

Supplementary Table 1. List of germplasms and commercial cultivars of red paprika used in this study.

Individual No.	Accession No.	Scientific name	Name	Classification	Origin
1	IT225020	<i>Capsicum annuum</i> var. <i>annuum</i>	EU014	Cultivar	South America
2	IT225020	<i>Capsicum annuum</i> var. <i>annuum</i>	EU014	Cultivar	South America
3	IT235524	<i>Capsicum annuum</i> var. <i>annuum</i>	E.C.Wonder	-	Unknown
4	IT235549	<i>Capsicum annuum</i> var. <i>annuum</i>	Kubansky	Land-race	Russia
5	IT235549	<i>Capsicum annuum</i> var. <i>annuum</i>	Kubansky	Land-race	Russia
6	IT235549	<i>Capsicum annuum</i> var. <i>annuum</i>	Kubansky	Land-race	Russia
7	IT235551	<i>Capsicum annuum</i> var. <i>annuum</i>	Kapitoshka	Cultivar	Russia
8	IT235551	<i>Capsicum annuum</i> var. <i>annuum</i>	Kapitoshka	Cultivar	Russia
9	IT235551	<i>Capsicum annuum</i> var. <i>annuum</i>	Kapitoshka	Cultivar	Russia
10	IT235587	<i>Capsicum annuum</i> var. <i>annuum</i>	Blogarskii 79	-	Uzbekistan
11	IT235738	<i>Capsicum annuum</i> var. <i>annuum</i>	Doce italiana	Cultivar	Unknown
12	IT235738	<i>Capsicum annuum</i> var. <i>annuum</i>	Doce italiana	Cultivar	Unknown
13	IT236271	<i>Capsicum annuum</i> var. <i>annuum</i>	Pusztagold	-	Germany
14	IT236271	<i>Capsicum annuum</i> var. <i>annuum</i>	Pusztagold	-	Germany
15	IT236272	<i>Capsicum annuum</i> var. <i>annuum</i>	53	-	Uzbekistan
16	IT236272	<i>Capsicum annuum</i> var. <i>annuum</i>	53	-	Uzbekistan
17	IT236272	<i>Capsicum annuum</i> var. <i>annuum</i>	53	-	Uzbekistan
18	IT236278	<i>Capsicum annuum</i> var. <i>annuum</i>	Northstar Hybrid	-	Unknown
19	IT236705	<i>Capsicum annuum</i> var. <i>annuum</i>	Chi xuan san dao zhong	Cultivar	China
20	IT236705	<i>Capsicum annuum</i> var. <i>annuum</i>	Chi xuan san dao zhong	Cultivar	China
21	IT236845	<i>Capsicum annuum</i> var. <i>annuum</i>	Uzbekistan-KJG-2006-19	Land-race	Kyrgyzstan
22	IT236845	<i>Capsicum annuum</i> var. <i>annuum</i>	Uzbekistan-KJG-2006-19	Land-race	Kyrgyzstan
23	IT236845	<i>Capsicum annuum</i> var. <i>annuum</i>	Uzbekistan-KJG-2006-19	Land-race	Kyrgyzstan
24	IT236921	<i>Capsicum annuum</i> var. <i>annuum</i>	Blg. Ratund	Cultivar	Unknown
25	IT236921	<i>Capsicum annuum</i> var. <i>annuum</i>	Blg. Ratund	Cultivar	Unknown
26	IT236921	<i>Capsicum annuum</i> var. <i>annuum</i>	Blg. Ratund	Cultivar	Unknown
27	IT237098	<i>Capsicum annuum</i> var. <i>annuum</i>	New Ace	Cultivar	Unknown
28	IT237098	<i>Capsicum annuum</i> var. <i>annuum</i>	New Ace	Cultivar	Unknown
29	IT237292	<i>Capsicum annuum</i> var. <i>annuum</i>	Myasistii	Land-race	Kyrgyzstan
