Table S1 The relative concentration of volatile metabolites

Number	Name	0 day	3 day	6 day	9 day	12 day	15 day	21 day	28 day	42 day
1	Diallyl sulfide	0.847	1.486	2.565	3.486	4.054	4.633	4.469	5.938	7.017
2	Diallyl disulfide	14.511	26.385	25.593	24.954	24.162	21.928	20.725	17.752	13.817
3	Diallyl trisulfide	1.915	2.679	4.327	5.546	5.631	6.709	9.391	8.323	7.906
4	Diallyl tetrasulphide	15.483	10.470	9.298	9.377	8.936	8.578	9.280	8.006	7.639
5	Dimethyl disulfide	0.042	0.099	0.160	0.193	0.183	0.188	0.154	0.204	0.156
6	Allyl methyl sulfide	0.202	0.371	0.532	0.847	0.928	1.102	0.732	1.008	1.140
7	Allyl methyl disulfide	3.399	7.716	8.595	8.502	7.829	7.523	5.702	6.593	6.577
8	Allyl methyl trisulfide	2.287	2.125	3.036	3.938	4.197	4.978	5.591	6.623	7.178
9	Allyl thiopropionate	0.018	0.070	0.060	0.021	0.009	0.008	0.002	0.003	0.002
10	Allyl n-propyl sulphide	0.007	0.006	0.009	0.013	0.016	0.018	0.016	0.024	0.029
11	3-Vinyl-1,2-dithiacyclohex-4-ene	16.171	8.696	5.900	4.012	4.191	3.863	3.789	4.086	4.016
12	3-Vinyl-1,2-dithiacyclohex-5-ene	0.986	0.545	0.422	0.396	0.398	0.426	0.484	0.472	0.497
13	1,3-Dithiole-2-thione	0.547	0.490	0.594	0.547	0.603	0.413	0.408	0.481	0.460
14	3,4-Dimethylthiophene	1.563	0.831	0.525	0.204	0.155	0.100	0.078	0.083	0.093
15	1,3-Dithiacyclohexane	0.116	0.082	0.104	0.122	0.133	0.148	0.135	0.204	0.251
16	Sulfur dioxide	7.304	4.927	1.840	0.352	0.241	0.258	0.194	0.149	0.119
17	Propyl ethynyl sulfoxide	0.000	1.315	0.975	0.856	0.844	0.758	0.632	0.722	1.002
18	Trans-3,5-Diethyl-1,2,4-trithiolane	1.193	0.657	0.466	0.328	0.319	0.216	0.136	0.168	0.288
19	Trimethylthiourea	0.177	0.079	0.042	0.021	0.021	0.016	0.021	0.039	0.059
20	Methyl propenyl disulfide	0.921	1.172	1.308	1.592	1.568	1.538	1.152	1.424	1.679
21	2-Ethylidene[1,3]dithiane	0.573	0.333	0.223	0.122	0.123	0.118	0.087	0.108	0.097
22	Di(1-Propenyl) sulfide	0.388	0.361	0.291	0.200	0.205	0.203	0.168	0.209	0.222
23	3-Methoxythiophene	0.287	0.260	0.201	0.154	0.159	0.144	0.124	0.147	0.168
24	S-(3-Hydroxypropyl) thioacetate	0.007	0.280	0.147	0.041	0.019	0.018	0.008	0.007	0.005
25	2-Ethylthiophene	0.270	0.143	0.100	0.035	0.037	0.026	0.024	0.026	0.026
26	Acetic acid, 2-(thiocarboxy)hydrazide, O-methyl ester	0.068	0.212	0.340	0.399	0.380	0.355	0.275	0.299	0.321
27	Acetic acid	0.161	3.176	5.415	5.529	4.465	7.095	5.963	6.074	8.011
28	Butanoic acid	0.020	0.224	0.445	0.434	0.568	0.636	0.467	0.559	0.627
29	Benzoic acid	0.201	0.983	2.609	3.279	3.729	3.822	4.078	3.920	4.112
30	Propanoic acid	0.004	0.160	0.210	0.275	0.246	0.293	0.224	0.253	0.249
31	Propyl acetate	0.001	0.138	0.146	0.161	0.138	0.143	0.109	0.138	0.142
32	2-Butyl acetate	0.000	0.189	0.171	0.168	0.167	0.170	0.114	0.160	0.159
33	Butyric acid, ethyl ester	0.000	0.151	0.150	0.169	0.171	0.182	0.126	0.173	0.196
34	Propionic acid, propyl ester	0.000	0.016	0.019	0.019	0.020	0.019	0.013	0.018	0.020
35	Pentanoic acid, ethyl ester	0.075	0.048	0.061	0.068	0.064	0.068	0.044	0.058	0.062
36	Hexanoic acid, ethyl ester	0.004	0.015	0.032	0.036	0.034	0.034	0.022	0.028	0.028
37	Benzoic acid, ethyl ester	0.000	0.806	1.304	1.213	1.145	1.139	0.853	1.001	1.011
38	Propene	15.699	11.542	11.694	10.676	11.785	10.292	11.357	11.307	11.407
39	2-Propen-1-ol	0.986	0.726	0.386	0.085	0.073	0.065	0.043	0.066	0.046
40	Acetaldehyde	0.461	0.234	0.359	0.546	0.415	0.354	0.279	0.313	0.339
41	2-Butanol	0.013	0.326	0.397	0.518	0.456	0.497	0.358	0.495	0.543
42	1-Butanol, 3-methyl-, acetate	1.398	0.495	0.237	0.226	0.275	0.261	0.227	0.209	0.200
43	Ethyl trans-2-pentenoate	0.113	0.321	0.311	0.288	0.269	0.282	0.189	0.256	0.270
44	(Z)-Benzaldoxime	11.583	8.662	8.400	10.050	10.639	10.378	11.759	11.875	11.817

