

## Cancer Association of South Africa (CANSA)



### Fact Sheet and Position Statement on Sunless Tanning

#### Introduction

Sunless tanning- also known as UV-free tanning, self-tanning, spray-tanning (when something is applied topically) or fake-tanning - refers to the application of chemicals to the skin or making use of chemicals that are taken by mouth or per injection, to produce an effect similar in appearance to a suntan. The popularity of sunless tanning rose since the 1960s after links were made by health professionals between exposure to the sun and other sun tanning methods, such as sunbeds or tanning beds, and the incidence of skin cancer. (Wikipedia).

Chung, *et al.* (2010) published a paper in *Dermatologic Surgery* in which they tested the premise of whether a tanned individual was perceived to be more attractive than a person who did not have a tanned appearance. They took photos of 45 women, and posted these on the 'Hot or Not Website' (a site wherein individuals could offer 1-10 attractiveness ratings of submitted photos). Furthermore, using an Adobe Photoshop option, the authors artificially created tanned versions of the 45 photos. Accordingly, ratings were elicited for both the 'untanned' (n = 6,228) and 'tanned' (n = 8,988) versions of the photos. The authors analysed the data in three ways, all of which yielded the same conclusion: The population who logged onto the website considered tanned people to be more attractive.

#### Sunless Tanning



**Nahar, V.K., Wilkerson, A.H., Mayer, J.E., Gromley, Z., Berry, D., Nahar, L. & Brodell, R.T. 2020.**

“The aim of this study was to explore dermatologists' practices and attitudes related to educating and counseling their adolescent patients about indoor tanning. An online survey was carried out with a convenience sample of 100 dermatologists. Findings indicated that the majority of the dermatologists are actively engaged in discussing tanning bed use and sun protection with their adolescent patients. Most expressed positive attitudes toward educating patients on the risks of tanning bed use. Limited time was the most commonly reported barrier for the lack of discussion regarding indoor tanning. Of note, more than half of the dermatologists (65%) had patients suffering from tanning addiction. For tanning-addicted patients, dermatologists can encourage lifestyle changes, the use of sunless tanning products, and referrals when the patient's needs extend beyond the scope of the dermatologist.”

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November 2020

## Different Categories of Sunless Tanning Products

Broadly speaking, there are four categories of sunless tanning products (STPs) on the markets. They include:

- STPs that are applied externally to the skin – topical application
- STPs that are inhaled
- Products that are taken internally in the form of tablets
- Products that are administered by means of injection

### Sunless Tanning Products (STPs) that are Applied to the Skin – Topical Application

Topical self-tanning products (STPs) are available as lotions, creams, sprays, and pledgets (towels or wipes). Commercial preparations typically contain between 3 and 5 percent Dihydroxyacetone (DHA), a sugar molecule that bronzes the very top layer of the skin. The browning effect occurs within a few hours. The effect is temporary - the colour fades in 7-10 days as the skin naturally sloughs off.

Topically applied sunless tanning products are generally recognised as safe (GRAS).

Bronzing powders - a cosmetic applied to the skin to simulate a temporary and short lived sun tan. Face powder is a cosmetic powder applied to the face to set a foundation after application. It can also be reapplied throughout the day to minimise shininess caused by oily skin. There is translucent sheer powder, and there is pigmented powder. Certain types of pigmented facial powders are meant to be worn alone with no base foundation. Powder tones the face and gives an even appearance. Besides toning the face, some powders with sunscreen can also reduce skin damage from sunlight and environmental stress. It comes packaged either as a compact or as loose powder. It can be applied with a sponge, brush, or powder puff. Uniform distribution over the face is achieved more easily when a loose powder is applied.



[Picture Credit: Bronzing Powder]

Because of the wide variation among human skin tones, there is a corresponding variety of colours of face powder. There are also several types of powder. A common powder used in beauty products is talc (or baby powder), which is absorbent and provides toning to the skin.



[Picture Credit: Spray Bronzer]

Spray bronzers – this is the application of a fast drying, brown spray-on colour solution. The change in colour is visible the moment the product is applied to the skin using an airbrush or spray.

Stick bronzers – this looks similar to deodorant sticks. These products can be stroked right onto the legs for instant colour. It is said that using a concealer with the leg bronzer will help hide scars, spider veins, and other leg imperfections. Also, leg bronzers can be set with translucent powder to keep the colour from rubbing off



[Picture Credit: Stick Bronzer]

Tanning Wipes (also known as tanning towelettes) – these are said to be convenient and easy to use. It is said to create a streak-free, natural looking tan-like effect. With enough self-tanner for one application, each towelette can be used at home or on-the-go. The tan is usually two shades darker than one's natural skin tone. Results may vary.



[Picture Credit: Tanning Wipes]

Sunless tanning lotion – a lotion applied topically to stain the skin to a desired tone. Although lotions that contain DHA are said to be the most reliable and useful, there are dozens of other types of products on the market.



[Picture Credit: Sunless Tanning Lotion]

Tanning accelerators - lotions that usually contain the amino acid tyrosine claim that they stimulate and increase melanin formation, thereby accelerating the tanning process. At this time, there is no scientific data available to support these claims.

