

Cultivar- and Growth-Stage-Dependent Variability of Saponins in Roots and Leaves of *Beta vulgaris* L. Characterized by Liquid Chromatography Coupled with Mass Spectrometry

by

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Supplementary Materials

Table S1. Content of saponins 1–8 in leaves of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW). **Table S2.** Content of saponins 9–16 in leaves of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW). **Table S3.** Content of saponins 17–24 in leaves of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW). **Table S4.** Content of saponins 25–32 in leaves of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW). **Table S5.** Content of saponins 1–8 in roots of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW). **Table S6.** Content of saponins 9–16 in roots of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW). **Table S7.** Content of saponins 17–24 in roots of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW). **Table S8.** Content of saponins 25–32 in roots of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW). **Table S9.** Summary of two-way ANOVA results showing the effects of cultivar, harvest date, and their interaction on individual saponins (S1–S32) and total saponin content in leaves and roots of *Beta vulgaris* L.

Table S1. Content of saponins 1–8 in leaves of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW).

Harvest date	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard
	Saponin 1				Saponin 2				Saponin 3				Saponin 4			
Jun 16	nd	nd	nd	nd	nd	3.58 ± 0.37	nd	nd	nd	nd	nd	nd	nd	5.57 ± 0.6	nd	78.96 ± 3.87
Jun 30	nd	29.50 ± 2.35	nd	nd	nd	1.62 ± 0.10	nd	nd	nd	nd	nd	30.43 ± 0.60	nd	7.92 ± 0.59	26.88 ± 1.81	574 ± 8.29
Jul 14	nd	2.91 ± 0.19	20.68 ± 0.86	nd	nd	2.17 ± 0.12	19.77 ± 1.23	22.55 ± 1.30	nd	nd	18.05 ± 0.57	72.12 ± 4.41	nd	311.65 ± 22.42	7.83 ± 0.63	105.29 ± 6.21
Jul 28	52.51 ± 1.57	55.13 ± 4.24	214.65 ± 8.48	18.92 ± 0.88	nd	1.94 ± 0.14	26.87 ± 1.67	15.24 ± 0.78	52.24 ± 1.58	8.91 ± 0.44	22.28 ± 1.67	74.29 ± 5.23	29.79 ± 1.73	194.09 ± 15	56.15 ± 3.33	684.69 ± 52.30
Aug 11	32.02 ± 1.31	177.92 ± 11.96	147.28 ± 8.57	74.91 ± 3.41	nd	2.65 ± 0.18	127.62 ± 9.59	17.53 ± 1.28	33.31 ± 1.84	15 ± 0.62	63.48 ± 3.84	118.74 ± 5.51	2.85 ± 0.17	182.15 ± 14.17	107.91 ± 4.21	1355.48 ± 68.7
Aug 25	92.27 ± 5.46	70.23 ± 3.8	55.96 ± 2.96	82.22 ± 5.15	nd	55.69 ± 3.08	20.74 ± 1.44	61.4 ± 4.11	4.66 ± 0.12	83.76 ± 6.37	37.22 ± 2.95	127.84 ± 6.54	nd	632.34 ± 42.57	66.75 ± 3.96	2775.37 ± 108.43
Sep 08	24.35 ± 1.87	5.86 ± 0.37	nd	79.38 ± 5.16	nd	6.11 ± 0.39	nd	16.63 ± 1.12	nd	8.28 ± 0.41	nd	114.18 ± 5.06	nd	68.51 ± 5.17	nd	816.93 ± 50.87

	Saponin 5				Saponin 6				Saponin 7				Saponin 8			
Jun 16	nd	nd	nd	nd	16.14 ± 0.7	nd	nd	nd	nd	nd	nd	nd	70.08 ± 2.84	44.25 ± 4.91	56.54 ± 4.91	216.02 ± 11.76
Jun 30	nd	nd	nd	nd	31.52 ± 1.38	nd	nd	26.68 ± 0.69	nd	9.44 ± 0.46	nd	28.19 ± 0.43	60.65 ± 3.62	20.06 ± 0.68	639.42 ± 43.05	1232.11 ± 4.75
Jul 14	nd	nd	nd	nd	22.52 ± 0.96	nd	53.97 ± 2.92	102.11 ± 7.24	nd	6.15 ± 0.42	29.22 ± 1.84	36.57 ± 2.20	886.82 ± 38.81	221.33 ± 16.06	438.07 ± 28.49	749.99 ± 50.65
Jul 28	nd	nd	nd	nd	98.7 ± 3.33	27.18 ± 2.11	73.55 ± 4.38	91.14 ± 6.31	36.46 ± 1.11	19.68 ± 1.50	151.18 ± 8.29	21.98 ± 1.60	971.93 ± 34.28	149.08 ± 11.59	1568.07 ± 93.20	1885.34 ± 109.08
Aug 11	nd	nd	nd	20.27 ± 1.42	38 ± 1.96	41.72 ± 1.43	432.62 ± 29.68	136.81 ± 9.63	12.73 ± 0.83	63.96 ± 3.90	90.96 ± 6.02	28.88 ± 2.18	1058.4 ± 33.20	763.87 ± 59.26	2414.15 ± 52.68	2411.84 ± 104.67
Aug 25	nd	155.19 ± 10.45	nd	33.44 ± 2.47	11.73 ± 0.9	166.46 ± 12.58	200.06 ± 9.56	173.69 ± 9.41	25.84 ± 1.18	25.57 ± 1.91	35.53 ± 2.22	57.23 ± 3.06	53.94 ± 2.40	1178.91 ± 69.41	1275.02 ± 51.55	3260.83 ± 188.19
Sep 08	nd	nd	nd	2.83 ± 0.1	nd	14.31 ± 0.78	nd	132.89 ± 6.88	nd	1.94 ± 0.14	nd	40.75 ± 3.23	28.02 ± 1.84	118.16 ± 8.62	74.19 ± 2.87	1552.36 ± 65.62

Values are mean ± standard deviation ($n=2$ – biological replicates, each in triplicate). nd – not detected.

Table S2. Content of saponins 9–16 in leaves of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW).

