

Table S1. Carotenoids and tocopherols concentration of human milk at different lactation stages ($\mu\text{g}/100\text{mL}$).

	0-4 days (n = 77)	5-11 days (n = 89)	12-30 days (n = 73)	31-60 days (n = 90)	61-120 days (n = 90)	121-240 days (n = 90)	<i>P</i> -value ¹	<i>Post hoc</i> test ²
β -carotene	8.0 (4.7-15.2)	2.8 (2.0-4.4)	2.1 (1.4-3.1)	1.7 (1.3-3.0)	1.9 (1.4-2.7)	1.8 (1.4-2.6)	< 0.001 *	P1 > P2 > P3 = P4 = P5 = P6
β -cryptoxanthin	6.2 (2.4-12.9)	3.4 (1.7-5.7)	2.4 (1.1-3.9)	1.7 (1.1-2.6)	1.8 (1.0-4.0)	2.1 (1.1-3.7)	< 0.001 *	P1 > P2 > P3 = P4 = P5 = P6
Lutein	5.7 (2.9-10.2)	7.0 (4.6-10.3)	2.2 (1.2-6.3)	2.9 (0.9-5.9)	2.8 (1.2-6.5)	3.7 (2.4-5.9)	< 0.001 *	P1 = P2 > P3 = P4 = P5 = P6
Lycopene	6.3 (4.0-9.9)	2.5 (1.7-4.3)	1.8 (1.2-2.6)	1.4 (1.1-2.0)	1.4 (1.0-2.0)	1.5 (1.3-2.0)	< 0.001 *	P1 > P2 > P3 = P4 = P5 = P6
Zeaxanthin	1.0 (0.6-1.5)	1.4 (1.0-2.2)	0.8 (0.4-1.5)	0.8 (0.4-1.4)	1.0 (0.4-1.4)	1.1 (0.8-1.4)	< 0.001 *	P2 > P1 = P3 = P4 = P5 = P6
α -tocopherol	645 (388-1176)	382 (236-551)	239 (145-396)	206 (126-345)	212 (112-300)	211 (135-326)	< 0.001 *	P1 > P2 > P3 = P4 = P5 = P6
γ -tocopherol	68 (48-121)	63 (43-103)	70 (39-104)	73 (41-120)	68 (39-112)	88 (56-137)	< 0.033 *	P2 = P3 < P6; P1 = P4 = P5 = P6

Data are presented as the medians (interquartile ranges). * Indicates a significant difference among the six periods ($p < 0.05$). ¹ Compared by Kruskal-Wallis test. ² Compared by Mann-Whitney U test with adjusted alpha value ($\alpha' = 0.01$). Period 1: 0-4 days *postpartum*; period 2: 5-11 days *postpartum*; period 3: 12-30 days *postpartum*; period 4: 31-60 days *postpartum*; period 5: 61-120 days *postpartum*; period 6: 121-240 days *postpartum*.

Table S2. Carotenoids and tocopherols concentration of human milk from different cities (Beijing, Suzhou, and Guangzhou cities).

	City1: Beijing (n = 151)		City2: Suzhou (n = 180)		City3: Guangzhou (n = 178)		P-value ¹	Post hoc test ²
	median (25th-75th)	range	median (25th-75th)	range	median (25th-75th)	range		
β-carotene, μg/100mL	1.7 (1.3-3.2)	0.7-12.6	2.4 (1.7-4.3)	0.7-121.5	2.7 (1.7-5.0)	0.8-62.0	< 0.001 *	C1 < C2 = C3
β-cryptoxanthin, μg/100mL	1.1 (0.8-2.0)	0.4-10.4	3.6 (2.1-7.7)	0.3-44.0	2.8 (1.7-5.2)	0.6-64.3	< 0.001 *	C1 < C3 < C2
Lutein, μg/100mL	2.2 (1.0-4.1)	0.3-24.2	4.9 (2.6-7.9)	0.3-46.1	5.8 (2.9-8.7)	0.3-30.2	< 0.001 *	C1 < C2 = C3
Lycopene, μg/100mL	1.7 (1.3-2.8)	0.7-16.7	1.7 (1.3-2.7)	0.7-25.6	2.1 (1.4-3.8)	0.7-27.9	0.006 *	C1 = C2 < C3
Zeaxanthin, μg/100mL	0.8 (0.4-1.4)	0.3-5.0	1.1 (0.7-2.0)	0.3-7.6	1.1 (0.7-1.5)	0.3-3.9	< 0.001 *	C1 < C2 = C3
α-tocopherol, μg/100mL	215 (117-333)	1-1784	296 (208-478)	18-2383	285 (148-479)	18-1803	< 0.001 *	C1 < C2 = C3
γ-tocopherol, μg/100mL	71 (48-107)	11-245	94 (59-148)	11-350	53 (31-88)	2-252	< 0.001 *	C3 < C1 < C2

Data are presented as the medians (interquartile ranges) and ranges. * Indicates a significant difference among the three cities ($p < 0.05$). ¹ Compared by Kruskal-Wallis test. ² Compared by Mann-Whitney U test with adjusted alpha value ($\alpha' = 0.01$).

Table S3. Comparisons of carotenoids and tocopherols concentration according to characteristics of lactating women and their offspring ($\mu\text{g}/100\text{mL}$).

