

Sunscreens

Are they harming our reefs?

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We have all been told, when going outside into the sun, to slather our skin with sunscreen. It is agreed, nobody wants to have skin cancer or heaven forbid, wrinkles. But, are we, in an effort to save our skin, perhaps harming our bodies and also destroying the coral reefs we all enjoy?

According to the U.S. National Park Service estimates, between 4,000 and 6,000 tons of sunscreen wash off swimmers, SCUBA divers, and snorkelers into coral reef environments every year ([www.noaa.gov/docs/Site%20Bulletin Sunscreen final.pdf](http://www.noaa.gov/docs/Site%20Bulletin%20Sunscreen%20final.pdf)). It is estimated that 90 percent of swimming, snorkeling, and diving tourists are concentrated on 10 percent of the world's reefs. As a consequence, our favorite spots are exposed to the majority of sunscreens.

Sunscreens contain organic and /or inorganic UV filters that absorb, reflect, or scatter UV light. They also contain microbial preservatives, moisturizers, and anti-oxidants that can damage coral reefs, contribute to bleaching and coral death. Sunscreens are only a part of a long list of threats to coral reefs that includes pollution, overfishing, and climate change, but this threat no less critical.

The International Coral Reef Initiative (ICRI) has shown that specific individual components of sunscreen can have adverse effects on corals and other marine organisms under certain circumstances. The chemical UV filter oxybenzone has been studied most intensively, and the following results have been described.

- Bleaching of coral fragments
- Damage and deformation of coral larvae
- Damage to coral DNA and to their reproductive success.
- Induction of lytic viral cycle in symbiotic zooxanthellae with latent infections.

Researchers and environmental groups are not advocating we should stop using sunscreens. Instead, they are encouraging consumers to carefully read the labels before they purchase a sunscreen. The U.S. Park Service, professional dive associations, and numerous eco-tour operators recommend, to help protect the coral reefs, that you avoid sunscreens with oxybenzone and use only mineral sunscreens. Mineral sunscreens are made with 'non-nanosized' zinc oxide or titanium oxide (non-nanosized means the ingredients are 100 nanometers or more in diameter) appear to be safer for coral reefs than chemical ones.

All sunscreens are not created equal. In 2019, a report from the Environmental Working Group (EWG) found that nearly two-thirds of sunscreens do not work and contain chemicals readily absorbed by the body.

The federal government requires sunscreen claims be 'truthful and not misleading,' but there is no agreed-upon definition of using the words 'natural,' 'green,' 'safe,' 'reef safe,' or 'coral safe,' therefore these words are potentially meaningless when it pertains to sunscreens. It also means sunscreen manufacturers are not required to test their products to ensure such products do not harm aquatic life.

Hawaii, Palau, and recently in Key West have taken significant steps toward controlling the use of sunscreens. They are actually regulating the sale, and use of sunscreens to an effort to protect their reefs.

In 2018, Hawaii passed legislation banning the sale of sunscreen products containing two most common chemicals, oxybenzone, and octinoxate both believed to be harmful to aquatic life. Officials in Key West,

early this year, voted to ban the sale of sunscreens with those ingredients. Both of these laws do not go into effect until 2021.

Starting January 1, 2020, under Palau's Responsible Tourism Education Act of 2018, the island nation is banning all "reef-toxic" sunscreens. No one will be permitted to bring, sell import or manufacture products containing the banned ingredients (see the * on the attached list) into the republic. Anyone entering Palau with these prohibited ingredients will have them confiscated. Retailers that violate the law will be subject to \$1,000 fine per violation.

Palau's legislation came after a UNESCO study on Jellyfish Lake found the presence of oxybenzone in the water, sediment, and jellyfish.

Palau has even gone one step further; telling tour operators, they should provide customers with reusable alternatives to disposable plastic or polystyrene cups, plastic or polystyrene food containers, water bottles, and drinking straws.

Retail company REI has agreed to stop carrying products containing oxybenzone (expected to go into effect in 2020).

This is a list of the most common ingredients found in sunscreens, including those banned by Palau, Hawaii and Key West. Additionally, I included the Haereticus Environmental Laboratory (www.haerreticus-lab.org) list because it is inclusive and more extensive:

- Oxybenzone (benzophenone-3)*
- Octinoxate (octyl methoxycinnamate)*
- Octocrylene*
- 4-methyl-benzylidene camphor*
- Triclosan*
- Methyl paraben*
- Ethyl paraben*
- Butyl paraben*
- Benzyl paraben*
- Phenoxyethanol*
- Para-aminobenzoic acid (PABA)
- Propylparaben
- Any form containing microplastic spheres or beads.
- Any nanoparticles like zinc oxide or titanium oxide (not yet proven to be harmful).

Oxybenzone is an FDA approved sunscreen that is effective in reducing UV exposure. It penetrates the skin and is used to help other chemicals penetrate the skin. According to the Center for Disease Control (CDC), 97 percent of Americans have this chemical circulating in their bodies. It is also listed as a direct cause of coral bleaching.

Octinoxate is another commonly used UV filter approved by the FDA for use in sunscreens. It is absorbed through the skin and has been found in human urine blood and breast milk, showing it is systematically absorbed. It is also an endocrine disruptor that can mimic hormones. It too is listed as a direct cause of coral bleaching.

For more information on Oxybenzone and Octinoxate , go to www.ncbi.nlm.nih.gov/pmc/articles/PMC2291018/.

Some dermatologists and trade groups have opposed bans, arguing more research is needed and that banning sunscreens could lead to higher skin cancer rates. The *American Academy of Dermatologists* has stated that skin cancer is the most common cancer in the United States and that people should protect themselves with sunscreen, protective clothing, and by staying out of the sun.

The results of sunscreen studies need to be taken seriously if you plan to swim, SCUBA, or snorkel. Use a sunscreen that is reef or coral safe. How do you tell? READ THE LABEL. Sunscreens containing any of the chemicals listed above should be avoided. Even personal care items, such as shampoo, lip balm, hair conditioner, cosmetics, and shower gel may contain some of these harmful chemicals.

A reef-friendly move everyone can take is to cover most of your body with UPF (ultraviolet protective factor) clothing or just a plain old T-shirt. For optimal protection, you will still need to apply sunscreen; best results will be by using a mineral based product.

For those of us who love the outdoors and participate in watersports, there are really no perfect answers to finding the perfect sunscreen. Mineral-based sunscreens, those containing zinc oxide, and titanium oxide, score well with environmental assessments. They provide strong sun protection with few health concerns and do not break down in the sun.

For additional reading, google 'sunscreen' and 'sunscreen damage to reefs,' you will find a mountain of information; some of it surprising, and some of it interesting. The February 2019 issue of Undercurrent has an interesting article on sunscreens worth reading.

Additionally, www.Stream2Sea.com has a very convenient **Ingredients to Avoid Card**. The list is downloadable.

Remember, if sunscreen is on your skin, it will also be on the reef. Use it, sparingly!

Thanks to:

EWG's 13th Annual Guide to Sunscreens
ICRI – Sunscreens - Plan of Action 2016-2018
Asia Pacific, November 2018
Time Magazine, October 2015
Undercurrent, February 2019