

Supplement Table S1. Concentrations of carotenoids (µg/l, median, P25, P75) in breast milk over lactation in Changchun

Carotenoids		0~5d (N=30)	10~15d (N=30)	40~45d (N=98)	200~240d (N=102)	300~400d (N=100)	H value	P
lutein	median,	81.84(45.79,	116.80(90.2	69.98(48.95,	69.02(40.37,	61.42(40.92,	31.556	<0.001
	P25, P75	118.15) ^a	7,137.88) ^{ab}	89.22) ^a	89.41) ^a	90.39) ^a		
zeaxanthin	median,	16.52(10.95,	31.09(25.23,	23.23(15.55,	16.35(11.68,	16.20(11.93,	55.436	<0.001
	P25, P75	34.34) ^{ab}	45.05)	30.68) ^a	21.16) ^b	23.08) ^b		
β-cryptoxanthin	median,	69.03(39.92,	31.58(18.36,	17.67(10.44,	19.05(10.74,	15.18(9.33,2	81.734	<0.001
	P25, P75	148.53) ^a	46.25) ^a	23.56) ^b	30.61) ^b	1.06) ^b		
β-carotene	median,	135.64(71.1	28.87(16.57,	18.36(11.45,	24.83(15.37,	22.44(15.78,	82.45	<0.001
	P25, P75	4,258.17)	44.15) ^a	28.14) ^b	44.43) ^a	32.71) ^{ab}		
lycopene	median,	85.97(46.19,	8.49(5.47,11	1.12(0,5.64)	0(0,4.27) ^a	0(0,7.32) ^a	119.784	<0.001
	P25, P75	144.46)	.07)	^a				

^{a,b,c,d} Median values within a row with dissimilar superscript letters were significantly different ($P < 0.001$).

Supplement Table S2. Concentrations of carotenoids (µg/l, median, P25, P75) in breast milk over lactation in Lanzhou

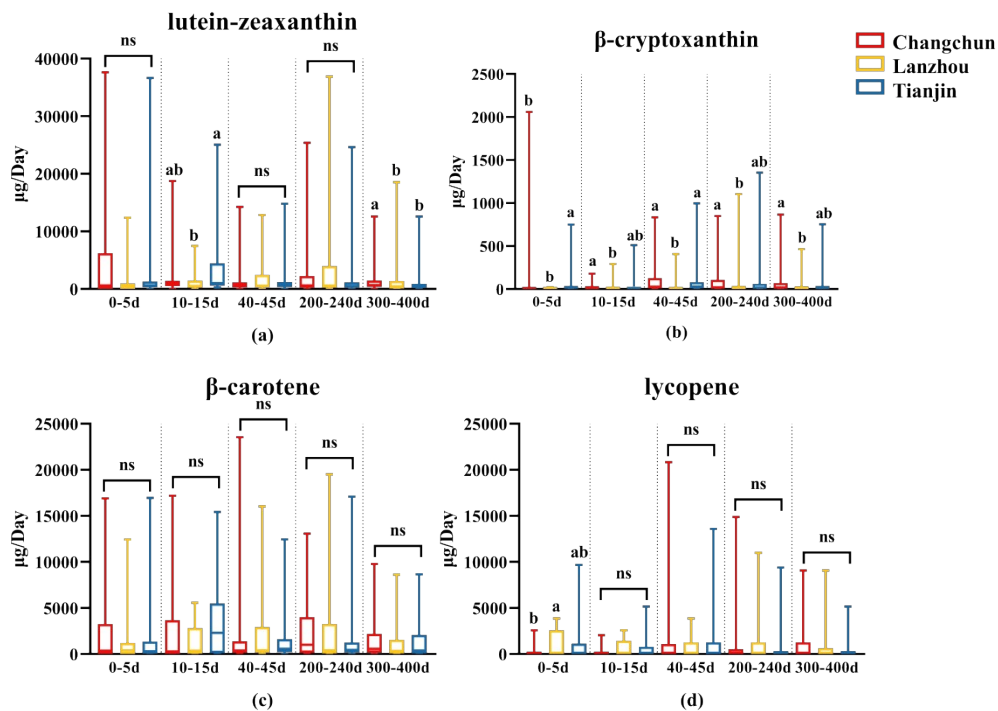
Carotenoids		0~5d (N=30)	10~15d (N=30)	40~45d (N=97)	200~240d (N=109)	300~400d (N=98)	H value	P
lutein	median,	97.33(58.80,	80.29(56.68,	73.77(48.62,	87.26(50.78,	95.77(65.18,	9.393	0.052
	P25, P75	155.54)	124.39)	112.96)	133.12)	135.24)		
zeaxanthin	median,	23.406(12.8	22.28(12.95,	18.98(13.26,	26.57(19.08,	30.85(21.43,	27.311	<0.001
	P25, P75	9,34.65) ^{ab}	35.34) ^{ab}	34.43) ^b	42.36) ^a	45.73) ^a		
β-cryptoxanthin	median,	110.70(58.5	32.26(18.25,	18.46(10.40,	33.29(21.46,	37.48(25.83,	94.49	<0.001
	P25, P75	7,156.91)	43.09) ^{ab}	32.59) ^a	49.39) ^b	58.26) ^b		
β-carotene	median,	175.51(113.	33.40(20.38,	21.4(13.55,3	25.77(15.16,	29.19(18.63,	89.593	<0.001
	P25, P75	53,335.15)	51.16) ^{ab}	4.03) ^a	39.66) ^{ab}	49.22) ^b		
lycopene	median,	129.96(80.3	14.72(9.10,2	8.00(0.59,17	5.39(0,16.54	14.81(0,21.5	89.947	<0.001
	P25, P75	9,237.78)	1.90) ^a	.96) ^{ab}	) ^b	9) ^a		