### **Position of the Cancer Association of South Africa (CANSA) Regarding Topically Applied Sunless Tanning Products**

The position of CANSA:

- CANSA does not promote the perception that a tanned skin is more desirable or makes a person more attractive than when having a pale skin
- CANSA firmly believes that topical sunless tanning products should NOT be applied to children's skins under any circumstance
- CANSA is of the opinion that individuals who choose to make use of any form of topical sunless tanning (a fake tan) should be aware that:
  - Sunless tanning stains the skin a darker colour, but that this darker colour does NOT provide any protection against the UV rays of the sun
  - Sunless tanning products that contain sunscreen provides relevant protection for a maximum of two hours after application and NOT for the duration of the sunless tan

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- None of the sunless tanning products that are available have been scientifically proven to stimulate the production of melanin in the skin
- CANSA is also of the opinion that individuals who make use of one or other form of topical sunless tanning must be aware that:
  - They need to always protect their skin when exposing their skin to UV radiation from the sun by using an appropriate sunscreen
  - They must stay in the shade whenever possible
  - Wear a broad brimmed hat, sun protective clothing and approved sunglasses
  - Use a broad spectrum sunscreen with an appropriate SPF15 or higher at least 20 minutes before they go into the sun
  - Re-apply the sunscreen at least every two hours especially when perspiring or going into the water
- CANSA further believes that individuals who make use of a topical sunless tanning product that contains Dihydroxyacetone (DHA), must be aware that it does not protect the skin against the harmful UV rays of the sun whilst it will prevent the formation of Vitamin D in the skin during sun exposure.

### **What the Research Says About Topically Applied Sunless Tanning Products**

A review of the scientific literature provided the following information regarding topically applied sunless tanning products (STP's):

- STPs may contain Dihydroxyacetone (DHA)
- STPs are generally recognised as safe (GRAS)
- STPs are intended for external application only
- Topical exposure to Dihydroxyacetone (DHA) may have cytotoxic effects (toxic effects on cells in the skin)
- Users of STPs should shield their eyes, lips, and mucous membranes during application
- Users of STPs should refrain from ingesting or inhaling any product that contains Dihydroxyacetone (DHA)
- Users of STPs often believe that, because their skin is of darker tone, they are protected against UV radiation, resulting in risky (natural and artificial) skin cancer tanning behaviour
- STPs do not provide any protection from exposure to ultraviolet radiation – users should, therefore, take the necessary precautions to protect their skin against UV radiation

**Braunberger, T.L., Nahhas, A.F., Katz, L.M., Sadrieh, N. & Lim, H.W. 2018.**

“The sunless tanning industry has experienced rapid growth due to public education on the dangers of ultraviolet radiation on skin and improvements in products. Dihydroxyacetone (DHA) is a 3-carbon sugar allowed by the Food and Drug Administration (FDA) as a color additive in sunless tanning products. Bronzers, a product removed with soap and water, may also contain DHA. DHA is intended for external application, not including the mucous membranes or in or around the eye area. DHA has been used in spray-tan booths and by airbrushing it onto consumers, although these are unapproved uses, as contact with the color additive is not restricted to the external part of the body. Consequently, the FDA recommends customers shield their eyes, lips, and mucous membranes, as well as refrain from ingestion or inhalation of DHA. Unlike sunscreens, products that protect against ultraviolet radiation and are regulated by the FDA as non-prescription drugs, sunless tanning products are

regulated as cosmetics and cannot provide any protection from exposure to ultraviolet radiation. There are reports of non-cosmetic uses of DHA that are not FDA approved.

**Diehl, K., Görig, T., Schilling, L., Greinert, R., Breitbart, E.W. & Schneider, S.** 2019.

**BACKGROUND:** Sunless tanning products (STPs) are often seen as "healthy alternative" to sunbathing and indoor tanning. However, STP use may entail indirect risks such as overestimating an individual's natural skin type, resulting in risky (natural and artificial) tanning behavior. We aimed to explore STP use in combination with other health-related risk behaviors (eg, smoking), skin cancer risk, risk awareness of ultraviolet radiation, and preventive behavior.

**METHODS:** We used data from the NCAM, a nationwide representative cross-sectional sample (n = 3000, aged 14-45, 48.6% female) interviewed via telephone. Differences between STP users and nonusers regarding the abovementioned aspects were identified using chi<sup>2</sup>-test.

**RESULTS:** The 1-year prevalence of STP use was 7.5%. Tanning bed users showed a higher prevalence of STP use than past and never users (16.1% vs 9.6% vs 5.8%, P < 0.05). Although STP users had a higher skin cancer risk based on individual characteristics, they were less likely to have participated in a skin cancer screen.

**CONCLUSION:** The identified parallel use of STPs and tanning beds can have severe health consequences, since the "fake tan" of STPs may lead to an overestimation of the individual's skin type, which may result in overdosed UV exposure. The lower risk awareness among STP users accompanied with their higher skin cancer risk calls for target group-specific prevention.

**Dodds, M., Arron, S.T., Linis, E., Polcari, I. & Mansch, M.D.** 2018.

**IMPORTANCE:** Incidence rates of nonmelanoma and melanoma skin cancers are increasing rapidly in the United States likely because of increased UV light exposure. Sunless tanning is a safe alternative to achieve tanned skin that might help reduce skin cancer incidence by deterring risky behaviors. However, limited data exist on the characteristics and associated skin cancer risk behaviors of sunless tanners in the United States.

**OBJECTIVE:** To assess the demographic characteristics and skin cancer risk behaviors of sunless tanners among adults in the United States.

**DESIGN, SETTING, AND PARTICIPANTS:** This secondary analysis of a cross-sectional study used data from the 2015 National Health Interview Survey, a population-based survey of the US noninstitutionalized civilian population. Participants included 27 353 men and women 18 years or older.

**MAIN OUTCOME AND MEASURES:** Participant demographics and skin cancer risk behaviors, including indoor tanning, skin cancer screening, sunburn, and sun protection behaviors.

