

Supplementary Table I – Average bioaccessibility (%)[†] of carotenoids from different food matrices digested with divalent minerals at varying concentrations*. Results represent mean ± SD (n =4).

Calcium (mg/L)		0	250	500	1000
Tomato Juice					
	<i>β-carotene</i>	6.00 ± 0.57	8.23 ± 0.30	2.09 ± 0.10	0.00 ± 0.00
	<i>Lutein</i>	71.61 ± 1.15	50.41 ± 2.96	18.19 ± 1.09	0.00 ± 0.00
	<i>Lycopene</i>	1.47 ± 0.03	1.17 ± 0.06	0.22 ± 0.03	0.00 ± 0.00
	<i>Phytoene</i>	47.56 ± 3.36	56.14 ± 3.95	16.05 ± 0.82	0.00 ± 0.00
	<i>Phytofluene</i>	40.23 ± 2.36	49.09 ± 2.60	13.47 ± 0.91	0.00 ± 0.00
Carrot Juice					
	<i>β-carotene</i>	5.81 ± 0.58	11.41 ± 0.16	6.83 ± 0.06	0.051 ± 0.09
	<i>α-carotene</i>	14.64 ± 3.05	31.33 ± 0.40	23.33 ± 0.39	1.57 ± 0.26
	<i>Lutein</i>	82.72 ± 3.90	82.95 ± 1.90	83.45 ± 1.81	11.00 ± 0.37
	<i>Phytoene</i>	21.06 ± 5.27	57.76 ± 2.12	52.46 ± 1.77	0.00 ± 0.00
	<i>Phytofluene</i>	18.51 ± 4.45	49.79 ± 1.01	50.44 ± 1.12	0.00 ± 0.00
Apricot Nectar					
	<i>β-carotene</i>	6.62 ± 0.28	12.07 ± 0.31	7.08 ± 0.33	0.00 ± 0.00
	<i>Phytoene</i>	46.77 ± 4.70	63.87 ± 2.57	38.36 ± 2.46	0.00 ± 0.00
	<i>Phytofluene</i>	46.86 ± 1.54	63.92 ± 2.03	37.34 ± 0.65	0.00 ± 0.00
Spinach					
	<i>β-carotene</i>	10.76 ± 0.12	6.22 ± 1.37	0.00 ± 0.00	0.00 ± 0.00
	<i>Lutein</i>	13.92 ± 0.21	6.94 ± 1.13	0.07 ± 0.00	0.00 ± 0.00
	<i>Neoxanthin</i>	21.38 ± 0.39	13.79 ± 0.68	0.17 ± 0.01	0.00 ± 0.00
Field Salad					
	<i>β-carotene</i>	6.05 ± 0.30	6.40 ± 0.14	0.89 ± 0.06	0.00 ± 0.00
	<i>Lutein</i>	6.36 ± 0.10	7.17 ± 0.27	1.38 ± 0.07	0.00 ± 0.00
	<i>Neoxanthin</i>	4.65 ± 0.28	5.83 ± 0.21	1.23 ± 0.06	0.00 ± 0.00
Magnesium (mg/L)		0	100	200	300
Tomato Juice					
	<i>β-carotene</i>	15.03 ± 1.35	11.17 ± 0.68	5.56 ± 0.05	0.00 ± 0.00
	<i>Lutein</i>	92.50 ± 6.15	69.50 ± 0.98	37.68 ± 3.99	0.00 ± 0.00
	<i>Lycopene</i>	5.09 ± 0.54	3.40 ± 0.14	1.13 ± 0.02	0.00 ± 0.00
	<i>Phytoene</i>	59.06 ± 4.02	46.56 ± 1.24	24.29 ± 2.44	0.94 ± 0.21
	<i>Phytofluene</i>	73.05 ± 6.32	57.55 ± 1.08	27.64 ± 1.93	2.16 ± 0.06
Carrot Juice					
	<i>β-carotene</i>	17.69 ± 2.21	19.62 ± 0.40	4.66 ± 0.56	0.00 ± 0.00
	<i>α-carotene</i>	26.43 ± 3.52	32.46 ± 0.65	9.99 ± 1.85	0.00 ± 0.00
	<i>Lutein</i>	60.71 ± 3.12	60.57 ± 1.71	24.42 ± 0.21	0.00 ± 0.00
	<i>Phytoene</i>	27.06 ± 3.99	35.70 ± 1.19	13.45 ± 0.54	0.00 ± 0.00
	<i>Phytofluene</i>	39.44 ± 2.85	51.88 ± 0.28	16.57 ± 1.12	0.00 ± 0.00
Apricot Nectar					
	<i>β-carotene</i>	20.00 ± 0.84	2.95 ± 0.20	0.00 ± 0.00	0.00 ± 0.00
	<i>Phytoene</i>	46.94 ± 2.99	3.64 ± 4.21	0.00 ± 0.00	0.00 ± 0.00
	<i>Phytofluene</i>	54.44 ± 4.04	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
Spinach					
	<i>β-carotene</i>	9.81 ± 1.16	10.28 ± 0.89	10.88 ± 0.06	7.87 ± 0.13

