RG-8
266	1191.6187	$C_{57}H_{94}O_{23}$	22.66	1.6	357.08	+HCOO,-H,+Cl	1145.6078,1078.5895,946.4345,783.4843,621.4364,537.3423,459.3831,375.2897	PPD+3Glc+Xyl+Butenoyl	WG-7	RG-9
267	1165.6036[b]	$C_{55}H_{92}O_{23}$	22.82	2.1	366.96	+HCOO,-H,+Cl	1119.5927,1077.5851,945.5412,783.490	PPD+3Glc+Xyl+Ac		RG-9

							0,621.4359,459.3834,375.2892			
268	961.5388	$C_{47}H_{80}O_{17}$	22.85	1.1	319.23	+HCOO,-H	915.5311,783,4891,621.4361,537.3421,459.3830,375.2890	PPD+2Glc+Xyl	WG-7	RG-7
269	797.4700[a]	$C_{41}H_{68}O_{12}$	22.93	0.96	293.79	-H,+HCOO	751.4621,619.4206,457.3549	Ginsenoside Rg6		RG-total
270	1033.5604[b]	$C_{50}H_{84}O_{19}$	23.05	1.5	337.70	+HCOO,-H	945.5444,537.3438,459.3845,375.2895	PPD+3Glc+Ac	WG-11	RG-6
271	1221.6292[b]	$C_{58}H_{96}O_{24}$	23.17	1.8	359.58	+HCOO,-H,+Cl	1175.6238,1107.5964,717.3627,459.3829,375.2889	PPD+4Glc+Butenoyl (Ginsenoside Ra6 or isomer)	WG-9	RG-10
272	1191.6193	$C_{57}H_{94}O_{23}$	23.23	2.1	365.75	+HCOO,-H,+Cl	1145.6111,1059.5760,946.4392,783.4885,621.4365,537.34225,459.3840,375.2897	PPD+3Glc+Xyl+Butenoyl	WG-9	RG-9
273	1001.5343[b]	$C_{50}H_{82}O_{20}$	23.30	1.6	328.39	-H	915.5324,783.4890,621.4368,537.3427,459.3832,375.2893	PPD+2Glc+Xyl+Mal	WG-7	RG-10
274	1033.5600[b]	$C_{50}H_{84}O_{19}$	23.34	1.1	340.07	+HCOO,-H,+Cl	945.5420,537.3403,375.2893	PPD+3Glc+Ac		RG-6
275	1001.5341[b]	$C_{50}H_{82}O_{20}$	23.43	1.4	328.34	-H	915.5311,783.4894,621.4360,537.3408,459.3840,375.2892	PPD+2Glc+Xyl+Mal	WG-7	RG-7
276	961.5394	$C_{47}H_{80}O_{17}$	23.48	1.7	317.89	+HCOO,-H,+Cl	621.4360,537.3408,459.3841,375.2892	PPD+2Glc+Xyl	WG-7	RG-7
277	811.4857	$C_{42}H_{70}O_{12}$	23.48	0.5	269.37	+HCOO,-H,+Cl	765.4770,619.4208	5,6-Dedihydro-PPD+Glc+Rha		RG-11
278	1075.5703[b]	$C_{53}H_{88}O_{22}$	23.63	0.8	446.40	-H	1040.4664,837.4055,621.4368,537.3432,459.3830,375.2896	Chikusetsusaponin FK3 or isomer	WG-7	RG-7
279	1033.5602[b]	$C_{50}H_{84}O_{19}$	23.67	1.3	333.06	+HCOO,-H,+Cl	945.5394,537.3427,459.3834,441.3704,375.2885	PPD+3Glc+Ac		RG-6
280	1119.6188[b]	$C_{57}H_{94}O_{23}$	23.51	2.0	359.52	+HCOO,-H,+Cl	1145.6135,1077.5882,969.4466,716.3601,675.3562,537.3415,459.3833,375.2896	PPD+3Glc+Xyl+Butenoyl	WG-9	RG-9

