Contaminants in Baby Food

GOALS

The goals of this project were to:

- Determine the levels of total arsenic, inorganic arsenic, cadmium, lead, mercury, bisphenols, phthalates, per- and polyfluoroalkyl substances (PFAS), and microplastics in various foods intended for infants and toddlers younger than 2, excluding infant formula.
- Assess the health risks to young children from dietary intake of these contaminants from tested foods using the most health-protective limits.

TEST APPROACH AND METHODS

We tested two or four unique samples each of 48 food products packaged in jars, pouches, tubs, and boxes. The products include snacks (bars, biscuits, cookies, crackers, crunchies, puffs, rice rusks, melties) of various flavors; dry cereals (multigrain, oatmeal, oatmeal and barley, and rice); fruits and vegetables, with one or more ingredients, in a jar, container, or pouch; and meals/entrées containing meat (chicken, turkey), grain (rice), and vegetables. The 20 organic and 28 non-organic or conventional products represented top-selling national, store, and private brands, and were purchased between February and March 2026 from supermarkets in New York, Connecticut, and California, as well as online.

To be clear, Consumer Reports conducts its testing to provide consumers with advice to inform their decision-making. We do not perform compliance or regulatory testing, and our results are not meant to be viewed as such.

The unopened samples were masked, blind-coded to preserve their identities, and shipped to an independent, accredited laboratory.

At the lab, sample preparation was performed in fume hoods verified to be free of trace metals contamination. Water, sample containers, and other materials used for the analyses were monitored for contamination to account for any biases in sample results.

Testing for total arsenic, cadmium, lead, and mercury was performed using Triple Quadrupole Inductively Coupled Plasma Mass Spectrometry (ICP-QQQ-MS). All samples were prepared and analyzed in accordance with the Association of Official Analytical Chemists (AOAC) Method 2015.01.

Any sample with an arsenic result above the method detection limit was analyzed for the inorganic arsenic species arsenate and arsenite, and three organic arsenic species—monomethyl arsonic acid (MMA), dimethyl arsinic acid (DMA), and trimethyl arsine oxide (TMAO)—using Ion Chromatography Inductively Coupled Plasma Mass Spectrometry (IC-ICP-MS).

Testing for bisphenol A (BPA), bisphenol F (BPF), and bisphenol S (BPS) was performed using liquid chromatography mass spectrometry (LC-MS/MS). All samples were prepared and analyzed in accordance with a method from the Journal of Chromatography A.

Testing for the phthalates BBzP, DBP, DiBP, DCHP, DEP, DEHP, DnHP, DMP, DiNP, and DNOP, DEHA, DINCH, and DEHT was performed by gas chromatography mass spectrometry (GC-MS/MS).

Testing for 30 PFAS chemicals was performed by liquid chromatography mass spectrometry (LC-MS/MS). All samples were prepared and analyzed in accordance with the Food and Drug Administration Method FDA C-0100.03.

Testing of select samples for counts and size distributions of microplastics was performed using laser direct infrared (LDIR) spectroscopy.

For the applicable tests, sample analysis was preceded by at least a five-point calibration curve spanning the entire concentration range of interest. Calibration curves were performed at the beginning of each analytical day and verified during analysis. The testing conformed to the quality control criteria and performance requirements set in cited official methods, as well as to those in ISO 17025.

DATA ANALYSIS

We estimated the intakes of the analyzed contaminants associated with a serving of each food using the serving sizes on the product labels, our test results, and the average body weight of U.S. children up to 2 years old. We used the recommended body weight from the Environmental Protection Agency (2011 "Exposure Factors Handbook"[1]) of 9.8 kilograms.

For contaminant test results below the method detection limit (MDL), we applied a method used by many risk assessors,[2] including the EPA,[3] to estimate the average concentration of a product. If the contaminant was detected in any of the two or four samples tested for a product, then test results below the MDL for that product were assumed to have a concentration equal to half the MDL. If the contaminant was not detected in any of the samples tested for a product, we assumed a concentration of zero for all the samples of that product.

We did not assess the risks from microplastics because we are not aware of any regulatory standard or health-based exposure limit.

