July 2025

TEST METHODOLOGY

Heavy Metals in Baby Foods

GOALS

To determine levels of heavy metals—specifically Arsenic, Cadmium, Lead, and Mercury—in baby, infant, toddler, and child food products, inform parents and caregivers about potential health risks, and promote safer product choices. Olive tested 298 products within this category.

TEST APPROACH AND METHODS

All products were analyzed by Light Labs, an ISO 17025 accredited laboratory based in Ann Arbor, Michigan. Testing was conducted using inductively coupled plasma tandem mass spectrometry (ICP-MS/MS) following microwave-assisted acid digestion for sample preparation. Products initially identified with elevated contaminant levels underwent retesting for verification. For products with elevated arsenic levels, additional tests distinguished inorganic from organic arsenic forms.

Products initially testing below established guidelines did not undergo additional inorganic arsenic testing, as total arsenic concentrations already confirmed compliance.

Quality control measures involved rigorous validation protocols and verification using NIST traceable standard reference materials. Selected samples were analyzed multiple times to ensure accuracy and precision.

DATA ANALYSIS

Samples yielding concentrations below the method detection limit (MDL) were categorized as non-detects and reported explicitly as below the relevant regulatory or guideline limits. The MDL for all tests conducted was significantly lower than established allowable limits, ensuring confidence in identifying compliant products.

Metal concentrations were directly compared against FDA, EU, and Clean Label Project limits (ppb). Prop 65 evaluations used serving sizes to calculate micrograms per serving for daily intake compliance.

EXPOSURE ASSESSMENT

The Olive Standard integrates the strictest contaminant limits from FDA, EU, and Clean Label Project guidelines. Olive separately evaluates products against California Proposition 65 guidelines (MADLs), legally enforceable standards requiring consumer warnings if exceeded.

- **Arsenic**: FDA action levels and EU Regulation 2023/915 were used to assess arsenic exposure risk. Olive separately analyzed inorganic arsenic, given its known heightened toxicity.
- **Cadmium and Lead**: Levels assessed against FDA, EU, Clean Label Project, and Proposition 65 MADLs. Prop 65 MADLs served as the benchmark for legally required consumer warnings.
- **Mercury**: Evaluated against Clean Label Project standards, as FDA and Proposition 65 have not established mercury limits in foods.

Health-Based Exposure Limits Informing Olive's Assessments

Heavy Metal	FDA Limit (ppb)	EU Limit (ppb)	Clean Label Project Limit (ppb)	Prop 65 MADL (µg/day)
Inorganic Arsenic	100	10-20*	100	10
Cadmium	N/A	5-40*	5-40*	4.1
Lead	10-20*	10-20*	10-50*	0.5
Mercury	N/A	N/A	100	N/A

CLP: Clean Labal Project
MADL Maximum Allowable Dose Level
N/A: Not applicable
*:Limit depends on the product category

REFERENCES

- FDA Arsenic Action Level (Link)
- FDA Lead Action Level (Link)
- EU Established Limits on Cadmium and Lead (Link)
- California Prop 65 Contaminant Standard (Link)
- Clean Label Project Contaminant Standards (Link)
- EU Regulation 2023/915 (Link)
- ATSDR documentation on health risks of heavy metals (Link)
- EPA documentation on health risks of heavy metals (Link)
- CDC documentation on health risks of heavy metals (Link)
- Chandravanshi L, Shiv K, Kumar S. Developmental toxicity of cadmium in infants and children: a review. Environ Anal Health Toxicol. 2021 Mar;36(1):e2021003-0. doi: 10.5620/eaht.2021003. Epub 2021 Feb 4. PMID: 33730790; PMCID: PMC8207007. (Link)

RESULTS

Of the 298 tested products, Olive identified:

- 16 products (~5%) exceeding California Prop 65 MADL for lead.
- 17 products (~6%) exceeding FDA Action Levels and/or EU Limits for arsenic or lead.
- 3 products exceeded EU Limits for cadmium
- ***% of products where > 1 serving exceeds California Prop 65 Daily Limit: ~15%***

HEALTH RISKS OF HEAVY METALS

- **Arsenic**: Chronic inorganic arsenic exposure risks developmental issues, neurotoxicity, and increased cancer risk.
- **Cadmium**: Accumulates causing kidney and bone damage; may impair nutrient absorption in children.
- **Lead**: Even minimal exposure can cause irreversible neurological damage, reduced IQ, and attention disorders in children.
- **Mercury**: Methylmercury impairs brain development, affecting cognitive and motor functions in infants and young children.

LIMITATIONS AND CLARIFICATIONS

The Olive Standard is highly protective and informative but does not itself constitute a legal judgment under Proposition 65. Prop 65 compliance involves specific assessments based on consumer exposure frequency and average intake, distinct from Olive's single-serving exposure assessments.