							.			
281	1029.5289[b]	$C_{50}H_{80}O_{19}$	23.92	1.3	326.84	+HCOO,-H	983.5222,659.4146,537.3556,455.3517,437.3416	PPD+2Glc+GlurA+Ethyl ester		RG-11
282	1191.6189[b]	$C_{57}H_{94}O_{23}$	24.00	1.8	353.48	+HCOO,-H,+Cl	1077.5835,783.4873,621.4352,459.3829,375.2890	PPD+3Glc+Xyl+Butenoyl	WG-6	RG-7
283	811.4858	$C_{42}H_{70}O_{12}$	24.01	1.1	302.98	+HCOO,-H	675.3540,621.4369,443.3524	Ginsenoside Rg8 or isomer	WG-6	RG-8
284	1033.5602[b]	$C_{50}H_{84}O_{19}$	24.06	1.2	338.29	+HCOO,-H,+Cl	987.5552,783.783.4908,605.4012,537.3423,459.3843,375.2889	PPD+3Glc+Ac	WG-6	RG-6
285	1001.5343[b]	$C_{50}H_{82}O_{20}$	24.21	1.6	327.02	-H	915.5292,621.4350,537.3431,459.3830,375.2894	PPD+2Glc+Xyl+Mal	WG-7	
286	665.4275[a]	$C_{36}H_{60}O_{8}$	24.27	0.7	274.85	+HCOO,+Cl	457.3650,354.2012	Ginsenoside Rk3	WG-2	RG-2
287	1033.5599[b]	$C_{50}H_{84}O_{19}$	24.38	1.0	338.49	+HCOO,-H,+Cl	945.5421,675.3557,621.4371,459.3820,375.2889	PPD+3Glc+Ac	WG-6	RG-6
288	1191.6182[b]	$C_{57}H_{94}O_{23}$	24.54	1.2	357.08	+HCOO,-H,+Cl	1077.5826,783.4880,621.4363,537.3428,459.3822,375.2895	PPD+3Glc+Xyl+Butenoyl	WG-8	RG-9
289	975.5552	$C_{48}H_{82}O_{17}$	24.68	1.8	324.25	+HCOO,-H,+Cl	929.5488,783.4895,459.3824,375.2896	PPD+2Glc+Rha	WG-7	RG-7
290	975.5551[b]	$C_{48}H_{82}O_{17}$	24.83	1.7	323.50	+HCOO,-H,+Cl	929.5465,537.3435,375.2893.	PPD+2Glc+Rha	WG-7	RG-7
291	1059.5755	$C_{52}H_{86}O_{19}$	24.92	0.9	344.65	+HCOO,-H,+Cl	1013.5698,946.5449,537.3431,459.3831,375.2882	PPD+3Glc+Butenoyl (Quinquenoside I or isomer)	WG-6	RG-6
292	1015.5502[b]	$C_{51}H_{84}O_{20}$	25.13	1.9	328.22	-H	929.5462,605.4050,537.3437,459.3828,375.2893	PPD+2Glc+Rha+Mal	WG-7	RG-7
293	707.4379	$C_{38}H_{62}O_{9}$	25.07	0.5	280.61	+HCOO, -H	661.4331,637.4309,457.3671	Ginsenoside Rs7 or isomer		RG-3

294	1191.6180[b]	$C_{57}H_{94}O_{23}$	25.29	1.0	370.98	+HCOO, -H	1077.5817,459.3839,375.2882	PPD+3Glc+Xyl+Butenoyl	WG-8	RG-9
295	793.4386	$C_{42}H_{66}O_{14}$	25.34	0.6	302.79,	-H, +Cl	613.3728,569.3832,455.3515	OA-3-Glc-GlurA (Chikusetsusaponin IVa or isomer)	WG-6	RG-6
296	829.4967[a]	$C_{42}H_{72}O_{13}$	25.37	1.2	301,54	+HCOO	620.3841,497.3626,453.3363,437.3411	Ginsenoside F2	WG-10	RG-7
297	925.4816	$C_{47}H_{74}O_{18}$	25.72	1.5	335.76	-H	587.3963,569.3836,551.3736,455.3517	OA+GlurA+Xyl+Glc	WG-6	RG-6
298	1059.5761[b]	$C_{52}H_{86}O_{19}$	26.11	1.5	344.83	+HCOO,-H,+Cl	945.5398,621.4337,537.3439,459.3832,375.2893	PPD+3Glc+Butenoyl (Quinquenoside I or isomer)	WG-7	RG-7
299	1075.5707[b]	$C_{52}H_{86}O_{20}$	26.32	1.1	347.31	+HCOO, -H	946.5443,621.4361,537.3425,459.3825,375.2886	PPD+3Glc+2Ac		RG-6
300	1277.6925	$C_{62}H_{104}O_{24}$	26.57	2.0	370.39	+HCOO,-H,+Cl	945.5408,621.4349,459.3833,375.2888	PPD+4Glc+$CH_3(CH_2)_4CH$=CHCO (Quinquenoside II or isomer)	WG-9	RG-6
301	961.5390	$C_{47}H_{80}O_{17}$	26.64	1.3	312.50	+HCOO, -H	915.5312,783.4890,621.4364,573.3193,459.3824	PPD+2Glc+Xyl	WG-11	
302	829.4960[a]	$C_{42}H_{72}O_{13}$	26.69	0.7	300.13	+HCOO,-H,+Cl	783.4894,621.4378,459.3826,375.2898	20S-Ginsenoside Rg3	WG-11	RG-6
303	667.4424	$C_{36}H_{62}O_8$	26.69	-0.3	285.55	+HCOO	459.3826,375.2891	PPD+Glc		RG-11
304	871.5069	$C_{44}H_{74}O_{14}$	26.97	0.9	310.64	+HCOO,-H	783.4882,538.0604,375.2896	PPD+2Glc+Ac	WG-5	RG-6
305	895.5060	$C_{46}H_{74}O_{14}$	27.01	0.0	333.82	+HCOO,-H	687.4466,537.3513,455.3518,437.3413	OA+Glc+GlurA+Butyl		RG-13
306	1057.5599	$C_{52}H_{84}O_{19}$	27.01	1.0	335.82	+HCOO,-H	1011.5639,687.4466,537.3513,455.3518,437.3413	OA+2Glc+GlurA+Butyl		RG-13
307	829.4960[a]	$C_{42}H_{72}O_{13}$	27.05	0.6	296.3	+HCOO,-H	783.4870,621.4340,459.3823,375.2891	(20R)-Ginsenoside Rg3	WG-7	RG-7

