

## Supplementary materials

**Table S1.** Reported capsaicinoid contents in Korean red pepper (Hwang et al., 2011; Hwang et al., 2014; Jeon and Lee, 2009; Yu et al., 2009)

Red pepper cultivar	Capsaicin (mg/kg)	Dihydrocapsaicin (mg/kg)	Total capsaicinoid (mg/kg)
Cheongyang	774.2–2,788.1	331.8–720.1	1,106.0–3,508.2
Hanbando	959.7	451.7	1,411.4
Geonchowang	840.0	339.4	1,179.4
Woorigeon	706.2	290.5	996.7
Geumbit	553.6	273.9	827.5
Muhanjilju	451.9	194.6	646.5
Dokyacheongcheong	439.8	200.6	640.4
PR Daechon	389.2	151.9	541.1
Daebakna	316.3	119.6	435.9
Shinsegye	298.2	248.4	546.6
Jangsuwang	282.3	154.8	437.1
Ogwang	344.2	214.4	558.6
Daetong	251.8	204.2	456.0
Wangdaebak	1,222.2	437.8	1,660.0
Myeongak	216.9	156.1	373.0
Shishito	153.5	77.9	231.4

**Table S2.** Labeled pungency level, moisture content, ASTA color value, capsaicinoid content and free sugar content of red pepper powders

