Safe and Efficient Sunscreen Protection

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Abstract

Sun protection still continues to be a popular, emotional topic for discussion with increasing interest being shown in science, the media as well as in our own private lives. In general, people tend to fall into two sunscreen groups - the users and the non-users.

This article will briefly show why it is necessary and possible to use reliable systems that are easy and pleasant to apply and do not represent a risk for the consumer.

Finally the topic of formulation will be touched upon to show why the formulation of UV sunscreens is more than ever a combination of complex laws, regulations, high tech chemistry and scientific processes from physics to biology.

Introduction

The awareness of the importance of a good protection of the skin against UV rays has dramatically increased in western countries and Asia over the last decades. In the past ten years the necessity to combine a UV A protection to the already known UV B protection has also been brought to the consumer's attention. As can be seen in Figure 1, the UV A radiation penetrates deeper into the dermis. The importance and relevance of UV A protection has also been seen to take a higher prominence in the advertising campaigns of the sunscreen producers.

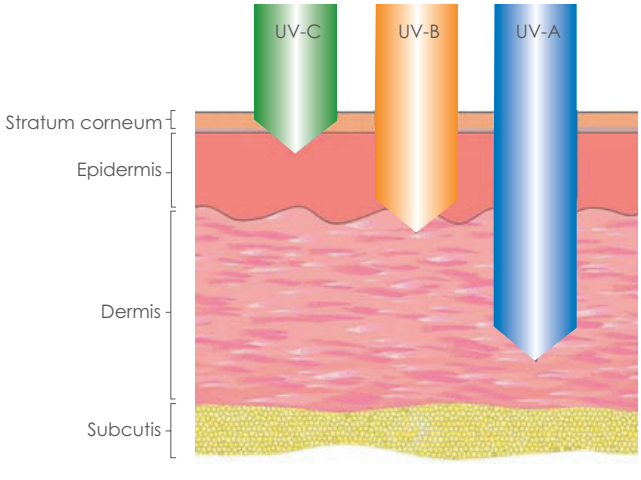

Figure 1 Illustration of the different sources of irradiation coming from the sun as well as the penetration depth into the skin (source German Society of Dermatologist)

Many reviews and articles have recently been published[1] on this topic, as quoted in this article, with the subject first mentioned as far back as the early 1990s by Brian Diffey. The process of photo-aging (Figure 2, see next page), which is mainly caused by UV A irradiation, is still not well known or understood by many consumers. Its negative effects are seen sometimes years after over exposure and most of the time UV A exposure does not lead to a painful erythema.

The recently published European recommendation[2] is meant to help the consumers to find the most suitable sun protection more easily. The currently drafted US final sunscreen monograph[3] has also addressed the relevance of UV A protection and proposes certain labelling and testing measures that will also help raise consumer awareness.

European Regulations for UV Filters

Europe today is taking the lead in a more sophisticated way to better protect the consumers. This is not only achieved through the possible use of photo-stable UV absorbers but also recently via the definition of a better sun protection showing a "balanced" UV A and UV B protection, as well as an adapted method to measure it. The huge advantage of the new UV A COLIPA method is that it takes the photo-stability of the filter platform into consideration as well as the ethical problems of irradiating human volunteers, by replacing the PPD Method (Persistent Pigment Darkening) *in-vivo* by an *in-vitro* step. It is still necessary to have the *in-vivo* SPF value in order to calculate the UV A factor (APF) through the application of a mathematical calculation.

Figure 3 (see next page) shows an idealized distribution between UV A and UV B absorption, which is theoretically required for an optimal protection. The most efficient protection is always