From the French Market Elements in Baby Foods and Associate Health Risks

A new study published provides updated information on the levels of essential and toxic elements in baby foods commercially available on the French market.



Study

Early childhood nutritional intake progresses from an exclusively milk-based diet to a diversified diet. Commercial baby foods can form an important part of infants' diets and are specifically formulated to meet their growth and developmental needs.

Beyond meeting increasing nutritional demands, these baby foods can also increase infants' exposure to chemical contaminants. According to previous national food safety monitoring programs, chemical contaminants in baby foods, particularly arsenic, cadmium, lead, and mercury, are present at low levels and mostly align with European regulatory limits.

Recent studies on the chemical composition of baby foods in different countries suggest that food category, formulation, and geographical origin may influence chemical contaminant levels. However, these studies have focused on a limited number of toxic contaminants, highlighting the need for a comprehensive chemical profiling of commercial baby foods.

The current study aimed to determine the levels of 28 major and trace elements in 97 baby foods commercially available on the French market. A broad range of food categories, formulations, production modes, packaging types, and commercially available brands were considered in the analysis. The products, purchased from French supermarkets in 2024, included 42 fruit-based purees, 16 vegetable-based meals, 18 vegetable-and-meat meals, 18 vegetable-and-fish meals, and three infant cereal products.

Findings

The analysis detected major elements, such as sodium, potassium, calcium, and magnesium, in nearly all selected samples. Potassium was the most abundant major element. Nutritionally important trace elements, such as iron, zinc, copper, and manganese, were also consistently detected in all samples.

Among toxic elements, cadmium was quantified in 78% of samples, whereas arsenic, nickel, and lead were quantified in 48%, 47%, and 44% of the samples, respectively. Cadmium, lead, and

nickel levels were generally low across all food categories and complied with current European maximum levels.

Arsenic levels, on the other hand, varied significantly across food categories. While levels were low in fruit-, vegetable-, and meat-based products and infant cereals, arsenic was significantly higher in vegetable and fish meals. The median total arsenic concentration in these fish-containing meals was 0.0663 mg/kg, with a maximum of 0.875 mg/kg. The well-documented accumulation of arsenic in aquatic environments may explain this distribution pattern.

In the five samples containing the highest levels of total arsenic, inorganic arsenic levels were below 0.003 mg/kg, well below the European maximum level established for baby foods. This finding indicates that only a small fraction of total arsenic is present as inorganic arsenic in these samples.

The proportion of inorganic arsenic was less than 1% of total arsenic in samples. This is consistent with the presence of arsenobetaine and other organoarsenic compounds commonly found in marine fish. These findings highlight the importance of considering specific arsenic compounds when evaluating potential health risks, as total arsenic levels alone would substantially overestimate the toxicologically relevant fraction in the analyzed fish-containing samples.

Among various packaging types, significantly higher levels of tin were detected in glass jars with metallic lids. The observed significant association between packaging types and the presence of tin suggests that packaging materials may be the most likely source of tin contamination rather than agricultural practices.

Principal component analysis identified food category as the main determinant of variability in baby foods' chemical compositions. Specifically, fruit-based products formed a well-defined cluster characterized by lower levels of various elements. Infant cereals, by contrast, formed a clearly separated cluster from other food categories because of higher levels of iron, zinc, calcium, and manganese. Vegetable-, meat-, and fish-based products showed substantial overlap, indicating that shared ingredients and complex formulations influence the chemical composition of these food categories.

Further analysis showed that commercially available baby foods may represent an important dietary source of exposure to the toxic element aluminum and, to a lesser extent, nickel under certain consumption patterns. However, these findings should be interpreted with caution as these estimates are based on illustrative scenarios using commercial serving sizes, rather than nationally representative food consumption data.

These estimates provide an initial indication of potential dietary exposure and do not reflect a formal dietary exposure assessment.

Conclusion

The study found that levels of regulated toxic elements in the tested commercially available baby foods agree with European maximum limits. Overall, the findings indicate that fish-based products contain higher levels of arsenic; infant cereals contain higher levels of several essential minerals due to fortification, and vegetable-based products generally contain higher levels of cadmium and nickel.

Consistent with previous French Total Diet Studies, the current study provides updated information on the presence of essential and toxic elements in commercially available baby foods. Additionally, the study highlights the potential influence of packaging materials on the elemental composition of baby foods and the need to consider specific arsenic compounds when evaluating potential health risks.

The study has several limitations, including its relatively small sample of commercially available products, particularly the inclusion of only three infant cereals, which may limit the generalizability of the findings. Inorganic arsenic was measured in only five selected samples, while the dietary exposure estimates were based on hypothetical consumption scenarios. Further research using larger, representative samples and comprehensive dietary data is needed to better assess potential health risks.

Taken together, these findings provide data for future dietary exposure assessments and highlight the need for continuous monitoring of baby foods.

Source:

https://www.news-medical.net/news/20261102/Does-choosing-organic-baby-food-change-its-mineral-content.aspx