	<i>Lutein</i>	9.19 ± 0.62	8.24 ± 0.78	9.13 ± 0.03	5.93 ± 0.08
	<i>Neoxanthin</i>	16.05 ± 1.13	13.63 ± 1.25	14.90 ± 0.14	9.70 ± 0.91
Field Salad					
	<i>β-carotene</i>	29.43 ± 1.90	20.37 ± 0.46	6.90 ± 0.95	0.00 ± 0.00
	<i>Lutein</i>	26.16 ± 1.89	16.61 ± 0.43	6.84 ± 1.05	0.88 ± 0.06
	<i>Neoxanthin</i>	23.93 ± 1.18	15.85 ± 0.68	7.15 ± 0.83	1.41 ± 0.08

Zinc (mg/L)		0	12.5	25	50	100	200
Tomato Juice							
	<i>β-carotene</i>	15.00 ± 0.55	14.32 ± 0.13	15.19 ± 0.91	14.05 ± 0.18	11.77 ± 0.37	9.51 ± 0.65
	<i>Lutein</i>	95.42 ± 3.52	89.28 ± 0.76	92.09 ± 0.25	85.97 ± 2.51	69.99 ± 1.56	58.90 ± 1.26
	<i>Lycopene</i>	4.16 ± 0.33	3.90 ± 0.33	3.84 ± 0.20	3.43 ± 0.18	2.71 ± 0.14	3.13 ± 1.03
	<i>Phytoene</i>	62.09 ± 2.41	59.16 ± 0.39	65.00 ± 1.54	57.79 ± 0.74	49.23 ± 0.56	38.38 ± 1.65
	<i>Phytofluene</i>	77.74 ± 8.67	78.55 ± 0.60	80.90 ± 3.38	72.88 ± 1.82	62.60 ± 0.95	47.42 ± 0.80
Carrot Juice							
	<i>β-carotene</i>	13.13 ± 1.55	15.41 ± 0.32	15.88 ± 0.57	16.83 ± 0.34	12.39 ± 0.41	7.48 ± 0.44
	<i>α-carotene</i>	23.70 ± 2.34	28.63 ± 2.63	29.50 ± 1.03	31.10 ± 0.59	22.79 ± 0.92	15.87 ± 1.49
	<i>Lutein</i>	88.41 ± 5.42	81.62 ± 2.70	80.97 ± 0.18	76.02 ± 0.86	68.40 ± 0.62	54.74 ± 2.51
	<i>Phytoene</i>	31.23 ± 2.55	36.23 ± 3.94	36.81 ± 2.10	38.12 ± 2.31	28.76 ± 1.18	22.74 ± 1.62
	<i>Phytofluene</i>	52.50 ± 4.63	59.42 ± 5.53	62.47 ± 1.15	64.99 ± 1.83	45.43 ± 1.40	35.33 ± 1.53
Apricot Nectar							
	<i>β-carotene</i>	20.93 ± 0.37	19.82 ± 2.26	17.84 ± 0.93	16.28 ± 1.78	12.59 ± 1.06	0.00 ± 0.00
	<i>Phytoene</i>	22.65 ± 1.32	20.47 ± 1.64	18.40 ± 2.26	15.95 ± 0.85	10.99 ± 2.71	0.00 ± 0.00
	<i>Phytofluene</i>	12.55 ± 0.72	11.42 ± 0.90	10.23 ± 1.21	8.90 ± 0.44	5.47 ± 0.78	0.00 ± 0.00
Spinach							
	<i>β-carotene</i>	4.37 ± 0.55	5.68 ± 0.66	6.90 ± 0.45	7.11 ± 0.32	7.66 ± 0.30	7.02 ± 0.11
	<i>Lutein</i>	5.98 ± 1.05	6.76 ± 0.59	6.19 ± 0.27	6.14 ± 0.83	7.17 ± 0.10	6.60 ± 0.45
	<i>Neoxanthin</i>	8.84 ± 1.17	10.20 ± 0.92	8.76 ± 0.54	9.10 ± 1.37	10.52 ± 0.56	10.12 ± 0.69
Field Salad							
	<i>β-carotene</i>	16.58 ± 1.20	24.42 ± 2.66	27.71 ± 3.89	30.53 ± 0.74	28.36 ± 0.67	24.27 ± 0.28
	<i>Lutein</i>	16.35 ± 0.71	22.36 ± 1.72	25.86 ± 3.20	24.06 ± 0.77	22.53 ± 0.92	18.90 ± 0.28
	<i>Neoxanthin</i>	14.73 ± 1.98	15.66 ± 0.81	19.69 ± 1.88	19.92 ± 0.42	18.05 ± 0.18	17.32 ± 0.09

