

Sunscreen

Our Point of View

Introduction

Clean Label Project's mission is to raise awareness on the presence of potentially dangerous environmental contaminants and toxins in everyday consumer products. To Clean Label Project, sometimes what's not on the label is what's most important. Clean Label Project believes that when it comes to industrial and environmental contaminants and chemicals of concern, less exposure is better than more. Not only are these compounds potentially toxic, but information currently available on the long-term effects of routine exposure to these contaminants and chemicals of concern is already concerning, and our understanding is still developing. As a result, Clean Label Project believes that a serious conversation needs to be had with brands and regulatory bodies on the presence of these contaminants and chemicals of concern in consumer products. This document examines the results of Clean Label Project's findings on contaminants and chemicals of concern found in popular sunscreens. Our goal is to focus on what's inside each product to bring truth to the consumer and change the definition of consumer product safety.

Why Sunscreen?

The sun care market is one of the largest in the cosmetics space, with US sales of at least \$1.8 Billion USD in 2016¹. Especially during the summer months, people use sunscreen for protection during a large variety of activities, including outdoor work, recreational activities, chores, and more. In the US, as many as 14% of men, and 30% of women regularly use sunscreen², with more using these products at least occasionally. Considering the numbers involved, Clean Label Project felt that it was important to assess what is *really* in the top selling sunscreens.

Clean Label Project also did not want to overlook the impact on America's youngest and most vulnerable populations. Clean Label Project wanted to look at the contents in children vs. adult sunscreen. When enjoying the summer sun, campfires, and cookouts, babies and children are dermally and orally exposed to sunscreens that may be coated on their hands, feet, and faces.

Can contaminants in sunscreen affect health?

A common question with skin-care products is whether the contaminants we find in products can affect health. The purpose of skin is to act as a protective barrier, blocking many harmful aspects of the environment from reaching our organs. However, our skin is not a perfect armor – and many chemicals can slip past the skin into our blood. Heavy metals, for example, are slowly absorbed through the skin and into the blood stream³. As such,

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while applying these chemicals to your skin may not be quite as dangerous as eating them, consumers should still take care when choosing products to select those that are the most effective as well as with the lowest levels of contaminants. Recent sunscreen innovations include spritzers and aerosol sprays as they are easy to apply on squirmy children and hard to reach places. But these forms of application come with the risk of inhalation exposure.

What was Clean Label Project's Methodology?

Clean Label Project purchased and tested over 100 top selling sunscreens based on the Amazon.com best seller lists. The initial scope of the study was targeted at sunscreens marketed to caregivers of infants and children and the study was amended to compare the findings to the ingredients and levels of contaminants and chemicals of concern in adult/mainstream sunscreens. The scope of testing and review included industrial and environmental contaminant testing, which included heavy metals like arsenic, cadmium, lead and mercury, the use of oxybenzone and octinoxate as ingredients and sulfates (including sodium lauryl sulfate and sodium laureth sulfate). The testing also included antioxidant activity testing which can provide the skin other tangible benefits including the defense from free radicals⁴. Clean Label Project also utilized an "at-home" comparison study using light-sensitive paper to detect the efficacy variability among top-selling sunscreens within the same SPF.

Clean Label Project worked with an analytical chemistry laboratory to test over 40 brands and 97 products, amassing and benchmarking thousands of data points.

What Contaminants Were Found in Clean Label Project's Sunscreen Study?

Sunscreens tested by Clean Label Project had an array of

contaminants found, including detectible levels of arsenic, cadmium, lead, mercury, and sulfates.

Heavy metals like cadmium, mercury, lead, and arsenic (as shown in Table 1) have been linked to a number of adverse health outcomes, including cancer⁵, developmental harm⁶, and brain damage⁷. This is especially concerning given that many sunscreens are marketed towards caregivers of infants and children.

Table 1: Analytes in Sunscreen

Analyte	% of Products tested with detection
Lead	80%
Cadmium	53%
Sulfates	83%
Arsenic	14%

Sulfates are a class of chemical, found in many cosmetics product. Some sulfates, including Sodium Lauryl Sulfate (SLS) and Sodium Laureth Sulfate (SLES), are noted skin irritants⁸.