No.	Labeled pungency level <sup>1)</sup>	Moisture (% w/w)	ASTA color value	Capsaicinoid (mg/kg sample)			Free sugar (% w/w)			
				Capsaicin	Dihydrocapsaicin	Total capsaicinoid	Fructose	Glucose	Sucrose	Total free sugar
1	-	10.9±0.2 <sup>2)</sup>	73.7±0.1	55.5±0.4	28.2±0.2	83.7±0.5	6.5±0.7	3.6±0.4	0.4±0.1	10.6±1.2
2	-	11.0±0.2	75.2±1.6	63.5±0.4	31.4±0.2	94.9±0.7	9.3±0.0	5.3±0.0	0.7±0.0	15.3±0.0
3	-	7.7±0.2	96.8±0.4	83.2±0.3	41.1±0.1	124.3±0.4	7.4±0.2	4.8±0.1	0.5±0.0	12.7±0.3
4	-	11.8±0.1	59.4±1.4	127.4±0.4	77.4±3.4	204.9±3.7	5.4±0.2	3.4±0.1	0.3±0.0	9.1±0.3
5	-	10.7±0.0	60.4±0.8	145.3±3.6	82.7±0.7	228.0±2.9	5.4±0.1	3.1±0.1	0.3±0.0	8.9±0.2
6	1	10.1±0.0	101.8±0.8	35.9±0.2	24.8±0.1	60.7±0.2	6.1±0.3	3.8±0.2	0.2±0.0	10.1±0.5
7	1	8.3±0.1	103.6±0.7	40.5±0.2	27.2±0.1	67.7±0.3	6.6±0.1	4.1±0.1	0.5±0.0	11.2±0.2
8	1	9.0±0.1	110.4±1.2	40.0±0.9	27.9±0.6	67.9±1.4	8.3±0.2	5.3±0.0	0.7±0.0	14.2±0.2
9	1	9.3±0.0	109.2±0.1	41.1±1.1	28.9±0.5	69.9±1.6	7.0±0.1	4.5±0.1	0.6±0.0	12.0±0.2
10	1	9.2±0.0	102.5±1.4	45.8±2.0	30.7±1.2	76.4±3.3	6.7±0.2	4.7±0.2	0.6±0.0	12.0±0.4
11	1	7.7±0.1	93.5±2.6	49.7±0.6	33.5±0.2	83.2±0.8	5.8±0.1	3.7±0.1	0.5±0.0	9.9±0.1
12	1	9.0±0.1	100.3±0.6	50.8±0.0	35.1±0.0	86.0±0.0	7.1±0.3	5.8±0.2	0.7±0.0	13.6±0.5
13	1	8.3±0.0	112.0±0.1	56.6±1.2	42.2±1.1	98.8±0.2	7.3±0.1	4.7±0.1	0.7±0.0	12.7±0.2
14	1	13.9±0.3	78.7±0.7	70.4±1.6	41.8±2.9	112.2±4.5	5.1±0.3	3.0±0.2	0.3±0.0	8.4±0.4
15	1	14.7±0.1	71.7±0.5	71.7±0.4	42.1±0.4	113.9±0.8	5.6±0.6	3.0±0.3	0.3±0.0	8.9±1.0
16	1	13.4±0.4	72.0±2.3	70.7±4.8	44.1±3.2	114.8±8.0	5.3±0.1	3.1±0.0	0.3±0.0	8.6±0.1
17	1	12.4±0.7	72.0±0.5	76.0±1.0	46.0±0.4	122.0±1.4	5.7±0.4	3.2±0.2	0.8±0.0	9.7±0.7
18	1	12.7±0.7	86.6±0.4	78.2±0.1	44.4±2.3	122.6±2.2	6.1±0.0	3.5±0.0	0.7±0.0	10.3±0.1
19	1	11.1±0.2	93.7±0.9	79.1±1.3	45.5±0.3	124.6±1.6	8.5±0.1	5.2±0.0	0.2±0.0	13.9±0.1
20	1	13.1±0.5	92.3±0.7	79.4±0.4	45.6±0.6	125.1±1.0	8.6±0.1	5.3±0.1	0.2±0.0	14.2±0.2
21	1	9.6±0.8	95.8±0.1	79.3±0.4	46.0±0.2	125.3±0.6	10.5±0.0	6.5±0.1	0.2±0.0	17.2±0.1
22	1	12.0±0.0	67.4±0.1	79.9±0.6	48.0±2.0	127.9±1.5	5.2±0.0	3.0±0.0	0.8±0.0	9.0±0.1
23	1	11.3±0.4	69.3±0.9	81.3±0.6	48.6±0.2	129.9±0.3	5.1±0.2	2.7±0.1	0.7±0.0	8.5±0.4
24	1	7.0±0.2	63.2±0.3	82.2±0.5	56.4±0.1	138.6±0.4	7.4±0.3	3.9±0.1	0.9±0.1	12.2±0.5
25	1	13.4±0.1	62.7±1.8	89.4±5.7	52.3±4.0	141.7±9.6	6.2±0.0	3.8±0.0	0.4±0.0	10.4±0.1
26	1	13.3±0.1	57.9±0.6	92.8±2.1	55.2±1.3	148.0±3.4	6.1±0.0	3.7±0.0	0.4±0.0	10.3±0.0
27	1	6.6±0.0	66.9±1.0	94.5±0.1	64.4±0.0	158.9±0.1	8.2±0.7	4.6±0.4	0.5±0.1	13.3±1.2
28	1	7.7±0.4	62.6±1.3	105.8±3.5	73.8±2.0	179.7±5.4	6.7±0.1	3.7±0.1	0.4±0.0	10.8±0.2
29	2	12.6±0.3	77.1±2.2	88.3±2.1	51.4±1.4	139.7±3.5	5.1±0.2	2.9±0.1	0.7±0.0	8.7±0.4
30	2	12.2±0.1	74.3±0.8	95.4±1.6	54.0±0.9	149.3±2.5	6.6±0.5	3.8±0.3	0.4±0.0	10.7±0.8
31	2	11.6±0.1	69.3±0.6	101.9±4.1	53.7±1.9	155.6±5.9	5.1±0.1	2.9±0.0	0.3±0.0	8.3±0.2
32	2	12.4±0.1	71.0±1.0	109.3±2.0	61.6±1.3	170.9±3.3	4.5±0.3	2.6±0.2	0.7±0.0	7.8±0.5
33	2	12.0±0.1	81.4±2.1	134.8±0.3	71.9±0.1	206.7±0.4	4.9±0.7	2.9±0.1	0.2±0.0	8.1±0.8
34	2	11.5±0.3	69.7±1.1	153.7±0.4	83.0±0.2	236.7±0.6	4.9±0.2	2.7±0.1	0.2±0.0	7.7±0.2

(continued)