Values are means of triplicate relative peak areas to that of the total peak area of all components in the sample.

Table S2 The relative concentration of primary metabolites

Number	Name	0 day	3 day	6 day	9 day	12 day	15 day	21 day	28 day	42 day
1	Lactic acid	0.060	0.171	0.306	0.511	0.722	0.420	0.539	0.520	0.346
2	Butanedioic acid	0.004	0.020	0.038	0.067	0.099	0.073	0.117	0.125	0.095
3	DL-Malic acid	2.410	1.448	1.464	1.315	1.656	1.237	1.374	1.268	1.080
4	n.-Octanoic acid	2.037	1.214	0.790	0.433	0.447	0.181	0.219	0.195	0.276
5	Ribonic acid	0.476	0.297	0.217	0.185	0.151	0.127	0.139	0.133	0.120
6	Isocitric acid	0.412	0.403	0.580	0.682	0.685	0.509	0.547	0.488	0.531
7	L-Alanine	0.308	0.816	0.626	0.595	0.535	0.272	0.338	0.284	0.191
8	L-Leucine	0.086	0.156	0.221	0.295	0.258	0.121	0.145	0.141	0.103
9	L-Valine	0.042	0.046	0.051	0.045	0.045	0.029	0.039	0.036	0.035
10	L-Isoleucine	0.053	0.066	0.080	0.077	0.082	0.053	0.079	0.076	0.078
11	Glycine	0.008	0.034	0.038	0.037	0.038	0.029	0.035	0.036	0.037
12	Serine	0.300	0.064	0.064	0.040	0.060	0.031	0.051	0.047	0.037
13	L-Threonine	0.092	0.071	0.067	0.052	0.053	0.029	0.041	0.039	0.035
14	L-Proline	1.058	0.650	0.808	0.882	1.015	0.638	0.929	1.070	1.214
15	L-Cysteine	0.241	0.167	0.080	0.044	0.042	0.016	0.019	0.016	0.021
16	Ornithine	0.294	0.367	0.360	0.284	0.230	0.114	0.178	0.163	0.136
17	Glutamic acid	0.200	0.145	0.218	0.234	0.224	0.153	0.216	0.200	0.189
18	DL-Phenylalanine	0.177	0.180	0.232	0.249	0.257	0.179	0.245	0.248	0.266
19	L-Asparagine	0.177	0.079	0.106	0.054	0.047	0.021	0.025	0.022	0.024
20	Lanthionine	1.184	0.643	0.331	0.153	0.133	0.050	0.058	0.047	0.061
21	L-Methionine	0.148	0.115	0.083	0.059	0.053	0.031	0.038	0.034	0.043
22	L-Tyrosine	1.603	0.952	0.557	0.270	0.257	0.117	0.141	0.113	0.153
23	L-Lysine	0.085	0.122	0.164	0.175	0.192	0.131	0.192	0.185	0.179
24	L-Homoserine	0.462	0.253	0.125	0.059	0.053	0.025	0.028	0.025	0.036
25	N-Acetylglutamine	0.323	0.288	0.227	0.183	0.130	0.104	0.135	0.122	0.097
26	Erythritol	0.025	0.032	0.054	0.097	0.160	0.110	0.181	0.200	0.150
27	Pentitol	0.003	0.057	0.099	0.135	0.088	0.099	0.072	0.071	0.100
28	Xylulose	0.016	0.019	0.013	0.011	0.007	0.007	0.007	0.007	0.006
29	Arabinose	0.001	0.015	0.037	0.054	0.043	0.038	0.044	0.042	0.043
30	D-Ribose	0.024	0.021	0.022	0.027	0.026	0.018	0.024	0.028	0.026
31	D-Fructose	0.262	3.005	3.393	3.108	3.417	4.068	3.566	3.510	3.743
32	D-Glucose	0.048	0.679	1.698	2.375	2.364	2.706	2.586	2.894	2.914
33	Sucrose	6.557	5.091	5.207	4.635	5.050	5.201	5.065	5.924	5.559
34	Myo-Inositol	1.533	1.562	1.505	1.600	1.443	1.457	1.578	1.592	1.712
35	1,3 Propanediol	0.000	0.632	1.454	2.354	3.096	1.918	2.361	2.301	1.588
36	Succinylacetone	0.131	0.087	0.087	0.059	0.049	0.029	0.034	0.032	0.033