**RESULTS:** Of the 27 353 adults (representative of more than 198 million US adults; mean [SE] age, 46.0 [0.2] years) studied, 6.4% (SE, 0.2%) reported sunless tanning. Factors associated with sunless tanning included being young, female, non-Hispanic white, college educated, nonobese, and sun sensitive, living in the western United States, and having a family history of skin cancer. Sunless tanners were more likely to report indoor tanning (adjusted prevalence odds ratio [aPOR], 3.77; 95% CI, 3.19-4.43; P < .001), recent sunburn (aPOR, 1.55; 95% CI, 1.31-1.83; P < .001), use of sunscreen ( $\beta$  = 0.19; 95% CI, 0.09-0.28; P < .001), and having had a full-body skin examination (aPOR, 1.77; 95% CI, 1.51-2.08; P < .001) but less likely to seek shade ( $\beta$  = -0.12; 95% CI, -0.19 to -0.04; P = .001) or use protective clothing when outdoors (long pants:  $\beta$  = -0.18; 95% CI, -0.26 to -0.11; P < .001; long sleeves:  $\beta$  = -0.10; 95% CI, -0.18 to -0.03; P = .01). Among indoor tanners, sunless tanners compared with those who did not sunless tan reported increased frequency of indoor tanning (mean [SE], 19.2 [1.9] vs 14.9 [1.2] sessions in the past 12 months; P = .04) but no differences in other skin cancer risk behaviors.

**CONCLUSIONS AND RELEVANCE:** This study suggests that sunless tanning is associated with risky skin cancer-related behaviors. Longitudinal studies are needed to assess whether sunless tanning changes UV exposure behaviors to better determine whether sunless tanning represents an effective public health strategy to reduce rates of skin cancer in the United States.

**Smith, K.R., Granberry, M., Tan, M.C.B., Daniel, C.L. & Gassman, N.R. 2018.**

“The active ingredient in sunless tanning products (STPs) is a simple sugar, dihydroxyacetone (DHA). Several studies have demonstrated that DHA is absorbed within the viable layers of skin and not fully contained within the stratum corneum. Additionally, spray tanning and other aerosolized application methods have increased the risk of internal exposure through mucous membranes and inhalation. Beyond its presence in STPs, DHA also occurs as an endogenous by-product of fructose metabolism, and an excess of DHA in cells can induce advanced glycation end (AGE) products and oxidative stress. Therefore, exogenous and endogenous exposures to DHA may be harmful to cells, and it has already been demonstrated that exogenous exposure to DHA is cytotoxic in immortalized keratinocytes. Still, little is known about the exogenous DHA exposure effects on other skin components. In this study, we explore the effects of exogenous DHA exposure in a human melanoma cell line, A375P. Melanoma cells were sensitive to DHA and displayed a transient burst of reactive oxygen species within an hour of exposure. Cell cycle arrest at G2/M was observed within 24 h of exposure, and apoptosis, monitored by the cleavage of PARP-1 and Caspase-3, was detected within 72 h of exposure to DHA. Together, these demonstrate that exogenous exposure to DHA has cytotoxic effects in our selected cell model and indicates the need to further investigate the exogenous exposure effects of DHA in other relevant exposure models.”

### **The Use of a Nasal Spray as a form of Sunless Tanning Product (STP)**

Tanning nasal spray is a spray that is usually squirted up the nostrils twice a day. It is said to assist in the creation of a beautiful tan within days. There are different types of tanning nasal sprays on the market – they mostly contain melanotan whilst others contain herbal extracts. Their safety have not been adequately researched.



[Picture Credit: Tanning Nasal Spray]

### **Position of the Cancer Association of South Africa (CANSA) Regarding the Use of a Nasal Spray as a Form of Applied Sunless Tanning Product (STP)**

The position of CANSA:

- CANSA wishes to discourage individuals from making use of any nasal spray as a form of sunless tanning as the safety of any of these products have not been adequately researched.

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### What the Research Says About Melanotan Containing Sunless Tanning Products

A review of the scientific literature provided the following information regarding sunless tanning products (STP's) that contain Melanotan:

**Callaghan Lii, D.J.** 2018.

“Melanotan-I and melanotan-II are alpha-melanocyte stimulating hormone (a-MSH) analogues that can be purchased illicitly online with relative ease and are injected subcutaneously to stimulate a tan. Little is known about the use of these unregulated substances. An observational survey was posted to an online forum in which participants share their experiences using melanotan-I or melanotan-II. Users were asked to complete this voluntary, anonymous survey, which had questions focusing on motivation and hesitation for and against using melanotan, difficulty in acquiring it, and plans for continuing to use melanotan in the future.”

**Dreyer, B.A., Amer, T. & Fraser, M.** 2019.

Melanocortin analogues, such as melanotan, are illegally used for artificial tanning. They have also been suggested as possible therapeutic agents in the treatment of erectile dysfunction. This case study presents a patient attending the accident and emergency department, in a tertiary urology centre, with acute priapism [unwanted, persistent erection] after abdominal subcutaneous injection of melanotan. The priapism was diagnosed as 'low-flow' and managed with cavernosal aspiration, irrigation and subsequent intracavernosal injection of phenylephrine. The patient avoided requiring surgical shunting but had not yet recovered erectile function at 4-week follow-up. Acute priapism is an unreported side effect of melanocortin analogue use and this case report presents a patient managed without surgical intervention. Future therapeutic application of these agents will need to take this potential life altering complication into consideration.

### Sunless Tanning Products (STPs) that are Ingested

There are a variety of types of sunless tanning products (STPs) that are ingested for their reaction. These include:



Tanning tablets – it usually contains canthaxanthin, and can make one yellow/orange if one takes too much. It is NOT APPROVED by the FDA as too high dosages causes pigment to concentrate in the retina of the eyes (canthaxanthin retinopathy). It can cause liver disease and bone marrow suppression. The dosage provided on the bottle of the tanning tablets are usually too high for safe use.

[Picture Credit: Tanning Tablets]

Although the FDA has approved the use of canthaxanthin in food, it does not approve its use as a tanning agent. When used as a colour additive, only very small amounts of canthaxanthin are necessary. As a tanning agent, however, much larger quantities are used. After canthaxanthin is consumed, it is deposited all over one's body, including in the skin, which turns an orange-brown colour. These types of tanning pills have been linked to various side effects, including hepatitis.



Tanning capsules – these are similar to tanning tablets described above. The main difference being that the product is presented in a capsule instead of a compressed tablet form.