Harvest date	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard
	Saponin 9				Saponin 10				Saponin 11				Saponin 12			
Jun 16	nd	nd	39.9 ± 3.96	nd	nd	nd	nd	nd	9.42 ± 0.87	nd	nd	371.09 ± 20.92	nd	nd	nd	nd
Jun 30	nd	nd	141.59 ± 9.69	nd	nd	nd	nd	nd	nd	17.05 ± 0.83	78.20 ± 5.35	800.41 ± 13.02	nd	nd	nd	57.60 ± 1.61
Jul 14	24.05 ± 0.59	nd	nd	nd	nd	nd	24.75 ± 0.96	10.18 ± 0.67	886.82 ± 38.81	10.85 ± 0.72	60.95 ± 4.84	1368.73 ± 65.59	47.35 ± 2.19	nd	nd	112.59 ± 7.43
Jul 28	139.18 ± 10.69	nd	nd	nd	nd	nd	175.78 ± 9.26	5.8 ± 0.23	113.37 ± 3.93	4.74 ± 0.31	150.79 ± 10.24	633.13 ± 30.64	nd	nd	nd	25.4 ± 1.89
Aug 11	3.96 ± 0.24	nd	34.51 ± 2.00	105.31 ± 8.17	nd	128.48 ± 7.93	358.32 ± 14.85	74.86 ± 4.59	279.18 ± 8.39	49.99 ± 3.64	204.33 ± 12.30	939.57 ± 48.25	2.29 ± 0.09	nd	82.66 ± 5.07	301.69 ± 21.78
Aug 25	10.99 ± 0.48	47.81 ± 2.58	57.50 ± 1.47	94.5 ± 5.18	91.39 ± 4.43	346.27 ± 24.71	135.45 ± 6.63	370.00 ± 28.23	38.20 ± 2.92	137.4 ± 9.10	127.59 ± 7.75	1107.02 ± 64.69	nd	nd	53.20 ± 4.05	164.54 ± 6.00
Sep 08	nd	nd	13.19 ± 0.70	65.08 ± 4.73	nd	42.09 ± 3.17	nd	160.37 ± 7.66	1.77 ± 0.13	13.98 ± 0.93	nd	771.01 ± 48.94	nd	nd	nd	191.82 ± 8.22
	Saponin 13				Saponin 14				Saponin 15				Saponin 16			
Jun 16	nd	72.45 ± 8.55	26.6 ± 2.91	104.43 ± 6.28	nd	19.94 ± 2.66	nd	nd	25.36 ± 1.72	17.13 ± 2.32	37.52 ± 3.15	257.15 ± 12.53	546.87 ± 22.65	228.35 ± 26.15	36.62 ± 3.79	430.48 ± 23.33
Jun 30	nd	124.63 ± 9.25	14.92 ± 0.93	58.25 ± 0.98	nd	152.2 ± 9.18	nd	10.18 ± 0.07	60.83 ± 2.39	14.91 ± 0.68	61.76 ± 2.97	142.19 ± 4.50	238.74 ± 9.57	66.93 ± 5.01	168.66 ± 6.33	722.86 ± 7.59
Jul 14	nd	296.91 ± 20.14	44.23 ± 2.45	160.71 ± 11.93	nd	80.16 ± 5.49	46.6 ± 2.44	21.92 ± 0.86	22.52 ± 1.43	37.79 ± 2.76	82.42 ± 4.33	134.04 ± 6.53	2232.22 ± 61.56	255.32 ± 13.72	1066.55 ± 68.1	396.56 ± 21.22
Jul 28	44.77 ± 2.7	373.18 ± 29.31	104.9 ± 7.63	123 ± 6.89	nd	71.21 ± 5.25	191.23 ± 13.36	49.11 ± 3.72	171.38 ± 6.68	10.48 ± 0.58	31.08 ± 1.66	183.04 ± 13.53	437.83 ± 15.23	70.15 ± 5.45	649.96 ± 42.24	1134.78 ± 62.20
Aug 11	4.13 ± 0.11	411.71 ± 25.99	nd	33.35 ± 2.21	5.89 ± 0.21	89.24 ± 5.92	38.82 ± 2.13	16.29 ± 1.26	54.07 ± 2.22	16.44 ± 1.30	56.31 ± 2.51	201.98 ± 12.85	638 ± 29.68	727.85 ± 57.18	662.71 ± 48.34	471.08 ± 22.98
Aug 25	7.69 ± 0.12	476.68 ± 34.03	nd	270.35 ± 11.64	8.42 ± 0.22	76.08 ± 5.95	11.87 ± 0.18	83.85 ± 4.70	68.39 ± 3.54	47.81 ± 2.81	226.28 ± 15.84	108.97 ± 8.12	843.01 ± 52.03	445.55 ± 22.58	1097.57 ± 51.72	2216.03 ± 89.38
Sep 08	33.88 ± 1.63	43.34 ± 3.13	6.39 ± 0.49	204.73 ± 13.50	62.11 ± 3.31	5.07 ± 0.32	nd	67.58 ± 5.02	5.28 ± 0.28	4.57 ± 0.30	77.16 ± 3.42	112.51 ± 7.74	581.17 ± 41.73	40.33 ± 2.94	12.30 ± 0.98	1506.44 ± 97.23

Values are mean ± standard deviation ($n=2$ – biological replicates, each in triplicate). nd – not detected.

Table S3. Content of saponins 17–24 in leaves of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW).

