

CLP Insights: Key Findings in Coffee



Introduction

The Clean Label Project was founded with a mission to uncover the hidden risks of environmental contaminants in everyday products. The guiding principle is straightforward: **reducing contaminants is always better!**

While we know these contaminants can be harmful, the long-term effects are still coming to light. That's why the Clean Label Project champions urgent conversations among brands, consumers, retailers, the medical community, and regulators to tackle this critical issue.

This document is designed as a follow-up to the key findings on contaminants in popular decaf coffee products, the Clean Label Project published in 2021, where we highlighted methylene chloride use in the process of decaffeinating coffee.

A 2025 caffeinated coffee study performed by the Clean Label Project focused on contaminant findings and aimed to highlight the gaps in traditional nutritional labels.



Why Coffee

Coffee is one of the most popular beverages in the U.S., generating USD \$269.27 billion in 2024. Over 1 billion people worldwide drink coffee every day. That's about 12.6% of the world's population. At Clean Label Project, rather than accepting safety as a given, we rely on data and science to reveal the truth behind what consumers are really ingesting, focusing on ensuring transparency and safety in the market.

Executive Summary:

Key Data and Findings from Protein Category Insights Report

Grand View Market estimated the global market size of coffee at USD \$269.27 billion in 2024 and is projected to reach USD \$369.46 billion by 2030. While many assume that the coffee sector as a whole is safe, the Clean Label Project's Coffee Category Report highlights important data regarding potential contaminants in coffee. This study, which tested 57 products from 45 of the top-selling brands, highlights concerns that challenge the current understanding of product purity.

The Clean Label Project conducted over **7,069 individual tests on contaminants**, including heavy metals (lead, cadmium, arsenic, mercury), mycotoxins, pesticides, phthalates, glyphosate, and Aminomethylphosphonic acid (AMPA), a byproduct of glyphosate breakdown. These chemicals, known for their potential to harm human health, can contaminate coffee through environmental exposure, agricultural practices, processing, and packaging materials.

The study's findings highlight that many products may contain dangerous levels of contaminants not reflected on traditional nutrition labels, despite the growing health-conscious market.

Many varieties of consumer coffee products were tested to determine if roast (light, medium, dark), packaging type (bagged, canned, pods), and product claims (organic) were associated with particular levels of contaminants.

The United States federal government and all US States have no contaminant regulations for coffee. Usually, Clean Label Project uses California Prop 65 limits as a guideline for contaminant thresholds, but coffee is exempt from CA Prop 65. The Clean Label Project compared the coffee results to the EU Food and Beverage contaminant limits, listed below:

Contaminants Tested	EU Limits on Coffee
Glyphosate (Round-up)	100 ppb (green), No limit established (roasted)
AMPA (A Glyphosate Residue)	No Limit Established
Phthalates (Packaging Residue)	Migration limits: <ul style="list-style-type: none"> • DBP = 120 µg/kg or 120 ppb • BBP = 6,000 µg/kg or 6,000 ppb • DEHP = 600 µg/kg or 600 ppb • DINP + DIDP = 1,800 µg/kg or 1,800 ppb
Acrylamide (Chemical from cooking)	No Limit Established
Arsenic (Heavy Metal)	No Limit Established
Cadmium (Heavy Metal)	No Limit Established
Mercury (Heavy Metal)	No Limit Established
Lead (Heavy Metal)	No Limit Established
Pesticides	10 ppb - 200 ppb

- 100% of the organic coffees tested had AMPA, and glyphosate is banned for organic products.
- Packing Type matters: Choose Bags or Pods and avoid Cans.
- Roast Level matters: Choose Dark or Light Roast and avoid Medium Roast.
- Region of the world matters: Africa presents the lowest levels of heavy metals in coffee, while Hawaii has the highest. This is probably due to the active volcanic soil where Hawaiian coffee is grown.
- "Organic" coffee has fewer industrial contaminants than conventional coffee.

One surprising data point was how much glyphosate is used in the coffee growing and harvesting process. While the results found very little glyphosate in coffee, a significant amount of AMPA (Aminomethylphosphonic acid) was found. Essentially, when glyphosate breaks down in the environment, [AMPA is one of the byproducts. AMPA is considered persistent in the environment](#) and has been linked to various health and ecological concerns. The most interesting finding was that 100% of the organic coffees tested had AMPA, and glyphosate is banned for organic products. Overall, caffeinated coffee is one of the cleanest categories the Clean Label Project has tested. While coffee is relatively clean, the results show certain packaging and roasts will provide the cleanest, guilt-free cup of coffee.

