Q&A

This month, we asked top practitioners to address your concerns about chemical sunscreen and its effects on your body and the environment.

BY MICHAEL A. MILLER

Spring is in the air, and this year I want to tan safely. Which sunscreen should I choose?

As temperatures rise and the lakeside breeze smells of spring foliage, beach-goers take up arms (and legs and tummies) in their annual quest for the perfect tan. Some also feel the urgency to protect themselves from the sun's harsh UVB rays—the type that cause skin cancer. This is a step in the right direction, but what if doing so causes damage to the environment and our bodies? Autumn Blum, the cosmetic chemist at Stream2Sea, graciously schooled us on the dangers of chemical sunscreens and the available alternatives that are a win-win for you and the aquatic ecosystem.

NATURAL SOLUTIONS: *What chemicals will you commonly find in synthetic sunscreens and how do they impact the environment?*

AUTUMN BLUM: Chemical based sunscreens usually contain a combination of two or more active ingredients like oxybenzone, avobenzone, octylmethoxycinnamate, and homosalate. Many of these ingredients bioaccumulate in the body, have suspected and documented health concerns, and have also been shown to be hazardous to the environment.

Some mineral sunscreen ingredients have even been shown to be harmful to the aquatic environment. Nano particles have become a major cause of concern regarding their ability to bioaccumulate in aquatic species. ClearZinc, although naturally compliant, is listed as highly toxic to fish and other aquatic organisms on the front page of its Material Data Safety Sheet. Four ingredients commonly found in sunscreens were recently shown to bleach or kill coral even in miniscule concentrations.

NS: *What are the health concerns from oxybenzone and other chemicals found in sunscreen?*

AB: The US Centers for Disease Control (CDC) reports that oxybenzone is found in urine samples of 97 percent of Americans and linked it to allergies, hormone disruption, and cell damage. According to the Environmental Working Group, oxybenzone is "ineffective and harmful," and lists nearly 600 products containing it.

NS: *What are the alternatives to using oxybenzone and other chemical sunscreens?*

AB: There are two types of sunscreens on the market today—chemical sunscreens that work by absorbing UV rays, and mineral sunscreens that work by reflecting UV rays. People that choose mineral sunscreens usually do so because they are sensitive to the chemicals or are trying to avoid the impact of chemical sunscreens on their body or the environment. Both zinc oxide and titanium dioxide have been approved by the FDA as mineral sunscreens, because, in properly formulated products, they have been shown to be very effective UV filters and can meet broad spectrum claims.

NS: *I've heard SPF 40 is marginally better than SPF 20, but 40 sounds twice as protective. What gives?*

AB: Sunscreens with very high SPFs offer only marginally better UVB protection (the rays that cause sunburn), yet consumers often believe they are getting double the protection. For example, an SPF 15 will block about 93 percent of the UVB rays, an SPF 30 will block about 97 percent. Moving to an SPF 50 will only block about 1 percent more UVB rays than an SPF 30! It's very deceptive. The differences in protection are so minute, yet give users such a false sense of security that it may tempt people to stay in the sun longer than they should while applying too little sunscreen. Your skin may be protected from sunburn, but you could leave yourself exposed to the UVA rays that cause other kinds of skin and cellular damage. Our preference is to offer sunscreens that will feel good on your skin and encourage you to reapply every 80 minutes or after a good swim.

NS: *What are the implications of light absorption by chemical sunscreen?*

AB: When chemical sunscreen absorbs UV light, it becomes energized. Eventually, it will release the energy by interacting with other molecules. This

effect can often lead to the formation of the harmful byproducts we know as free radicals. When this occurs inside the skin, free radicals can cause skin damage, irritation, and sagging, and increase the risk of cancer. These same products that are meant to protect our bodies from sun damage can also cause sensitivity to light.

