

Table 15. β -Carotene and derived non-volatile β -apo-carotenoid content in food items. Data represent the mean (\pm SEM) of at least three technical replicates. Repetitive entries represent biological replicates originating (Orig) from different Philippine markets (L1-L5). Field-grown biofortified crops were from HarvestPlus (HP) or the greenhouse (FR). The categories (Cat) are (NGV) non-green vegetables; (C) cereal grains; (GLV) green leafy vegetables; (F) fruits; and (SD) soft drinks. β -carotene and apo-carotenoids were quantified by LC-MS as given in the Methods section. (nd) not detected; (trace) refers to compounds < than 50% ($0.2 \mu\text{g g}^{-1}$ or ml^{-1} ; β -carotene) and < 25% (2.5 ng g^{-1} or ml^{-1} for β -apo-8'-carotenol, 2.2 ng g^{-1} or ml^{-1} for β -apo-10'-carotenol, 2.1 ng g^{-1} or ml^{-1} for β -apo-12'-carotenol, 1.8 ng g^{-1} or ml^{-1} for β -apo-14'-carotenol, 1.7 ng g^{-1} or ml^{-1} for retinal, 1.5 ng g^{-1} or ml^{-1} for β -apo-13-carotenone, 1.3 ng g^{-1} or ml^{-1} for β -ionylidene-acetaldehyde) of the lowest amount on column used in the standard curves. The GoldenRice entries (19-27) refer to a storage time course experiment. Grains were harvested and stored at ambient temperatures in the dark (dah, days after harvest). The maize entries (7-11) refer to samples shipped for analysis after three months of storage at ambient temperature. OFSP, orange fleshed sweet potatoes

No	Food item	β -Carotene $\text{C}_{40}\text{H}_{56}$ $[\mu\text{g g}^{-1}]$	β -Apo-8'- carotenol $\text{C}_{38}\text{H}_{50}\text{O}$ $[\text{ng g}^{-1}]$	β -Apo-10'- carotenol $\text{C}_{37}\text{H}_{48}\text{O}$ $[\text{ng g}^{-1}]$	β -Apo-12'- carotenol $\text{C}_{36}\text{H}_{46}\text{O}$ $[\text{ng g}^{-1}]$	β -Apo-14'- carotenol $\text{C}_{34}\text{H}_{42}\text{O}$ $[\text{ng g}^{-1}]$	Retinal ($\text{C}_{30}\text{H}_{42}\text{O}$) $[\text{ng g}^{-1}]$	β -Apo-13- carotenone $\text{C}_{34}\text{H}_{42}\text{O}$ $[\text{ng g}^{-1}]$	β -ionylidene- acetaldehyde $\text{C}_{15}\text{H}_{20}\text{O}$ $[\text{ng g}^{-1}]$	Total apo- carotenoids $[\text{ng g}^{-1}]$	Apocar. Prop. [%]	English	Scientific	Cat.	Orig.
Provitamin A-biofortified															
1	NASPOT13 O	61.3 \pm 4.8	19.2 \pm 4.0	28.7 \pm 1.1	24.3 \pm 1.9	16.1 \pm 0.8	15.3 \pm 1.6	24.7 \pm 0.7	15.3 \pm 0.9	143.6 \pm 10.9	0.2	OFSP	<i>Ipomoea batatas</i>	NGV	HP
2	NASPOT12 O	14.8 \pm 0.2	trace	5.3 \pm 1.0	4.1 \pm 0.6	3.4 \pm 0.2	3.3 \pm 0.2	6.6 \pm 1.8	5.7 \pm 0.8	30.2 \pm 5.5	0.2	OFSP	<i>Ipomoea batatas</i>	NGV	HP