Harvest date	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard
	Saponin 17				Saponin 18				Saponin 19				Saponin 20			
Jun 16	nd	1.22 ± 0.24	6.01 ± 1.30	nd	45.13 ± 2.47	22.49 ± 2.77	nd	6.94 ± 1.16	34.71 ± 1.66	46.23 ± 4.93	170.83 ± 13.39	90.67 ± 6.56	128.85 ± 5.97	184.71 ± 20.03	20.66 ± 2.96	430.31 ± 19.56
Jun 30	nd	2.86 ± 0.20	nd	nd	nd	nd	nd	9.56 ± 0.02	96.09 ± 4.94	81.51 ± 6.07	106.09 ± 3.57	108.02 ± 0.54	61.37 ± 2.73	371.11 ± 19.72	86.58 ± 5.38	84.96 ± 2.78
Jul 14	nd	3.41 ± 0.26	nd	nd	15.29 ± 0.6	nd	45.48 ± 2.45	20.91 ± 1.61	12.14 ± 0.69	62.87 ± 3.96	508.51 ± 38.6	301.48 ± 22.89	8.02 ± 0.51	416.9 ± 31.17	16.56 ± 1.23	55.66 ± 3.27
Jul 28	nd	nd	nd	nd	15.79 ± 1.02	nd	nd	28.68 ± 2.23	992.27 ± 48.66	145.57 ± 11.32	745.58 ± 42.41	270.61 ± 18.03	117.2 ± 4.35	144.01 ± 11.04	nd	74.03 ± 5.41
Aug 11	nd	nd	nd	nd	21.23 ± 0.96	16.47 ± 1.30	nd	17.69 ± 0.96	178.87 ± 7.70	384.51 ± 29.63	117.44 ± 6.79	124.38 ± 5.41	24.33 ± 1.88	234.53 ± 13.52	nd	188.75 ± 10.33
Aug 25	nd	nd	nd	nd	48.42 ± 2.29	15.73 ± 0.56	39.48 ± 1.62	54.27 ± 3.74	321.58 ± 22.44	183.14 ± 9.77	270.44 ± 8.56	727.03 ± 41.17	55.36 ± 2.33	101.98 ± 6.96	nd	36.40 ± 2.49
Sep 08	nd	nd	4.3 ± 0.32	nd	23.47 ± 1.51	2.47 ± 0.19	20.52 ± 1.57	31.78 ± 1.83	217.44 ± 11.57	14.99 ± 0.96	197.99 ± 14.50	244.03 ± 8.50	28 ± 1.85	8.59 ± 0.59	105.01 ± 5.84	199.18 ± 11.83
	Saponin 21				Saponin 22				Saponin 23				Saponin 24			
Jun 16	32.4 ± 1.98	nd	31.08 ± 4.33	54.7 ± 2.45	52.09 ± 2.87	955.90 ± 96.61	786.80 ± 71.16	1581.47 ± 85.99	57.04 ± 2.60	nd	24.35 ± 3.54	nd	33.99 ± 2.17	46.97 ± 4.68	364.67 ± 32.24	70.47 ± 5.19
Jun 30	89.31 ± 5.11	nd	48.59 ± 2.35	4.3 ± 0.06	37.08 ± 1.68	1307.45 ± 75.10	310.07 ± 13.99	1461.43 ± 12.10	20.87 ± 1.22	nd	45.14 ± 3.25	16.36 ± 0.07	88.2 ± 2.69	141.9 ± 9.33	38.01 ± 1.79	35.99 ± 1.21
Jul 14	nd	nd	127.15 ± 4.72	8.91 ± 0.59	81.7 ± 2.4	2259.2 ± 127.20	312.34 ± 15.41	651.66 ± 37.56	490.56 ± 24.59	nd	133.86 ± 4.89	13.10 ± 0.54	nd	92.02 ± 5.16	561.72 ± 30.32	21.62 ± 1.63
Jul 28	154.69 ± 6.29	20.75 ± 1.57	211.44 ± 16.1	45.75 ± 3.46	326.88 ± 18.65	1857.70 ± 153.75	2101.69 ± 143.92	1636.43 ± 75.70	130.12 ± 9.91	nd	98.45 ± 6.85	37.27 ± 2.89	336.61 ± 25.53	350.58 ± 27.13	1246.57 ± 80.14	96.63 ± 3.51
Aug 11	62.92 ± 2.35	49.63 ± 3.9	217.51 ± 13.99	35.65 ± 1.95	74.83 ± 3.11	2422.47 ± 127.35	331.05 ± 16.75	1108.31 ± 42.61	76.12 ± 4.02	63.96 ± 4.16	75.8 ± 4.03	19.2 ± 1.26	106.2 ± 7.92	650.83 ± 44.32	775.06 ± 54.49	35.75 ± 2.57
Aug 25	176.08 ± 8.18	19.2 ± 1.03	83.53 ± 4.54	21.96 ± 0.94	183.69 ± 9.87	1832.54 ± 98.05	358.71 ± 27.12	3042.89 ± 83.49	95.81 ± 3.43	216.34 ± 4.72	595.07 ± 27.41	224.69 ± 4.17	178.91 ± 10.19	280.61 ± 3.75	604.37 ± 29.55	189.79 ± 6.97
Sep 08	16.47 ± 0.95	1.83 ± 0.12	53.72 ± 2.51	17.64 ± 1.08	1460.45 ± 10.43	149.29 ± 9.11	736.08 ± 29.88	2159.32 ± 129.28	35.65 ± 2.15	19.3 ± 1.45	11.71 ± 0.56	69.39 ± 2.97	221.33 ± 8.82	49.98 ± 1.90	349.83 ± 19.16	66.30 ± 5.15

Values are mean ± standard deviation ($n=2$ – biological replicates, each in triplicate). nd – not detected.

Table S4. Content of saponins 25–32 in leaves of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW).