[1] "Exposure Factors Handbook," 2011 Edition, chapter 8, Environmental Protection Agency, https://www.epa.gov/expobox/exposure-factors-handbook-2011-edition. [2] Xue, J.; Zartarian, V.; Wang, S.; et al., "Probabilistic Modeling of Dietary Arsenic Exposure and Dose and Evaluation with 2003-2004 NHANES Data," *Environmental Health Perspectives* 118, no. 3 (2010): 345-50. [3] "Regional Guidance on Handling Chemical Concentration Data Near the Detection Limit in Risk Assessments," Environmental Protection Agency, https://www.epa.gov/risk/regional-guidance-handling-chemical-concentration-data-near-detection-limit-risk-assessments.

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We compared our estimated intakes of the contaminants from a serving of each food with health-based limits in the table below using the following equation:

% CR Level of Concern = (Estimated Intake/Health-Based Limit) x 100

This equation derives from the public health concept of hazard quotient and the following equation:

Hazard Quotient (HQ) = Estimated Dose/Reference Dose

A % CR Level of Concern greater than 100 or HQ greater than 1 indicates a comparatively higher health risk at this consumption level.

We used the California Office of Environmental Health Hazard Assessment (OEHHA) Maximum Allowable Dose Levels (MADL) as our benchmarks for CR's levels of concern for cadmium, lead, DEHP, and DBP. MADLs are levels established through California's Proposition 65 law. CR uses these values because the standards are the most health-protective. A measured level greater than 100 percent of CR's level of concern indicates that consumption of that serving amount per day would pose a comparatively higher health risk.

However, while we use the MADLs involved in Prop 65, we approach our exposure assessment differently from what's outlined in Prop 65. Prop 65 takes into consideration consumers' average exposure over time and dietary frequency to calculate whether a product exceeds the MADL and requires a warning label. By contrast, Consumer Reports assumes the label-recommended daily serving of the product in its risk assessment calculations. This difference in methodology means no Prop 65 judgments can be made from CR's findings. Our results are meant to provide guidance on which products have comparatively higher levels of a contaminant, not to identify the point at which exposure to the contaminant will have measurable harmful health effects, or to assess compliance with California law.

Selected Health-Based Exposure Limits and Guidance/Regulatory Limit

Contaminant	Source	Endpoint and Basis for Limit/Guidance or Regulatory Limit	Value (Unit)
Inorganic Arsenic	EFSA (2023)	A reference point that corresponds to a 5% increase in incidence of skin cancer relative to the background, and that also covers lung cancer, bladder cancer, skin lesions, ischemic heart disease, chronic kidney disease, respiratory disease, spontaneous abortion, stillbirth, infant mortality, and neurodevelopmental effects	0.06 ug/kg bw/day
	FDA (2020)*	Action level for inorganic arsenic in infant rice cereal	100 ng/g
Cadmium	OEHHA (2017)	OEHHA Proposition 65 Maximum Allowable Dose Level (MADL) for chemicals causing reproductive toxicity (cadmium, oral exposure)	4.1 ug/day
Lead	OEHHA (2017)	OEHHA Proposition 65 Maximum Allowable Dose Level (MADL) for chemicals causing reproductive toxicity (total lead, oral exposure)	0.5 ug/day
Methylmercury	EPA (Updated 2001)	Noncancer oral reference dose based on developmental neuropsychological impairment	0.1 ug/kg-day
Bisphenol A (BPA)	EFSA (2023)	Tolerable Daily Intake (TDI) for reproductive, developmental, and metabolic effects	0.2 ng/kg bw/day
DEHP	OEHHA (2003)	OEHHA Proposition 65 "Safe Harbor" or MADL (male children 29 days to 24 months old)	58 ug/day
	MV Maffini et al 2021*	Lowest intakes significantly associated with endpoints of concern in human studies	0.03-242.5 ug/kg bw/day
DBP/DiBP	OEHHA (2007)	OEHHA Proposition 65 "Safe Harbor" or MADL for reproductive toxins (total lead, oral exposure)	8.7 ug/day
6:2 FTS	EPA (2024)	Human health toxicity value for immune effects	0.2 ug/kg-day

*Action level was compared to our analyzed levels and the exposure limit to our estimated intakes, but the values were not used to determine the levels of concern.