30	IT237292	<i>Capsicum annuum</i> var. <i>annuum</i>	Myasistii	Land-race	Kyrgyzstan
31	IT242337	<i>Capsicum annuum</i> var. <i>annuum</i>	A8E0123	Land-race	Bulgaria
32	IT242337	<i>Capsicum annuum</i> var. <i>annuum</i>	A8E0123	Land-race	Bulgaria
33	IT247030	<i>Capsicum annuum</i> var. <i>annuum</i>	RPK-210	Land-race	Russia
34	IT247030	<i>Capsicum annuum</i> var. <i>annuum</i>	RPK-210	Land-race	Russia
35	IT247217	<i>Capsicum annuum</i> var. <i>annuum</i>	P 088-2	Line	China
36	IT247217	<i>Capsicum annuum</i> var. <i>annuum</i>	P 088-2	Line	China
37	IT247218	<i>Capsicum annuum</i> var. <i>annuum</i>	P 088-7	Line	China
38	IT247218	<i>Capsicum annuum</i> var. <i>annuum</i>	P 088-7	Line	China
39	IT250172	<i>Capsicum annuum</i> var. <i>annuum</i>	Jia men tian shu	Cultivar	China
40	IT250216	<i>Capsicum annuum</i> var. <i>annuum</i>	Kapia	Land-race	Bulgaria
41	IT261229	<i>Capsicum annuum</i>	Germany-BHJ-1999-77	-	Unknown
42	IT261230	<i>Capsicum annuum</i>	Germany-BHJ-1999-78	-	Unknown
43	IT261230	<i>Capsicum annuum</i>	Germany-BHJ-1999-78	-	Unknown
44	IT261230	<i>Capsicum annuum</i>	Germany-BHJ-1999-78	-	Unknown
45	IT261266	<i>Capsicum annuum</i> var. <i>annuum</i>	P 0811-76	Line	China
46	IT261266	<i>Capsicum annuum</i> var. <i>annuum</i>	P 0811-76	Line	China
47	IT261266	<i>Capsicum annuum</i> var. <i>annuum</i>	P 0811-76	Line	China

Supplementary Table 1. Continued

Individual No.	Accession No.	Scientific name	Name	Classification	Origin
48	IT261267	<i>Capsicum annuum</i> var. <i>annuum</i>	P 0811-75	Line	China
49	IT261267	<i>Capsicum annuum</i> var. <i>annuum</i>	P 0811-75	Line	China
50	IT261267	<i>Capsicum annuum</i> var. <i>annuum</i>	P 0811-75	Line	China
51	IT261271	<i>Capsicum annuum</i> var. <i>annuum</i>	P 0811-69	Line	China
52	IT261271	<i>Capsicum annuum</i> var. <i>annuum</i>	P 0811-69	Line	China
53	IT261271	<i>Capsicum annuum</i> var. <i>annuum</i>	P 0811-69	Line	China
54	IT261274	<i>Capsicum annuum</i> var. <i>annuum</i>	P 0811-66	Line	China
55	IT261288	<i>Capsicum annuum</i> var. <i>annuum</i>	Da tian jiao	Cultivar	China
56	IT261288	<i>Capsicum annuum</i> var. <i>annuum</i>	Da tian jiao	Cultivar	China
57	IT261297	<i>Capsicum annuum</i> var. <i>annuum</i>	RPK-086	Land-race	Russia
58	IT261297	<i>Capsicum annuum</i> var. <i>annuum</i>	RPK-086	Land-race	Russia
59	IT261297	<i>Capsicum annuum</i> var. <i>annuum</i>	RPK-086	Land-race	Russia
60	IT261358	<i>Capsicum annuum</i> var. <i>annuum</i>	P 092-8	Line	China
61	IT261360	<i>Capsicum annuum</i> var. <i>annuum</i>	P 092-6	Line	China