Harvest date	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard	Snow Ball	Cylindra	Round Dark Red	Rhubarb Chard
	Saponin 25				Saponin 26				Saponin 27				Saponin 28			
Jun 16	nd	22.26 ± 2.98	nd	25.26 ± 1.79	nd	4.80 ± 0.84	nd	nd	30.89 ± 0.75	48.83 ± 5.84	55.30 ± 6.37	nd	174.35 ± 4.92	38.47 ± 4.62	106.34 ± 11.21	124.27 ± 6.26
Jun 30	nd	35.92 ± 2.66	nd	5.76 ± 0.05	nd	3.15 ± 0.23	nd	nd	9.81 ± 0.37	45.91 ± 2.43	32.77 ± 1.8	72.24 ± 0.95	137.02 ± 3.87	77.01 ± 5.46	164.9 ± 12.22	23.33 ± 0.63
Jul 14	nd	22.03 ± 1.44	nd	13.19 ± 0.54	nd	nd	nd	nd	277.93 ± 9.19	41.1 ± 2.94	175.19 ± 10.64	77.42 ± 5.91	nd	60.33 ± 4.32	47.76 ± 2.43	16.67 ± 1.29
Jul 28	nd	23.09 ± 1.70	nd	25.02 ± 1.98	nd	nd	nd	nd	48.07 ± 3.21	32.54 ± 2.32	572.52 ± 41.57	160.2 ± 11.63	196.71 ± 14.1	8.17 ± 0.53	45.4 ± 2.38	26.17 ± 1.89
Aug 11	3.42 ± 0.14	101.01 ± 3.84	nd	17.85 ± 1.07	nd	nd	nd	nd	67.83 ± 4.4	184.84 ± 3.33	165.53 ± 10.03	58.08 ± 4.58	69.98 ± 5.44	35.01 ± 1.36	56.08 ± 4.24	75.66 ± 5.62
Aug 25	15.2 ± 1.04	39.36 ± 1.37	nd	26.01 ± 1.28	nd	nd	nd	nd	84.84 ± 6.00	41.94 ± 0.67	106.03 ± 7.59	672.13 ± 47.05	130.39 ± 9.15	59.48 ± 2.64	145.76 ± 11.01	14.06 ± 0.88
Sep 08	25.65 ± 1.94	4.57 ± 0.06	16.55 ± 0.98	22.43 ± 1.13	nd	nd	27.28 ± 1.04	nd	170.21 ± 7.57	3.02 ± 0.20	157.89 ± 12.19	225.78 ± 10.86	10.01 ± 0.60	5.53 ± 0.11	165.12 ± 11.99	53.82 ± 3.23
	Saponin 29				Saponin 30				Saponin 31				Saponin 32			
Jun 16	590.74 ± 24.38	127.99 ± 14.53	265.86 ± 21.26	3767.92 ± 200.86	302.59 ± 13.63	908.64 ± 84.22	1901.57 ± 35.92	1005.57 ± 50.57	nd	2.87 ± 0.64	nd	nd	26.38 ± 2.20	10.37 ± 1.77	nd	nd
Jun 30	1270.39 ± 67.83	505.18 ± 38.68	189.26 ± 11.5	799.06 ± 11.88	1693.79 ± 84.86	1170.16 ± 56.89	1278.08 ± 70.14	1477.71 ± 5.48	nd	1.11 ± 0.05	nd	nd	nd	1.16 ± 0.08	nd	nd
Jul 14	814.75 ± 62.66	118.8 ± 6.83	554.74 ± 32.82	624.29 ± 47.73	1902.45 ± 132.91	898.53 ± 69.29	2789.32 ± 107.29	2082.29 ± 156.76	nd	nd	nd	nd	nd	nd	74.58 ± 5.96	nd
Jul 28	308.15 ± 24.15	204.42 ± 17.88	1028.86 ± 76.45	1612.18 ± 58.56	2258.8 ± 172.26	1178.38 ± 100.02	4364.06 ± 76.93	1473.04 ± 77.52	4.86 ± 0.31	nd	nd	6.29 ± 0.24	38.86 ± 2.79	nd	197.33 ± 8.32	42.64 ± 2.70
Aug 11	418.27 ± 29.92	439.61 ± 16.66	321.95 ± 23.45	500.44 ± 30.07	1479.65 ± 54.39	2792.54 ± 22.55	3443.28 ± 259.71	1622.95 ± 71.31	2.28 ± 0.05	nd	nd	nd	36.25 ± 1.19	71.02 ± 1.35	125.22 ± 0.01	23.53 ± 1.39
Aug 25	813.28 ± 49.49	210.69 ± 3.77	288.29 ± 22.09	1274.39 ± 51.75	2485.72 ± 131.42	1945.38 ± 13.41	1836.36 ± 77.63	3497.07 ± 289.36	4.91 ± 0.17	nd	nd	nd	79.55 ± 2.04	nd	43.06 ± 2.37	60.5 ± 1.90
Sep 08	977.05 ± 58.80	17.25 ± 0.15	282.15 ± 17.69	557.09 ± 38.72	2083.69 ± 122.59	122 ± 1.08	1454.93 ± 32.04	2000.88 ± 2.20	14.2 ± 0.10	nd	5.26 ± 0.18	5.01 ± 0.11	33.76 ± 1.71	nd	27.46 ± 0.65	30.98 ± 1.48

Values are mean ± standard deviation (n=2 – biological replicates, each in triplicate). nd – not detected.

Table S5. Content of saponins 1–8 in roots of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW).

Harvest date	Snow Ball	Cylindra	Round Dark Red	Snow Ball	Cylindra	Round Dark Red	Snow Ball	Cylindra	Round Dark Red	Snow Ball	Cylindra	Round Dark Red
	Saponin 1			Saponin 2			Saponin 3			Saponin 4		
Jun 16	nd	nd	55.97 ± 2.49	nd	nd	nd	nd	nd	233.58 ± 13.00	nd	nd	2043.2 ± 69.66
Jun 30	nd	nd	9.35 ± 0.53	nd	nd	nd	nd	nd	28.6 ± 1.92	nd	nd	50.5 ± 3.12
Jul 14	nd	29.14 ± 0.56	17.9 ± 0.58	nd	nd	nd	39.64 ± 2.79	55.01 ± 0.71	112.07 ± 1.11	nd	283.32 ± 5.99	nd
Jul 28	19.71 ± 0.86	10.57 ± 0.59	9.16 ± 0.57	nd	nd	97.73 ± 5.13	13.17 ± 0.58	43.8 ± 1.58	237.65 ± 16.14	nd	823.64 ± 35.55	nd
Aug 11	14.18 ± 0.57	1.45 ± 0.08	68.21 ± 2.79	94.01 ± 5.73	nd	68.78 ± 2.54	458.94 ± 30.77	24.95 ± 1.00	98.26 ± 7.16	35.7 ± 2.32	388.55 ± 19.72	864.19 ± 19.34
Aug 25	12.4 ± 0.63	2.19 ± 0.07	72.45 ± 4.97	55.69 ± 3.15	nd	60.96 ± 3.18	245.78 ± 18.37	26.93 ± 1.92	296.2 ± 12.07	13.89 ± 0.63	131.93 ± 10.52	2709.06 ± 102.5
Sep 08	2.78 ± 0.14	1.71 ± 0.1	24.6 ± 1.22	28.26 ± 1.06	5.41 ± 0.25	26.82 ± 0.91	109.25 ± 8.43	26.16 ± 1.7	8.5 ± 0.66	nd	5.53 ± 0.21	305.64 ± 16.33
	Saponin 5			Saponin 6			Saponin 7			Saponin 8		
Jun 16	nd	nd	nd	nd	nd	572.73 ± 31.03	nd	nd	95.86 ± 5.96	nd	607.81 ± 32.13	7812.49 ± 414.63
Jun 30	nd	nd	nd	nd	nd	74.74 ± 4.34	nd	nd	32.06 ± 2.36	630.08 ± 49.57	508.88 ± 38.86	2423.69 ± 175.6
Jul 14	nd	nd	nd	71.23 ± 2.83	147.86 ± 1.25	180.93 ± 2.51	9.98 ± 0.27	44.13 ± 0.32	25.31 ± 0.46	2524.49 ± 116.87	2673.57 ± 75.53	5332.31 ± 36.53
Jul 28	nd	nd	nd	13.53 ± 1.01	432.81 ± 33.35	1092.42 ± 56.38	69.49 ± 4.71	9.49 ± 0.55	80.01 ± 4.69	1829.14 ± 110.79	5159.53 ± 282.21	12027.21 ± 422.8
Aug 11	nd	nd	nd	445.73 ± 34.38	64.63 ± 3.01	566.44 ± 34.54	53.49 ± 4.01	1.33 ± 0.06	104.25 ± 8.04	9725.05 ± 573.02	1856.09 ± 69.06	7225.9 ± 366.84
Aug 25	nd	nd	nd	299.99 ± 21.52	47.4 ± 2.7	744.83 ± 55.22	28.59 ± 1.84	7.85 ± 0.58	141.2 ± 7.94	6795.84 ± 367.48	539.37 ± 42.35	10225.59 ± 624.92
Sep 08	nd	nd	nd	133.14 ± 10.43	44.3 ± 1.59	131.34 ± 10.01	12.38 ± 0.42	4.32 ± 0.2	48.91 ± 3.34	3062.95 ± 192.11	662.5 ± 54.95	3139.33 ± 108.82