Values are means of triplicate relative peak areas to that of the internal standard.

Table S3 The detailed information of 15 phenolic compounds

Number	Name	Quant ion (m/z)	Collision energy (eV)	Declustering potential (V)	Regression equation	Correlation coefficient (r)	Linear range (ng/mL)	LOD[a] (ng/mL)	LOQ[b] (ng/mL)
1	Protocatechuic acid	109.10	-13.00	-23.00	y=8030x-18100	0.9942	5-500	1.5	5.0
2	(+)-Catechin	122.90	-34.00	-10.00	y=3100x+638	0.9879	1-100	0.3	1.0
3	*p*-Coumaric acid	64.80	-51.00	-17.00	y=1510x-2400	0.9987	1-100	0.3	1.0
4	Caffeic acid	134.90	-21.00	-38.00	y=91400+4720000	0.9985	50-2000	15.0	50.0
5	*p*-Hydroxybenzoic	92.90	-17.00	-20.00	y=2830+108000	0.9989	10-1000	3.0	10.0
6	Vanillic acid	107.90	-22.00	-30.00	y=7320+6650	0.9990	2-500	0.6	2.0
7	Quercitrin	254.80	-43.00	-29.00	y=1590x-223	0.9978	2-100	0.6	2.0
8	Ferulic acid	134.00	-19.00	-17.00	y=1430x+8520	0.9984	50-1000	15.0	50.0
9	Sinapic acid	163.90	-16.00	-20.00	y=1720x+41800	0.9966	10-1000	3.0	10.0
10	Myricetin	178.90	-29.00	-33.00	y=3000x-4970	0.9983	2-100	0.6	2.0
11	Resveratrol	143.00	-37.00	-23.00	y=2560x-1170	0.9974	2-100	0.6	2.0
12	Quercetin	150.90	-30.00	-7.00	y=94100x-166000	0.9997	2-200	0.6	2.0
13	Apigenin	117.00	-36.00	-15.00	y=9940x-23800	0.9966	2-100	0.6	2.0
14	Kaempferol	187.00	-37.00	-16.00	y=16900x+10200	0.9998	1-100	0.3	1.0
15	Isorhamnetin	300.00	-25.00	-68.00	y=58200x-135000	0.9969	2-100	0.6	2.0