[Picture Credit: Tanning Capsules]

### **Position of the Cancer Association of South Africa (CANSA) Regarding the Use of Ingested Products as a Form of Sunless Tanning Product (STP)**

The position of CANSA:

- CANSA wishes to discourage individuals from ingesting any products as a form of sunless tanning as the safety of any of these products have not been adequately researched.
- CANSA wishes to discourage individuals from making use of the following under any circumstance:
  - Tanning tablets
  - Tanning capsulesas the safety of their ingredients have been insufficiently researched

### **What the Research Says About Sunless Tanning Products (STPs) that are Ingested**

A review of the scientific literature provided the following information regarding sunless tanning products (STP's) that are ingested:

**Esatbeyoglu, T. & Rimbach, G. 2017.**

“The aim of this review is to summarize the relevant literature about the use of canthaxanthin in food science and nutrition research. Canthaxanthin is a red-orange carotenoid that belongs to the xanthophyll group. This naturally occurring pigment is present in bacteria, algae and some fungi. Canthaxanthin is also responsible for the color of flamingo feathers, koi carp skin and crustacean shells. Canthaxanthin is widely used in poultry (broiler, laying hens) as a feed additive. Canthaxanthin can be obtained by total synthesis. The canthaxanthin-mediated color of foods is an important quality criterion for consumers.”

**Challiol, C.F., Bastien, A., Giambriuni, J.M. & Fernandez Meijide, N. 2018.**

**INTRODUCTION:** Canthaxanthin is a chemical product used to tan the skin. Its most frequent adverse effect is canthaxanthin retinopathy [damage to the retina of the eyes, which may cause vision impairment].

**PURPOSE/ METHODS:** Report, case series.

**RESULTS:** Two female patients, one 42 years-old and the other 72 years-old, with signs of retinopathy due to canthaxanthin. Complete ophthalmology examinations were carried out. The peripheral fovea birefringent deposits with internal retinal involvement were studied using multimodal imaging.

**CONCLUSION:** Canthaxanthin retinopathy is rare. Multimodal imaging may provide important data for the differential diagnosis of crystalline retinopathy.

## Sunless Tanning Products (STPs) that are administered by means of injection

Tanning injections - A synthetic hormone injected to “top up tans” is illegal and should not be used. Widespread coverage has been given to the news that Melanotan, injected under the skin to encourage the skin to darken, has never been safety tested by any Western government healthcare agency.



[Picture Credit: Tanning Injections]

The drug is sold online or under the counter at gyms and beauty salons and because the drug is self-injected, there are fears that users are putting themselves at risk of infections such as hepatitis or HIV. There are different ‘versions’ of the product, namely Melanotan and Melanotan-II.

## CANSA’s Position Regarding Injection Solution Containing Melanotan and Melanotan-II as a Form of Sunless Tanning Product

The position of CANSA:

- CANSA would like to warn the public against this product. Melanotan-II is a dangerous laboratory-made chemical that is similar to a hormone found in humans. Care should be taken not to confuse Melanotan-II with melatonin.
- Melanotan-II has been used to produce erections in men with erectile dysfunction (ED), and lately also to tan the skin without exposure to the sun (sunless tanning).
- Melanotan-II is similar to a substance found in our bodies, called “melanocyte-stimulating hormone”, which increases the production of skin-darkening pigments. Melanotan-II is thought to work on the brain to stimulate erections in men.



• [Picture Credit: Melanotan-II]

- Melanotan-II is possibly safe when used under medical supervision for treating erectile dysfunction. There is, however, insufficient information to know whether it is at all safe for other uses. Adverse effects which may occur with the use of melanotan-II include nausea, stomach cramps, decreased appetite, flushing, tiredness, yawning, darkened skin, spontaneous erections of the penis, and other side effects. Cases of malignant melanoma (the most dangerous type of skin cancer) have been described following the use of Melanotan-II.
- Women who are pregnant or breastfeeding should not use Melanotan-II at all.
- Anyone currently using Melanotan or Melanotan-II should stop doing so immediately for their own safety. The drug has not been safety tested. Users are advised to consult their health professional for advice.

## What the Research Says About Injection Solutions Used as a Form of Sunless Tanning Products (STPs)

A review of the scientific literature provided the following information regarding Melanotan and Melanotan-II used as sunless tanning products (STP’s):

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**Nelson, M.E., Bryant, S.M. & Aks, S.E. 2012.**

**INTRODUCTION:** Melanotan products are currently purchased over the Internet and are designed to induce melanogenesis to create sunless tanning as well as are used as sexual stimulants. We report a novel case of systemic toxicity with sympathomimetic excess and rhabdomyolysis after use of Melanotan II.

**CASE REPORT:** A 39 year-old Caucasian male injected subcutaneously 6 mg of Melanotan II purchased over the Internet in an attempt to darken his skin during wintertime. This dose was six times the recommended starting dose per the patient. In the emergency department two hours post injection, he complained of diffuse body aches, sweating, and a sensation of anxiety. Vital signs included BP 151/85 mmHg, HR 130 bpm that peaked at 146 bpm, and temperature of 97.8°F. Physical exam demonstrated a restless and anxious appearing male with mydriasis, diaphoresis, tachycardia, and diffuse muscle tremors. Pertinent laboratory values were creatinine 2.25 mg/dL, CPK 1760 IU/L, troponin 0.23 ng/mL, WBC 19.1 k/ $\mu$ L. Urinalysis demonstrated 3 + blood with red cell casts but 0-2 RBC/hpf. Qualitative urine drug screen was negative for metabolites of cocaine and amphetamines but positive for opiates. The patient received benzodiazepines for agitation and anxiety and had improvement in his symptoms. He was admitted to the ICU and during hospitalization his CPK elevated to 17773 IU/L 12 hours later. He continued to receive intravenous fluids with sodium bicarbonate for rhabdomyolysis and his CPK decreased to 2622 IU/L with improvement of creatinine to 1.23 mg/dL upon discharge from the ICU after 3 days. The substance, which he injected, was analyzed via mass spectrometry and was confirmed to be Melanotan II when compared with an industry purchased standard sample.