Values are mean ± standard deviation ($n=2$ – biological replicates, each in triplicate). nd – not detected.

Table S6. Content of saponins 9–16 in roots of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW).

Harvest date	Snow Ball	Cylindra	Round Dark Red	Snow Ball	Cylindra	Round Dark Red	Snow Ball	Cylindra	Round Dark Red	Snow Ball	Cylindra	Round Dark Red
	Saponin 9			Saponin 10			Saponin 11			Saponin 12		
Jun 16	nd	nd	nd	nd	nd	nd	nd	91.60 ± 6.53	1556.90 ± 81.93	nd	nd	83.59 ± 4.83
Jun 30	nd	nd	nd	nd	nd	nd	289.98 ± 19.29	100.76 ± 7.20	207.96 ± 11.41	nd	nd	13.76 ± 0.71
Jul 14	nd	nd	nd	nd	nd	nd	2397.45 ± 94.82	405.84 ± 0.03	315.38 ± 2.01	nd	nd	21.32 ± 0.37
Jul 28	nd	37.94 ± 2.42	nd	nd	nd	nd	1010.39 ± 44.62	4579.51 ± 296.51	1521.67 ± 98.66	nd	37.58 ± 2.68	93.27 ± 9.41
Aug 11	7.7 ± 0.29	90.86 ± 5.71	nd	nd	nd	nd	2135.46 ± 140.39	165.21 ± 11.87	2163.55 ± 76.10	8.10 ± 0.57	10.86 ± 0.56	54.20 ± 3.94
Aug 25	95.86 ± 7.30	21.27 ± 1.41	nd	nd	nd	nd	1666.29 ± 125.47	111.68 ± 4.52	1784.69 ± 103.49	77.97 ± 5.25	6.56 ± 0.40	95.85 ± 6.28
Sep 08	166.6 ± 10.55	nd	nd	nd	nd	nd	1372.45 ± 85.83	146 ± 6.68	315.32 ± 19.31	29.72 ± 2.21	5.30 ± 0.38	16.68 ± 0.49
	Saponin 13			Saponin 14			Saponin 15			Saponin 16		
Jun 16	nd	129.59 ± 9.29	37.09 ± 2.72	nd	106.15 ± 5.77	125.28 ± 5.40	65.7 ± 4.25	189.59 ± 11.04	14.42 ± 3.16	1233.22 ± 34.90	4502.83 ± 230.16	1520.24 ± 65.79
Jun 30	nd	155.41 ± 12.38	134.97 ± 7.40	nd	134.35 ± 8.64	463.76 ± 19.42	454.01 ± 34.82	54.91 ± 2.84	9.55 ± 0.59	7597.85 ± 576.39	7029.22 ± 502.71	1179.82 ± 83.95
Jul 14	nd	479.03 ± 0.52	nd	nd	532.59 ± 1.66	nd	285.59 ± 10.63	8.54 ± 0.08	nd	3187.14 ± 210.50	305.02 ± 0.10	3040.32 ± 41.18
Jul 28	nd	249.32 ± 12.83	nd	nd	317.22 ± 21.99	nd	163.74 ± 6.36	190.85 ± 14.73	nd	6798.15 ± 270.43	2923.22 ± 212.43	9503.48 ± 515.85
Aug 11	nd	14.09 ± 0.68	nd	nd	10.93 ± 0.81	51.88 ± 3.69	10.54 ± 0.57	49.84 ± 3.25	nd	2990.45 ± 171.91	89.17 ± 6.10	1307.42 ± 53.69
Aug 25	nd	48.07 ± 1.98	38.38 ± 2.62	nd	39.64 ± 2.30	146.35 ± 10.25	60.30 ± 4.72	673.35 ± 40.13	nd	4436.75 ± 223.11	276.46 ± 13.68	3165.4 ± 208.30
Sep 08	nd	16.13 ± 0.92	17.95 ± 1.00	nd	16.39 ± 0.77	135.81 ± 10.01	56.14 ± 3.52	nd	123.65 ± 9.13	2572.92 ± 121.56	277.46 ± 19.34	3711.87 ± 114.09

Values are mean ± standard deviation ($n=2$ – biological replicates, each in triplicate). nd – not detected.

Table S7. Content of saponins 17–24 in roots of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW).

