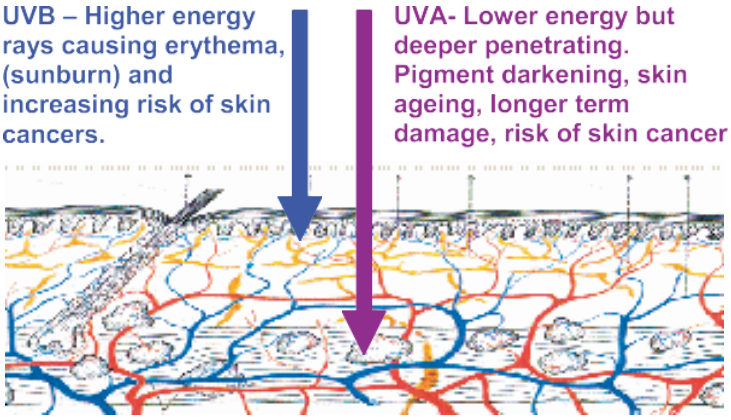
Clinical Data
Mineral broad-spectrum sunscreen
Zinc Oxide

Introduction
Consumers are increasingly aware of the health risks and skin damaging effects associated with sun exposure. There is also a growing concern over the environmental safety and potential skin irritation of non-mineral (organic) sunscreens. Zinc Oxide (ZnO) provides the benefits of superior UVA and UVB protection in one ingredient.

Concerns over safety of chemicals in sunscreens
Increasing usage of organic 'chemical' UV absorbers in everyday products has led to concern about prolonged chemical exposure causing skin irritation and sensitisation. Zinc oxide, on the other hand, has a long history in skincare products such as calamine lotion for use on even the most sensitive of skin. Zinc oxide sunscreens are widely recommended by dermatologists for patients with skin disorders, or those suffering sensitisation or irritation from chemical-based sunscreens.

It takes more than high SPF to protect skin from the sun.
UV light consists of both UVA and UVB rays, with both contributing to skin damage caused by sun exposure.
Both UVA and UVB penetrate to different levels within the skin leading to various types of skin damage.

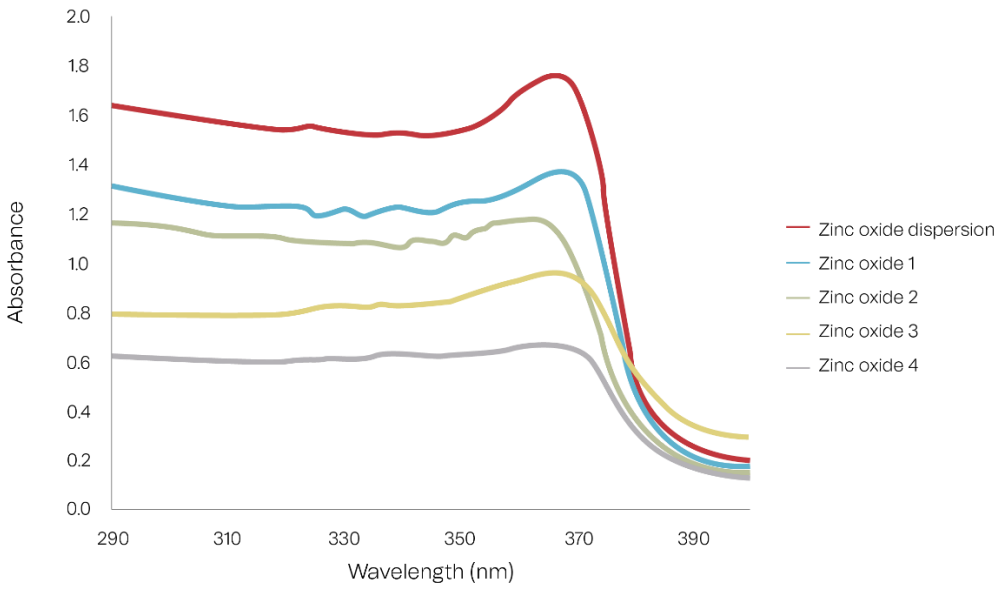


The importance of UVA protection
The long-term effects of UVA on the skin are well recognised. UVA is a major contributor to skin ageing, hyperpigmentation and heightened risk of skin cancers.

