

SUPPLEMENTARY MATERIAL

Accumulation of trace elements within *Vitis vinifera* L. varieties cultivated in Biscay (Basque Country) for txakoli production: A two-year case study

Olaia Liñero^{*}, Jose Antonio Carrero, Andone Estonba, Alberto de Diego

*Corresponding author.

Department of Analytical Chemistry, Faculty of Science and Technology, University of the Basque Country (UPV/EHU), P.O. Box 644, 48080 Bilbao, Basque Country, Spain.

E-mail address: olaia.linero@ehu.eus (O. Liñero)

Table S1. Procedural limits of detection (LOD, mg kg⁻¹) of the methods used in the analysis of plant and soil samples.

Element	LOD (mg kg ⁻¹) for plant samples	LOD (mg kg ⁻¹) for soil samples
Na	5.3	-
K	6.4	-
Ca	43	-
Mg	3.5	1.66
Al	1.1	2.6
Ti	0.37	0.86
V	0.15	0.56
Cr	0.11	0.18
Mn	0.57	0.13
Fe	2.9	1.66
Co	0.035	0.011
Cu	0.24	0.058
Zn	16	13
As	0.034	0.076
Sr	0.48	0.74
Mo	0.16	0.10
Cd	0.018	0.024
Ba	0.14	0.13
Tl	0.0077	0.014
Pb	0.077	0.13

Table S2. Certified values (in mg kg⁻¹) of the reference materials used to check the quality of the analytical methods for plant (SRM 1570a) and soil (ERM CC-141) samples.

The certified values for the ERM CC-141 material refer to the *aqua regia* extractable contents. The trueness (as % of recovery) and precision (as relative standard deviation, RSD, %) obtained after replicate analysis (n = 20 for the ERM CC-141; n = 22 for the SRM 1570a) of the reference materials are also included. The concentration of some of the elements of interest is not certified in one or both of the CRMs.

Element	SRM 1570a			ERM CC-141		
	Certified value (mg kg ⁻¹)	RSD (%)	Recovery (%)	Certified value (mg kg ⁻¹)	RSD (%)	Recovery (%)
Al	310 ± 11	7	95	-	-	-
V	0.57 ± 0.03	8	88	-	-	-
Mn	75.9 ± 1.9	6	95	387 ± 17	10	85
Co	0.39 ± 0.05	7	83	7.9 ± 0.9	9	75
Pb	-	-	-	32.2 ± 1.4	8	87
Cu	12.2 ± 0.6	7	89	12.4 ± 0.9	8	82
Zn	82 ± 3	7	95	50 ± 4	10	102
As	0.068 ± 0.012	10	104	7.5 ± 1.4	9	102
Sr	55.6 ± 0.8	8	98	-	-	-
Cd	2.89 ± 0.07	5	92	0.25 ± 0.04	7	92
Cr	-	-	-	31 ± 4	10	75

Table S3. Concentration (mg kg⁻¹) of 17 elements measured in soils (n = 5) during the two years of study (2013-2014).

Grapevine varieties, Hondarrabi Zerratia, Hondarrabi Zuri and Riesling, are expressed with acronyms, OZZ, OZ and R, respectively. All the concentrations were above the limits of detection (LOD, see Table S1). Soils from Riesling variety were not taken in May 2013, due to technical problems to access to the vineyard.