The Clean Label Project's Methodology

Clean Label Project purchased and rigorously **tested 57 of the top-selling coffees, sourced from Nielsen, SPINS, and Amazon's best-seller lists**, and supplemented with top products from the natural and organic marketplace. It also assessed multiple panels of industrial and environmental contaminants. Collaborating with an analytical chemistry lab, Clean Label Project amassed 7,069 data points from 45 brands and 57 products to benchmark the findings.

How Does the Clean Label Project Measure These Contaminants?

Clean Label Project contracted the independent, ISO/IEC 17025-accredited analytical chemistry laboratory, Ellipse Analytics, to test six (6) industrial chemical panels, including heavy metals and bisphenols A and S.

The heavy metals, arsenic, cadmium, lead, and mercury, were tested by Inductively Coupled Plasma – Mass Spectroscopy (ICP-MS). Phthalates were tested by Gas Chromatography – Mass Spectroscopy (GC-MS/MS). Bisphenols and pesticides are tested by Liquid Chromatography – Tandem Mass Spectroscopy (LC-MS/MS).



Contaminants Found in Clean Label Project's Coffee Study

Glyphosate Findings

The Clean Label Project found glyphosate in two coffee samples. Glyphosate usually dissipates with heat, so the roasting process of coffee would cook off the glyphosate chemical residue. Glyphosate is a broad-spectrum systemic herbicide and crop desiccant. It has been registered as a pesticide in the U.S. since 1974.

Glyphosate	Sample Tested	Low	High	Mean
Category	57	0.00	3.76	0.11
Bag	36	0.0	0.0	0.0
Can	6	0.0	2.7	0.4
Pod	15	0.0	3.8	0.3
Light	8	0.0	0.0	0.0
Medium	35	0.0	3.8	0.2
Dark	14	0.0	0.0	0.0
Conventional	45	0.0	3.8	0.1
Organic	12	0.0	0.0	0.0

Why does Clean Label Project test for Glyphosate?



Glyphosate Health Issues: Glyphosate, the active ingredient in many herbicides like Roundup, has been linked to several potential health effects, including cancer, liver inflammation, and metabolic disorders. Other concerns include potential endocrine disruption, effects on the immune system, and neurodegenerative effects.



How Glyphosate Contaminates Coffee: Glyphosate is a common herbicide and is broadly used in the growing of coffee. Weed control can impact coffee production by 40%. Mowing is an option, but the usage of glyphosate is an easy, less expensive way to kill all weeds growing around the coffee crop and is frequently used to clear land around the coffee crop for easier harvesting. When glyphosate is used in between rows, and depending on when it is applied, it may be detectable in the green beans.

Aminomethylphosphonic Acid Findings

The Clean Label Project found **Aminomethylphosphonic acid (AMPA) in 72%, or 41 out of 57, of the coffee samples** tested, including **100% of the organic samples**; this was surprising because glyphosate is banned for application on organic products. AMPA is a chemical compound that is a major breakdown product of the herbicide glyphosate and also a degradation product of other aminophosphonates used in water treatment.

AMPA	Sample Tested	Low	High	Mean
Category	57	0.00	577.95	37.62
Bag	36	0.00	383.10	31.15
Can	6	0.00	577.95	98.16
Pod	15	0.00	136.64	28.91
Light	8	0.00	51.42	11.10
Medium	35	0.00	577.95	37.41
Dark	14	0.00	383.10	53.29
Conventional	45	0.00	577.95	37.18
Organic	12	4.35	181.80	39.23

Why does Clean Label Project test for AMPA?



AMPA Health Issues: Studies have shown that AMPA has similar health risks to glyphosate, and AMPA exposure was associated with increased breast cancer risk in a small cohort. It has been found that childhood exposure to AMPA may increase the risk of liver stress and damage in early adulthood, which could lead to more serious diseases later.



How AMPA Contaminates Coffee: Glyphosate is a chemical that breaks down in the environment over time; when glyphosate breaks down, one of the chemicals it changes to is AMPA. AMPA can be tested to see if Glyphosate was applied to a crop in the past.

Acrylamide Findings

Acrylamide was found in 100% of the coffee samples tested. When accounting for serving size, all samples fell within the EU limits, but a few cups of coffee would quickly push you over the limits for the day. Acrylamide is a colorless, odorless chemical compound that is formed when certain foods are cooked at high temperatures.