A true broad-spectrum absorber
Zinc Oxide's absorbance profile spans both the UVA and UVB spectrum.

Superior action of Zinc oxide dispersion
Zinc Oxide dispersion in coco-caprylate caprate

1/ Provides a slightly higher UVA protection versus other simple zinc oxide powder products



UV absorbance spectrum, Zinc Oxide (4 types) VS Zinc oxide dispersion in coco-caprylate caprate

2/ Provides enhanced product aesthetics:

- The skin feel is more elegant as the Zinc Oxide dispersion in the coco-caprylate caprate emollient spreads evenly over the skin leaving no greasy residue, just a silky moisturised feeling.
- Exceptional transparency is possible even at high use levels.

Photostability of Zinc oxide maintaining high levels of protection
SPF testing methods specified by regulatory authorities require sunscreen samples to be pre irradiated prior to testing to ensure that products remain effective during sun exposure. Many commonly used chemical absorbing (organic) sunscreens exhibit photo-instability, thereby losing effectiveness once exposed to UV radiation.
Zinc Oxide is photo-stable in formulations, offering more reliable protection.

Replacing chemical (organic) sunscreens
Zinc Oxide can replace chemical UV filters in sun care formulations by achieving comparable aesthetics while:

- Providing 100% mineral protection when used as the only filter, or in combination with TiO2
- Providing a photostable formula without the stabilisers required when using chemical UV filters
- Simplifying the formulation as Zinc Oxide dispersions can be used as a single and effective broad-spectrum filter.
- Providing protection suitable for sensitive skins; zinc oxide sunscreens are widely recommended by dermatologists for patients with skin disorders, or those suffering sensitisation or irritation from chemical-based sunscreens.

UVA/UVB broad-spectrum protection
Of the currently available sunscreens, only zinc oxide provides effective protection across the UV band range of 240 to 400 nm, covering UVC (240 to 280 nm), UVB (280 to 320 nm), UVA 2 (320 to 340 nm), and UVA 1 (340 to 400nm).

Facts-UV damage

1. UVA rays account for 95% of our sun exposure. They cause skin ageing and contribute to skin cancer.
2. The risk for skin cancer doubles in people who have had five or more sunburns.
3. UVA rays penetrate deeply into the skin layers, damaging collagen and cells which leads to wrinkling, hyperpigmentation and loss of elasticity.
4. UVB rays mostly affect the outer layer of the skin causing redness and burning.

Zinc Oxide recent study

- A new study led by two Australian universities has found evidence that zinc oxide nanoparticles used in sunscreen does not cause cellular toxicity even after repeated applications.
- The levels we found in blood were very small," says McCall, a research consultant on nano safety at CSIRO. "After applications over five days, the levels of the tracer zinc in the blood were one thousandth of what is the naturally-occurring total zinc levels in the blood.

Reef Safe

Unlike some organic/chemical sunscreens such as oxybenzone that have been banned in many regions due to reef toxicity and coral bleaching, zinc oxide is not damaging to oceans and is considered reef safe.

Zinc Oxide Anti-bacterial & Wound Healing

- Zinc oxide had been used during the regime of Pharaohs, and historical records show that Zinc Oxide was used in many ointments for the treatment of injuries and boils even in 2000 BC
- Of all natural and synthetic wound dressing materials, the chitosan hydrogel microporous bandages laced with zinc oxide nanoparticles developed by Kumar Etal are highly effective in treating burns, wounds and diabetic foot ulcers
- Zinc oxide is widely used to reduce irritation from nappy rash and is also considered the ideal gentle sunscreen for babies.

References:

https://www.spiedigitallibrary.org/journals/journal-of-biomedical-optics/volume-25/issue-1/014509/Noninvasive- in-vivo-human-multiphoton-microscopy--a-key-method/10.1117/1.JBO.25.1.014509.full?SSO=1
https://heartland-derm.com/skin-cancer-prevention/
https://www.cosmeticsdesign-asia.com/Article/2019/01/23/Australian-study-supports-the-use-of-zinc-oxide- nanoparticles-in-sunscreens
https://www.abc.net.au/science/articles/2012/11/30/3642924.htm
https://nanoscalereslett.springeropen.com/articles/10.1186/s11671-018-2532-3