No.	Labeled pungency level <sup>1)</sup>	Moisture (% w/w)	ASTA color value	Capsaicinoid (mg/kg sample)			Free sugar (% w/w)			
				Capsaicin	Dihydrocapsaicin	Total capsaicinoid	Fructose	Glucose	Sucrose	Total free sugar
35	2	7.5±0.2	67.5±0.5	167.4±6.0	103.4±3.1	270.8±9.1	7.2±0.6	4.0±0.3	0.5±0.0	11.7±0.9
36	2	6.6±0.1	62.9±0.9	206.8±1.8	132.5±1.2	339.3±3.0	5.6±0.3	3.4±0.2	0.2±0.0	9.2±0.4
37	3	6.8±0.1	66.4±0.1	42.8±1.2	22.4±0.8	65.1±2.1	8.8±0.1	4.9±0.0	0.4±0.0	14.2±0.1
38	3	11.4±0.1	69.5±2.1	71.6±0.6	39.3±0.3	110.9±0.9	4.7±0.2	2.7±0.1	0.3±0.0	7.7±0.4
39	3	9.4±0.4	66.9±0.9	77.4±0.4	43.6±0.1	120.9±0.5	9.2±0.0	6.4±0.0	0.5±0.0	16.1±0.1
40	3	11.8±0.4	61.6±1.9	78.8±0.8	43.4±0.5	122.2±1.3	7.7±0.0	5.3±0.1	0.3±0.0	13.3±0.0
41	3	12.8±0.0	77.1±0.2	77.6±2.2	45.4±1.6	123.1±3.8	6.1±0.1	3.4±0.1	0.3±0.0	9.9±0.2
42	3	12.6±0.4	71.3±0.1	80.4±1.7	48.4±1.1	128.8±2.8	4.7±0.1	2.8±0.1	0.3±0.0	7.9±0.2
43	3	12.2±0.1	87.7±1.6	83.0±2.9	48.5±1.5	131.5±4.3	5.1±0.5	3.1±0.3	0.3±0.0	8.4±0.9
44	3	13.1±0.6	72.8±2.0	83.4±0.1	48.9±0.1	132.4±0.2	5.5±0.0	3.2±0.0	0.3±0.0	9.1±0.0
45	3	12.5±0.2	59.3±2.0	86.1±0.6	50.8±0.6	136.9±1.2	5.8±0.1	3.5±0.0	0.3±0.0	9.6±0.1
46	3	12.6±0.1	64.0±0.8	89.0±6.3	52.2±4.0	141.1±10.3	6.3±0.0	3.9±0.0	0.4±0.0	10.6±0.1
47	3	6.9±0.4	62.5±1.0	97.0±4.3	68.1±2.8	165.1±7.1	7.2±0.5	4.0±0.3	0.5±0.0	11.7±0.8
48	3	11.9±0.0	85.5±1.0	107.8±1.3	59.1±1.0	167.0±2.3	5.7±0.1	3.1±0.0	0.3±0.0	9.1±0.1
49	3	10.2±0.0	88.6±0.8	110.7±0.4	67.8±0.1	178.5±0.3	8.1±0.1	4.7±0.2	0.6±0.0	13.4±0.3
50	3	6.2±0.1	64.6±0.0	109.5±4.6	73.3±2.9	182.8±7.5	6.5±0.0	3.3±0.0	0.3±0.0	10.1±0.1