	Mg	Al	Ti	V	Cr	Mn	Fe	Co	Cu	Zn	As	Sr	Mo	Cd	Ba	TI	Pb
YEAR 2013																	
May																	
OZZ	3000±90	23400±1300	9.0±1.4	34.5±1.7	31.9±1.1	560±53	31000±1900	9.5±1.1	19.5±2.3	77.7±7.9	8.66±0.74	19.1±3.9	0.652±0.058	0.232±0.055	76.2±7.7	0.341±0.015	25.9±2.7
OZ	3100±200	24600±1500	16.0±2.8	42.3±4.4	36.8±4.6	520±110	25400±2700	9.6±1.4	21.2±7.9	76±19	8.6±1.4	23.3±3.9	0.67±0.13	0.217±0.081	77±10	0.399±0.050	32.2±5.9
June																	
OZZ	2900±180	24600±2800	8.6±2.5	35.9±2.8	33.7±2.2	620±120	25100±1200	10.9±2.1	24.6±3.8	76.3±5.5	8.92±0.15	22.3±9.9	0.81±0.14	0.293±0.033	75.4±7.6	0.333±0.035	26.7±1.8
OZ	3000±290	23384±1900	9.9±1.5	36.1±3.0	31.5±1.6	540±110	22000±660	9.3±2.1	24.9±9.5	67.4±8.3	7.96±0.54	18.9±1.5	0.709±0.063	0.260±0.030	62.0±7.1	0.323±0.022	29.1±2.7
R	2600±470	22137±1300	7.7±1.6	32.7±2.1	30.3±3.0	590±70	22200±2200	10.5±1.0	23.2±5.9	72±13	7.94±0.71	13.7±2.8	0.73±0.19	0.29±0.10	52.5±6.6	0.323±0.022	27.1±4.2
September																	
OZZ	2500±450	28300±5800	12.4±5.4	44.0±9.9	37.5±6.9	464±87	25600±1900	11.8±1.2	23.5±5.9	70.1±9.7	9.26±0.85	17.1±2.2	0.77±0.77	0.203±0.077	68±11	0.288±0.061	23.7±3.2
OZ	2800±230	29100±3200	20.2±7.3	46.5±6.4	36.7±4.7	504±90	22300±730	10.3±2.0	28±11	65.5±7.7	8.13±0.63	18.5±2.4	0.410±0.043	0.204±0.064	70.0±6.6	0.317±0.035	28.5±3.8
R	2500±320	29400±300	16.7±6.1	42.9±6.9	34.7±4.9	548±64	23900±920	10.6±1.0	21.5±1.0	68.8±6.2	8.73±0.76	14.7±2.6	0.430±0.042	0.184±0.066	62.9±6.5	0.319±0.031	23.8±3.7
October																	
OZZ	2400±400	27500±4300	10.2±3.6	40.6±8.5	34.3±6.9	430±130	26100±2600	9.9±1.3	22.7±2.9	75.5±9.7	8.88±0.53	15.4±2.7	0.403±0.063	0.188±0.068	67±11	0.291±0.057	22.4±3.5
OZ	3000±230	29000±1200	16.7±1.9	44.9±2.4	35.5±2.7	497±96	23400±290	8.9±1.3	23.9±5.9	70.0±6.3	8.27±0.33	17.0±1.0	0.47±0.10	0.197±0.035	69.1±4.6	0.317±0.010	27.1±3.9