NS: *So, chemical sunscreens are undisputedly bad. Why are "organic" sunscreens also bad?*

AB: When most people see the word organic, they think natural, wholesome, and safe. When referring to sunscreen, however, organic refers to the chemical sunscreens that no ordinary consumer would consider to be organic. Simply put, some really nasty chemical sunscreen ingredients are labeled 'organic' because they are carbon-based ingredients. Take oxybenzone, also known as benzophenone-3, for instance. According to the manufacturer, oxybenzone is an organic compound commonly found in sunscreens due to its UVA- and UVB-absorbing properties. The manufacturers aren't lying, but they certainly aren't telling the whole truth.

The advantage of using these ingredients is the ability to claim very high SPF ratings with minimal expense and ease of manufacturing and formulating, plus they go on nice and clear, giving the customer the aesthetics they are used to. The disadvantages are huge. They are very unstable and can degrade quickly in high temperatures, so they require additional chemical stabilizers. They may also penetrate the skin and disrupt or mimic the body's hormones. In addition, many of these ingredients have been linked to coral bleaching and aquatic toxicity.

NS: *How do consumers know whether a product is truly natural before buying?*

AB: Consumers need to educate themselves, read labels, ask questions, and read ingredient dictionaries when they come across a new ingredient! The word "natural" is not a regulated labeling term and therefore can be deceptive.

NS: *What are the federal labeling regulations surrounding sunscreen?*

AB: The FDA does not distinguish between mineral sunscreens and chemical sunscreens, and regulates both as drugs. As such, they must be labeled using a drug facts panel. Sunscreen labels must minimally indicate SPF including broad spectrum if applicable, water resistance, and reapplication procedures. The warnings and direction language are well regulated, but the marketing claims are not.

NS: *What is the difference between a product that is labeled "reef safe" and one that is actually safe for the reefs?*

AB: Reef safe claims on sunscreen labels are potentially meaningless as they are currently unregulated. Chemical ingredients including oxybenzone and clear zinc, both found in sunscreens labeled "reef safe," have been proven unsafe to the environment in several recent studies.

NS: *How should one apply sunscreen in the safest manner for themselves and the environment?*

AB: When switching from chemical sunscreens to minerals, it's very easy to apply more than necessary. We always recommend applying in front of a mirror if possible. Apply small amounts in sections and rub it in well. Make sure you are getting adequate coverage. The product will last on your skin much longer if applied properly and you can minimize the whitening by rubbing it in. We also believe that a little whitening is a good thing. You can see where the product might be missing and when you don't see it anymore, you know it's time to reapply.

NS: *What's wrong with aerosol sunscreen application?*

AB: I am not a fan of any aerosol or even non-aerosol spray-on sunscreens. First, if you're applying sunscreen on a moving boat or on a windy day, much of the sunscreen may miss its intended target. Then there is the issue of coverage—exactly how much is getting on you, and how much is floating away? Finally, and most importantly, the chemical dispersants used in aerosol products may be damaging to the environment and have been linked to respiratory issues. Children are especially at risk.

NS: *What tips do you have for consumers of mineral sunscreen?*

AB: Stream2Sea has optimized our formulas using non nano titanium dioxide with just enough oils to allow the product to spread and minimize whitening. You do have to rub it in more than normal, but it feels wonderful on the skin and will not cause breakouts. And most importantly, it's safe for you and safe for the waters! NS

SEARCH FOR PRODUCTS THAT:

- **Do not use** nano particles (you can tell because it may say "clear" on the label and does not specifically say "non-nano"). The minerals are super small and virtually non-visible. Human safety is controversial and they also have been shown to be toxic to the aquatic environment, so we avoid them.
- **Do not use** coated and clear zinc (you can tell by the term clear zinc or goes on clear on the label). The coating has been shown to be toxic to the aquatic environment (even though it complies with natural standards).
- **Do not add** lots of oil to the formula to improve the spread. This will make it less whitening, but will also make it very oily, and it causes people with sensitive skin to break out.