

Ingredients in infant milks

Choline, Inositol, L-Carnitine, Taurine

Choline

Choline is found in a number of forms in human milk, and the choline content of human milk is influenced by maternal choline intake. It is synthesised in the body, and the extent to which it is a required dietary component under normal circumstances is unclear. Choline serves as the precursor for the synthesis of phosphatidyl choline (PC), the main phospholipid in brain, liver and other tissues. PC plays a role in normal membrane composition and signalling processes, lipid metabolism, and normal brain development. As it is essential, and the potential for impaired synthesis or increased needs are not clear, it remains mandatory in infant formula. Following EFSA (2014) recommendations, current regulations specify a minimum choline content of 25mg/100kcal in infant formula, however it is not considered a necessary ingredient in follow-on formula.

Inositol

Inositol is an essential growth factor which is synthesised in the body but may need to be provided in the diet under certain conditions. Inositol is present in high concentration in human milk and decreases over the course of lactation. Inositol levels in blood are high among neonates, leading to the suggestion that inositol plays an important role in early development (Scientific Committee on Food, 2003) and as the amount of endogenous synthesis in infants is unknown, legislation has previously given minimum and maximum levels for inositol in infant formula suitable from birth. Current regulations reflect the EFSA opinion (2014) that inositol should be added to infant formula at 4mg/100kcal, but that it is not a necessary component of follow-on formula.

L-Carnitine

L-carnitine is the generic term used for a number of compounds that include L-carnitine, acetyl-L-carnitine, and propionyl-L-carnitine. L-carnitine plays a critical role in energy production and is concentrated in tissues like skeletal and cardiac muscle. The body makes sufficient L-carnitine to meet the needs of most people. However, some individuals, including pre-term infants, cannot make enough and L-carnitine must be supplied in the diet. Cows' milk contains more L-carnitine than human milk. Current regulations specify that L-carnitine should be added to infant formula at a minimum (target) content of 1.2mg/100kcal, however it is not considered a necessary addition to follow-on formula.

Taurine

Taurine is a free amino acid found abundantly in human milk and in only small amounts in cows' milk. Most infant formulas are enriched with taurine, although it is an optional ingredient. Interestingly, taurine has been added to formula for many years because it was found in human milk, and the patent protection of the addition to formula made it economically beneficial to some companies, despite there being little scientific rationale for it. Many decades later it appears that taurine is a safe addition to infant milk, but there remains no clear clinical benefit for it (Koletzko et al, 2005). EFSA (2014) in their *Scientific opinion on the essential composition of infant and follow-on formulae* have recently stated that:

“The panel considers that the addition of taurine to infant formula or follow-on formula is not necessary.”

Current regulations reflect this guidance and taurine remains a non-essential ingredient in infant formula and follow-on formula.

References

European Food Safety Authority (2014). Scientific opinion on the essential composition of infant and follow-on formulae. *EFSA Journal*, 12 (7), 3760. Available at <http://www.efsa.europa.eu/en/efsajournal/doc/3760.pdf>

Koletzko B, Baker S, Cleghorn G, et al (2005). Global standard for the composition of infant formula: Recommendations of an ESPGHAN coordinated International Expert Group. *Journal of Pediatric Gastroenterology*, 41, 584-599.

Scientific Committee on Food (2003). *Report of the Scientific Committee on Food on the Revision of Essential Requirements of Infant Formulae and Follow-on Formulae*. Brussels: European Commission.