R	2400±340	28600±2300	15.0±5.7	40.0±5.3	33.9±4.9	601±46	23700±1300	10.8±1.0	21.7±2.6	72.7±6.0	8.70±0.75	14.8±2.8	0.433±0.086	0.212±0.065	63.8±8.4	0.330±0.032	27.0±3.6
YEAR 2014																	
May																	
OZZ	2500±250	31800±5100	11.7±4.3	31.5±4.6	25.1±3.1	454±84	24790±870	4.8±1.0	11.6±4.1	45.1±3.7	5.92±0.29	9.7±1.4	0.272±0.029	0.125±0.035	59±10	0.269±0.041	22.5±2.6
OZ	1900±270	24600±2600	3.9±1.1	23.9±2.8	21.1±2.3	390±160	28600±6100	4.9±1.3	10.4±1.9	49.4±8.7	5.85±0.36	7.2±0.10	0.223±0.029	0.111±0.052	48.0±7.6	0.212±0.038	17.3±3.2
R	2000±130	27200±1900	7.5±1.2	27.6±1.5	23.3±1.2	525±66	23990±860	6.8±1.4	11.6±2.2	50.4±5.0	6.37±0.65	7.5±2.0	0.279±0.024	0.19±0.10	46.3±3.2	0.244±0.016	19.8±3.2
June																	
OZZ	2170±310	28300±4100	7.6±3.6	28.0±4.0	23.5±2.5	460±100	26700±4200	5.5±1.3	11.1±2.5	48.7±5.5	6.12±0.47	8.2±1.6	0.255±0.038	0.140±0.064	53.6±9.1	0.244±0.036	19.6±3.2
OZ	2290±120	27500±1900	9.1±2.4	29.8±2.9	23.9±2.0	420±70	23400±980	5.7±2.3	11.0±4.0	42.5±4.5	5.81±0.44	8.7±1.0	0.239±0.042	0.106±0.026	50.5±3.0	0.240±0.015	20.2±2.2
R	1920±220	28100±1600	9.3±1.1	28.6±1.0	23.2±1.1	470±90	23200±1800	5.6±1.1	8.8±1.3	41.8±3.8	5.98±0.55	8.0±1.2	0.32±0.10	0.100±0.029	48.4±3.8	0.254±0.012	18.7±2.8
September																	
OZZ	1870±260	22000±5200	4.3±1.5	23.3±3.9	20.0±3.1	390±170	23300±2300	5.5±2.0	19.8±8.8	53.5±8.5	5.73±0.40	7.4±1.2	0.248±0.034	0.153±0.064	44.0±3.4	0.192±0.042	18.1±2.7
OZ	2180±560	20400±1100	5.7±1.1	25.1±1.0	19.4±1.4	390±50	21200±1600	4.7±1.6	18.7±1.8	50.3±5.2	5.38±0.27	7.8±1.0	0.225±0.019	0.135±0.014	39.7±2.1	0.183±0.011	19.0±1.6
R	1800±200	23300±2200	7.1±1.4	26.2±2.4	21.8±2.0	430±40	22200±2900	5.5±1.3	15.4±4.0	49.7±1.5	6.04±0.40	6.9±1.2	0.273±0.014	0.132±0.041	43.4±5.2	0.221±0.023	18.9±3.2