**DISCUSSION:** Melanotan products are purchased via the Internet and have three main formulations (Melanotan I, Melanotan II, and bremelanotide). Melanotan I increases melanogenesis and eumelanin content to produce sunless tanning. Melanotan II also increases skin pigmentation but also produces spontaneous penile erections and sexual stimulation. Bremelanotide is a variation of Melanotan II that is specifically designed for sexual stimulation. This unique case highlights the potential of systemic toxicity with sympathomimetic excess, rhabdomyolysis, and renal dysfunction from Melanotan II use.

**CONCLUSION:** Melanotan II use resulted in systemic toxicity including apparent sympathomimetic symptoms, rhabdomyolysis, and renal dysfunction.

[Picture Credit: Sunless Tanning with Melanotan-II]



### **How Sunless Tanning Products Work**

Sunless tanning products, also called self-tanners, can give one's skin a tanned look without exposure of the skin to harmful ultraviolet (UV) rays. These products are often sold as lotions and sprays that one can apply to one's skin. Professional spray-on tanning is also available at many salons, spas and tanning businesses.

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The active ingredient in many of these sunless tanning products is the colour additive, Dihydroxyacetone. When applied to the skin, dihydroxyacetone reacts with the dead cells in the surface of the skin to temporarily darken the skin. This colouring typically wears off after 7 to 10 days. Some sunless tanning products contain sunscreen which is effective only for about 2 hours. The tanned effect of the sunless tanning product DOES NOT provide any protection to the skin against ultraviolet rays from the sun. Should a person, who has applied a sunless tanning product, want to spend time outdoor, application of a sunscreen becomes essential.

### **What the Research Says About Self-tanning and Sunless Tanning Products (STPs)**

A review of the scientific literature provided the following information regarding self-tanning and sunless tanning products (STP's):

#### **Martini, M.C. 2017.**

“Practically all currently available self-tanning products have as their active ingredient dihydroxyacetone (DHA), which may or may not be combined with erythrulose, tyrosine derivatives, and occasionally a naphthoquinone. The resulting skin tone, which resembles a natural tan, is due to chemical combination of the DHA with amino acids in the skin through the Maillard reaction. Polymer pigments known as melanoidins are formed and are fixed in the stratum corneum, where they remain until corneocyte desquamation occurs. The colouring thus achieved is semi-permanent and is well tolerated by skin. While the formulation of such products is complex and their storage difficult, no other substances provide more satisfactory or more lasting results.”

### **Effects of Active Ingredients of Sunless Tanning Products**

A summary of the effects of active ingredients of sunless tanning products includes:

Canthaxanthin – is a naturally occurring chemical, which is most commonly utilised as a colourant for food and dyes or in skin bronzing agents. Its most prevalent impact on human health is canthaxanthin retinopathy, which appears as birefringent, yellow to red crystals surrounding the macula of the eye. This occurs with increasing, dose-dependent exposure. Generally, patients remain asymptomatic (without symptoms) and findings may only be evident on fundoscopic examination of the eye. Cessation of canthaxanthin ingestion appears to reverse the retinopathy, but the time until crystal disappearance is variable. Despite a usually favourable outcome, long-standing visual changes may occur with significant visual loss secondary to canthaxanthin retinopathy (Beaulieu, Warwar & Buerk, 2013).

Melanotan – this product is available via the Internet and has three main formulations (Melanotan I, Melanotan II, and bremelanotide). Melanotan I increases melanogenesis (increase in melanin) and eumelanin content to produce sunless tanning. Melanotan II also increases skin pigmentation but also produces spontaneous penile erections and sexual stimulation. Bremelanotide is a variation of Melanotan II that is specifically designed for sexual stimulation. Melanotan results in systemic toxicity including apparent sympathomimetic symptoms (mimic the effects of transmitter substances of the sympathetic nervous system such as catecholamines, epinephrine (adrenaline), norepinephrine (noradrenaline), dopamine, etc. Such drugs are used to treat cardiac arrest and low blood pressure, or to delay premature labour, and also rhabdomyolysis. Rhabdomyolysis is a condition in which

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damaged skeletal muscle tissue breaks down rapidly. Breakdown products of damaged muscle cells are released into the bloodstream; some of these, such as the protein myoglobin, are harmful to the kidneys and may lead to kidney failure, and renal dysfunction (malfunctioning of the kidneys).

There have been reports of dysplastic naevi and melanoma associated with the use of melanotropic peptides.

(Nelson, Bryant & Aks, 2012; Ong & Bowling, 2012).

Dihydroxyacetone (DHA) – this is the active tanning ingredient in some sunless tanning lotions. It reacts with the amino groups of proteins to form a brown-coloured complex. Furthermore, DHA also causes DNA damage (Petersen, *et al.*, 2004).

Research by Armas, *et al.* (2009) found that DHA-induced melanoidins in skin act as a topical sunscreen which attenuates the formation of 25(OH)d (Vitamin D).

DHA has been approved for cosmetic use by the US Food and Drug Administration (FDA), the Canadian Health Ministry, and the EU Nations. It is considered non-toxic and non-carcinogenic. Because it does not use the skin's melanocytes to make the skin 'tan', it is recommended as a cosmetic remedy for improving the appearance of vitiligo. DHA-based sunless tanning has been recommended by the Skin Cancer Organization, American Academy of Dermatologists, Canadian Dermatology Association, The American Cancer Society and the American Medical Society.

Tyrosine - Tyrosine is one of the amino acids, which are the building blocks of protein. The body makes tyrosine from another amino acid called phenylalanine. Tyrosine can also be found in dairy products, meats, fish, eggs, nuts, beans, oats, and wheat.