51	3	13.7±1.6	93.9±0.5	126.3±1.3	68.6±0.6	194.8±2.0	8.8±0.2	5.2±0.1	0.4±0.0	14.4±0.3
52	3	6.7±0.2	93.7±0.1	131.9±0.1	63.4±0.2	195.3±0.4	8.8±0.1	5.1±0.0	0.5±0.0	14.4±0.0
53	3	5.0±0.1	47.9±0.4	128.0±0.1	71.7±0.0	199.7±0.1	8.3±0.1	5.7±0.1	0.6±0.0	14.5±0.1
54	3	9.1±0.0	90.1±3.5	135.1±2.3	72.3±2.0	207.4±4.3	7.7±0.0	4.6±0.0	1.0±0.0	13.3±0.0
55	3	11.6±0.2	63.1±0.2	136.1±1.5	72.4±1.3	208.5±2.8	4.7±0.1	2.4±0.0	0.3±0.0	7.5±0.1
56	3	11.5±0.0	71.8±1.0	135.9±0.2	77.3±0.0	213.3±0.2	4.6±0.3	2.6±0.1	0.3±0.0	7.5±0.4
57	3	8.5±0.1	88.7±1.0	150.2±1.3	72.9±0.7	223.1±2.0	8.7±0.1	5.2±0.1	1.0±0.0	14.9±0.2
58	3	8.6±0.0	60.0±0.2	144.1±0.8	86.9±0.6	231.0±1.4	7.1±0.0	4.4±0.0	0.4±0.0	11.9±0.0
59	3	12.2±0.1	94.5±0.0	153.6±0.8	81.0±0.6	234.6±1.4	8.1±0.0	4.7±0.0	0.4±0.0	13.2±0.0
60	3	9.4±0.0	66.1±1.4	147.0±1.1	88.0±0.6	235.0±1.8	5.8±0.1	3.9±0.1	0.3±0.0	10.0±0.2
61	3	7.1±0.1	76.5±1.4	125.5±1.2	111.8±1.0	237.3±2.1	9.4±0.0	5.9±0.1	0.4±0.0	15.7±0.2
62	3	10.3±0.0	46.9±0.2	153.7±4.4	93.7±6.7	247.4±11.1	6.2±0.1	3.3±0.0	0.5±0.0	10.0±0.1
63	3	8.0±0.2	111.6±2.3	179.8±1.5	89.0±0.6	268.7±2.0	7.1±0.1	5.3±0.1	0.8±0.0	13.2±0.0
64	3	9.4±0.0	99.1±2.1	192.8±0.2	97.9±0.5	290.6±0.7	5.3±0.1	3.3±0.0	0.6±0.0	9.3±0.1
65	3	10.5±0.0	88.8±4.3	192.5±1.1	118.1±0.9	310.6±2.1	7.4±0.1	4.2±0.1	1.0±0.0	12.6±0.1
66	3	9.0±0.1	109.0±0.7	209.5±0.2	101.4±0.1	310.9±0.3	6.4±0.2	4.3±0.0	0.6±0.0	11.4±0.2
67	3	9.0±0.1	101.7±0.3	213.8±1.8	101.6±1.0	315.4±2.8	6.0±0.0	3.7±0.0	0.6±0.0	10.3±0.0
68	3	5.7±0.0	84.1±0.1	216.3±2.0	129.2±1.3	345.4±3.3	9.4±1.4	6.5±0.9	0.5±0.1	16.5±2.4
69	3	9.3±0.0	106.8±0.5	240.9±9.4	123.7±4.4	364.6±13.8	6.5±0.1	4.6±0.1	1.0±0.0	12.0±0.1