308	871.5066	$C_{44}H_{74}O_{14}$	27.33	0.6	309.38	+HCOO,-H	825.4978,783.4886,621.4358,621.4358,459.3828,375.2888	PPD+2Glc+Ac	WG-7	RG-6
309	763.4279	$C_{41}H_{64}O_{13}$	27.63	0.7	305.89	-H	455.3511,397.2249	OA+GlurA+Xyl		RG-5
310	1195.6146[b]	$C_{56}H_{94}O_{24}$	27.81	2.4	355.37	+HCOO,-H	1149.6028,1108.6002,945.5423,783.4889,459.3834,375.2892	PPD+4Glc+Ac		RG-9
311	871.5063[b]	$C_{44}H_{74}O_{14}$	28.22	0.3	310.89	+HCOO,-H	783.4876,621.4336,459.3831,375.2888	PPD+2Glc+Ac	WG-6	RG-6
312	871.5065	$C_{44}H_{74}O_{14}$	29.22	0.5	312.62	+HCOO,-H,+Cl	783.3831,459.3812,375.2885	PPD+2Glc+Ac	WG-11	RG-11
313	871.5068	$C_{44}H_{74}O_{14}$	29.61	0.8	309.55	+HCOO,-H,+Cl	783.3831,459.3812,375.2885	PPD+2Glc+Ac		RG-13
314	1261.6757	$C_{65}H_{100}O_{21}$	30.19	2.5	371.68	+HCOO,-H	1215.6715,793.4381,613.3737,569.3843,455.3508	Polyacetyleneginsenoside-Ro or isomer		RG-9
315	1261.6778[b]	$C_{65}H_{100}O_{21}$	30.63	3.1	366.64	+HCOO,-H	731.4377,569.3838,455.3521	Polyacetyleneginsenoside-Ro or isomer	WG-4	RG-6
316	811.4874[a]	$C_{42}H_{70}O_{12}$	30.65	3.1	311.87	+HCOO,-H	765.4780,622.4415,537.3106,438.9777	Ginsenoside Rk1	WG-8	RG-6
317	853.4970	$C_{44}H_{72}O_{13}$	30.88	1.8	319.40	+HCOO,-H	807.4886,765.4790,603.4254,621.4368,441.3505	Ginsenoside Rs4 or Ginsenoside Rs5 or isomer	WG-6	RG-6
318	1215.6712[b]	$C_{65}H_{100}O_{21}$	30.96	2.3	384.26	-H	794.4451,587.5943,455.3517	Polyacetyleneginsenoside-Ro or isomer		RG-10
319	811.4862[a]	$C_{42}H_{70}O_{12}$	31.11	1.6	318.11	+HCOO,-H,+Cl	765.4809,475.5903,460.2649,455.3525	Ginsenoside Rg5	WG-6	RG-6
320	853.4965[b]	$C_{44}H_{72}O_{13}$	31.34	1.2	325.97	+HCOO,-H	807.4911,765.4786,603.4256,439.3560	Ginsenoside Rs4 or Ginsenoside Rs5 or isomer	WG-6	RG-6
321	853.4968	$C_{44}H_{72}O_{13}$	31.76	1.5	323.10	+HCOO,-H	765.4766,603.4330	Ginsenoside Rs4/Rs5 or isomer		RG-6
322	1099.6226	$C_{59}H_{90}O_{16}$	32.45	1.4	349.41	+HCOO,-H,+Cl	1053.6166,771.5049,613.3730,455.3512,	Baisanqisaponin C	WG-2	RG-2

							437.3405		orbaisanqisaponin A isomer		
323	853.4965	$C_{44}H_{72}O_{13}$	32.82	1.1	319.96	+HCOO,-H,+Cl	807.4911,765.3853,603.4236,439.3561	Ginsenoside Rs4/Rs5 or isomer	WG-2	RG- 2

Compound I: (20S,24S,25R)-6-O-[β-D-glucopyranosyl-(1→2)-β-D-glucopyrano-syl]-dammar-20,24-epoxy-3β,6α,12β,25,26-pentaol

Compound II: 6-O-β-D-(6'-acetyl)-glucopyranosyl-24-en-dammar-3,6,12,20S-tetraol

[a]: the saponins identified by comparing with the reference compounds.

[b]: the components identified manually based on the MS information because no matching in the in-house library (not reported).

Mal: the saponins identified with a single malonyl substituent.

Dimalonyl: the components identified with two malonyl substituents.

Ac: the components identified with an acetyl substituent.

Butenoyl: the components identified with a butenoyl substituent.