62	IT261361	<i>Capsicum annuum</i> var. <i>annuum</i>	P 092-5	Line	China
63	IT261361	<i>Capsicum annuum</i> var. <i>annuum</i>	P 092-5	Line	China
64	IT261361	<i>Capsicum annuum</i> var. <i>annuum</i>	P 092-5	Line	China
65	IT261362	<i>Capsicum annuum</i> var. <i>annuum</i>	P 092-4	Line	China
66	IT261364	<i>Capsicum annuum</i> var. <i>annuum</i>	P 092-2	Line	China
67	IT261364	<i>Capsicum annuum</i> var. <i>annuum</i>	P 092-2	Line	China
68	IT261365	<i>Capsicum annuum</i> var. <i>annuum</i>	P 092-1	Line	China
69	IT261391	<i>Capsicum annuum</i> var. <i>annuum</i>	P 088-8	Line	China
70	IT261392	<i>Capsicum annuum</i> var. <i>annuum</i>	P 088-6	Line	China
71	IT261393	<i>Capsicum annuum</i> var. <i>annuum</i>	P 088-5	Line	China
72	IT261394	<i>Capsicum annuum</i> var. <i>annuum</i>	P 088-4	Line	China
73	IT261394	<i>Capsicum annuum</i> var. <i>annuum</i>	P 088-4	Line	China
74	IT261394	<i>Capsicum annuum</i> var. <i>annuum</i>	P 088-4	Line	China
75	IT261395	<i>Capsicum annuum</i> var. <i>annuum</i>	P 088-3	Line	China
76	IT261395	<i>Capsicum annuum</i> var. <i>annuum</i>	P 088-3	Line	China
77	IT261429	<i>Capsicum annuum</i> var. <i>annuum</i>	Kubanskij Rannij 70/60	Land-race	Japan
78	IT261429	<i>Capsicum annuum</i> var. <i>annuum</i>	Kubanskij Rannij 70/60	Land-race	Japan
79	IT261429	<i>Capsicum annuum</i> var. <i>annuum</i>	Kubanskij Rannij 70/60	Land-race	Japan
80	IT261660	<i>Capsicum annuum</i> var. <i>annuum</i>	BYAL KALINKOV	Cultivar	Bulgaria
81	IT270378	<i>Capsicum annuum</i> var. <i>annuum</i>	10G211	Land-race	Uzbekistan
82	IT270413	<i>Capsicum annuum</i> var. <i>annuum</i>	A7E0215	Land-race	Bulgaria
83	IT270413	<i>Capsicum annuum</i> var. <i>annuum</i>	A7E0215	Land-race	Bulgaria
84	IT270413	<i>Capsicum annuum</i> var. <i>annuum</i>	A7E0215	Land-race	Bulgaria
85	IT270414	<i>Capsicum annuum</i> var. <i>annuum</i>	A7E0236	Land-race	Bulgaria
86	IT270442	<i>Capsicum annuum</i> var. <i>annuum</i>	Aurora	Cultivar	Germany
87	-	<i>Capsicum annuum</i> L.	Siroco	Commercial cultivar	Nederland
88	-	<i>Capsicum annuum</i> L.	Mavera	Commercial cultivar	Nederland
89	-	<i>Capsicum annuum</i> L.	Nesbitt	Commercial cultivar	Nederland
90	-	<i>Capsicum annuum</i> L.	Nagano RZ	Commercial cultivar	Nederland
91	-	<i>Capsicum annuum</i> L.	Gina	Commercial cultivar	China
92	-	<i>Capsicum annuum</i> L.	Hera Red	Commercial cultivar	Korea
93	-	<i>Capsicum annuum</i> L.	Minerva Red	Commercial cultivar	Korea

Supplementary Table 2. Total polyphenol content, antioxidant activity, and total red pigment content of 86 paprika accessions and 7 paprika cultivars.