Harvest date	Snow Ball	Cylindra	Round Dark Red	Snow Ball	Cylindra	Round Dark Red	Snow Ball	Cylindra	Round Dark Red	Snow Ball	Cylindra	Round Dark Red
Saponin 17			Saponin 18			Saponin 19			Saponin 20			
Jun 16	nd	nd	nd	44.89 ± 4.95	165.09 ± 10.79	65.28 ± 6.30	nd	188.17 ± 13.05	233.22 ± 10.58	466.39 ± 24.73	36.21 ± 4.02	16.60 ± 2.34
Jun 30	nd	nd	24.07 ± 1.50	556.85 ± 43.33	351.13 ± 21.59	19.92 ± 0.56	1282.17 ± 83.56	314.49 ± 23.75	730.52 ± 42.76	177.73 ± 10.41	14.25 ± 1.08	20.57 ± 1.20
Jul 14	nd	nd	nd	41.37 ± 0.95	68.58 ± 1.55	91.48 ± 2.44	689.73 ± 11.83	445.49 ± 0.24	403.07 ± 1.85	29.68 ± 0.83	7.62 ± 0.03	nd
Jul 28	nd	nd	nd	370.7 ± 20.86	140.94 ± 11.03	280.54 ± 19.65	285.78 ± 8.57	147.57 ± 10.74	514.31 ± 32.89	35.31 ± 1.61	66.19 ± 2.90	nd
Aug 11	nd	nd	nd	35.25 ± 2.58	12.27 ± 0.62	nd	214.76 ± 14.33	19.76 ± 0.84	351.12 ± 14.51	nd	20.11 ± 1.41	nd
Aug 25	nd	nd	nd	165.40 ± 12.99	10.92 ± 0.34	nd	394.11 ± 30.84	39.56 ± 1.79	276.33 ± 10.91	nd	41.06 ± 3.15	nd
Sep 08	nd	nd	nd	94.02 ± 6.62	11.79 ± 0.52	165.11 ± 9.65	168.57 ± 8.44	15.79 ± 0.97	58.72 ± 4.48	nd	0.53 ± 0.04	nd
Saponin 21			Saponin 22			Saponin 23			Saponin 24			
Jun 16	nd	10.12 ± 2.84	17.13 ± 2.73	169.07 ± 12.37	4424.37 ± 235.43	5062.43 ± 290.50	130.61 ± 6.58	560.24 ± 24.60	37.90 ± 2.50	15.14 ± 1.66	245.32 ± 12.80	321.38 ± 12.29
Jun 30	344.97 ± 13.41	18.63 ± 1.15	39.35 ± 3.03	191.48 ± 7.76	3567.28 ± 218.07	6678.2 ± 314.81	1763.12 ± 86.37	957.72 ± 49.66	3.04 ± 0.10	783.52 ± 29.56	488.02 ± 37.06	979.47 ± 68.21
Jul 14	131.90 ± 6.30	21.32 ± 0.13	44.77 ± 1.27	187.37 ± 11.83	9208.07 ± 162.68	258.28 ± 2.28	450.74 ± 22.51	310.21 ± 1.78	406.30 ± 5.26	356.15 ± 11.08	568.77 ± 8.71	697.35 ± 38.82
Jul 28	37.73 ± 2.56	nd	25.12 ± 0.94	228.08 ± 9.03	4400.17 ± 182.16	136.45 ± 5.94	1264.63 ± 47.63	202.67 ± 15.03	1275.06 ± 18.38	375.04 ± 26.40	323.96 ± 22.36	1556.25 ± 111.80
Aug 11	8.87 ± 0.54	nd	nd	78.04 ± 5.33	895.8 ± 60.14	3334.13 ± 138.95	287.13 ± 16.45	82.71 ± 5.76	33.80 ± 1.65	110.58 ± 7.19	32.10 ± 2.26	208.81 ± 14.40
Aug 25	22.98 ± 1.55	nd	nd	158.16 ± 12.07	659.09 ± 30.05	6031.56 ± 290.97	761.86 ± 59.85	14.95 ± 0.40	64.49 ± 2.67	238.36 ± 18.37	25.38 ± 1.81	361.29 ± 12.33
Sep 08	16.60 ± 0.63	nd	nd	41.65 ± 3.16	393.2 ± 24.96	2882.60 ± 138.67	351.07 ± 25.30	17.00 ± 0.95	390.30 ± 30.19	144.77 ± 9.82	15.42 ± 0.67	391.05 ± 22.64

Values are mean ± standard deviation ($n=2$ – biological replicates, each in triplicate). nd – not detected.

Table S8. Content of saponins 25–32 in roots of *Beta vulgaris* L. cultivars at different harvest times (mg/kg FW).

Harvest date	Snow Ball	Cylindra	Round Dark Red	Snow Ball	Cylindra	Round Dark Red	Snow Ball	Cylindra	Round Dark Red	Snow Ball	Cylindra	Round Dark Red
	Saponin 25			Saponin 26			Saponin 27			Saponin 28		
Jun 16	23.59 ± 3.02	58.17 ± 5.99	97.11 ± 7.50	34.21 ± 4.63	nd	nd	107.37 ± 5.70	1115.50 ± 64.76	474.12 ± 14.15	60.92 ± 6.39	15.62 ± 1.00	79.42 ± 9.27
Jun 30	nd	127.22 ± 7.92	115.74 ± 0.00	93.99 ± 5.35	nd	nd	1624.88 ± 71.55	963.83 ± 69.09	1554.54 ± 107.56	538.68 ± 42.08	nd	9.82 ± 0.51
Jul 14	nd	19.56 ± 0.06	nd	nd	nd	nd	599.62 ± 19.61	1205.85 ± 10.98	1035.05 ± 34.33	nd	nd	nd
Jul 28	nd	91.97 ± 7.34	nd	nd	nd	nd	461.05 ± 12.89	260.21 ± 18.33	1601.79 ± 98.93	67.15 ± 3.27	85.08 ± 5.18	nd
Aug 11	nd	38.88 ± 2.34	nd	nd	2.61 ± 0.14	nd	104.50 ± 6.27	61.87 ± 3.68	310.33 ± 18.54	16.78 ± 0.69	30.9 ± 2.00	nd
Aug 25	nd	20.48 ± 1.57	nd	nd	2.13 ± 0.10	nd	347.18 ± 18.24	162.98 ± 8.28	669.55 ± 50.26	115.84 ± 7.35	25.41 ± 1.35	nd
Sep 08	nd	11.06 ± 0.47	54.72 ± 3.51	nd	nd	nd	174.73 ± 6.91	139.68 ± 6.01	568.57 ± 36.86	100.74 ± 7.13	nd	56.11 ± 4.21
	Saponin 29			Saponin 30			Saponin 31			Saponin 32		
Jun 16	577.63 ± 29.19	1629.23 ± 82.58	1162.25 ± 65.04	846.41 ± 46.10	8233.12 ± 399.07	6438.22 ± 348.06	nd	4.97 ± 1.00	27.63 ± 3.22	nd	100.12 ± 9.54	129.86 ± 2.49
Jun 30	4317.87 ± 28.56	4889.87 ± 284.64	1825.38 ± 94.44	8390.5 ± 124.29	10352.20 ± 34.95	8173.75 ± 332.91	13.84 ± 0.50	15.74 ± 1.10	33.02 ± 2.36	765.95 ± 32.60	485.83 ± 10.55	182.49 ± 13.61
Jul 14	9426.05 ± 467.10	2703.43 ± 72.92	1472.62 ± 36.57	4798.40 ± 260.35	10023.27 ± 92.92	9985.90 ± 122.68	36.04 ± 1.99	13.87 ± 1.08	5.07 ± 0.14	39.58 ± 2.81	13.68 ± 1.21	107.79 ± 0.14
Jul 28	7234.49 ± 281.01	8594.04 ± 513.12	3307.00 ± 214.60	7986.27 ± 373.88	5394.13 ± 66.19	12944.19 ± 704.71	30.77 ± 2.33	29.58 ± 1.07	2.96 ± 0.12	159.67 ± 6.66	101.59 ± 5.86	289.72 ± 14.09
Aug 11	2673.17 ± 172.77	219.98 ± 16.84	2328.75 ± 149.08	5168.87 ± 50.45	1674.87 ± 104.79	6072.37 ± 290.47	7.11 ± 0.44	7.17 ± 0.32	nd	16.08 ± 1.06	33.06 ± 2.48	53.85 ± 2.43
Aug 25	2276.85 ± 148.97	235.85 ± 6.08	1636.94 ± 120.02	5648.23 ± 108.37	463.41 ± 12.68	8813.55 ± 248.01	23.17 ± 0.63	2.97 ± 0.48	nd	131.43 ± 4.72	10.75 ± 0.71	147.28 ± 4.96
Sep 08	2355.13 ± 65.15	147.29 ± 6.46	965.83 ± 50.91	3600.38 ± 122.87	370.45 ± 16.04	5028.53 ± 293.68	nd	1.56 ± 0.09	13.81 ± 0.42	31.92 ± 1.41	6.28 ± 0.33	148.12 ± 10.28

