

Antioxidant Combinations

INCREASING THE EFFICACY OF SUNSCREENS

By Christian Oresajo, Ph.D., Asst. V.P., R&D, L'Oréal USA

Topical application of antioxidants can complement sunscreen to protect the skin from UV damage. Combining natural-based antioxidant substances with sunscreen filters can improve protection against UV rays.

Exposure of mammalian skin to UV radiation increases levels of reactive oxygen species, which damages lipids, proteins, and nucleic acids in both epidermis and dermis and contributes to the sunburn reaction as well as

sunscreens do not provide 100% protection against UV radiation due to various reasons including uneven application, wash-off from body surface, and insufficient protection of UV range. Several recent studies have evaluated the protective role of antioxidants from within the skin.

UV-irradiation is a potent generator of oxidative stress in the skin leading to acute inflammatory reactions, such as erythema, and chronic reactions such as premature skin aging.

UV-irradiation is a potent generator of oxidative stress in the skin leading to acute inflammatory reactions, such as erythema, and chronic reactions, such as premature skin aging.

photo-aging.

Use of sunscreens for skin photo protection by preventing the penetration of harmful UV rays into skin is well established. However,

ANTIOXIDANT COMBINATIONS COMPLEMENT SUNSCREENS

The skin is equipped with an elaborate system of protective antioxidant substances. However, normal aging process as well as environmental stress such as UV can deplete the skin of these protective antioxidants. Topical

application of skin specific antioxidants and other natural antioxidant substances that penetrate the skin can replenish antioxidant capacity of skin.

As sunscreen protection on the skin's surface is not 100%, treatment with antioxidants could significantly boost photo protection by sunscreens. While sunscreens protect skin from the outside, antioxidants protect skin from inside by stimulating and supplementing the cell's own defense mechanisms and may remain active for several days. Since antioxidant mix does not generally absorb within the UVA/UVB spectrum, any protective effects of the treatment are not due to sunscreen-like effects.

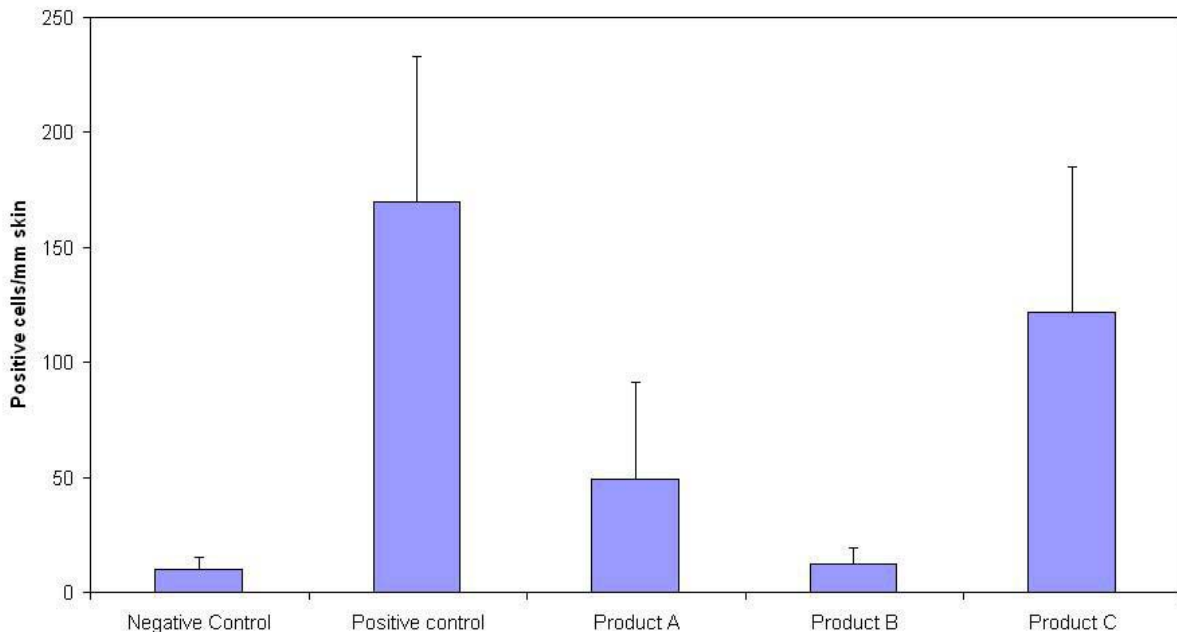
In a separate study, the group from L'Oréal tested the effect of a natural antioxidant extract from *Senna Alata* (common name: candle bush) leaf extract alone and in combination with sunscreens using La Roche-Posay Anthelios 60 Ultra Light Fluid Sunscreen with CELL-OX Shield™ technology. This study suggests a significant amount of photo protection by the antioxidant product alone; however, in combination with sunscreens, the photo protection was significantly higher. The levels of thymine dimmer formation, p53 protein expression, and MMP-9 protein production were all reduced significantly by the antioxidant product; but the combination of the antioxidant

with sunscreens produced even more reduction to the same level as non-UV exposed skin.

DUAL PROTECTION WITH CELL-OX SHIELD

This L'Oréal study demonstrates that high SPF alone is not enough to protect skin from UV-induced cell damage. La Roche-Posay, the brand trusted for over 15 years worldwide to offer exceptional UVA and UVB protection, offers a line of sun protection products that combines topical antioxidants with powerful UV filters with the new CELL-OX Shield technology. Anthelios Sunscreens with CELL-OX Shield provide dual protection against exposure to harmful UV rays that can lead to short-term and

Complimentary Effects of Antioxidants and Sunscreen on p53



long-term damage to skin cells, including skin cancer and premature aging. This two-pronged approach delivers a patented combination of two high efficacy sun filters and powerful antioxidants to further protect skin down to the cellular level¹.

