

The Ingredients *Column*

Sunscreens: Myths, Controversy and Photo Protection Beyond UV



by Irena James

Global sun care is heading toward a record high in sales, totaling approximately \$1.3 billion by the end of 2014. We should all feel very proud of ourselves. Our endless preaching and nagging to family, friends, and clients about the dangers of sun exposure for the beauty and health of their skin has apparently paid off. According to Euromonitor International and various other market research companies tracking sales and growth of designated skin care categories, we finally got through to them.

Selling sun care products has become easier than ever. Consumers are realizing the importance of protecting their skin from the sun and demanding products with sun protection properties to help combat these problems. Since research confirms that wearing SPF 15 daily protects the skin's antioxidant enzymes so that past damage can be repaired, younger clients now understand that it is never too early for sun protection, while older clients now know it is never too late and that applying sunscreen is not a waste of time and money.¹

Aestheticians have more choices in sun care products than ever before and brand loyalty is noticeably absent when purchasing decisions are made. As long as the sun care product offers impressive performance, aestheticians are more open to adding unknown, small, specialized, and niche private label sun care products to the prominent brand name product lineup on their shelves.

Despite the fact that no other category of products in our industry has been the subject of so many legal changes, misconceptions and controversies, demand for sun care products continues to grow.

New Rules

It is no longer legal to advertise sunscreens using the words *waterproof* or *sweat-proof* or to advertise a sun protection factor (SPF) rating higher than 50, as even a SPF 50 will not completely block ultraviolet (UV) light, which is why the FDA no longer allows the term *sunblock*. Manufacturers have been given a grace period to comply and remove the word from their packaging, but it takes time to fully comply, so just because there are a number of products out there claiming to be sunblocks, that does not mean they provide superior performance over sunscreens. The truth is that they are all sunscreens.

Sunscreen Misconceptions and Controversies

Some aestheticians and clients still believe that it is best to combine sunscreen with their daily moisturizer, foundation, and other products because this practice will encourage the use of sunscreens.

The first problem with customizing sunscreens is that it is *illegal*. Sunscreens are not cosmetics. They are over-the-counter (OTC) drugs regulated by the US Food and Drug Administration (FDA). This means they must be made under FDA monograph specifications and cannot be altered once they leave the factory. The second problem is that in order to obtain the specific sun protection factor stated on the packaging, a specific amount of product needs to be applied. Therefore, sunscreens should always be applied separately on top of a moisturizer or a treatment product, but never blended with other products prior to application. Most people already apply less than what is needed for complete protection, and further adulteration of their sunscreen will only result in inadequate protection and a risk of sunburn.

One of the most troublesome misconceptions circulating in our industry is that wearing sunscreens can produce free radicals. Organic sunscreen ingredients such as avobenzone and oxybenzone produce a chemical reaction on the skin by which ultraviolet radiation is lowered and released as heat. While it is true that the skin is affected by a certain amount of free radicals generated in the process, it is also true that the oxygen we breathe is the number one source of free radicals in our body. By far, the benefits of using sunscreen outweigh any potential risk, especially when the risk can be easily managed by the inclusion of effective antioxidants in sunscreen formulations. Equally troublesome is the misconception that wearing sunscreens can cause vitamin D deficiency. When we combine the fact that no sunscreen blocks all ultraviolet rays

and that the average person does not apply enough sunscreen in order to block the amount of ultraviolet needed to manufacture vitamin D, it is easy to understand why this statement's accuracy needs to be questioned. According to the American Cancer Society, children and adults get plenty of vitamin D through multivitamins, vitamin D-rich foods (such as milk and fortified orange juice), and everyday sun exposure. So, why are our clients still uneasy about this issue? Unbeknownst to most skin care professionals and the general public, the minimum *normal lower limit* value for vitamin D has been raised, therefore, most people today show vitamin D levels below the new *normal range*, but this has absolutely nothing to do with wearing sunscreens.

