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An Examination and Explanation of *Consumer Reports'* Article on Chocolate

The December 15th, 2022, *Consumer Reports* article entitled, "Lead and Cadmium Could Be in Your Dark Chocolate" purports to analyze and inform consumers of lead and cadmium levels in dark chocolate. The article ignores the correct CA Prop 65 Standard that was set specifically for chocolate in 2018. Additionally, the article goes on to set up what the author calls "CR levels" and then compares various chocolate brands using a percent difference to the CR levels. Using percents can be a misleading way to communicate information and in this case it is misleading.

Putting the Article into Context

When *Consumer Reports* was planning to write an article on this subject, they contacted several firms, including Chocolove, and trade groups for their research. The consistent message to *Consumer Reports* was that the matter of trace elements and minerals in chocolate had been studied and peer reviewed extensively. The definitive standard was set in California in 2018 and became part of the California Proposition 65 body of regulations (CA Prop 65). The set of standards specifically for chocolate and relative to cocoa content is also known as the As You Sow Settlement or 2018 Settlement standards.

The CR article shares comments from an interview with As You Sow (ASY) staff but makes no mention of the CA Prop 65 Standard for chocolate set in 2018. Given that the CR article quotes an ASY employee, it is known that the writer had knowledge of correct CA Prop 65 standards for chocolate.

Rather than using the As You Sow settlement standards, *Consumer Reports* based their article on a non-food safety standard of their own creation. This omission to report on the CA Prop 65 Standard for chocolate and decision by Consumer Reports to create their own "CR levels," is the first and second of several choices CR made in this article that are questionable. That CR uses the term "levels" indicates they were conversant on US FDA and CA state levels for lead and cadmium.

The National Confectioners Association (NCA), wrote in response to the *Consumer Reports* article:

The California Office of Environmental Health Hazard Assessment (OEHHA) guidelines cited in the *Consumer Reports* study are not food safety standards. An expert investigation conducted through our prior California Proposition 65 settlement (with As You Sow) concluded that cadmium and lead are present in cocoa and chocolate due to soil and that bean cleaning during processing of cocoa beans reduces lead and cadmium in chocolate products.

The *Consumer Reports* article states that, "there are no federal limits for the amount of lead and cadmium most foods can contain...." This statement is simply not true.

In fact, there *are* federal limits (levels) for many foods and in particular a maximum level was set specifically for candy to be consumed by small children at 0.1 parts per million (ppm). This standard is



easy to find in Docket Number [FDA-2005-D-0084](#) Center for Food Safety and Applied Nutrition, Food and Drug Administration.

The *Consumer Reports'* article continues, "...CR's scientist believe that California's levels are the most protective available." If the CR writer is stating fact that they indeed believe that California's levels are the most protective available, then why did CR not inform the readers of California Proposition 65 levels specific for chocolate? Why did CR not use the California level specific for chocolate for their article?

Any firm selling chocolate in California needs to comply with CA Prop 65 levels, which are the most current and more stringent than US FDA levels. All chocolate companies doing business in California either adopted or, in one way or another, complied with the CA levels. At present, the CA Food and Drug Branch (FDB) has no current action and has found no violation of the CA Prop 65 Standard for chocolate on any of the firms listed in the CR article.

Chocolove adopted the CA Prop 65 standards for lead and cadmium levels in chocolate.

The below table summarizes the CA Prop 65 concentration of lead and cadmium present in chocolate products that require a product warning. In other words, this table show maximum levels permissible for sale in CA without a warning label.

Covered Product	Lead Concentration	Cadmium Concentration
Chocolate products with up to 65% cacao content	0.1 ppm	0.4 ppm
Chocolate products with greater than 65% and up to 95% cacao content	0.15 ppm	0.45 ppm
Chocolate products with greater than 95% cacao content	0.225 ppm	0.96 ppm

Instead of using CA Prop 65 standards for chocolate, *Consumer Reports* uses something of their own creation that they call "CR levels". These CR levels are not specific to chocolate, not specific to cocoa content, not as current as 2018 levels, and do not have the benefit of open discussion by peer review as did the CA Prop 65 levels set for chocolate.

After creating their own CR level, *Consumer Reports* fails to report their analytical data in ppm or ppb, which would be transparent, rather they went an extra step and chose a lack of transparency with the use of percents. To use percents of a contrived standard to communicate results is a misuse of numerical data for the purpose of the CR narrative.

To make sense of the CR levels, Chocolove factored CR's levels (reported as percents) to the OEHHA ppm levels that CR reports using, to arrive at test results in ppm. PPM can be directly compared to the CA Prop 65 Standard for chocolate. The facts are that the CR test results show all Chocolove bars tested *do* comply with the CA Prop 65 standards set specifically for chocolate.



It would appear from our reverse engineering of the CR levels to ppm that all chocolate in the CR test results comply with CA Prop 65 standards for chocolate. Why then didn't *Consumer Reports* publish that all chocolate they tested complies with CA Prop 65 standards for chocolate?

The CA Prop 65 Standard and the US FDA standards are written in ppm. Analytical testing for trace levels of metals today is reported in ug /gram, or what is a part per billion, ppb. The *Consumer Reports* article doesn't report the parts per billion or ug/gram levels in their results.

Wikipedia has a scientific-reviewed entry on what is a ppb and answers with an illustration:

One part per billion (ppb) denotes one part per 1,000,000,000 (10^9) parts, and a value of 10^{-9} . This is equivalent to about three seconds out of a century. By factoring a test result of 20 ppb, the example would still be 1 minute in a lifetime of 100 years.

