NUTRIENTS | 中国城市母亲母乳中 10 种低聚糖含量随时间的变化趋势

与配方奶喂养婴儿相比，母乳喂养婴儿往往不易感染，且认知能力可能会提高。人乳低聚糖（HMO）是母乳中第三丰富的成分，但配方奶中却不存在这种成分，HMO 可能是母乳喂养有优势的原因之一。

在此次横断面观察性研究中，我们研究了中国母亲母乳中的 HMO 组成，以确定哺乳阶段、分娩方式及地理位置的影响。研究采用高液相色谱法测定了中国三个不同城市的 446 份母乳样品中 10 种 HMO 的含量。

结果显示，约有 21% 的样本中包含的 2'-岩藻糖基乳糖（2'-FL）水平低于定量限度，这与其他人群中非分泌型岩藻糖基转移酶-2 的频率相似，但在所有样本中均检测到了 2'-FL。在哺乳过程中，大多数 HMO 水平都会逐渐降低，但 3-岩藻糖（基）乳糖的水平则逐渐上升。2'-FL 和 3-岩藻糖（基）乳糖的水平高似乎具有很强的相关性，表明有某种共同调节的机制。在哺乳早期，6'-唾液酸乳糖水平高于 3'-唾液酸乳糖，而在哺乳超过 2-4 个月后，3'-唾液酸乳糖则占优势。

分娩方式和地理位置并不会对母乳中 HMO 组成产生影响。

参考文献：Austin S,et al. Nutrients. 2016 Jun 8;8(6). pii: E346.

文献链接：https://www.ncbi.nlm.nih.gov/pubmed/27338459

Table 1. Study population characteristics.