[a] LOD is limit of detection

[b] LOQ is limit of quantation

Table S4 The concentration of 15 phenolic compounds (mg/kg of lyophilized sample, n=3)

Number	Name	0day	3day	6day	9day	12day	15day	21day	28day	42day
1	Protocatechuic acid	0.175	0.189	0.161	0.172	0.208	0.245	0.297	0.314	0.413
2	(+)-Catechin	0.648	0.462	0.273	0.556	0.784	0.700	0.406	0.523	1.184
3	*p*-Coumaric acid	0.040	0.061	0.084	0.111	0.119	0.125	0.138	0.356	0.383
4	Caffeic acid	1.815	20.134	28.630	26.343	29.727	34.300	28.490	19.553	19.633
5	*p*-Hydroxybenzoic	1.841	1.112	2.891	3.591	5.728	6.351	8.675	6.727	8.237
6	Vanillic acid	0.086	0.206	0.871	1.266	1.649	2.060	1.995	3.162	3.302
7	Quercitrin	0.746	1.135	0.893	0.675	0.441	0.329	0.526	0.834	0.511
8	Ferulic acid	0.626	5.840	7.224	10.096	17.953	9.224	10.537	17.850	24.710
9	Sinapic acid	0.765	2.266	7.413	8.139	12.490	6.963	6.067	9.529	7.644
10	Myricetin	0.039	0.382	0.214	0.370	0.200	0.200	0.298	0.828	0.832
11	Resveratrol	0.023	0.022	0.029	0.023	0.035	0.023	0.026	0.029	0.034
12	Quercetin	0.027	0.114	0.103	0.181	0.090	0.120	0.146	0.365	0.553
13	Apigenin	0.037	0.037	0.037	0.038	0.041	0.041	0.041	0.047	0.046
14	Kaempferol	0.010	0.052	0.041	0.068	0.053	0.064	0.084	0.195	0.286
15	Isorhamnetin	0.034	0.247	0.297	0.378	0.241	0.279	0.384	1.040	0.961

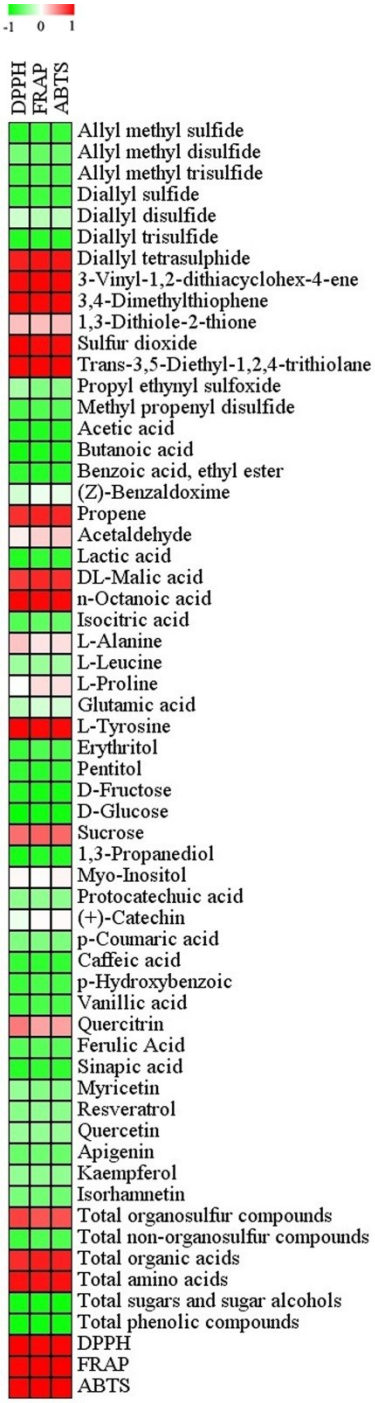

Fig. S1 A correlation map between metabolites and antioxidant activity (DPPH, ABTS and FRAP). Each square indicates the Pearson's correlation coefficient values (r). The red color represents a positive ($0 < r < 1$) correlation and the green color represents a negative ($-1 < r < 0$) correlation.