As the first line of defense, a patented synergistic filtering system with a performance booster delivers photostability and broad-spectrum protection² with enhanced efficacy against UVA and UVB rays. This exclusive patented combination of two sun filters includes Avobenzone (3%), which protects against long UVA

rays and is stabilized by the UVB filter, Octocrylene (5%) to provide enhanced UVA protection. In addition, a unique photostabilizing booster enhances longer lasting photostability performance³ with maintained UVA and UVB protection even after five hours.

The second line of defense against cell damage is a

Sweating and rubbing can alter the uniformity and provide holes. After removal, the sunscreen must be reapplied to be effective. When some sunscreens absorb energy, they are chemically destroyed and no longer efficient. For all of these reasons, sunscreens do not offer 100% photo protection all the time.

Anthelios Sunscreens with CELL-OX Shield provide dual protection against exposure to harmful UV rays that can lead to short-term and long-term damage to skin cells, including skin cancer and premature aging.

TRUE BROAD SPECTRUM COVERAGE WITH HIGH UVA PROTECTION

The importance and efficacy of true broad spectrum coverage with high UVA protection in protecting against DNA damage has also been proven in laboratory testing. A recent study using a Comet Assay in vitro evaluated the DNA damaging effects of UV rays on normal human epidermal keratinocytes. The testing showed that Anthelios 60 was more efficient than a competitive SPF 50 formula with a lower UVA absorption (containing 15% homosalate, 7.5% octinoxate, 5% octisalate and 2.4% titanium dioxide) in protecting DNA of cultured human keratinocytes against UV induced oxidative damage.

powerful patent-pending antioxidant combination. This exclusive complex includes *Senna Alata* leaf extract, which has a self-defense mechanism to protect against cell damage that works in combination with an additional antioxidant to help protect skin from environmental aggressors.

CONCLUSION


Sunscreens contain chemicals that work on the surface of the skin to absorb certain wavelengths of radiation. No single sunscreen fully protects against all ultraviolet wavelengths. Sunscreen protection is also a function of the uniformity of the application to the surface of the skin.

Antioxidants protect the skin in an entirely different manner. They are the natural way that the body protects itself from the sun. Absorption of ultraviolet



radiation by the skin generates oxidative stress. This causes oxidative chemical reactions in skin that modify the skin's chemical nature. If antioxidants are present at the site of reaction, they can neutralize the oxidative stress and prevent the chemical reaction from happening. In the course of the reaction, the antioxidant is depleted.

In time, the antioxidant capacity of skin may become

inadequate and damage will ensue. If topical antioxidants can be formulated to enter skin, they can add to the skin's own antioxidant pool and increase protection. They have an advantage over sunscreens because once inside the skin they are stable, cannot be removed by washing or rubbing, and last for several days. 

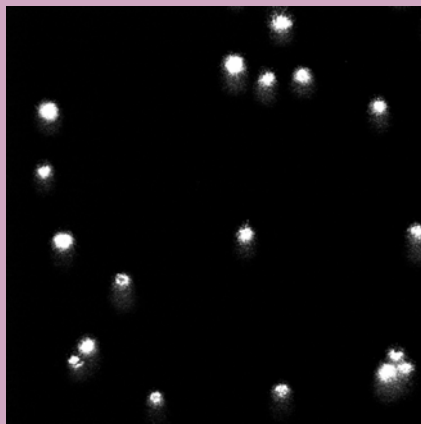
¹ Upper layers of the skin.

² SPF 60, PFA 26 and photostable.

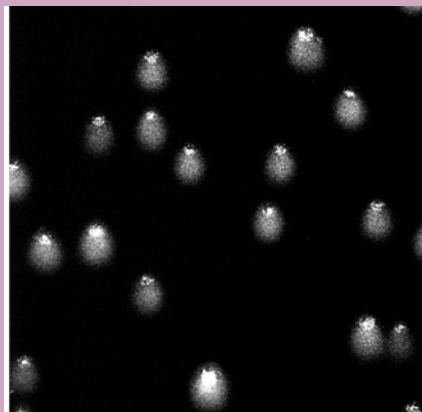
³ Longer lasting than non-stabilized sunscreens.



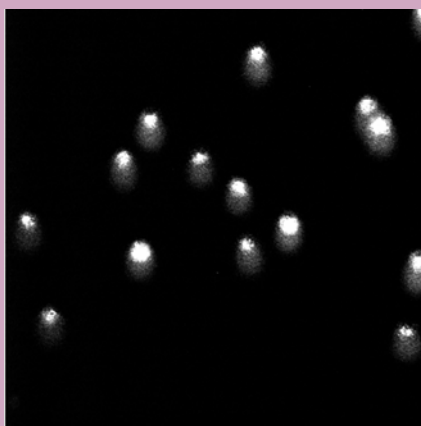
Assay Images



Anthelios 60 / Protected



Exposed / Untreated



Competitor



Control

About the Author

Christian Oresajo, Ph.D., is currently Assistant Vice President, Research and Development, L'Oréal USA. Prior to joining L'Oréal, Christian worked for over 20 years performing clinical evaluations for top international companies in the personal care industry. He is a member of several professional organizations including the Society of Investigative Dermatology and the American Academy of Dermatology. Christian is co-author of several publications and book chapters on skin-related topics, including ethnic skin, and is currently an adjunct assistant professor at Howard University School of Medicine, Department of Dermatology, Washington, D.C. He holds a Ph.D. degree in Biochemistry from American University, Washington, D.C. For more information on this topic, visit the La Roche-Posay L'Oréal USA website at:

www.anthelios.com, or contact La Roche-Posay directly at: 800.560.1803.