Tyrosine is used in protein supplements to treat an inherited disorder called phenylketonuria (PKU). People who have this problem can't process phenylalanine properly, so as a result they can't make tyrosine. To meet their bodies' needs, supplemental tyrosine is given.

People take tyrosine for depression, attention deficit disorder (ADD), attention deficit-hyperactivity disorder (ADHD), the inability to stay awake (narcolepsy), and improving alertness following sleep deprivation. It is also used for stress, premenstrual syndrome (PMS), Parkinson's disease, Alzheimer's disease, chronic fatigue syndrome (CFS), alcohol and cocaine withdrawal, heart disease and stroke, ED (erectile dysfunction), loss of interest in sex, schizophrenia, and as a tanning agent and appetite suppressant

Some people also apply tyrosine to the skin to reduce age-related wrinkles.

### **CANSA's Position**

- CANSA does not promote the perception that a tanned skin is more desirable or makes a person more attractive than when having a pale skin
- CANSA wishes to discourage individuals from making use of the following under any circumstance:
  - Tanning tablets
  - Tanning capsules

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- Tanning nasal sprays
- Tanning injections
  - as the safety of their ingredients have been insufficiently researched
- CANSA firmly believes that topical sunless tanning products should NOT be applied to children's skins under any circumstance
- CANSA is of the opinion that individuals who choose to make use of any form of topical sunless tanning (a fake tan) should be aware that:
  - Sunless tanning stains the skin a darker colour, but that this darker colour does NOT provide any protection against the UV rays of the sun
  - Sunless tanning products that contain sunscreen provides relevant protection for a maximum of two hours after application and NOT for the duration of the sunless tan
  - None of the sunless tanning products that are available have been scientifically proven to stimulate the production of melanin in the skin
- CANSA is also of the opinion that individuals who make use of one or other form of topical sunless tanning must be aware that:
  - They need to always protect their skin when exposing their skin to UV radiation from the sun by using an appropriate sunscreen
  - They must stay in the shade whenever possible
  - Wear a broad brimmed hat, sun protective clothing and approved sunglasses
  - Use a broad spectrum sunscreen with an appropriate SPF15 or higher at least 20 minutes before they go into the sun
  - Re-apply the sunscreen at least every two hours especially when perspiring or going into the water
- CANSA further believes that individuals who make use of a topical sunless tanning product that contains Dihydroxyacetone (DHA), must be aware that it does not protect the skin against the harmful UV rays of the sun whilst it will prevent the formation of Vitamin D in the skin during sun exposure.

### **Medical Disclaimer**

This Fact Sheet and Position Statement is intended to provide general information only and, as such, should not be considered as a substitute for advice, medically or otherwise, covering any specific situation. Users should seek appropriate advice before taking or refraining from taking any action in reliance on any information contained in this Fact Sheet and Position Statement. So far as permissible by law, the Cancer Association of South Africa (CANSA) does not accept any liability to any person (or his/her dependants/estate/heirs) relating to the use of any information contained in this Fact Sheet And Position Statement.

Whilst CANSA has taken every precaution in compiling this Fact Sheet and Position Statement, neither it, nor any contributor(s) to this Fact Sheet can be held responsible for any action (or the lack thereof) taken by any person or organisation wherever they shall be based, as a result, direct or otherwise, of information contained in, or accessed through, this Fact Sheet and Position Statement.



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### Bronzing Powder

[https://www.google.co.za/search?q=cosmetic+bronzing+powder+definition&source=Inms&tbm=isch&sa=X&ei=bj78U-n18yO7Qb6poCwAw&sqi=2&ved=0CAYQ\\_AUoAQ&biw=1517&bih=714&dpr=0.9#facrc=\\_&imgdii=\\_&imgrc=Z-SG9vnyfe1kDM%253A%3BTzkbqd8x4qNoAM%3Bhttp%253A%252F%252Fwww.imancosmetics.com%252Fresources%252Fuploads%252Fimg165.jpg%3Bhttp%253A%252F%252Fwww.imancosmetics.com%252Fshop%252Fproducts%252Fface%252Fbronzer%3B539%3B409](https://www.google.co.za/search?q=cosmetic+bronzing+powder+definition&source=Inms&tbm=isch&sa=X&ei=bj78U-n18yO7Qb6poCwAw&sqi=2&ved=0CAYQ_AUoAQ&biw=1517&bih=714&dpr=0.9#facrc=_&imgdii=_&imgrc=Z-SG9vnyfe1kDM%253A%3BTzkbqd8x4qNoAM%3Bhttp%253A%252F%252Fwww.imancosmetics.com%252Fresources%252Fuploads%252Fimg165.jpg%3Bhttp%253A%252F%252Fwww.imancosmetics.com%252Fshop%252Fproducts%252Fface%252Fbronzer%3B539%3B409)

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November 2020

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## Stick Bronzer

[https://www.google.co.za/search?q=stick+bronzer&tbm=isch&tbo=u&source=univ&sa=X&ei=0z38U5iiGerA7Aa604C4DQ&sqi=2&ved=0CBsQsAQ&biw=1517&bih=714&dpr=0.9#facrc=\\_&imgdii=\\_&imgrc=VXh5pEDQtEvZRM%253A%3BbXfGRwS73I1w1M%3Bhttp%253A%252F%252Fbeautyeditor.ca%252Fwp-content%252Fuploads%252FfMK\\_BronzingStick.jpg%3Bhttp%253A%252F%252Fbeautyeditor.ca%252F2010%252F06%252F17%252Ffor-reals-this-makeup-is-from-mary-kay%252F%3B600%3B775](https://www.google.co.za/search?q=stick+bronzer&tbm=isch&tbo=u&source=univ&sa=X&ei=0z38U5iiGerA7Aa604C4DQ&sqi=2&ved=0CBsQsAQ&biw=1517&bih=714&dpr=0.9#facrc=_&imgdii=_&imgrc=VXh5pEDQtEvZRM%253A%3BbXfGRwS73I1w1M%3Bhttp%253A%252F%252Fbeautyeditor.ca%252Fwp-content%252Fuploads%252FfMK_BronzingStick.jpg%3Bhttp%253A%252F%252Fbeautyeditor.ca%252F2010%252F06%252F17%252Ffor-reals-this-makeup-is-from-mary-kay%252F%3B600%3B775)