	β -carotene ¹	β -cryptoxanthin ¹	Lutein ¹	Lycopene ¹	Zeaxanthin ¹	α -tocopherol ¹	γ -tocopherol ¹
Age, years							
< 25	2.4 (1.7-3.9)	3.1 (1.7-5.7) ^a	4.2 (2.2-7.3)	1.8 (1.3-3.2)	1.1 (0.7-1.8)	284 (175-452)	77 (52-131)
25-30	2.2 (1.4-3.9)	2.1 (1.1-4.0) ^a	4.1 (2.0-7.0)	1.8 (1.3-2.8)	1.0 (0.6-1.4)	261 (139-403)	67 (42-107)
> 30	2.5 (1.6-5.0)	2.5 (1.1-4.7)	3.9 (1.8-8.7)	1.8 (1.3-2.9)	1.1 (0.7-1.6)	281 (179-473)	73 (41-120)
Offspring gender							
Male	2.4 (1.5-4.2)	2.5 (1.4-4.8)	4.6 (2.2-8.0)	1.8 (1.3-3.2)	1.1 (0.6-1.7)	274 (153-452)	73 (44-121)
Female	2.2 (1.5-4.2)	2.1 (1.1-4.6)	3.6 (1.7-6.8)	1.8 (1.3-2.8)	1.0 (0.6-1.5)	275 (171-442)	68 (44-107)
Education							
Middle school or below	2.3 (1.5-4.1)	2.7 (1.5-5.2) ^a	4.1 (2.1-7.4)	1.7 (1.3-2.4)	1.1 (0.7-1.8) ^a	283 (165-448)	84 (45-143)
High school	2.2 (1.5-4.1)	2.4 (1.4-4.8)	4.5 (2.0-7.1)	1.8 (1.1-3.1)	1.1 (0.6-1.5)	263 (161-419)	67 (43-103)
College or above	2.4 (1.5-4.9)	2.1 (1.0-4.5) ^a	3.9 (2.0-7.3)	2.0 (1.3-3.2)	1.0 (0.6-1.4) ^a	273 (156-468)	70 (44-107)
Family's per capita income, Yuan/mo							
< 2000	2.2 (1.4-3.9)	2.5 (1.4-5.1)	3.8 (2.1-7.4)	1.7 (1.3-2.8)	1.0 (0.6-1.5)	268 (164-451)	76 (46-122)
2000-4000	2.2 (1.4-4.1)	2.1 (1.1-4.1)	3.8 (1.8-6.2)	1.7 (1.3-2.8)	1.0 (0.6-1.5)	272 (142-426)	73 (43-112)
> 4000	2.5 (1.7-4.8)	2.5 (1.4-5.8)	5.3 (2.1-8.7)	2.2 (1.4-3.4)	1.1 (0.6-2.0)	293 (174-496)	67 (43-109)
Unknown	2.2 (1.7-5.9)	1.7 (1.2-5.3)	5.7 (2.3-8.8)	2.0 (1.3-3.5)	0.8 (0.6-1.9)	283 (178-432)	58 (28-130)
Delivery mode							

Vaginal delivery	2.4 (1.5-4.1)	2.7 (1.4-4.8)	4.6 (2.2-7.5) ^a	1.8 (1.3-2.7)	1.1 (0.7-1.7) ^a	274 (164-453)	71 (44-113)
Cesarean delivery	2.2 (1.5-4.3)	2.1 (1.1-4.7)	3.5 (1.7-6.9) ^a	1.8 (1.3-3.5)	1.0 (0.6-1.4) ^a	274 (161-427)	73 (44-115)
Present BMI							
Underweight	2.6 (1.6-3.8)	2.8 (1.5-4.0)	7.4 (2.9-9.0) ^a	1.5 (1.1-2.1)	1.5 (0.8-2.6) ^{abc}	285 (214-463)	80 (47-122)
Normal	2.4 (1.5-4.5) ^a	2.5 (1.4-5.3)	4.3 (2.1-7.4)	1.8 (1.3-2.9)	1.1 (0.6-1.5) ^a	268 (161-438)	68 (41-112)
Overweight	2.0 (1.4-3.9) ^{ab}	1.8 (1.1-3.9)	3.4 (1.5-6.4) ^a	2.0 (1.3-3.2)	1.0 (0.6-1.5) ^b	274 (158-446)	75 (51-121)
Obesity	1.7 (1.1-2.2) ^b	1.4 (0.8-5.6)	3.4 (1.3-6.9)	2.1 (1.3-4.6)	0.7 (0.4-1.4) ^c	288 (141-603)	93 (62-180)
Gestational weight gain							
Inadequate	2.4 (1.5-5.3)	2.8 (1.5-4.7)	5.1 (2.3-8.6)	1.7 (1.3-2.7)	1.3 (0.7-1.8)	279 (151-449)	67 (41-106)
Adequate	2.4 (1.5-4.5)	2.5 (1.3-6.0)	4.5 (2.1-8.1)	2.0 (1.3-3.3)	1.1 (0.6-1.6)	282 (171-455)	69 (42-118)
Excessive	2.2 (1.5-4.0)	2.1 (1.0-4.2)	3.5 (1.8-6.4)	1.8 (1.3-2.9)	1.0 (0.6-1.4)	265 (158-426)	76 (48-112)
Dietary supplements intake							
Yes	2.2 (1.7-3.6)	2.4 (1.1-3.8)	3.9 (2.1-6.6)	1.7 (1.3-2.5)	1.1 (0.6-1.4)	274 (146-381)	68 (35-107)
No	2.3 (1.5-4.4)	2.4 (1.3-4.8)	4.2 (2.1-7.5)	1.8 (1.3-3.2)	1.0 (0.6-1.7)	273 (162-457)	72 (45-116)

Data are presented as the medians (interquartile ranges). ¹Compared by analysis covariance adjusted with cities (Beijing, Suzhou, and Guangzhou cities) and periods of lactating (0-4 days, 5-11 days, 12-30 days, 31-60 days, 61-120 days, and 121-240 days *postpartum*). Median values in the same column with same superscript letters (a, b, c) were significantly different, $p < 0.05$.