Sodium (mg/L)		0	375	750	1500
Tomato Juice					
	<i>β-carotene</i>	4.03 ± 1.86	5.07 ± 1.17	6.83 ± 0.42	8.42 ± 0.93
	<i>Lutein</i>	58.99 ± 0.96	56.46 ± 3.27	61.63 ± 1.95	70.14 ± 7.94
	<i>Lycopene</i>	1.07 ± 0.59	1.58 ± 0.38	1.82 ± 0.08	2.00 ± 0.41
	<i>Phytoene</i>	28.96 ± 11.10	37.42 ± 8.22	49.37 ± 308	63.40 ± 8.50
	<i>Phytofluene</i>	23.19 ± 9.64	29.20 ± 5.90	38.79 ± 3.79	57.60 ± 4.44
Carrot Juice					
	<i>β-carotene</i>	3.98 ± 0.26	4.96 ± 0.97	6.89 ± 0.27	12.76 ± 2.87
	<i>α-carotene</i>	8.61 ± 0.57	10.86 ± 2.09	16.15 ± 1.39	28.98 ± 6.51
	<i>Lutein</i>	74.96 ± 0.36	77.33 ± 6.55	89.00 ± 9.29	92.93 ± 3.02
	<i>Phytoene</i>	12.50 ± 0.77	15.51 ± 2.14	22.78 ± 1.66	41.84 ± 3.55
	<i>Phytofluene</i>	8.01 ± 0.84	9.94 ± 1.40	15.01 ± 0.79	26.10 ± 5.22
Apricot Nectar					
	<i>β-carotene</i>	9.77 ± 0.21	10.27 ± 0.26	11.27 ± 0.28	11.36 ± 0.49

	<i>Phytoene</i>	67.25 ± 0.76	74.33 ± 2.17	84.96 ± 2.18	88.36 ± 3.81
	<i>Phytofluene</i>	65.08 ± 2.66	66.77 ± 1.52	81.30 ± 1.37	80.70 ± 6.34
Spinach					
	<i>β-carotene</i>	8.13 ± 1.16	7.46 ± 0.46	7.13 ± 1.11	8.22 ± 0.96
	<i>Lutein</i>	11.37 ± 0.27	10.47 ± 0.82	12.03 ± 1.50	10.87 ± 0.68
	<i>Neoxanthin</i>	16.98 ± 0.53	16.82 ± 0.79	15.69 ± 0.51	16.14 ± 0.46
Field Salad					
	<i>β-carotene</i>	7.81 ± 0.30	10.27 ± 0.21	7.02 ± 1.17	7.00 ± 0.23
	<i>Lutein</i>	8.09 ± 0.05	8.43 ± 0.13	6.25 ± .23	5.68 ± 0.09
	<i>Neoxanthin</i>	6.55 ± 0.13	6.67 ± 0.33	5.16 ± 0.36	4.28 ± 0.11

*Concentrations given in final digestion stage (small intestine)

*Bioaccessibility expressed as percentage of originally present carotenoids before digestion