^{a,b,c,d} Median values within a row with dissimilar superscript letters were significantly different ($P < 0.001$).

Supplement Table S3. Concentrations of carotenoids (µg/l, median, P25, P75) in breast milk over lactation in Tianjin

Carotenoids		0~5d (N=30)	10~15d (N=30)	40~45d (N=106)	200~240d (N=91)	300~400d (N=99)	H value	P
lutein	median,	69.50(36.80,	94.99(61.14,	60.24(37.3,8	45.99(25.53,	54.46(26.68,	25.475	<0.001
	P25, P75	101.12) ^{ab}	137.49) ^b	1.25) ^a	77.68) ^a	80.87) ^a		
zeaxanthin	median,	15.21(9.11,2	36.71(23.46,	21.96(13.14,	14.75(10.20,	13.83(9.24,2	52.996	<0.001
	P25, P75	4.74) ^{ab}	50.80)	30.77) ^b	20.76) ^a	1.08) ^a		
β-cryptoxanthin	median,	65.81(42.82,	40.57(18.88,	16.43(10.52,	22.76(14.62,	17.73(10.33,	77.732	<0.001
	P25, P75	138.93) ^a	67.70) ^{ab}	28.93) ^c	32.73) ^{bc}	25.16) ^c		
β-carotene	median,	157.16(106.	35.24(21.94,	19.04(10.43,	31.47(13.63,	27.27(13.20,	91.778	<0.001
	P25, P75	42,309.78)	53.85) ^a	30.05)	55.21) ^a	49.32) ^a		
lycopene	median,	83.32(57.32,	11.82(9.35,2	7.14(3.64,11	0(0,8.84) ^a	0(0,4.70) ^a	153.215	<0.001
	P25, P75	207.16)	1.41)	.6)				

^{a,b,c,d} Median values within a row with dissimilar superscript letters were significantly different ($P < 0.001$).



Supplement Figure S1. Comparison of carotenoids in 24-hour dietary recall from three cities during lactation (µg/day). The label indicates that for each tissue without a common letter, “ns” means no significance between groups ($P < 0.05$) based on the nonparametric Kruskal–Wallis test followed by Bonferroni correction.

Supplement Table S4. Correlations of carotenoids levels in middle mature milk and FFQ and in late mature milk and 24-hour meal review

β-cryptoxanthin	Changchun	Lanzhou	Tianjin
	r	r	r
middle-stage mature milk and FFQ	-0.032	-0.12	-0.066
late-stage mature milk and 24-hour meal review	0.037	-0.123	-0.056

* $P < 0.05$.