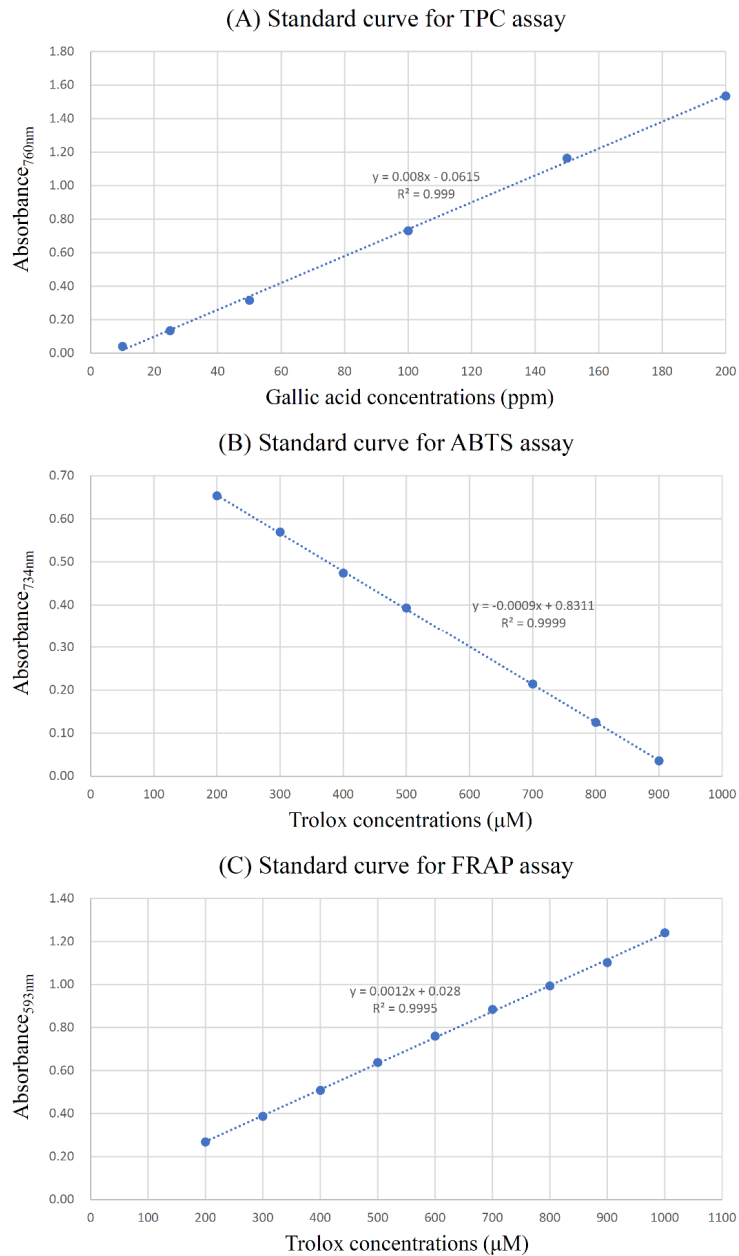
Individual No.	Accession No.	Classification	Origin	Total polyphenol content	Antioxidant activity		Total red pigment content
				TPC (mg GAE·g ⁻¹ DW)	ABTS (mg trolox·g ⁻¹ DW)	FRAP (mg trolox·g ⁻¹ DW)	ASTA value
1	IT225020	Germplasm	South America	10.33±0.37	35.04±0.47	24.86±0.45	38.38±1.16
2	IT225020	Germplasm	South America	9.50±0.12	35.74±0.64	20.72±0.31	39.69±0.38
3	IT235524	Germplasm	Unknown	9.49±0.41	28.72±1.99	18.50±0.25	15.99±1.28
4	IT235549	Germplasm	Russia	11.68±0.80	33.24±1.08	24.17±1.25	12.68±1.01
5	IT235549	Germplasm	Russia	11.84±0.52	34.58±1.98	27.42±1.85	21.68±0.38
6	IT235549	Germplasm	Russia	9.48±1.01	27.16±0.79	18.78±1.87	54.56±3.80
7	IT235551	Germplasm	Russia	10.47±0.48	36.41±0.22	21.02±1.28	44.66±4.20
8	IT235551	Germplasm	Russia	9.55±0.06	35.55±1.08	19.96±0.58	29.25±2.48
9	IT235551	Germplasm	Russia	10.81±0.30	32.19±0.19	25.76±0.85	39.99±3.37
10	IT235587	Germplasm	Uzbekistan	8.96±0.22	29.60±1.32	18.48±0.65	51.06±1.74
11	IT235738	Germplasm	Unknown	10.99±0.13	29.56±0.46	17.51±0.88	30.39±0.21
12	IT235738	Germplasm	Unknown	8.73±0.21	30.56±0.66	19.05±0.54	48.11±0.85
13	IT236271	Germplasm	Germany	10.30±0.31	34.89±0.99	20.25±1.48	7.49±0.17
14	IT236271	Germplasm	Germany	11.12±0.17	38.55±1.22	21.27±1.36	17.63±0.22
15	IT236272	Germplasm	Uzbekistan	10.73±0.98	28.56±1.20	22.79±0.22	22.58±0.90
16	IT236272	Germplasm	Uzbekistan	9.85±0.71	31.64±0.49	21.89±1.05	26.38±0.38
17	IT236272	Germplasm	Uzbekistan	9.06±0.52	31.64±1.73	18.72±0.03	34.80±1.51
18	IT236278	Germplasm	Unknown	10.91±0.84	32.95±0.83	24.46±0.26	14.81±1.24
19	IT236705	Germplasm	China	10.04±0.81	32.32±1.19	21.46±0.94	33.78±2.17
20	IT236705	Germplasm	China	9.87±0.21	31.94±1.40	21.76±0.46	34.03±1.62
21	IT236845	Germplasm	Kyrgyzstan	10.99±0.23	38.48±1.43	26.13±0.07	26.62±1.78
22	IT236845	Germplasm	Kyrgyzstan	10.53±0.18	39.83±0.54	24.42±0.87	37.94±1.11
23	IT236845	Germplasm	Kyrgyzstan	10.82±0.13	36.16±1.28	23.04±0.30	40.43±3.70