Table S4. Concentration (mg kg⁻¹) of 20 elements measured in different plant organs (roots, leaves, flowers and grapes, n = 5) of Hondarrabi Zerratia variety during the two years of study (2013-2014).

<LOD = below the limit of detection (see Table S1). Samples of leaves from June 2013 were not taken due to phytosanitary works carried out at the same time in the area. Sampling in October 2014 was also not possible due to technical problems to access to the vineyard.

	Na	Mg	Al	K	Ca	Ti	V	Cr	Mn	Fe	Co	Cu	Zn	As	Sr	Mo	Cd	Ba	Tl	Pb
YEAR 2013																				
May																				
roots	147±59	900±250	200±200	5800±1300	9200±2900	0.94±0.69	1.93±0.13	1.6±1.2	31.6±7.1	1000±470	0.40±0.12	27±12	101±27	0.46±0.12	32.1±7.2	0.13±0.10	0.142±0.074	17.9±4.7	0.028±0.013	2.74±0.87
leaves	770±160	1300±150	68±15	15600±1600	7800±1800	0.911±0.065	<LOD	0.16±0.11	110±21	91±21	0.28±0.14	11.9±2.4	36±22	<LOD	13.7±4.8	0.18±0.12	0.042±0.025	3.0±1.4	<LOD	0.77±0.31
June																				
roots	230±150	950±380	500±840	5090±470	15400±9400	2.3±1.8	2.2±1.0	2.0±1.1	33.1±7.9	1800±1100	0.51±0.23	35±20	140±91	0.66±0.38	34.8±3.6	0.27±0.25	0.19±0.12	16.0±4.2	0.032±0.024	3.0±1.5
flowers	290±160	1760±950	79±45	19000±1000	9700±3500	0.69±0.91	<LOD	0.14±0.12	92±46	65±34	<LOD	8.3±4.5	86±53	0.078±0.010	25±15	0.30±0.25	0.046±0.029	6.3±3.9	<LOD	0.53±0.39
September																				
roots	131±72	830±350	360±120	4770±670	4500±850	0.51±0.46	0.22±0.18	0.48±0.22	16.0±5.6	338±182	0.75±0.35	23±17	133±41	0.41±0.26	25.2±3.1	0.14±0.12	0.058±0.027	15.2±4.3	0.026±0.019	2.71±0.80
leaves	510±250	3900±1600	30±12	12300±1400	56000±13000	0.62±0.26	<LOD	0.12±0.10	321±39	75.1±6.9	0.12±0.10	211±67	60±13	<LOD	75±15	0.16±0.11	0.050±0.019	19.5±9.8	0.013±0.010	0.67±0.23
grapes	36±17	630±180	2.8±1.2	14400±1500	1500±400	<LOD	<LOD	<LOD	8.6±3.3	15.6±3.9	<LOD	5.2±1.8	<LOD	<LOD	4.9±1.3	<LOD	<LOD	1.23±0.46	<LOD	<LOD
October																				
roots	580±380	830±470	800±430	11000±3600	10200±6300	2.1±1.3	0.41±0.24	1.33±0.85	19.9±7.1	723±510	0.14±0.11	17.6±7.7	329±146	0.48±0.13	29.9±3.9	0.11±0.10	0.090±0.035	17.1±6.6	0.013±0.011	3.2±1.6