| *n*	5–11 Days	12–30 Days	1–2 Months	2–4 Months	4–8 Months
	90	90	90	90	90
Mothers					
Age (years), mean (SD)	27 (4)	27 (3)	28 (4)	27 (4)	26 (4)
Height (m), mean (SD)	160 (4)	160 (5)	161 (5)	161 (5)	159 (5)
Weight (kg), mean (SD)	60.7 (8.7)	60.8 (7.9)	61.9 (8.9)	58.4 (8.3)	56.2 (8.1)
BMI (kg/m^2), mean	23.7 (3.2)	23.7 (3.0)	23.9 (3.1)	22.5 (2.9)	22.2 (3.1)
Gestational weight gain (kg), mean (SD)	16.7 (7.4)	16.2 (6.0)	15.9 (5.7)	15.9 (5.9)	14.9 (7.6)
Postpartum weight loss (kg), mean (SD)	9.1 (6.1)	8.6 (5.3)	9.8 (4.0)	10.0 (6.2)	10.6 (5.9)
Non-smokers (%)	100	99	100	98	100
Cesarean delivery (%)	42	48	59	39	38
Household income (RMB/Month)					
<2000	22	19	27	29	34
2000–4000	41	50	46	44	46
>4000	33	24	26	24	20
Unknown	1	7	2	0	0
Infant					
Males (%)	57	53	53	60	48
Gestational age at birth (weeks), mean (SD)	39.3 (1.2)	39.2 (1.3)	39.2 (1.6)	39.4 (1.3)	39.5 (1.5)
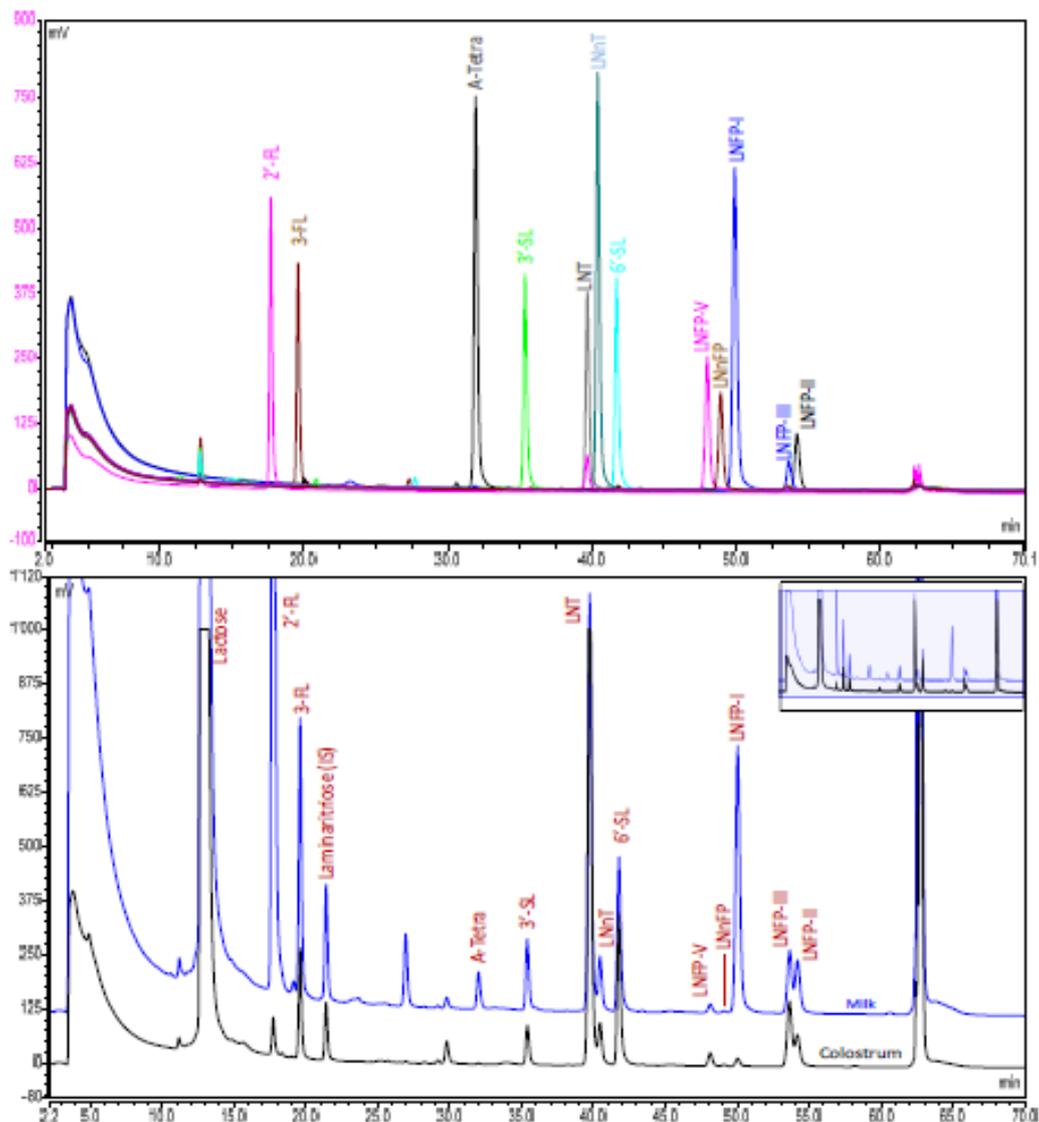
Figure 1. Chromatograms of human milk oligosaccharides (HMO). Top panel: overlay of the chromatograms of HMO standards injected individually. Lower panel: overlay of the chromatograms of pooled milk and pooled colostrum (both purchased from Lee Biosolutions, Maryland Heights, MO, USA).
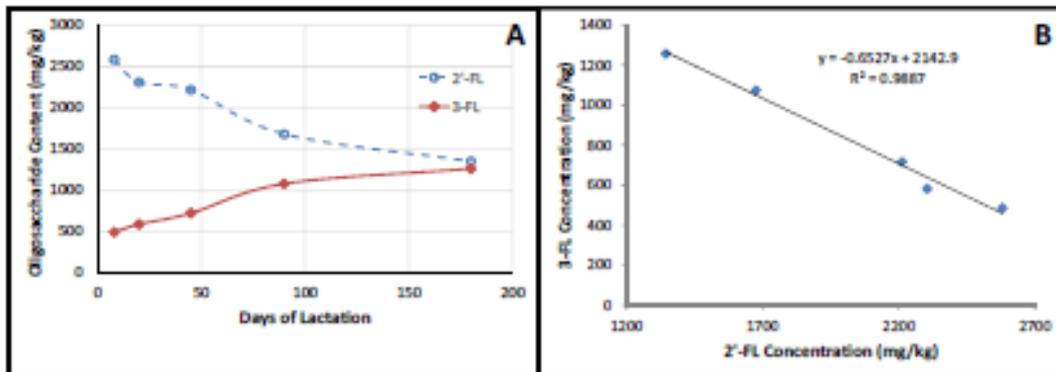
Figure 2. (A) Changes in 2'-FL and 3-FL concentration at different stages of lactation; (B) Correlation between 3-FL concentration and 2'-FL concentration.
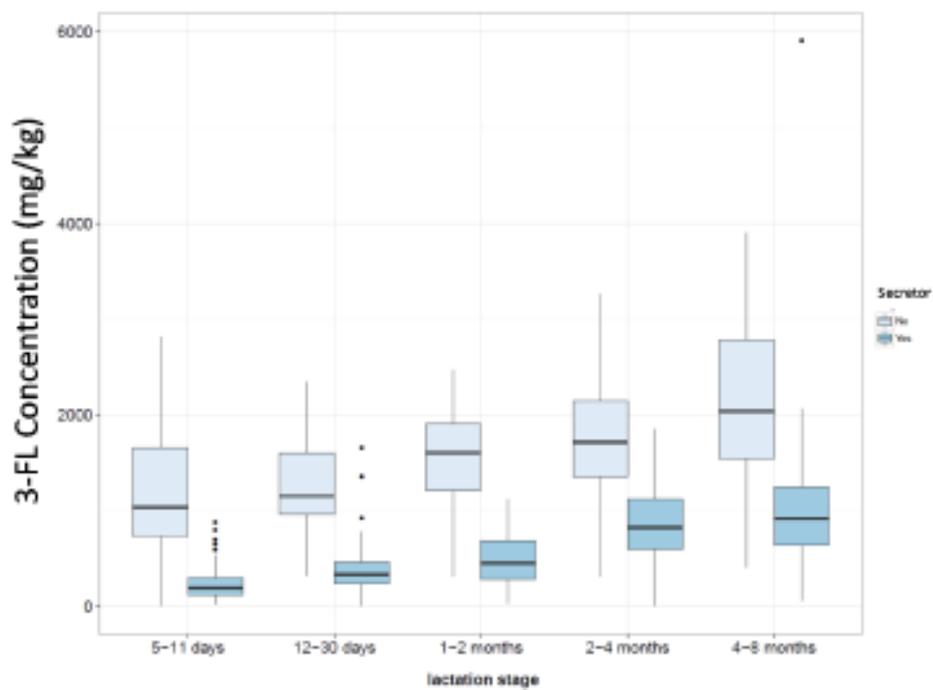

Figure 3. 3-FL concentration in milk samples comparing secretor vs. non-secretor milk, where non-secretor status has been assigned to samples having 2'-FL content below the method LoQ.