3	Kabode (NASPOT10 O)	32.8 \pm 1.3	4.4 \pm 0.3	6.0 \pm 0.5	6.4 \pm 1.3	5.2 \pm 0.1	5.2 \pm 0.8	8.3 \pm 0.3	7.4 \pm 1.2	44.8 \pm 4.5	0.1	OFSP	<i>Ipomoea batatas</i>	NGV	HP
4	Vila (NASPOT19 O)	17.7 \pm 0.6	8.2 \pm 1.5	15.4 \pm 0.3	11 \pm 0.7	5.6 \pm 0.4	6.1 \pm 0.5	10.6 \pm 0.3	7.7 \pm 0.3	64.6 \pm 4.0	0.4	OFSP	<i>Ipomoea batatas</i>	NGV	HP
5	Kakamaga (SPK004)	19.7 \pm 0.3	3.1 \pm 0.7	7.3 \pm 0.8	6.3 \pm 1.0	4.0 \pm 0.5	3.4 \pm 0.5	7.2 \pm 0.7	7.4 \pm 0.2	38.7 \pm 4.3	0.2	OFSP	<i>Ipomoea batatas</i>	NGV	HP
6	Eliumula	98.2 \pm 1.2	13.4 \pm 1	22.5 \pm 1.8	21.3 \pm 1.1	13.8 \pm 0.6	11.8 \pm 1.1	23.1 \pm 0.7	15.3 \pm 0.8	121.3 \pm 7.1	0.1	OFSP	<i>Ipomoea batatas</i>	NGV	HP
7	Sarmmaz 38	1.9 \pm 0.1	trace	30.9 \pm 0.8	36.7 \pm 1.5	5.9 \pm 0.7	10.6 \pm 0.6	65.0 \pm 3.6	8.4 \pm 0.7	158.4 \pm 8.1	8.3	Maize	<i>Zea mays</i>	C	HP
8	Sarmmaz 39	1.0 \pm 0.1	trace	29.6 \pm 0.3	36.6 \pm 0.6	nd	7.6 \pm 0.9	79.5 \pm 3.1	7.2 \pm 0.9	160.6 \pm 6.3	16.1	Maize	<i>Zea mays</i>	C	HP
9	Ifo Hyb 3	1.8 \pm 0.1	9.4 \pm 1.7	33.6 \pm 0.3	50.9 \pm 3.3	1.8 \pm 0.7	14.2 \pm 0.6	110.4 \pm 8.8	9.6 \pm 0.6	229.9 \pm 16.0	17.7	Maize	<i>Zea mays</i>	C	HP
10	Ifo Hyb 4	1.3 \pm 0.1	trace	31.9 \pm 0.9	35.3 \pm 0.4	2.1 \pm 1.2	15.7 \pm 0.9	59.3 \pm 2.6	8.0 \pm 1.1	153.8 \pm 10.3	8.5	Maize	<i>Zea mays</i>	C	HP
11	Control ACR91	1.1 \pm 0.1	trace	63.1 \pm 3.6	26.9 \pm 1.5	2.4 \pm 0.3	8.4 \pm 1.5	52.5 \pm 2.7	5.0 \pm 0.1	158.6 \pm 10.8	14.4	Maize	<i>Zea mays</i>	C	HP
12	UMUCASS 36	10.5 \pm 1.7	3.4 \pm 1.1	9.5 \pm 1.1	10.4 \pm 1.2	5.9 \pm 0.4	4.0 \pm 0.8	8.3 \pm 0.4	20.7 \pm 1.6	62.3 \pm 6.6	0.6	Cassava	<i>Manihot esculenta</i>	NGV	HP
13	UMUCASS 37	10.7 \pm 1	3.1 \pm 0.4	6.6 \pm 0.9	9.0 \pm 0.5	5.5 \pm 0.6	4.7 \pm 0.5	10.0 \pm 1	20.0 \pm 0.4	58.9 \pm 4.3	0.6	Cassava	<i>Manihot esculenta</i>	NGV	HP
14	UMUCASS 38	12.9 \pm 0.5	6.5 \pm 0.3	7.8 \pm 0.3	12.0 \pm 0.1	5.9 \pm 0.4	5.1 \pm 0.7	12.4 \pm 0.4	19.2 \pm 1.4	68.8 \pm 3.6	0.5	Cassava	<i>Manihot esculenta</i>	NGV	HP
15	UMUCASS 44	15.2 \pm 0.9	3.4 \pm 0.3	10.3 \pm 0.9	9.2 \pm 0.5	5.9 \pm 0.3	4.9 \pm 0.4	9.3 \pm 0.1	17.6 \pm 0.8	60.8 \pm 3.3	0.4	Cassava	<i>Manihot esculenta</i>	NGV	HP
16	UMUCASS 45	11.0 \pm 1.1	2.9 \pm 0.2	7.5 \pm 0.3	7.0 \pm 1.0	4.3 \pm 0.3	3.7 \pm 0.6	8.0 \pm 0.1	16.1 \pm 1.6	49.5 \pm 4.2	0.4	Cassava	<i>Manihot esculenta</i>	NGV	HP
17	UMUCASS 46	17.8 \pm 0.7	8.5 \pm 0.9	11.8 \pm 0.5	15.3 \pm 0.9	10.7 \pm 0.2	8.0 \pm 0.4	16.5 \pm 1.3	26.2 \pm 1.2	96.8 \pm 5.3	0.5	Cassava	<i>Manihot esculenta</i>	NGV	HP