Values are mean ± standard deviation ($n=2$ – biological replicates, each in triplicate). nd – not detected.

Table S9. Summary of two-way ANOVA results showing the effects of cultivar, harvest date, and their interaction on individual saponins (S1–S32) and total saponin content in leaves and roots of *Beta vulgaris* L.

Source of variation	df	f value	p value	df	f value	p value	df	f value	p value	df	f value	p value	df	f value	p value
Saponin 1			Saponin 2			Saponin 3			Saponin 4			Saponin 5			
Leaves															
Cultivar	3	49249	< 0.0001	3	84.521	< 0.0001	3	409.088	< 0.0001	3	714.364	< 0.0001	3	91.41	< 0.0001
Time	6	251069	< 0.0001	6	172.172	< 0.0001	6	144.713	< 0.0001	6	181.764	< 0.0001	6	147.274	< 0.0001
Cultivar x Time	18	66368	< 0.0001	18	59.552	< 0.0001	18	41.705	< 0.0001	18	112.019	< 0.0001	18	95.044	< 0.0001
Residuals	28	-	-	28	-	-	28	-	-	28	-	-	28	-	-
Roots															
Cultivar	2	510.43	< 0.0001	2	278.268	< 0.0001	2	149.561	< 0.0001	2	791.78	< 0.0001	2	nd	< 0.0001
Time	6	63.98	< 0.0001	6	172.776	< 0.0001	6	76.424	< 0.0001	6	211.904	< 0.0001	6	nd	< 0.0001
Cultivar x Time	12	83.66	< 0.0001	12	90.532	< 0.0001	12	72.844	< 0.0001	12	277.537	< 0.0001	12	nd	< 0.0001
Residuals	21	-	-	21	-	-	21	-	-	21	-	-	21	-	-
Source of variation	df	f value	p value	df	f value	p value	df	f value	p value	df	f value	p value	df	f value	p value
Saponin 6			Saponin 7			Saponin 8			Saponin 9			Saponin 10			
Leaves															
Cultivar	3	103.263	< 0.0001	3	121.75	< 0.0001	3	343.52	< 0.0001	3	66.43	< 0.0001	3	75.331	< 0.0001
Time	6	138.038	< 0.0001	6	157.243	< 0.0001	6	200.446	< 0.0001	6	43.631	< 0.0001	6	226.951	< 0.0001
Cultivar x Time	18	59.246	< 0.0001	18	66.111	< 0.0001	18	43.656	< 0.0001	18	87.316	< 0.0001	18	57.163	< 0.0001
Residuals	28	-	-	28	-	-	28	-	-	28	-	-	28	-	-
Roots															
Cultivar	2	278.589	< 0.0001	2	356.111	< 0.0001	2	327.391	< 0.0001	2	133.966	< 0.0001	2	nd	< 0.0001
Time	6	84.177	< 0.0001	6	44.255	< 0.0001	6	90.157	< 0.0001	6	77.914	< 0.0001	6	nd	< 0.0001
Cultivar x Time	12	46.566	< 0.0001	12	37.253	< 0.0001	12	49.404	< 0.0001	12	103.96	< 0.0001	12	nd	< 0.0001
Residuals	21	-	-	21	-	-	21	-	-	21	-	-	21	-	-
Source of variation	df	f value	p value	df	f value	p value	df	f value	p value	df	f value	p value	df	f value	p value
Saponin 11			Saponin 12			Saponin 13			Saponin 14			Saponin 15			
Leaves															
Cultivar	3	847.572	< 0.0001	3	465.918	< 0.0001	3	321.489	< 0.0001	3	121.689	< 0.0001	3	320.321	< 0.0001
Time	6	83.433	< 0.0001	6	92.625	< 0.0001	6	42.248	< 0.0001	6	52.924	< 0.0001	6	21.919	< 0.0001
Cultivar x Time	18	2.481	< 0.0001	18	55.641	< 0.0001	18	32.957	< 0.0001	18	65.452	< 0.0001	18	37.655	< 0.0001
Residuals	28	-	-	28	-	-	28	-	-	28	-	-	28	-	-
Roots															
Cultivar	2	23.948	< 0.0001	2	208.261	< 0.0001	2	1036.855	< 0.0001	2	458.106	< 0.0001	2	139.619	< 0.0001
Time	6	93.138	< 0.0001	6	59.775	< 0.0001	6	199.04	< 0.0001	6	113.74	< 0.0001	6	49.91	< 0.0001
Cultivar x Time	12	80.681	< 0.0001	12	30.773	< 0.0001	12	227.135	< 0.0001	12	211.405	< 0.0001	12	101.585	< 0.0001
Residuals	21	-	-	21	-	-	21	-	-	21	-	-	21	-	-