## Sunless Tanning Lotion

[https://www.google.co.za/search?q=tanning+lotion&source=lnms&tbm=isch&sa=X&ei=rkH8U5y-POTH7Abe54CICw&sqi=2&ved=0CAYQ\\_AUoAQ&biw=1517&bih=714&dpr=0.9#facrc=\\_&imgdii=\\_&imgrc=TRm0OGbJBRub8M%253A%3BmrpN\\_2OnkvMnEM%3Bhttp%253A%252F%252Fimages.iherb.com%252F%252Ffalb-00397-2.jpg%3Bhttp%253A%252F%252Fwww.iherb.com%252Fproduct-reviews%252Falba-botanica-sunless-tanning-lotion-4-oz-113-g%252F37457%252F%253Fp%253D1%3B1600%3B1600](https://www.google.co.za/search?q=tanning+lotion&source=lnms&tbm=isch&sa=X&ei=rkH8U5y-POTH7Abe54CICw&sqi=2&ved=0CAYQ_AUoAQ&biw=1517&bih=714&dpr=0.9#facrc=_&imgdii=_&imgrc=TRm0OGbJBRub8M%253A%3BmrpN_2OnkvMnEM%3Bhttp%253A%252F%252Fimages.iherb.com%252F%252Ffalb-00397-2.jpg%3Bhttp%253A%252F%252Fwww.iherb.com%252Fproduct-reviews%252Falba-botanica-sunless-tanning-lotion-4-oz-113-g%252F37457%252F%253Fp%253D1%3B1600%3B1600)

## Tanning Capsules

[https://www.google.co.za/search?q=tanning+tablets+south+africa&source=lnms&tbm=isch&sa=X&ei=hj\\_8U7jnAcyI7Aby2YGwBw&sqi=2&ved=0CAYQ\\_AUoAQ&biw=1517&bih=714&dpr=0.9#q=tanning+capsules&tbm=isch&facrc=\\_&imgdii=EMalb09s8Z0KWM%3A%3BWqEm9eudz9JZGM%3BEMalb09s8Z0KWM%3A&imgrc=EMalb09s8Z0KWM%253A%3BmQIRNFv41N9gM%3Bhttp%253A%252F%252Fwww.healthstore.uk.com%252Fimages%252Fwww.healthstore.uk.com%252Fextralarge%252F094933Oro-Tan-60-Tabs-B.jpg%3Bhttp%253A%252F%252Fwww.healthstore.uk.com%252Fp463188%252Fhealth-aid-oro-tan-sun-tanning-tablets-60-tabs.html%3B357%3B500](https://www.google.co.za/search?q=tanning+tablets+south+africa&source=lnms&tbm=isch&sa=X&ei=hj_8U7jnAcyI7Aby2YGwBw&sqi=2&ved=0CAYQ_AUoAQ&biw=1517&bih=714&dpr=0.9#q=tanning+capsules&tbm=isch&facrc=_&imgdii=EMalb09s8Z0KWM%3A%3BWqEm9eudz9JZGM%3BEMalb09s8Z0KWM%3A&imgrc=EMalb09s8Z0KWM%253A%3BmQIRNFv41N9gM%3Bhttp%253A%252F%252Fwww.healthstore.uk.com%252Fimages%252Fwww.healthstore.uk.com%252Fextralarge%252F094933Oro-Tan-60-Tabs-B.jpg%3Bhttp%253A%252F%252Fwww.healthstore.uk.com%252Fp463188%252Fhealth-aid-oro-tan-sun-tanning-tablets-60-tabs.html%3B357%3B500)

## Tanning Injections

[https://www.google.co.za/search?q=tanning+injection&source=lnms&tbm=isch&sa=X&ei=8UH8U5zWj-WN7AalrYDlCg&ved=0CAYQ\\_AUoAQ&biw=1517&bih=714&dpr=0.9#facrc=\\_&imgdii=\\_&imgrc=YqwzeggkT7MXQM%253A%3BIOEIhQ3lFsgm0M%3Bhttp%253A%252F%252Fscenicunmelanotan.files.wordpress.com%252F2014%252F06%252Ftanni](https://www.google.co.za/search?q=tanning+injection&source=lnms&tbm=isch&sa=X&ei=8UH8U5zWj-WN7AalrYDlCg&ved=0CAYQ_AUoAQ&biw=1517&bih=714&dpr=0.9#facrc=_&imgdii=_&imgrc=YqwzeggkT7MXQM%253A%3BIOEIhQ3lFsgm0M%3Bhttp%253A%252F%252Fscenicunmelanotan.files.wordpress.com%252F2014%252F06%252Ftanni)

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melanotan4.jpg%253Fw%253D698%3Bhttp%253A%252F%252Fscenicssunmelanotan.wordpress.com%252F%3B493%3B312