leaves	490±180	4500±1500	29±16	10800±2300	69300±6400	0.56±0.16	<LOD	0.11±0.10	304±39	70.7±7.5	0.17±0.10	203±22	46±35	<LOD	83±14	0.41±0.12	0.046±0.016	20±10	0.010±0.010	0.64±0.13
grapes	430±190	1000±200	2.6±1.8	30700±9500	760±220	<LOD	<LOD	<LOD	5.8±1.3	21.9±8.4	<LOD	8.4±1.3	<LOD	<LOD	3.0±1.0	<LOD	0.075±0.027	0.70±0.42	<LOD	<LOD
YEAR 2014																				
May																				
roots	244±83	630±170	280±17	4450±2000	37000±18000	2.56±0.89	0.18±0.12	0.12±0.10	11±10	50±23	0.81±0.40	12.1±7.7	280±160	1.54±0.63	30±15	0.54±0.9	0.051±0.088	6.3±2.8	0.061±0.048	1.38±0.67
leaves	560±230	1600±240	100±39	10200±3500	11400±1600	5.40±0.81	0.20±0.17	0.15±0.11	75±17	72±19	0.41±0.12	11.7±3.5	46.6±8.9	0.14±0.12	20.1±7.4	0.36±0.16	0.027±0.017	3±1.2	<LOD	0.33±0.12
June																				
roots	430±140	590±230	254±16	3500±670	35000±37000	3.5±1.1	0.22±0.12	0.14±0.12	8.6±4.4	78±51	0.19±0.11	14±10	640±600	0.62±0.17	22.5±9.6	0.17±0.10	0.18±0.16	17.0±6.7	0.074±0.042	2.3±1.3
leaves	660±340	1160±230	67±27	12100±1300	14700±2900	3.72±0.23	<LOD	0.20±0.16	98±34	71.6±6.0	0.33±0.21	9.6±2.7	36.6±4.0	0.26±0.14	27±12	0.17±0.12	<LOD	6.8±2.6	<LOD	0.34±0.14
flowers	180±30	2350±290	22.4±9.7	11600±4400	17800±4700	5.34±0.87	<LOD	<LOD	94±30	73±10	<LOD	10.4±1.3	160±68	<LOD	24.7±9.9	0.80±0.16	0.067±0.037	7.1±2.7	<LOD	0.63±0.28
September																				
roots	140±100	880±180	760±390	5100±1200	29000±22000	4.1±1.4	3.3±1.0	3.1±1.1	43±24	780±240	0.712±0.25	25±12	100±39	1.22±0.54	30.2±7.5	0.19±0.14	0.13±0.10	16.1±4.3	0.030±0.012	3.1±1.4
leaves	300±100	2610±950	115±26	11150±770	37200±6500	3.74±0.85	0.17±0.10	0.72±0.28	443±81	90.0±8.9	0.26±0.12	150±120	79±36	0.27±0.16	75±16	0.19±0.16	0.038±0.018	18.5±7.4	0.016±0.010	1.19±0.65
grapes	60±24	690±240	3.8±1.2	13000±1800	6900±3400	<LOD	<LOD	<LOD	11.8±9.1	8.3±6.1	<LOD	23±12	22.7±4.5	<LOD	9.5±2.8	<LOD	<LOD	2.5612±	<LOD	<LOD

Table S5. Concentration (mg kg⁻¹) of 20 elements measured in different plant organs (roots, leaves, flowers and grapes, n = 5) of Hondarrabi Zuri variety during the two years of study (2013-2014).