(continued)

No.	Labeled pungency level <sup>1)</sup>	Moisture (% w/w)	ASTA color value	Capsaicinoid (mg/kg sample)			Free sugar (% w/w)			
				Capsaicin	Dihydrocapsaicin	Total capsaicinoid	Fructose	Glucose	Sucrose	Total free sugar
70	3	10.0±0.0	86.7±1.4	245.2±9.6	146.2±6.2	391.4±15.8	7.9±0.3	5.8±0.2	0.4±0.0	14.1±0.6
71	3	7.9±0.1	102.0±0.0	268.7±1.8	123.2±0.9	391.9±2.8	6.0±0.2	3.9±0.1	0.7±0.0	10.6±0.3
72	3	11.1±0.4	68.5±0.9	328.4±0.1	188.1±0.1	516.5±0.2	8.5±0.0	5.3±0.0	0.3±0.0	14.2±0.1
73	3	9.7±0.0	101.1±2.3	363.9±13.7	182.1±2.3	546.0±15.9	5.1±0.1	3.9±0.1	1.3±0.0	10.3±0.2
74	4	11.8±0.0	58.2±0.4	92.0±2.7	53.7±1.7	145.6±4.3	6.0±0.4	3.6±0.3	0.4±0.1	9.9±0.8
75	4	11.6±0.1	57.7±0.4	97.2±8.1	55.2±5.0	152.3±13.1	6.9±0.2	4.2±0.1	0.5±0.0	11.5±0.3
76	4	10.8±0.4	72.0±0.8	322.6±3.1	158.6±1.4	481.2±4.6	8.2±0.1	5.1±0.1	0.3±0.0	13.6±0.2
77	4	10.7±0.0	121.6±0.2	395.0±2.0	223.2±1.3	618.2±3.3	6.2±0.0	4.4±0.0	0.6±0.0	11.2±0.0
78	4	5.7±0.1	69.6±1.0	439.8±4.4	227.6±1.6	667.5±5.9	10.0±0.0	5.6±0.0	0.4±0.0	16.0±0.0
79	4	9.6±0.1	110.7±1.8	902.9±40.7	290.9±13.1	1,193.8±53.9	3.7±0.2	2.1±0.1	0.5±0.0	6.2±0.4
80	5	5.6±0.0	69.2±1.7	332.5±5.7	157.2±2.5	489.7±8.2	9.1±1.3	5.3±0.7	0.7±0.2	15.1±2.1
81	5	9.4±0.0	61.4±0.3	564.0±13.1	269.7±4.7	833.7±17.8	5.2±0.2	2.6±0.1	0.3±0.0	8.2±0.3
82	5	8.7±0.1	111.4±1.0	705.1±0.6	274.0±1.2	979.1±0.7	4.1±0.2	2.2±0.1	0.4±0.0	6.7±0.3
83	5	9.1±0.4	84.4±0.3	732.6±12.4	256.0±4.6	988.6±17.0	5.3±0.1	3.2±0.1	0.3±0.0	8.7±0.2
84	5	8.5±0.1	103.1±1.4	727.2±2.7	278.1±1.3	1,005.3±4.0	4.3±0.1	2.3±0.1	0.5±0.0	7.1±0.2
85	5	4.8±0.0	65.4±0.0	711.5±12.9	298.9±6.1	1,010.4±19.0	6.3±0.1	3.3±0.0	0.5±0.0	10.1±0.1
86	5	8.9±0.1	60.6±0.3	693.1±5.9	327.3±3.2	1,020.4±9.1	4.9±0.1	2.7±0.0	0.4±0.0	8.1±0.1
87	5	12.2±0.2	59.2±0.2	737.1±9.2	300.4±3.4	1,037.6±12.5	4.6±0.1	2.3±0.1	0.3±0.0	7.2±0.1
88	5	9.2±0.0	106.7±0.2	774.7±24.7	302.6±7.9	1,077.3±32.7	4.2±0.1	2.3±0.0	0.4±0.0	6.9±0.1
89	5	9.6±0.1	108.2±0.6	817.9±6.0	317.4±2.5	1,135.3±8.5	4.1±0.2	2.3±0.1	0.4±0.0	6.7±0.3
90	5	9.6±0.1	101.2±1.0	827.1±3.4	315.4±1.2	1,142.5±4.6	3.9±0.2	2.2±0.1	0.5±0.0	6.5±0.3
91	5	7.5±0.8	43.5±1.0	783.8±28.5	472.3±17.8	1,256.1±46.4	7.5±0.1	4.4±0.3	0.2±0.0	12.1±0.3
92	5	7.9±0.0	108.5±1.6	1,021.1±12.2	355.3±3.6	1,376.5±15.8	3.8±0.2	2.2±0.1	0.5±0.0	6.5±0.1
93	5	8.7±0.0	115.4±1.7	1,029.5±0.6	372.4±0.2	1,402.0±0.8	4.0±0.2	2.0±0.0	0.5±0.0	6.5±0.2

<sup>1)</sup>Pungency level was labelled as following: -, no label; 1, mild hot; 2, slight hot; 3, medium hot; 4, very hot; 5, extreme hot.

<sup>2)</sup>All samples were analyzed in duplicate and expressed as mean±standard deviation.