

CANADIAN DERMATOLOGY ASSOCIATION POSITION STATEMENT THE USE OF NANOPARTICLES IN SUNSCREENS

The use of the nanoparticulates zinc oxide (ZnO) and titanium dioxide (TiO₂) in sunscreens has been authorized in Canada since 2013¹. ZnO and TiO₂ containing products have been approved for use for many years in Europe as well as in Australia and the US.

Nanoparticles are used in sunscreen as they are highly effective at blocking ultraviolet radiation, while remaining cosmetically appealing i.e. not looking "white" when applied to the skin. ZnO and TiO₂ are considered "mineral or "physical" sunscreen filters.

There have been concerns expressed about the theoretical health impact of these nanoparticles due to their potential to form oxygen free radicals which could be toxic to cells. It is true that "raw" nanoparticles can generate these free radicals, but nanoparticles in commercially-available sunscreens are coated to prevent free radical formation. In addition, studies show that nanoparticles in sunscreen tend to "clump" together on the skin, forming large aggregates, and therefore do not penetrate the skin at all.

In 2010, the Pharmacy and Therapeutics committee of the Canadian Dermatology Association undertook an exhaustive literature review of all the evidence available on the safety of sunscreens containing nanoparticles. The search was based on an earlier expansive review undertaken by the Department of Australian Health and Ageing Therapeutic Goods Administration.

The bulk of evidence from both the Australian review and the 2010 review clearly indicated that absorption does not occur through intact skin and therefore the risks from application of products to the skin were deemed negligible. More recent studies and Medline searches conducted in 2016 and 2017 have confirmed these earlier conclusions.

Therefore, despite the variety of theoretical concerns that have been raised, since there is no absorption through intact skin after cutaneous application of nanoparticulate ZnO or TiO₂ containing sunscreens, these products are considered safe. There is no evidence to suggest that the application of sunscreen products containing nanoparticulate ZnO or TiO₂ will result in toxicity.

Despite the safety of nanoparticles in sunscreens for humans, recent research has suggested there may be a negative impact to the environment, specifically to marine life and plants. Continued vigilance is required to monitor the effect of nanoparticles on the environment.

¹Sunscreen Monograph Health Products and Food Branch, Health Canada July 7, 2013