#### **Tanning Nasal Spray**

[https://www.google.co.za/search?q=tanning+nasal+spray&source=lnms&tbn=isch&sa=X&ei=nkD8U6HSFqf07AaT4oG4DA&sqi=2&ved=0CAYQ\\_AUoAQ&biw=1517&bih=714&dpr=0.9#facrc=\\_&imgdii=\\_&imgrc=O41Fylq7jZaoaM%253A%3BzMGVffu-HUK-QM%3Bhttp%253A%252F%252Fmedia-cache-ak0.pinimg.com%252F236x%252Fc8%252Faa%252Ff6%252Fc8aaf6caf48b7c5224cb9b4355c71e49.jpg%3Bhttp%253A%252F%252Fwww.pinterest.com%252Fannamegatan%252Fmelanotan-nasal-spray%252F%3B190%3B285](https://www.google.co.za/search?q=tanning+nasal+spray&source=lnms&tbn=isch&sa=X&ei=nkD8U6HSFqf07AaT4oG4DA&sqi=2&ved=0CAYQ_AUoAQ&biw=1517&bih=714&dpr=0.9#facrc=_&imgdii=_&imgrc=O41Fylq7jZaoaM%253A%3BzMGVffu-HUK-QM%3Bhttp%253A%252F%252Fmedia-cache-ak0.pinimg.com%252F236x%252Fc8%252Faa%252Ff6%252Fc8aaf6caf48b7c5224cb9b4355c71e49.jpg%3Bhttp%253A%252F%252Fwww.pinterest.com%252Fannamegatan%252Fmelanotan-nasal-spray%252F%3B190%3B285)

#### **Tanning Tablets**

[https://www.google.co.za/search?q=tanning+tablets+south+africa&source=lnms&tbn=isch&sa=X&ei=hj\\_8U7jnAcyl7Aby2YGwBw&sqi=2&ved=0CAYQ\\_AUoAQ&biw=1517&bih=714&dpr=0.9#q=tanning+tablets&tbn=isch&facrc=\\_&imgdii=\\_&imgrc=ky3505vLp85X-M%253A%3BWSLMHxHPJiKjOM%3Bhttp%253A%252F%252Fimages.vitaminimages.com%252Fhb%252Fvf%252Fproductimages%252FHB%252FH200W000%252FHB006495\\_R\\_H200W000.gif%3Bhttp%253A%252F%252Fwww.hollandandbarrett.ie%252Fbrand-330%3B96%3B200](https://www.google.co.za/search?q=tanning+tablets+south+africa&source=lnms&tbn=isch&sa=X&ei=hj_8U7jnAcyl7Aby2YGwBw&sqi=2&ved=0CAYQ_AUoAQ&biw=1517&bih=714&dpr=0.9#q=tanning+tablets&tbn=isch&facrc=_&imgdii=_&imgrc=ky3505vLp85X-M%253A%3BWSLMHxHPJiKjOM%3Bhttp%253A%252F%252Fimages.vitaminimages.com%252Fhb%252Fvf%252Fproductimages%252FHB%252FH200W000%252FHB006495_R_H200W000.gif%3Bhttp%253A%252F%252Fwww.hollandandbarrett.ie%252Fbrand-330%3B96%3B200)

#### **Tanning Topical Spray**

[https://www.google.co.za/search?q=tanning+topical+spray&source=lnms&tbn=isch&sa=X&ei=OUH8U7viLsGI7Aa7nYHoBw&ved=0CAYQ\\_AUoAQ&biw=1517&bih=714&dpr=0.9#facrc=\\_&imgdii=\\_&imgrc=qUCpCzqmww344M%253A%3BmY9ZsNuCp4m9NM%3Bhttp%253A%252F%252Fhealthwyze.org%252Fimages%252Fspray\\_tan.jpg%3Bhttp%253A%252F%252Fhealthwyze.org%252Findex.php%252Fcomponent%252Fcontent%252Farticle%252F354-is-spray-tanning-really-the-healthy-option.html%3B191%3B206](https://www.google.co.za/search?q=tanning+topical+spray&source=lnms&tbn=isch&sa=X&ei=OUH8U7viLsGI7Aa7nYHoBw&ved=0CAYQ_AUoAQ&biw=1517&bih=714&dpr=0.9#facrc=_&imgdii=_&imgrc=qUCpCzqmww344M%253A%3BmY9ZsNuCp4m9NM%3Bhttp%253A%252F%252Fhealthwyze.org%252Fimages%252Fspray_tan.jpg%3Bhttp%253A%252F%252Fhealthwyze.org%252Findex.php%252Fcomponent%252Fcontent%252Farticle%252F354-is-spray-tanning-really-the-healthy-option.html%3B191%3B206)

#### **Tanning Wipes**

[https://www.google.co.za/search?q=tanning+wipes&tbn=isch&tbo=u&source=univ&sa=X&ei=Aj38U7-IObCg7AbOu4HABQ&sqi=2&ved=0CCQQAQ&biw=1517&bih=714&dpr=0.9#facrc=\\_&imgdii=\\_&imgrc=IUYB7d3dLjNmRM%253A%3B4OgRCcMESzR40M%3Bhttp%253A%252F%252Fwww.onesteptan.com%252Fimage-files%252FFull%252520leg%252520wipe%252520on%252520sofa.jpg%3Bhttp%253A%252F%252Fwww.onesteptan.com%252F%3B230%3B213](https://www.google.co.za/search?q=tanning+wipes&tbn=isch&tbo=u&source=univ&sa=X&ei=Aj38U7-IObCg7AbOu4HABQ&sqi=2&ved=0CCQQAQ&biw=1517&bih=714&dpr=0.9#facrc=_&imgdii=_&imgrc=IUYB7d3dLjNmRM%253A%3B4OgRCcMESzR40M%3Bhttp%253A%252F%252Fwww.onesteptan.com%252Fimage-files%252FFull%252520leg%252520wipe%252520on%252520sofa.jpg%3Bhttp%253A%252F%252Fwww.onesteptan.com%252F%3B230%3B213)

#### **Traditions Resorts**

<http://www.traditionsresort.com/tan.html>

#### **WebMD**

<http://www.webmd.com/vitamins-supplements/ingredientmono-1037-tyrosine.aspx?activeingredientid=1037&activeingredientname=tyrosine>

#### **Wikipedia**

[http://en.wikipedia.org/wiki/Sunless\\_tanning](http://en.wikipedia.org/wiki/Sunless_tanning)

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November 2020