Unpacking Formula Choices in a Changing Marketplace

Highlighted Ingredients Added to Infant Formula

Ingredients	Description	Comments
Docosahexaenoic Acid (DHA), an Omega-3 fatty acid	A fatty acid that is sourced from an algae (plant-based) or a marine fish source (e.g., tuna oil). Breast milk DHA concentration varies based on a mother's diet.[1]	**DHA ranges:** **Breast milk:** 0.32 ± 0.22% of fatty acids; 6-29 mg/100 kcal (4-19 mg/100 mL)[1] **US:** between 8-17 mg/100 kcal (5-12 mg/100 mL)[2,3,4] **European:** minimum of 20 mg/100 kcal (13 mg/100 mL)[5] **European style (US manufactured):** 20 mg/100 kcal (13 mg/100 mL)[6] **Australian/New Zealand:** no minimum but maximum of 1% of total fatty acids[7]
Arachidonic Acid (ARA), an Omega-6 fatty acid	A fatty acid that is derived from fungus. It is recommended to be used in combination with DHA in a 1:1-1:2 ratio of DHA to ARA.[1,8]	**ARA ranges:** **Breast milk:** 0.47± 0.13% of fatty acids; 18-33 mg/100 kcal (12-22 mg/100 mL)[1] **US:** 26-35 mg/100 kcal[2,3,4] (17-23 mg/100 mL) **European:** Not required[6] **European style (US manufactured):** 34 mg/100 kcal (23 mg/100 mL)[5]
Prebiotics, Human Milk Oligosaccharides (HMOs)	Non-digestible carbohydrates that support healthy gut bacteria by feeding the beneficial bacteria. Approximately 200 HMO prebiotics are found naturally in human milk.[9]	**Prebiotics:** galactooligosaccharides (GOS), polydextrose (PDX), fructooligosaccharides (FOS) **HMO Prebiotics:** 2'-Fucosyllactose (2'-FL), 3'-Fucosyllactose (3'-FL); 3'-Galactosyllactose (3'-GL); 3'-Sialyllactose (3'-SL), 6'-Sialyllactose (6'-SL); Lacto-N-tetraose (LNT), Lacto-N-neotetraose (LNnT)
Probiotics	"Good" bacteria that promote a balance of bacteria in an infant's intestine. Thought to offset the growth of harmful bacteria that can contribute to infection and inflammation.[10]	Probiotics are living organisms. The health benefits are specific to the bacterial strain, not the more general bacterial species. The quantity and strain of the probiotic impact its ability to have a physiologic effect.[10] Examples: *L. rhamnosus* GG (ATCC 53103), *B. longum* (BB536), *L. reuteri* (DSM 17938)[2,3]
Lactoferrin	An iron transport protein present in human milk.[11]	Added in some infant formulas.[2]
Lactose	Lactose is a disaccharide that uses the lactase enzyme to break down into glucose and galactose. It is the primary carbohydrate in breast milk.[12]	Alternative carbohydrate sources in non-routine formulas: maltodextrin, corn syrup solids (glucose polymers), or sucrose.[12] High fructose corn syrup is not added to any infant formulas.
Iron	Iron is important for brain development, prevents anemia, and supports growth. Most healthy term infants have adequate iron stores for the first 6 months of life, dependent on gestational age, maternal iron status, and timing of umbilical cord clamping. By age 6 months, however, infants require additional iron in their diet.[13]	**Breast milk:** 0.09 mg/100 kcal (0.06 mg/100 mL)[13] **US:** 1.5-1.8 mg/100 kcal (1.01-1.24 mg/100 mL)[2,3,4] **European:** 0.7-1.03 mg/100 kcal (0.47-0.69 mg/100 mL)[14,15] **European style (US manufactured):** 1.2 mg/100 kcal (0.8 mg/100 mL)[6]

ANNENBERG CENTER FOR HEALTH SCIENCES AT EISENHOWER
Imparting knowledge. Improving patient care.

This activity is supported by an educational grant from **Mead Johnson Nutrition.**

Unpacking Formula Choices in a Changing Marketplace

Highlighted Ingredients Added to Infant Formula

References

1. Brenna JT, Varamini B, Jensen RG, Diersen-Schade DA, Boettcher JA, Arterburn LM. Docosahexaenoic and arachidonic acid concentrations in human breast milk worldwide. *Am J Clin Nutr* 2007;85(6): 1457-1464. doi:10.1093/ajcn/85.6.1457
2. Reckitt Mead Johnson Nutrition. Formulas. Updated 2021. Accessed October 15, 2023. https://hcp.meadjohnson.com/s/products/category/a4K4J000001uk3EUAQ/formulas
3. Abbott. Our Products. Updated March 2023. Accessed October 15, 2023. https://www.abbottnutrition.com/our-products/similac-360-total-care
4. Gerber. Nutrient Reference Chart. Updated 2022. Assessed October 15, 2023. https://medical.gerber.com/sites/default/files/2022-09/Nutrient-Chart-2022.pdf
5. Bocquet A, Briend A, Chouraqui JP, et al. The new European regulatory framework for infant and follow-on formulas: Comments from the Committee of Nutrition of the French Society of Pediatrics (CN-SFP). *Arch Pediatr.* 2020;27(7):351-353. doi:10.1016/j.arcped.2020.09.002
6. Bobbie. Our Ingredients. Updated 2023. Assessed October 15, 2023. https://www.hibobbie.com/pages/ingredients
7. Food Standards Australia and New Zealand. Food Standards Code 2021. Assessed October 8, 2023. https://www.foodstandards.gov.au/code/applications/Documents/A1124%20DHA%20Algal%20Oil%20in%20Infant%20Formula.pdf
8. Koletzko B, Lien E, Agostoni C, et al. The roles of long-chain polyunsaturated fatty acids in pregnancy, lactation and infancy: review of current knowledge and consensus recommendations. *J Perinat Med.* 2008;36(1):5-14. doi:10.1515/JPM.2008.001
9. Barile D, Rastall RA. Human milk and related oligosaccharides as prebiotics. *Curr Opin Biotechnol.* 2013;24(2):214-219. doi:10.1016/j.copbio.2013.01.008
10. Hill C, Guarner F, Regid G et al. The International Scientific Association for Probiotics and Prebiotics consensus statement on the scope and appropriate use of the term probiotic. *Nat Rev Gastroenterol Hepatol.* 2014;11:506-514.
11. Li W, Liu B, Lin Y, et al. The application of lactoferrin in infant formula: The past, present and future [published online ahead of print, 2022 Dec 19]. *Crit Rev Food Sci Nutr.* 2022;1-20. doi:10.1080/10408398.2022.2157792
12. Patel JK, Rouster AS. Infant Nutrition Requirements and Options. In: StatPearls. Treasure Island (FL): StatPearls Publishing; August 8, 2023.
13. Centers for Disease Control and Prevention. Breastfeeding. Iron. Reviewed April 4, 2023. Accessed October 18, 2023. https://www.cdc.gov/breastfeeding/breastfeeding-specialcircumstances/diet-and-micronutrients/iron.html
14. Aptamil. Products. Updated 2023. Accessed October 30, 2023. https://us.aptamil.com/aptamil-1-first-infant-milk
15. Kendamil. Infant Formulas. Products. Updated 2023. Accessed October 30, 2023. https://hcp.kendamil.com/product/classic-first-infant-milk-800g/#

This activity is supported by an educational grant from **Mead Johnson Nutrition.**