The Science: Minerals and Elements Occur Naturally in Food

Plants grow in soil and consequently, the plant absorbs minerals and elements. The resulting plant has minerals and elements in its tissue that are relative and somewhat proportional to the soil it grew in. The same is true for animals. Many foods are valued for the mineral content that they provide in our effort at nutrition.

Through the years, *Consumer Reports* has written several times on the correlation between plants/animals and the naturally occurring minerals/elements found in their respective tissues. Among their reporting are articles detailing just this correlation and the risks associated:

- ["Choose the Right Fish to Lower Mercury Risk Exposure"](#) (published October 2014)
- ["Heavy Metals in Baby Food: What You Need to Know"](#) (published August 16, 2018 and updated September 29, 2021)
- ["Your Herbs and Spices Might Contain Arsenic, Cadmium, and Lead"](#) (published November 09, 2021)
- ["Arsenic and Lead Are in Your Fruit Juice: What You Need to Know"](#) (published January 30, 2019)
- ["Arsenic, Lead Found in Popular Protein Supplements"](#) (published March 12, 2018)

Simply stated, there are minerals and elements in everything we eat. Some, like calcium, are good for you, but ironically even calcium supplements have been found to have high levels of lead. By showing this point using *Consumer Reports'* own articles, you may read and see that some articles have pretty good science. When compared with their article, ["Choose the Right Fish to Lower Mercury Risk Exposure"](#) from 2014, you can see that their recent article on chocolate perhaps says more about *Consumer Reports* than about chocolate. In their recent chocolate article, note the absence of the names and offices of scientists and the lack of any references to prior science and regulations.

To illustrate a good scientific article on trace levels of lead in the diet and to put lead into perspective, there is a peer reviewed article from *Science Direct* entitled, ["Lead exposure in an Italian population: Food content, dietary intake and risk assessment."](#) The article focuses on the diet of a population, complete with references



What Are Chocolove and Other Chocolate Companies Doing to Help?

The chocolate industry has been studying and reducing metals in food for more than 50 years. To look at how to reduce unwanted metals, as opposed to iron and magnesium that are wanted, one needs to look at every part of the process.

Ground/earth/soil is composed of many elements including trace levels of metal

The elemental composition of the earth's crust of soils varies from place to place. Cocoa grows in the tropics. The rich soils of some cocoa-growing regions, and in particular volcanic soils, make for great cocoa, but are higher in metals. The higher the metals in the soil result in higher metals in the plant tissue or on the plant materials after harvest.

Some research points toward older cocoa trees having higher uptake of water-soluble elements and metals from the soil. Simply not buying cocoa from certain regions can be done and Chocolove is active in analyzing regions and metal content. We question the rationale of destroying plots of mature trees and the impact of moving cocoa farms to areas not yet farmed. The matter is not as simple as just moving the trees. For some areas of the world, climate change is forcing farmers to move to new growing sites. In this move, there will be new trees and maybe some consideration of soil composition.

Clean soil and naturally occurring metals versus contaminated soils

By and large, contaminated soils are not an issue in cocoa growing. Most trace levels of metals in soils in the tropics are naturally occurring. Again, the best courses of action are for chocolate companies to test and if elevated, trace the supply chain back to source and look for root causes and then solve that.

Cocoa can get dusty in post-harvest

During drying and curing of cocoa beans, dirt and dust settle on and attach to the skin of cocoa beans. This route of addition is well known and the training of farmers to cover cocoa while drying is an in-country solution. For over 10 years, Chocolove has opted to pay extra for cleaner beans at the farmer level.

In-country exposures to metals in handling

Over the years, most processing machinery for dry cocoa beans (including bins, screens, and scoops) have phased out galvanized metal and soldered joints and thus the metals from those types of handling equipment. Food-grade equipment and farmer and handling training have been implemented.

Cleaning and grinding in Belgium

Chocolove does not make most of its own chocolate; rather we have a 27-year relationship with a roaster and grinder in Belgium, to make chocolate to Chocolove-specific recipes. Chocolove pays extra for a double cleaning of the beans at the factory level to remove more dirt and dust prior to grinding. This process reduces the dust content by half of what traditional processes use and it also reduces weight of useable beans and thus increases our cost.

The machinery used in Belgium is state of the art and made of stainless steel to a very high standard of food safety. In addition to paying for extra bean cleaning, Chocolove also pays extra for the cleaning of the roasting and grinding equipment to be free of other companies' beans and bean residue.



More testing and analysis

Our colleagues in Belgium conduct extensive tests and comply with stringent California Prop 65 standards. Chocolove tests on a frequency and sampling plan to spot check our Belgian colleague's testing. In addition to testing finished chocolate bars, we test various lots of cocoa liquor and cocoa butter. We strive to find any anomalies that may shed light on ways to reduce unwanted metals in chocolate.

At our 80,000 square foot factory in Boulder, Colorado, Chocolove makes all our own chocolate products and does not make any other companies' chocolate products. All the equipment in our facility is full of stainless steel: modern, state-of-the-art, and food grade. We follow FDA good manufacturing practices, and we are even inspected and certified under Safe Quality Food (SQF), which compliments the FDA standards.

We will continue to work with our valued supply chain partners to monitor and seek out incremental improvements in food safety in chocolate production.

Chocolove chocolate complies with the most stringent standards set in the US: the CA Prop 65 standards. Simply put, Chocolove chocolate is safe to enjoy daily.

If you have any questions or comments, please let us know.