

Ingredients in infant milks

Nucleotides

In the UK, the majority of non-organic standard cows' milk based infant formulas for healthy term infants, are supplemented with nucleotides. Nucleotides are substances that can be synthesised in the body from amino acids and which form the basis of DNA and RNA. The nucleotides added to infant milks include cytidine- disodium uridine- adenosine-, disodium- inosine-, and disodium guanosine- 5'-monophosphate. These substances are important metabolic regulators, involved in energy transfer and breaking down large molecules for example, and are particularly important in tissues with rapid turnover.

Nucleotides are not considered essential in the diet as they can be synthesised in the body, but it is thought that, at certain times (such as during periods of rapid growth or in disease), the process of synthesis of nucleotides may not be able to keep up with demand and that the body relies on dietary sources. Breastmilk is a source of nucleotides although the amount present is variable and their presence in human milk does not necessarily indicate a specific benefit for infants, as they may also be by-products of milk formation reflecting metabolic activity in the breast, shedding of cells or the occurrence of micro-organisms, without having a specific function for the infant (Scientific Committee on Food, 2003). Cows' milk contains considerably lower amounts of nucleotides, and the chemical composition of the nucleotides also differ from that of human milk. Heat treatment during infant milk production also degrades the nucleotides present. European regulations permit a maximum concentration of 5mg/100kcal (equivalent to about 3.4mg/100ml) of nucleotides to be added to infant formula on a voluntary basis (with variable amounts for each specific nucleotide).

Studies used by manufacturers to support the use of nucleotides in standard infant formula have shown conflicting results, particularly in respect of their effects on response to specific immunisations. The optimal level of supplementation is also unclear, as a wide range of nucleotide concentrations have been shown to have beneficial effects in term infants. The recent EFSA *Scientific opinion on the essential composition of infant and follow-on formulae* has clearly stated that:

“Taking into account the lack of convincing evidence for a benefit of the addition of nucleotides to infant and/or follow-on formula, the Panel consider that the addition of nucleotides to infant or follow-on formulae is not necessary.” (EFSA, 2014).

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>

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.