Consumers are increasingly looking for broad spectrum protection that prevents damage from both UVA and UVB rays.
Image Source: Unsplash user Tomas Salas

When I was growing up, sunscreen bottles were still color coded according to how tanned you wanted to get; bottles of SPF 4 were a deep brown for those who planned on getting darker color while more conservative users opted for the lighter packaging of SPF 10. The true sun-worshippers, of course, would forgo sunscreen altogether, choosing instead to slather on baby oil to attract rays.

Today, sunscreen choice is a very different matter. As our understanding of the impact sun radiation has on our bodies has grown, the vast majority of consumers are no longer considering the tanning potential of sunscreens, but prioritizing the level of skin cancer protection and anti-aging benefits they provide. As sunscreen has become **an everyday health and beauty essential**, the sunscreen market has expanded exponentially; as noted in *Cosmetics Business Market*, "The global sun care market is proving to be a red hot category, with new data from Euromonitor forecasting growth of 6.8% in 2018."[1]

However, the consumers aren't just demanding higher levels of sun protection; they also want expanded formulation options and diverse applications. "In today's beauty market, where multifunctionality is key, sun care products are expected to offer skin nourishment and anti-aging ingredients as well as UV protection, while skin care and color cosmetics products are expected to offer UV protection." At the same time, consumers are demanding higher quality, **cosmetically elegant**, scientifically proven products with accurate sun protection claims, creating both new opportunities and new challenges for cosmetics manufacturers. To keep up with these market demands, spectrophotometric determination of UV protection in cosmetic products is becoming more essential than ever before.

Broad spectrum protection is becoming more attractive to educated consumers who understand the dangers of UVA and UVB rays.
Image Source: Pexels user Wendy Hero

The Need for Broad Spectrum Analysis

One of the most important qualities consumers are now seeking in sunscreen is broad-spectrum protection. Historically, sunscreen manufacturers have focused their formulations on long-wave UVB protection, blocking the rays primarily responsible for immediate, visible damage such as sunburns and tans. While UVB rays are indeed associated with more damage than short-wave UVA rays, UVA irradiation also has the potential to cause significant negative effects on skin. As public awareness of both UVA and UVB effects have grown, demand for protection against both short and long-wave rays has grown. In fact, some manufacturers are now including separate metrics on labels to quantify UVA protection and determination of both UVB and UVA protection is increasingly becoming the industry standard.

Spectrophotometric determination of UV protection allows manufacturers to quantify both UVA and UVB protection.
Image Source: Flickr user Jeff Wilcox

Spectrophotometric Determination of UVA and UVB Protection

The most common method of UV protection determination is *in vivo* testing in the form of phototesting on human volunteers, a time consuming and labor-intensive process. To facilitate more rapid and economical testing, researchers are increasingly turning to *in vitro* testing "based mostly on diffuse transmittance measurements, obtained using a UV-Visible spectrophotometer equipped with a diffuse reflectance accessory."[2]This method allows you to quantify UV protection in accordance with the COLIPA International Sun Protection Factor Test to **determine SPF values**.

However, the COLIPA protocol and subsequent SPF determination only indicate UVB protection. UVA protection currently has no singular standardized protocol, nor a stable terminology, but rather includes a variety of descriptions and methodologies, including PPF (Phototoxic Protection Factor), PPD (Persistent Pigment Darkening), and PFA (Protection Factor UVA). Like SPF determination, *in*

vivo testing is the most common method of UVA protection determination, but has real functional and economic limitations. As such, spectrophotometrically based testing procedures such as "assessment of UV transmittance through a thin film" of sunscreen prepared on a substrate (COLIPA guidelines), instrumental solar radiation transmission measurement (Australian Standard), or critical wavelength determination (Broad Spectrum Rating) allows manufacturers to obtain reliable UVA protection information using rapid, economical, and accurate methods. Having the ability to include UVA protection information in packaging and marketing materials is increasingly attractive to consumers and helps strengthen brand reputation.

HunterLab Innovation

HunterLab has been a pioneer in the field of spectrophotometry for over 60 years. Our commitment to innovation and technological excellence has led to the creation of a full range of portable, benchtop, and in-line instruments ideally suited for today's cosmetics industry. Our spectrophotometers combine cutting-edge engineering with user-friendly designs that make them perfect for use in virtually any environment, allowing users to obtain the data they need with confidence and ease. **Contact us** to learn more about our renowned technologies and world-class customer support services and let us help you select the right instrument for your needs.

1. "Global Sun Care Market to Rise 6.4% by 2018," February 16, 2015, http://www.cosmeticsbusiness.com/news/article_page/Global_sun_care_market_to_rise_64_by_2018/105908
2. "Spectrophotometric Determination of UV Protection Provided by Cosmetic Products with Sunscreen Properties," 2011, http://www.chemikinternational.com/pdf/2011/07_2011/chemik_2011_7_8.pdf