18	TMS 419	0.6 \pm 0.0	trace	trace	trace	trace	nd	trace	11.0 \pm 0.6	13.4 \pm 1.1	2.2	Cassava	<i>Manihot esculenta</i>	NGV	HP
19	GR2E (dah 1)	31.1 \pm 1.1	23.5 \pm 2.1	77.4 \pm 4.2	60.2 \pm 0.2	32.3 \pm 0.9	21.2 \pm 0.6	81.3 \pm 0.9	14.8 \pm 0.8	310.7 \pm 9.6	1.0	Golden Rice	<i>Oryza sativa</i>	C	FR
20	GR2E (dah 8)	28.9 \pm 1.7	24.3 \pm 0.8	78.1 \pm 3.3	63.5 \pm 1.8	40.8 \pm 4.6	27.6 \pm 1.6	101.8 \pm 4	25.0 \pm 1.0	361.1 \pm 17.1	1.2	Golden Rice	<i>Oryza sativa</i>	C	FR
21	GR2E (dah 15)	26.1 \pm 0.7	26.3 \pm 2.0	87.3 \pm 5.4	74.2 \pm 3.3	47.2 \pm 3.3	31.3 \pm 0.8	112.3 \pm 1.8	32.2 \pm 1.1	410.8 \pm 17.6	1.6	Golden Rice	<i>Oryza sativa</i>	C	FR
22	GR2E (dah 22)	18.9 \pm 0.8	25.6 \pm 1.0	87.4 \pm 5.2	73.3 \pm 3.7	48.8 \pm 1.8	32.4 \pm 1.1	117.6 \pm 0.9	36.2 \pm 1.9	421.3 \pm 15.6	2.2	Golden Rice	<i>Oryza sativa</i>	C	FR
23	GR2E (dah 29)	16.8 \pm 0.5	23.1 \pm 1.6	93.6 \pm 4.6	72.8 \pm 2.1	51.8 \pm 1.9	34.3 \pm 0.7	119.9 \pm 3.0	36.0 \pm 1.2	431.5 \pm 15.1	2.6	Golden Rice	<i>Oryza sativa</i>	C	FR
24	GR2E (dah 36)	13.7 \pm 0.3	24.2 \pm 1.4	95.7 \pm 3.5	79.4 \pm 4.0	58.5 \pm 1.8	34.2 \pm 1.8	136.8 \pm 1.4	37.2 \pm 1.9	464.0 \pm 15.8	3.4	Golden Rice	<i>Oryza sativa</i>	C	FR
25	GR2E (dah 72)	4.1 \pm 0.1	12.1 \pm 4.2	85.6 \pm 6.3	61.1 \pm 4.1	58.0 \pm 1.1	24.3 \pm 1.1	110.2 \pm 3.3	24.6 \pm 1.2	375.9 \pm 21.3	9.2	Golden Rice	<i>Oryza sativa</i>	C	FR
26	GR2E dah 160	3.3 \pm 0.1	8.9 \pm 0.7	104.0 \pm 5.3	73.6 \pm 8.8	65.8 \pm 5.7	23.7 \pm 2.5	136.1 \pm 6.7	19.6 \pm 0.3	431.7 \pm 30.0	13.1	Golden Rice	<i>Oryza sativa</i>	C	FR
27	GR2E dah 215	2.7 \pm 0.1	7.1 \pm 0.5	109.7 \pm 12.3	78.2 \pm 4.9	75.3 \pm 4.5	21.8 \pm 1.1	138.1 \pm 4.3	17.5 \pm 0.4	447.7 \pm 28.0	16.6	Golden Rice	<i>Oryza sativa</i>	C	FR
Food basket Vegetables															
28	Carnote	41.4 \pm 3.1	23.3 \pm 0.9	27.1 \pm 1.1	22.2 \pm 1.4	16.5 \pm 0.5	17.2 \pm 0.6	25.5 \pm 0.5	16.2 \pm 1.0	147.9 \pm 6.2	0.4	Sweet potato tuber	<i>Ipomoea batatas</i>	NGV	L1
29	Carnote	41.5 \pm 3.3	21.0 \pm 1.1	43.9 \pm 5.5	23.0 \pm 2.7	22.0 \pm 4.7	21.8 \pm 3.4	44.9 \pm 10.5	24.1 \pm 4.1	200.7 \pm 32.1	0.5	Sweet potato tuber	<i>Ipomoea batatas</i>	NGV	L4
30	Egg plant	0.4 \pm 0.1	trace	2.4 \pm 0.3	trace	trace	trace	3.1 \pm 0.3	2.6 \pm 0.7	12.2 \pm 1.9	3.1	Eggplant	<i>Solanum melongena</i>	NGV	L1
31	Egg plant native	trace	trace	2.5 \pm 0.3	trace	trace	trace	6.9 \pm 0.3	nd	13.3 \pm 1.2	13.3	Eggplant	<i>Solanum melongena</i>	NGV	L3
32	Egg plant	trace	trace	3.4 \pm 0.1	3.4 \pm 0.1	1.9 \pm 0.3	trace	5.8 \pm 0.1	5.2 \pm 1.1	21.3 \pm 2.3	21.3	Eggplant	<i>Solanum melongena</i>	NGV	L4