Source of variation	df	f value	p value	df	f value	p value	df	f value	p value	df	f value	p value	df	f value	p value
<i>Saponin 16</i>			<i>Saponin 17</i>			<i>Saponin 18</i>			<i>Saponin 19</i>			<i>Saponin 20</i>			
Leaves															
Cultivar	3	196.318	< 0.0001	3	28.387	< 0.0001	3	93.487	< 0.0001	3	51.661	< 0.0001	3	221.449	< 0.0001
Time	6	118.317	< 0.0001	6	13.524	< 0.0001	6	113.676	< 0.0001	6	137.3	< 0.0001	6	42.662	< 0.0001
Cultivar x Time	18	73.025	< 0.0001	18	16.482	< 0.0001	18	39.294	< 0.0001	18	56.288	< 0.0001	18	55.891	< 0.0001
Residuals	28	-	-	28	-	-	28	-	-	28	-	-	28	-	-
Roots															
Cultivar	2	55.339	< 0.0001	2	128.962	< 0.0001	2	52.117	< 0.0001	2	111.525	< 0.0001	2	243.28	< 0.0001
Time	6	87.581	< 0.0001	6	128.962	< 0.0001	6	104.163	< 0.0001	6	147.989	< 0.0001	6	155.241	< 0.0001
Cultivar x Time	12	46.331	< 0.0001	12	128.962	< 0.0001	12	40.41	< 0.0001	12	33.378	< 0.0001	12	130.895	< 0.0001
Residuals	21	-	-	21	-	-	21	-	-	21	-	-	21	-	-

Source of variation	df	f value	p value	df	f value	p value	df	f value	p value	df	f value	p value	df	f value	p value
<i>Saponin 21</i>			<i>Saponin 22</i>			<i>Saponin 23</i>			<i>Saponin 24</i>			<i>Saponin 25</i>			
Leaves															
Cultivar	3	276.521	< 0.0001	3	278.006	< 0.0001	3	147.681	< 0.0001	3	281.24	< 0.0001	3	398.571	< 0.0001
Time	6	92.394	< 0.0001	6	28.324	< 0.0001	6	312.535	< 0.0001	6	83.876	< 0.0001	6	58.951	< 0.0001
Cultivar x Time	18	53.257	< 0.0001	18	50.128	< 0.0001	18	121.002	< 0.0001	18	31.611	< 0.0001	18	79.201	< 0.0001
Residuals	28	-	-	28	-	-	28	-	-	28	-	-	28	-	-
Roots															
Cultivar	2	445.78	< 0.0001	2	552.991	< 0.0001	2	206.663	< 0.0001	2	148.506	< 0.0001	2	196.905	< 0.0001
Time	6	291.94	< 0.0001	6	63.519	< 0.0001	6	172.884	< 0.0001	6	103.264	< 0.0001	6	108.172	< 0.0001
Cultivar x Time	12	180.405	< 0.0001	12	152.095	< 0.0001	12	98.48	< 0.0001	12	24.533	< 0.0001	12	46.021	< 0.0001
Residuals	21	-	-	21	-	-	21	-	-	21	-	-	21	-	-

Source of variation	df	f value	p value	df	f value	p value	df	f value	p value	df	f value	p value	df	f value	p value
<i>Saponin 26</i>			<i>Saponin 27</i>			<i>Saponin 28</i>			<i>Saponin 29</i>			<i>Saponin 30</i>			
Leaves															
Cultivar	3	179.843	< 0.0001	3	75.257	< 0.0001	3	106.869	< 0.0001	3	274.3	< 0.0001	3	65.488	< 0.0001
Time	6	189.881	< 0.0001	6	60.486	< 0.0001	6	39.111	< 0.0001	6	48.521	< 0.0001	6	51.883	< 0.0001
Cultivar x Time	18	216.029	< 0.0001	18	71.11	< 0.0001	18	35.91	< 0.0001	18	76.85	< 0.0001	18	26.965	< 0.0001
Residuals	28	-	-	28	-	-	28	-	-	28	-	-	28	-	-
Roots															
Cultivar	2	158.304	< 0.0001	2	78.351	< 0.0001	2	135.814	< 0.0001	2	124.12	< 0.0001	2	155.533	< 0.0001
Time	6	87.292	< 0.0001	6	132.844	< 0.0001	6	53.272	< 0.0001	6	163.03	< 0.0001	6	129.777	< 0.0001
Cultivar x Time	12	90.328	< 0.0001	12	34.302	< 0.0001	12	65.977	< 0.0001	12	50.242	< 0.0001	12	59.272	< 0.0001
Residuals	21	-	-	21	-	-	21	-	-	21	-	-	21	-	-

Source of variation	df	<i>Saponin 31</i>		<i>Saponin 32</i>		<i>Total Saponins</i>			
		<i>f value</i>	<i>p value</i>	<i>f value</i>	<i>p value</i>	<i>f value</i>	<i>p value</i>		
Leaves									
Cultivar	3	321.014	< 0.0001	3	367.489	< 0.0001	3	137.729	< 0.0001
Time	6	403.576	< 0.0001	6	271.373	< 0.0001	6	68.261	< 0.0001
Cultivar x Time	18	145.206	< 0.0001	18	132.734	< 0.0001	18	25.502	< 0.0001
Residuals	28	-	-	28	-	-	28	-	-
Roots									
Cultivar	2	16.661	< 0.0001	2	33.675	< 0.0001	2	77.454	< 0.0001
Time	6	51.888	< 0.0001	6	403.11	< 0.0001	6	69.358	< 0.0001
Cultivar x Time	12	56.84	< 0.0001	12	97.901	< 0.0001	12	31.562	< 0.0001
Residuals	21	-	-	21	-	-	21	-	-

Note: df, degrees of freedom; *f*, *f*-test value; *p*, probability level.