

Contaminants in infant milks

Aluminium contamination of powdered infant milks

There has been a long and significant history documenting the contamination of infant milks with aluminium and the consequent health effects of this, with aluminium toxicity associated with anaemia, bone disease and impaired neurological development (Fewtrell et al, 2011). Infant milks typically have 10 to 40 times more aluminium in them than breastmilk (Burrell and Exley, 2010; Chuchu et al, 2013). Warnings have been made to manufacturers over several decades in relation to aluminium toxicity and the vulnerability of developing infants to this, and therefore it could be assumed that levels in current infant milks would be low. However, in recent analyses of ready-to-feed infant milks, aluminium levels were found to vary from 155-422µg/litre, and in powdered milks from 106-756µg/litre, and there has been little change in content despite calls for a reduction (Chuchu et al, 2013). A recent analysis of specialised infant milks reported that the aluminium content of ready-to-drink preterm formulas ranged from 49.9 to 249.4 µg/litre. The aluminium content of powdered formulas for allergies ranged from 0.35 to 3.27µg/g which would be equivalent to about 32-385 µg/litre (Redgrove et al, 2019).

Soya protein based infant formula and pre-term infant formula have typically been found to have the highest amounts of aluminium (Burrell and Exley, 2010) and more recent analyses show that soya-based milks remain the highest, although all infant formula, follow-on formula and growing-up milks tested were contaminated with aluminium (Chuchu et al, 2013). Products are likely to be contaminated with aluminium from processing equipment and packaging, and a lack of progress in reducing this contaminant suggests that manufacturers do not consider it to be a health issue, despite evidence of both immediate and delayed toxicity in infants, especially pre-term infants. A recent study of pre-term infants fed intravenous fluids which were high in aluminium showed both impaired neurological development at 18 months and reduced bone mass at 13-15 years, and although there is likely to be much greater toxicity associated with intravenous administration of fluid, these findings suggest that significantly more should be done to reduce intakes (Fewtrell et al, 2011). EFSA considered aluminium toxicity in 2008 (EFSA, 2008) and suggested that 3 month old infants were typically exposed to aluminium at around 0.6-0.9mg/kg bw/week and 0.75-1.1mg/kg bw/week for soya formula, but acknowledged that the concentration in some formula brands was four times higher and that intakes could frequently exceed the current tolerable weekly intake of 1mg/kg bw/week. Breastfed infants are exposed to less than 0.07mg/kg bw/week.

Another study of milks in the UK in 2001 (Ikem et al, 2002) also reported that in some cases the amounts of aluminium, barium and thallium in infant milks exceeded stipulated water contamination levels, and again that soya protein based infant formula had higher aluminium contents than other formula, as did some milks made with partially hydrolysed protein.

Recent evidence suggests that levels of aluminium are higher in milks that are sold ready-to-feed in plastic bottles where the seal between the cap and the product is made of aluminium, and long-life cartons are also composed of packaging which has an aluminium foil central layer. However, variations between products with similar packaging means that there must be other sources of contamination (Chuchu et al, 2013). It appears that manufacturers have

not addressed issues relating to aluminium contamination and we believe precautionary practical solutions to this public health issue should be sought.

References

- Burrell SM, Exley C (2010). There is (still) too much aluminium in infant formulas. *BMC Pediatrics*, **10**, 63.
- Chuchu N, Patel B, Sebastien B, Exley C (2013). The aluminium content of infant formulas remains too high. *BMC Pediatrics*, **13**, 162-167.
- European Food Safety Authority (2008). Intake of aluminium from the diet. *The EFSA Journal*, **754**, 1-34.
- Fewtrell M, Edmonds CJ, Isaacs E, et al (2011). Aluminium exposure from parenteral nutrition in preterm infants and later health outcomes during childhood and adolescence. *Proceedings of the Nutrition Society*, **79**, 299-304
- Ikem A, Nwankwoala A, Oduyungbo S, et al (2002). Levels of 26 elements in infant formula from USA, UK and Nigeria by microwave digestion and ICP–OES. *Food Chemistry*, **77**, 439-447.
- Redgrove J, Rodriguez I, Mahadevan-Bava S, Exley C (2019). Prescription infant formulas are contaminated with aluminium. *Int J Environmental Research and Public Health*, **16**, 899-906.