ABCs of Infrared

Ultraviolet A (UVA) and ultraviolet B (UVB) radiation damage on the skin has been clearly identified and understood by our industry, but it was not until recently that infrared (IR) has come into the spotlight for its skin-damaging and aging properties. Ultraviolet only accounts for seven percent of the total amount of solar energy reaching the skin, while infrareds accounts for more than 50 percent. However, ultraviolet energy levels are much higher than infrareds and, therefore, more noxious. Different types of infrareds affect the skin differently. **IR-A** affects dermal collagen balance by targeting the mitochondria, increasing the production of enzymes responsible for collagen degradation and inducing cell death (apoptosis). **IR-B** and **-C** affect upper skin layers, mainly the epidermis, which slows down epidermal renewal.

New Area of Concern for Skin Damage: High Energy Visible Light and Indoor Protection

High energy visible (HEV) light, also known as near-UV (NUV), is another type of light on which most industry professionals have yet to be educated. New research shows that skin damage caused by HEV light may be as harmful as the damage caused by UVA and UVB light combined.

HEV light is a high frequency light in the violet/blue band with wavelengths from 400 to 500 nanometers in the visible spectrum. It does not generate the immediate erythema or edema reactions triggered by UVB and UVA, but like UVA, HEV light may be another silent, long-term aging wavelength. Understanding HEV light has exposed the harsh reality that we are all exposed to some form of HEV light every day of our life.

Computer monitors, flat screen televisions, mobile phones with flat screens, energy efficient cool white daylight or full spectrum lights, reflective surfaces like snow, concrete, sand, water, and glass or even sitting near car windows, provides constant exposure to the damaging effects of HEV lights.

The harmful effects of HEV light are many: weak barrier function, increased dryness and sensitivity, increase in the number of senescent cells, depressed immunity and suppressed healing, inflammation and redness, wrinkles, skin sagging, and uneven pigmentation.

Liposhield™ HEV (INCI: Melanin) is the first ingredient designed specifically to shield skin from HEV light. It is not a sunscreen because it only works in the HEV light range, but it can be incorporated into sunscreens in order to cover the light not addressed by ultraviolet filters and reflectors. It can also be incorporated into skin care products, instead of sunscreen ingredients. Inspired by melanin that naturally occurs in the human body where it is released into the skin as a first line of defense against exposure to certain damaging light waves, high energy visible melanin prevents oxidative stress, damage related to an impaired barrier, skin aging due to accelerated cell senescence and may also prevent uneven pigmentation and age spots.

Other ingredients that can lower the damage caused by HEV light are microfine titanium dioxide and zinc oxide, both of which are capable of reflecting high energy visible light near the top part of the UVA spectrum.

Sunscreens and Antioxidants: A Match Made in Heaven

Antioxidants in sunscreens are nothing new, but cutting edge ingredients such as enzymes derived from heat-loving microorganisms dwelling around deep-sea hydrothermal vents that offer new and innovative protection from ultraviolet and infrared radiation. *Thermus Thermophilus Ferment* represents the new generation of antioxidant and photo-protection ingredients. It counteracts reactive oxygen species (ROS) production in response to an increase in heat generated by infrared-induced stress.

The Future: Sunscreen Pills

Researchers at King's College London have determined how coral produces natural sunscreen to protect itself from damaging ultraviolet rays, leading scientists to believe these compounds could pave the way for a revolutionary type of sunscreen for humans. Coral, an animal with a unique symbiotic partnership with algae that lives inside it, must live in shallow water, making them vulnerable to sunburn. Scientists already knew that coral and some algae could protect themselves from harsh ultraviolet rays by producing their own sunscreens, but until now, they did not know how. This discovery could mean that within five years, an oral sunscreen pill may become commonplace in our industry.

Resources

¹ Sunscreens promote repair of ultraviolet radiation-induced dermal damage, Kligman LH et al., *J Invest Dermatol*. 1983 Aug;81(2):98-102.

Director of Product Development for YG Laboratories, Irena James has educated generations of students and industry peers on skin care ingredients, treatment protocols, and brand development. James' versatile experience in the skin care industry spans over 20 years, during which she worked as an aesthetician, educator, territory sales manager, and director of business development in the EU.