24	IT236921	Germplasm	Unknown	9.88±0.54	40.22±0.72	23.80±1.08	22.50±1.05
25	IT236921	Germplasm	Unknown	9.23±0.10	37.97±0.80	26.83±0.73	14.51±0.81
26	IT236921	Germplasm	Unknown	10.46±0.62	38.31±1.12	31.06±1.05	24.14±2.63
27	IT237098	Germplasm	Unknown	7.80±0.09	29.25±0.37	18.38±0.66	14.32±0.29
28	IT237098	Germplasm	Unknown	8.97±0.33	35.71±1.15	20.64±0.21	25.28±1.85
29	IT237292	Germplasm	Kyrgyzstan	9.25±0.32	37.24±0.37	21.52±0.33	51.63±1.43
30	IT237292	Germplasm	Kyrgyzstan	10.10±0.19	43.36±0.32	21.77±0.40	75.03±3.21
31	IT242337	Germplasm	Bulgaria	8.68±0.09	36.00±0.30	14.97±0.17	65.41±0.78
32	IT242337	Germplasm	Bulgaria	9.05±0.41	35.40±0.53	15.73±0.33	59.67±1.91
33	IT247030	Germplasm	Russia	9.52±0.27	34.72±0.20	18.30±0.28	44.47±1.01
34	IT247030	Germplasm	Russia	7.69±0.26	29.76±0.77	16.94±0.03	55.32±1.03
35	IT247217	Germplasm	China	9.67±0.28	37.10±0.39	20.97±1.02	25.34±0.22
36	IT247217	Germplasm	China	9.35±0.09	35.70±0.19	20.24±0.47	35.12±3.03
37	IT247218	Germplasm	China	9.10±0.05	32.89±0.50	18.37±0.26	16.21±1.10
38	IT247218	Germplasm	China	8.73±0.40	33.05±0.16	15.86±0.77	43.73±0.26
39	IT250172	Germplasm	China	9.38±0.25	31.87±0.30	13.19±0.37	46.17±0.43

Supplementary Table 2. Continued

Individual No.	Accession No.	Classification	Origin	Total polyphenol content	Antioxidant activity		Total red pigment content
				TPC (mg GAE·g ⁻¹ DW)	ABTS (mg trolox·g ⁻¹ DW)	FRAP (mg trolox·g ⁻¹ DW)	ASTA value
40	IT250216	Germplasm	Bulgaria	7.44±0.06	27.77±0.79	13.88±0.28	50.29±2.48
41	IT261229	Germplasm	Unknown	8.22±0.06	30.71±0.38	17.34±0.70	21.76±0.68
42	IT261230	Germplasm	Unknown	10.65±0.77	44.84±1.04	22.60±1.03	5.30±0.13
43	IT261230	Germplasm	Unknown	11.10±0.86	38.84±0.38	22.62±0.54	5.30±0.24
44	IT261230	Germplasm	Unknown	10.98±0.31	42.77±0.47	21.49±0.21	9.05±0.21
45	IT261266	Germplasm	China	8.25±0.26	31.02±0.21	15.63±0.86	52.86±1.11
46	IT261266	Germplasm	China	6.66±0.24	25.01±0.31	10.60±0.03	54.89±0.19