<LOD = below the limit of detection (see Table S1). Samples of leaves from June 2013 were not taken due to phytosanitary works carried out at the same time in the area. Sampling in October 2014 was also not possible due to technical problems to access to the vineyard.

	Na	Mg	Al	K	Ca	Ti	V	Cr	Mn	Fe	Co	Cu	Zn	As	Sr	Mo	Cd	Ba	Tl	Pb
YEAR 2013																				
May																				
roots	181±66	2000±230	500±330	5000±2000	11300±2200	1.88±0.96	2.30±0.77	2.09±0.63	32.7±5.2	1410±520	0.48±0.17	27.7±7.7	167±75	0.58±0.21	36.5±5.4	0.51±0.13	0.106±0.074	14.1±3.0	0.087±0.054	2.95±0.97
leaves	502±71	1950±380	48±16	14700±2400	7900±1800	0.91±0.13	<LOD	0.16±0.11	67.5±7.1	85±17	0.054±0.021	11.3±2.9	33±10	<LOD	15.1±2.5	0.37±0.21	0.048±0.021	1.83±0.48	<LOD	0.57±0.24
June																				
roots	225±75	2320±630	360±100	4400±1200	22000±11000	2.6±2.1	2.4±1.6	1.9±1.1	44±16	1700±1400	0.53±0.35	39±25	300±56	0.50±0.37	40.8±5.7	0.73±0.47	0.153±0.081	12.4±3.4	0.046±0.016	2.58±0.96
flowers	560±240	2120±430	115±42	25100±6800	10000±4500	0.72±0.28	<LOD	0.46±0.37	75±11	65±14	0.053±0.016	8.9±1.2	87±22	<LOD	26.6±7.7	0.31±0.15	0.047±0.016	12.7±6.6	<LOD	0.54±0.13
September																				
roots	128±87	1650±910	400±220	4900±1500	5200±1700	0.89±0.13	0.43±0.37	1.01±0.71	18±13	560±170	0.14±0.10	23±14	220±155	0.31±0.17	24.0±7.6	0.36±0.23	0.101±0.016	8.6±2.6	0.024±0.013	1.43±0.26
leaves	370±130	4410±630	51±23	20900±2600	51600±7600	0.57±0.12	<LOD	0.20±0.10	265±72	96±16	0.19±0.11	14.9±8.5	48±12	<LOD	70±11	0.31±0.17	0.048±0.019	9.7±1.9	<LOD	0.69±0.12
grapes	24±11	611±69	2.4±1.0	14300±1700	1320±170	<LOD	<LOD	<LOD	7.3±1.4	16.7±3.2	<LOD	5.7±1.3	<LOD	<LOD	4.70	<LOD	<LOD	0.72±0.19	<LOD	<LOD
October																				
roots	112±86	1640±430	510±180	4900±1800	6900±2900	1.34±0.60	0.76±0.56	1.88±0.30	26±13	640±220	0.22±0.13	22.5±4.9	163±77	0.23±0.12	22.7±6.9	0.27±0.12	0.101±0.048	8.4±2.9	0.036±0.012	1.24±0.69
leaves	330±120	4600±830	30±14	19700±2200	52000±6000	0.65±0.13	<LOD	0.21±0.12	201±64	86±21	0.19±0.11	19±11	41±11	<LOD	66±14	0.26±0.10	0.045±0.014	8.7±2.1	<LOD	0.56±0.18
grapes	130±82	630±340	2.8±1.3	18000±10000	880±410	<LOD	<LOD	<LOD	5.7±1.8	23±16	<LOD	5.2±1.6	<LOD	<LOD	3.1±1.4	<LOD±	<LOD	0.77±0.27	<LOD	<LOD
YEAR 2014																				
May																				
roots	256±140	510±200	300±16	5600±1200	46000±39000	2.5±1.0	1.08±0.49	1.08±0.54	11.0±8.1	44±20	0.06±0.026	8.0±3.8	200±57	0.39±0.18	26.2±8.0	0.16±0.12	0.14±0.10	7.9±3.6	0.027±0.013	1.6±1.1
leaves	820±200	1440±220	128±14	11100±1400	11700±1500	6.29±0.65	<LOD	0.24±0.35	88±26	56.4±7.6	0.03±0.018	10.9±2.1	40.6±2.7	<LOD	18.4±5.7	0.53±0.27	0.044±0.014	5.6±3.1	<LOD	0.30±0.10
June																				
roots	260±150	460±170	366±22	2700±1000	62000±49000	3.5±1.1	1.20±0.86	1.28±0.42	3.7±1.6	62±37	0.15±0.10	17±12	460±380	1.37±0.76	14.0±3.5	1.5±1.1	0.19±0.073	9.8±4.7	0.020±0.0176	1.35±0.76
leaves	520±290	1750±250	86±22	12600±1800	16300±2800	3.91±0.39	<LOD	<LOD	78±18	76±18	0.058±0.034	11.2±3.5	38.1±1.2	<LOD	32.3±7.8	0.41±0.16	0.022±0.013	5.08±0.97	<LOD	0.39±0.15
flowers	277±73	2980±650	30±11	11800±5000	75000±52000	5.81±0.80	<LOD	<LOD	73±12	70±11	<LOD	10.4±2.1	<LOD	<LOD	31.7±5.2	0.30±0.25	0.036±0.018	6.18±0.58	<LOD	0.47±0.21
September																				
roots	152±96	2130±650	267±96	7800±4200	50000±41000	6.9±3.4	6.5±2.4	4.3±1.3	50.4±8.8	650±280	1.01±0.28	40±24	153±95	1.88±0.54	31.9±8.0	0.54±0.20	0.167±0.093	15.4±3.8	0.078±0.016	3.8±1.1
leaves	221±44	3200±1200	118±37	13900±1500	36200±1700	2.99±0.36	<LOD	0.52±0.13	338±73	98±19	0.293±0.076	17.8±9.6	69.8±7.0	<LOD	83.7±9.7	0.31±0.11	0.038±0.016	11.1±2.6	<LOD	0.78±0.11
grapes	50±13	610±310	2.6±1.2	10900±5200	6900±3900	<LOD	<LOD	<LOD	7.7±5.9	9.7±4.3	<LOD	14.7±6.7	<LOD	<LOD	5.7±2.9	<LOD	<LOD	1.22±0.21	<LOD	<LOD