Dark or light roast coffee had the least amount of acrylamide. Also, canned coffee had significantly more acrylamide than bagged or coffee from pods.

Acrylamide	Sample Tested	Low	High	Mean
Category	57	78.7	319.6	159.5
Bag	36	78.7	280.2	152.5
Can	6	155.7	319.6	240.4
Pod	15	82.4	256.2	144.0
Light	8	131.1	256.2	164.8
Medium	35	109.9	319.6	169.9
Dark	14	78.7	280.2	130.5
Conventional	45	78.7	319.6	165.5
Organic	12	99.0	164.8	137.2

Why does the Clean Label Project test for acrylamide?



Acrylamide Health Issues: Acrylamide forms in some foods during high-temperature cooking. It has been linked to various health concerns, including nervous system effects, potential reproductive issues, and a possible link to cancer. While there's no conclusive evidence of a direct link between acrylamide in food and human cancer, animal studies have shown that acrylamide can cause cancer in high doses.



How Acrylamide Contaminates Coffee: Acrylamide is a naturally formed chemical in coffee, is not directly added to food as a contaminant but rather forms during high-temperature cooking processes. This process, known as the Maillard reaction, involves reducing sugars and amino acids, like asparagine, reacting at high temperatures. The Maillard reaction is responsible for both the browning of food and the development of flavors.

- How the coffee is roasted affects the presence of acrylamide. Many less expensive coffees, like those found in a can, are roasted at higher temperatures, increasing acrylamide in the beans.

Phthalate Findings

It was found in 40 of the 57 (17 without a detectable level), representing 70% of the coffee samples tested. The highest levels of phthalates were found in canned and coffee pods. Phthalates are a group of chemicals primarily used as plasticizers to make plastics more flexible and durable.

Phthalates	Sample Tested	Low	High	Mean
Di-n-butyl	57	0.0	517.20	15.05
Diethylhexyl	57	0.0	16.11	2.17
Butyl Benzyl	57	0.0	117.15	7.15
Bis(2-ethylhexyl)	57	0.0	856.29	51.14
Di-n-butyl				
Bag	36	0.0	32.2	6.3
Pod	6	0.0	55.0	37.8
Can	15	0.0	517.2	10.9
Di-n-butyl				
Light	3	ND	ND	ND
Medium	10	ND	517.20	57.22
Dark	8	ND	ND	ND
Bis(2-ethylhexyl)				
Bag	36	0.0	273.9	39.3
Pod	6	0.0	856.3	93.1
Can	15	0.0	54.3	17.6
Bis(2-ethylhexyl)				
Light	3	ND	33.61	3.73
Medium	10	ND	67.52	8.44
Dark	8	ND	ND	ND

Why does Clean Label Project test for Phthalates?



Phthalates Health Issues: Phthalates are a class of chemicals with endocrine-disrupting properties. These chemicals are associated with health harms including increased risk of cancer, asthma and allergies, and learning attention and behavioral difficulties in children.



How Phthalates Contaminate Food: Phthalates contaminate food and coffee primarily through packaging (bag, can, pods), processing equipment, and coffee preparation materials, which can leach into food and beverages. Additionally, phthalates can enter the food chain through contaminated water and soil.

Heavy Metals: Arsenic (As), Cadmium (Cd), Mercury (Hg), Lead (Pb) Findings

Heavy metals were found in 100% of the coffee products tested, but all were under the EU limits, per serving. The results below are by region, please note that not all packaging indicated origin by country and/or region. African coffees have the least amount of heavy metals on average, and Hawaii has the most. Hawaii most likely has the highest levels of heavy metals due to the volcanic soils in which the coffee is grown.

	As avg	Cd avg	Hg avg	Pb avg
Brazil(3)	2.8	6.2	0.0	5.8
Columbia(3)	3.1	8.8	0.0	8.2
Peru(2)	1.7	5.2	0.3	3.2
Guatemala(3)	1.7	7.5	0.0	3.9
Costa Rica(1)	0.0	6.0	0.0	4.1
Ethiopia(3)	1.9	3.3	0.3	3.5
Kenya(1)	1.5	2.9	0.3	6.2

	As avg	Cd avg	Hg avg	Pb avg
Africa(6)	2.0	4.4	0.2	4.9
Central America(6)	3.0	6.4	0.1	6.2
Hawaii(1)	93.6	19.7	0.2	3.8
South America(8)	2.0	6.7	0.1	5.6

Why does the Clean Label Project test for Heavy Metals?