47	IT261266	Germplasm	China	8.38±0.17	32.59±0.44	12.31±0.23	53.44±1.48
48	IT261267	Germplasm	China	9.02±0.28	32.28±0.25	15.03±0.53	35.40±0.09
49	IT261267	Germplasm	China	7.94±0.05	29.60±0.77	14.67±0.42	32.66±1.12
50	IT261267	Germplasm	China	10.00±0.52	39.03±1.30	17.81±0.18	36.98±0.78
51	IT261271	Germplasm	China	6.96±0.33	27.33±0.21	14.67±0.20	44.69±1.53
52	IT261271	Germplasm	China	6.35±0.17	24.25±0.62	14.09±0.25	13.28±0.30
53	IT261271	Germplasm	China	7.05±0.17	29.41±0.74	13.88±0.15	36.71±0.05
54	IT261274	Germplasm	China	8.96±0.10	32.99±0.42	24.30±0.06	24.87±0.50
55	IT261288	Germplasm	China	8.35±0.43	31.65±0.16	15.84±0.11	45.10±0.54
56	IT261288	Germplasm	China	9.00±0.31	34.74±0.50	13.50±0.69	68.99±0.95
57	IT261297	Germplasm	Russia	11.19±0.06	38.87±0.52	16.42±0.44	15.47±0.26
58	IT261297	Germplasm	Russia	9.14±0.58	38.51±0.41	15.31±0.28	22.33±0.74
59	IT261297	Germplasm	Russia	9.37±0.52	38.43±2.39	18.03±0.38	14.76±0.22
60	IT261358	Germplasm	China	7.95±0.31	31.25±1.04	10.54±0.12	37.91±1.26
61	IT261360	Germplasm	China	7.55±0.27	27.38±0.45	15.12±1.19	38.59±0.24
62	IT261361	Germplasm	China	9.27±0.32	34.25±0.84	13.46±1.03	23.04±0.46
63	IT261361	Germplasm	China	7.50±0.08	22.29±0.75	10.56±0.10	19.95±0.93
64	IT261361	Germplasm	China	10.89±0.42	38.02±0.60	17.05±0.22	15.28±0.13
65	IT261362	Germplasm	China	8.21±0.21	30.89±0.35	12.58±0.79	52.51±0.69
66	IT261364	Germplasm	China	8.64±0.09	28.25±0.45	11.70±1.54	16.81±0.28
67	IT261364	Germplasm	China	8.37±0.66	32.34±0.60	13.25±0.41	19.95±0.26
68	IT261365	Germplasm	China	7.18±0.06	25.47±1.33	12.60±0.30	23.37±0.41
69	IT261391	Germplasm	China	9.38±0.52	27.83±1.51	11.76±1.09	38.68±0.39
70	IT261392	Germplasm	China	7.68±0.15	30.51±0.53	12.61±0.13	25.15±0.66
71	IT261393	Germplasm	China	7.47±0.30	24.56±3.66	8.82±1.59	26.32±0.25
72	IT261394	Germplasm	China	9.72±0.65	25.64±0.28	12.53±1.11	21.92±1.83
73	IT261394	Germplasm	China	7.84±0.25	23.79±0.26	9.29±0.27	34.77±2.46
74	IT261394	Germplasm	China	7.78±0.05	25.08±2.45	11.44±1.46	41.03±0.17