Chemicals of concern?

Oxybenzone and Octinoxate are known endocrine disruptors⁹. They were also recently banned in the state of Hawaii, citing "significant harmful impacts on Hawaii's marine environment and residing ecosystem's"¹⁰ including damage to coral reefs. They also happen to be the active ingredients used a majority of the best-selling sunscreens in America. In fact, as shown in Table 2, these ingredients are used in both sunscreen targeting adults and children.

Table 2: Percent of Sunscreens tested that have Oxybenzone and Octinoxate in Children vs Adult

	Oxybenzone & Octinoxate	Contain Neither
Adult	30%	70%
Children	21%	79%

What's important to note is that dermatologists strongly encourage the use of sunscreen to protect from the sun's rays¹¹. However, the Clean Label Project 2018 Sunscreen Study brings to light other risks associated with the use of sunscreen. Consumers are encouraged to work with their dermatologist and family doctor to determine a sunscreen that is the right fit for them.

Why aren't these contaminants regulated?

Because sunscreens are intended to help prevent sunburn, and because many feature label claims regarding decreased risks of skin cancer and early skin aging caused by sun when used as directed, they are regulated as drugs in the United States. In recent years, there has been a growing interest in the active ingredients found in sunscreen marketed in European countries that cannot legally be included in sunscreens marketed in the United States without an approved New Drug Application (NDA). This is because sunscreens are regulated as cosmetics in Europe, not as drugs, and as such there are different regulations governing marketing of these products abroad¹².

The changing pattern of sunscreen use and evolving scientific knowledge have prompted the Food and Drug Administration (FDA) to solicit input from external experts regarding safety evaluations for the active ingredients found in sunscreen. In September 2014, the FDA held a meeting of the Nonprescription Drug Advisory Committee to bring together medical and scientific experts from a broad spectrum of expertise in the field to determine the type and extent of safety testing necessary for additional active ingredients to be marketed in sunscreens in the US. Shortly thereafter, this effort was formalized with the creation of the Sunscreen Innovation Act¹².

What's important to note here is the FDA's focus on "active ingredients." While this does mean that additional active ingredients will be under evaluation, this does not speak to the FDA's intention to monitor contaminants. By definition, a

contaminant is an unintended compound that was present in the finished product due to issues with raw ingredient quality, manufacturing processes, or similar quality-related issues.

Where are these contaminants coming from?

Sunscreen is a manufactured product, and as such all contaminants present in sunscreen come from many sources, including the raw ingredients, the manufacturing process, or as deliberate additives themselves. Sulfates, for example, are often deliberately included in finished products because of the effect they have on shelf life or other desired outcomes. Likewise, oxybenzone is an active ingredient in sunscreen. Heavy metals, on the other hand, are more difficult to explain. Clean Label Project believes that these metals are present in sunscreens because of contamination in the supply chain – which is to say the metals were present in the raw materials used to make the finished sunscreen product.

How does the Clean Label Project measure these contaminants?

Clean Label Project contracted an independent analytical chemistry laboratory, Ellipse Analytics, to test for arsenic, cadmium, lead, mercury, sulfates, efficacy, and antioxidants.

Table 3: The Analyte and Testing Instrument Used

Analyte	Instrument For Testing
Arsenic, Cadmium, Lead, Mercury	Inductively Coupled Plasma – Mass Spectroscopy (ICP-MS)
Sulfates	Fourier-Transform Infrared Spectroscopy (FTIR)
Antioxidants	DPPH Free Radical Scavenging Assay and analyzed using a plate reader

What should content-conscious consumers look for?

Our goal is to educate consumers to see past the flashy marketing by providing accurate and truthful product testing information. When selecting a sunscreen, consumers should weigh several factors:

- The SPF (the higher, the better)
- The type of coverage (full-spectrum coverage is best)
- The use of contaminants of concern (like Oxybenzone)
- The Clean Label Project's contaminants ranking, which accounts for all of these factors.

Of course, work with your dermatologist or family doctor to make sure you find a sunscreen that is the best fit for you and your family.

References

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