Table S6. Concentration (mg kg⁻¹) of 20 elements measured in different plant organs (roots, leaves, flowers and grapes, n = 5) of Riesling variety during the two years of study (2013-2014).

<LOD = below the limit of detection (see Table S1). Samples from May 2013 were not taken due to phytosanitary works carried out at the same time in the area. Sampling in October 2014 was also not possible due to technical problems to access to the vineyard.

	Na	Mg	Al	K	Ca	Ti	V	Cr	Mn	Fe	Co	Cu	Zn	As	Sr	Mo	Cd	Ba	Tl	Pb
YEAR 2013																				
June																				
roots	210±45	1230±470	200±800	5490±5890	28100±6600	3.3±1.8	2.5±1.0	2.2±1.9	30±14	1790±160	0.87±0.95	74±12	365±49	0.86±0.24	28.1±8.7	0.90±0.24	1.16±0.10	11.2±6.2	0.064±0.012	3.6±1.0
leaves	356.3±5.5	1380±110	94±32	13700±1400	7600±600	0.56±0.29	<LOD	0.152±0.025	117±36	105±35	0.12±0.031	7±1.8	30±10	<LOD	13.6±5.4	0.24±0.10	0.23±0.12	16±10	<LOD	0.52±0.15
flowers	360±100	2040±220	92±25	29700±4500	6700±800	0.63±0.11	<LOD	0.163±0.036	95±21	55±10	0.085±0.012	12±1.5	85±24	<LOD	16.2±3.7	<LOD	<LOD	18±13	<LOD	0.57±0.18
September																				
roots	60±80	877±37	463±94	3200±980	5870±360	4.76±0.54	<LOD	2.1±1.0	11.4±8.3	860±350	0.079±0.063	15±11	480±110	0.26±0.18	22±12	0.60±0.17	1.26±0.21	10.5±6.6	0.020±0.010	1.4±1.2
leaves	400±70	3605±78	89±26	22600±250	47200±300	0.80±0.12	<LOD	0.214±0.052	490±81	121±29	0.57±0.18	195±22	53±10	0.087±0.024	49±10	0.23±0.12	0.15±0.10	68±35	0.027±0.015	1.18±0.22
grapes	37±13	450±20	1.84±0.22	13140±890	680±210	<LOD	<LOD	0.182±0.068	11.3±3.2	13.7±2.3	<LOD	5.24±0.30	<LOD	<LOD	2.64±0.82	<LOD	<LOD	4.7±2.3	<LOD	<LOD
October																				
roots	230±50	680±170	310±100	3400±1300	6700±2600	4.9±1.6	1.4±1.0	0.62±0.21	12.8±5.3	1410±180	0.103±0.074	18.4±8.3	182±130	0.106±0.045	15.7±3.3	1.38±0.45	1.48±0.58	.88±2.5	0.020±0.013	1.23±0.77
leaves	400±130	3900±770	78±42	21000±3200	52000±5000	0.75±0.27	<LOD	<LOD	500±140	91±18	0.67±0.31	214±33	54±10	0.078±0.038	51.8±5.6	0.202±0.075	0.15±0.12	73±38	0.024±0.012	1.18±0.14
grapes	31±12	540±190	1.8±1.0	14500±4500	900±200	<LOD	<LOD	<LOD	5.6±2.0	16.4±2.2	<LOD	5.8±2.4	<LOD	<LOD	3.3±1.1	<LOD	<LOD	1.1±1.0	<LOD	<LOD
YEAR 2014																				
May																				
roots	158±59	740±180	879±14	4300±1900	60600±4500	3.2±1.2	1.4±1.0	0.34±0.14	15±11	925±13	0.106±0.052	15.7±4.5	310±170	1.50±1.17	16.6±4.2	0.37±0.24	1.23±0.63	4.7±1.2	0.018±0.010	1.14±0.31
leaves	343±64	1540±180	69±38	18500±3600	10300±1200	0.95±0.38	<LOD	0.18±0.10	261±69	75±14	0.079±0.035	294±17	47±18	0.17±0.10	15.9±4.2	0.18±0.10	0.32±0.25	31±16	<LOD	0.57±0.10
June																				
roots	260±120	487±88	435±14	1760±520	40200±3100	5.8±2.4	1.6±1.3	0.67±0.12	8.6±2.7	1034±14	0.25±0.21	21±13	730±430	0.98±0.12	13.2±7.0	0.79±0.51	1.6±1.3	12.5±6.0	0.038±0.026	1.83±0.90
leaves	349±40	1420±160	132±44	11200±3300	14600±2500	1.06±0.41	<LOD	0.2±0.10	316±68	101±20	0.116±0.031	746±12	37.7±3.8	0.19±0.21	23.0±6.9	0.256±0.042	0.23±0.10	47±29	0.010±0.010	0.60±0.13
flowers	201±51	2860±400	19±10	13300±3600	28400±5500	5.08±0.62	<LOD	<LOD	257±62	62±16	0.097±0.034	10.7±2.5	191±56	0.12±0.10	22.2±6.2	0.207±0.064	0.27±0.16	46±23	<LOD	0.78±0.65
September																				
roots	210±140	1160±820	300±600	6613±	95600±7000	9.8±7.0	2.5±1.1	3.0±2.0	36±18	510±260	0.62±0.33	35±28	240±130	2.1±1.5	25±13	0.20±0.13	1.14±0.10	18.4±9.2	0.082±0.026	4.4±2.7
leaves	368±58	1950±240	141±32	12574±	31700±2500	1.42±0.13	<LOD	0.454±0.021	760±120	87.7±8.5	0.47±0.12	1200±400	71±15	0.11±0.14	61±12	0.20±0.10	0.14±0.12	53±30	0.027±0.022	1.46±0.31
grapes	38±17	510±30	2.86±0.92	12388±	7500±2400	<LOD	<LOD	0.18±0.14	9.0±4.7	10.1±1.2	<LOD	29±14	<LOD	<LOD	4.4±1.1	<LOD	<LOD	9.3±6.1	<LOD	<LOD