Heavy metals (arsenic, lead, mercury, and cadmium) Health Issues: Heavy metals can cause a wide range of health problems, including damage to the nervous system, kidneys, liver, and other organs, as well as increased risk of cancer and other diseases. Exposure to heavy metals can lead to neurological issues like impaired cognitive function, memory loss, and brain damage. Additionally, heavy metals can impair the immune system, increase the risk of cardiovascular disease, and affect the reproductive system.



How Heavy Metals Contaminate Food: Heavy metals, such as arsenic, lead, mercury, and cadmium, are naturally occurring elements found in the Earth's crust. They can enter the environment through natural processes like volcanic eruptions, weathering of rocks, and soil erosion. Over time, they accumulate in air, water, and soil, where they can make their way into plants, animals, and eventually into human food sources. Though naturally occurring, the concentration of these metals can increase due to human activities such as mining, industrial processes, and agricultural practices, leading to higher exposure risks in food products. Given the absence of federal regulations that require proactive testing to minimize the introduction into finished products, they can be unintentionally introduced into all foods and consumer products.



Environmental toxins in coffee are very low compared to other categories. This includes metals and pesticides. Two factors that likely contribute to the low presence of environmental toxins are:

- Coffee is grown in trees/shrubs, therefore, fewer heavy metals (things grown in the ground are higher)
- The coffee plant has a slower uptake of earthen metals, unlike the cocoa tree.



Aren't These Contaminants Regulated?

Surprisingly, there are no comprehensive federal regulations specifically targeting dietary exposure to heavy metals and industrial contaminants in food and beverages (like coffee), with most safety efforts focused on physical and microbiological contaminants. However, recent discussions in Congress and the [FDA \(with Closer-to-Zero and action limits for baby food\)](#), are pushing for stricter standards on heavy metals and industrial chemicals in food products. States like California have led the charge with its [Prop 65 \(which is referenced many times in this coffee white paper\)](#), and California and Maryland transparency laws for heavy metals in baby food ([CA AB899 & MD SB723](#)). While ([CA AB899 & MD SB723](#)) initially focus on infant foods, they signal growing concern over contaminants in food across all categories.



What companies are leading in this space?

One company leading in testing and transparency is Love Grown, which has worked closely with the Clean Label Project to minimize industrial contaminants of its products. “At Love Grown, we’re committed to raising the bar on purity and safety so our customers can enjoy their daily brew without hesitation,” Love Grown President Katie Tyson noted. “We’re proud to be the only Clean Label Project Certified coffee brand, making our plastic-free coffee pods some of the safest options available. Together with CLP, we’re continuing to work toward reducing contaminants to as close to zero as possible.”

Our Mission

Clean Label Project™ is a national non-profit with the mission to bring truth and transparency to food and consumer product labeling. The foundation of food and consumer product safety in America is primarily focused on pathogen and microbiological contaminants. However, there is an increase in consumer, media, and academic attention being paid to the health consequences of exposure to heavy metals, pesticide residues, and plasticizers. Yet, consumers will never find this information on product labels. We are committed to changing the definition of food and consumer safety through the use of data, science, and transparency. We award brands with products that place an emphasized focus on purity and surpass the minimum regulations required by FDA. At Clean Label Project, we encourage brands to join us in becoming part of the solution to address the growing consumer concern of industrial & environmental contaminants and toxins in both food and consumer products.

Clean Label Project Certification

Food and consumer product safety regulatory fabric in America is largely focused on pathogen & microbiological contaminants. For categories where Clean Label Project does not have benchmarked data to warrant a Clean Label Project Purity Award, Clean Label Project borrows a page out the State of California Office of Environmental Health Hazard Assessment Safe Drinking Water and Toxic Enforcement Act of 1986. Informally known as Proposition 65, this regulation was enacted as a ballot initiative in November 1986. It considered the strictest regulation in the country when it comes to protecting consumers from industrial & environmental contaminants and chemicals of concern. Proposition 65 aims to protect the state's drinking water sources from being contaminated with chemicals known to cause cancer, birth defects or other reproductive harm, and requires businesses to inform Californians about exposures to such chemicals.



For a full list of products Clean Label Project
evaluated, please visit the website at
www.cleanlabelproject.org