75	IT261395	Germplasm	China	7.14±0.55	20.49±2.61	11.10±0.86	20.83±0.25
76	IT261395	Germplasm	China	8.86±0.20	22.50±2.50	13.20±0.91	52.89±1.16
77	IT261429	Germplasm	Japan	8.14±0.41	27.33±0.45	9.68±1.64	29.66±0.68
78	IT261429	Germplasm	Japan	7.45±0.06	26.12±0.46	11.57±0.32	40.18±2.07
79	IT261429	Germplasm	Japan	7.60±0.43	26.49±0.57	11.40±0.23	44.36±0.83

Supplementary Table 2. Continued

Individual No.	Accession No.	Classification	Origin	Total polyphenol content	Antioxidant activity		Total red pigment content
				TPC (mg GAE·g ⁻¹ DW)	ABTS (mg trolox·g ⁻¹ DW)	FRAP (mg trolox·g ⁻¹ DW)	ASTA value
80	IT261660	Germplasm	Bulgaria	7.88±0.28	29.91±0.26	13.66±0.24	14.65±0.45
81	IT270378	Germplasm	Uzbekistan	9.21±0.18	28.79±0.83	14.02±0.54	33.26±1.16
82	IT270413	Germplasm	Bulgaria	6.84±0.14	23.43±0.57	11.10±0.05	39.96±0.47
83	IT270413	Germplasm	Bulgaria	7.69±0.01	22.98±1.22	12.81±0.44	49.39±1.17
84	IT270413	Germplasm	Bulgaria	7.50±0.06	19.80±1.56	14.30±0.26	40.73±0.37
85	IT270414	Germplasm	Bulgaria	8.38±0.02	23.51±0.87	17.38±0.89	36.38±0.09
86	IT270442	Germplasm	Germany	10.48±0.13	32.80±1.09	19.76±0.07	24.00±1.06
87	Siroco	Commercial cultivar	Nederland	9.26±0.24	27.03±0.26	20.65±0.26	21.14±1.43
88	Mavera	Commercial cultivar	Nederland	8.75±0.13	29.46±1.08	17.86±1.06	17.20±0.71
89	Nesbit	Commercial cultivar	Nederland	8.05±0.04	28.98±0.51	14.37±1.15	24.20±0.94
90	Nagano RZ	Commercial cultivar	Nederland	9.63±0.18	29.95±0.95	20.44±0.38	33.73±0.70
91	Gina	Commercial cultivar	China	9.97±0.11	32.52±0.51	21.30±0.65	29.68±1.04
92	Hera Red	Commercial cultivar	Korea	11.50±0.12	33.53±0.88	21.88±0.38	14.47±0.25
93	Minerva Red	Commercial cultivar	Korea	8.49±0.34	29.84±0.10	19.13±1.05	29.73±1.11



Supplementary Fig. 1. Standard curves for TPC (A), ABTS (B), and FRAP (C) assays. TPC, total polyphenol content; ABTS, 2,2'-azino-bis-(3-ethylbenzothiazoline-6-sulfonic acid); FRAP, ferric reducing antioxidant power.