

SUN Products

DATABOOK 2024

INTRODUCTION	p. 2
SUN: BENEFITS, DANGERS AND PROTECTION	p. 3
Skin and sun: risky relationships	p. 4
Sun exposure: the right balance	p. 9
UV damage skin several hours after exposure	p. 12
Sun exposure: too many misconceptions, not enough caution!	p. 13
French people and sun protection	p. 15
Sun and tanning: what are the questions most asked by Internet users?	p. 17
Sun protection: advice still badly followed	p. 19
Sun protection: Gen Z needs to review its approach	p. 21
Which sun cream should you recommend?	p. 22
ANSM gives some advice about how to choose your sunscreen	p. 27
On the proper use of sunscreen products by the French ANSM	p. 28
Skin and sun: Ten Questions/Answers for the right protection	p. 30
Sun, my sunscreen and me	p. 35
Sun products: exposure data question safety for babies	p. 37
Moisturiser with SPF less effective than a sunscreen to protect skin	p. 41
Should we put on sunscreen indoors?	p. 43
UV filters: a daily concern?	p. 44
When used properly, sun creams do not block the synthesis of vitamin D	p. 45
DIY sunscreens: attention, danger!	p. 46
LES FILTRES ET ÉCRANS EN DÉBAT(S)	p. 47
Efficiency and safety	p. 48
Sunscreens: the wrong trial	p. 48
A recent study to confirm the effectiveness and safety of organic sunscreens	p. 50
How UV filters in sunscreen products penetrate the body	p. 52
A study on the dermal penetration of titanium dioxide	p. 53
Changes in efficacy and toxicity of sunscreens due to zinc oxide	p. 57
Accumulation of Benzophenone by degradation of Octocrylene in cosmetic products	p. 58
FEBEA reasserts that sunscreens are safe	p. 60
MBBT: an exceptional, but contradictory UV-filter	p. 61
Titanium dioxide	p. 63
Sunscreens and nano-titanium dioxide: health risks?	p. 66
EWG urges USFDA to ban Oxybenzone in sunscreen products	p. 68
French Anses calls for a ban on Octocrylene in sunscreens	p. 69
Environmental toxicity	p. 70
Sunscreens: a scientific paper in favour of nanos	p. 70
Nano or not: TiO ₂ is toxic for the environment	p. 73
Nano UV-filters: a hazard to sea life	p. 73
Classification of UV filters: European inconsistencies	p. 74
How sunscreens release metals and inorganic nutrients into seawater	p. 75
These UV filters that do not harm corals	p. 76
Toxicity of UV filters on corals: the French Anses recommendations	p. 77

REGULATION	p. 80
Datasheet: UV-filters and sunscreens	p. 81
In Europe	p. 95
Sunscreens: the European Commission Recommendation	p. 95
Karanja oil: an ANSM Opinion issued to manufacturers	p. 98
Regulation 2022/1176: new restrictions for Benzophenone-3 and Octocrylene	p. 98
Regulation 2022/135: restrictions for Methyl-n-Methylantranilate	p. 101
4-Methylbenzylidene Camphor : the SCCS final Opinion	p. 103
Request to the SCCS to re-evaluate the safety of Titanium Dioxide	p. 105
Regulation (EU) 2022/2195: new regulation for 4 cosmetic ingredients (EDs, colorant, UV filters)	p. 106
Regulation 2024/996: restrictions on vitamin A, Arbutin and 6 endocrine disruptors	p. 112
Revision of the European Commission's " Sunscreen Products " Recommendation	p. 121
On the ISO side	p. 125
Water resistance of sun protection products: the latest two ISO standards	p. 125
In vivo determination of SPF: new ISO standard	p. 126
Towards a valid method for measuring SPF in vitro	p. 126
Cosmetics Europe publishes Recommendation No.26 on the use of alternative methods to ISO 24444:2019	p. 127
Measuring the SPF in vitro: the prospects of the future ISO 23675 standard	p. 128
On the international scene	p. 131
Sunscreen products around the world (1/2)	p. 131
Sunscreen products around the world (2/2)	p. 134
Brazil updates its list of authorised UV-filters	p. 136
Brazil notifies its regulation on sunscreen products and multifunctional cosmetics with SPF	p. 144
UV filter assessment in the USA and Europe	p. 146
New FDA's guidelines for sunscreens products	p. 150
Sunscreens: New FDA Requirements	p. 150
Sunscreen Monograph: the FDA proposal	p. 152
New Zealand: major update of cosmetics regulations... and a ban on PFAS	p. 153
Taiwan updates its lists of restricted ingredients and UV filters	p. 155
"UV Filters" Ingredients Sheets	p. 157
FORMULATION OF SUNSCREEN PRODUCTS	p. 158
The right sunscreen formula	p. 159
Functional ingredients as SPF boosters	p. 164
No, anti-inflammatory ingredients do not have any impact on the SPF!	p. 168
Sunscreen products: what if they protected without doing any harm?	p. 170
When micro-organisms inspire sun protection research	p. 173
Sun protection: should we go for an SPF100+?	p. 177
Scientists find unprecedented protection against UVA	p. 179
More eco-friendly sunscreens with BASF's EcoSun Pass	p. 180
L'Oréal introduces "its biggest suncare innovation in 30 years"	p. 184

Introduction

Indispensable for protecting the skin from the harmful effects of UV rays, on the beach in summer or in the mountains in winter, sun protection products are nonetheless the subject of recurrent criticism as to their effectiveness or doubts as to their safety.

And regularly, debates resurface on the allergenicity or toxicity (for health or for the environment) of synthetic filters or nanoscreens, on the reality of SPF... while the formulation of this type of product always remains a challenge and their regulation, in Europe as well as internationally, is not the simplest...

Which options should be chosen? Which products, which set of filters, which formula, which galenic, which labelling? CosmeticOBS has compiled all its articles in this Databook to provide an overview of the delicate issue of sun protection products.

Sun: benefits, dangers and protection

First of all, it is not advisable to expose yourself to the sun without appropriate protection. This is not a luxury, it is a public health imperative, to protect the skin from sunburns and burns as well as from the development of melanoma, those very serious skin cancers. A sun protection product is essential. And this applies even more to children, who should never be exposed to the sun before the age of three.

And it's not a luxury to remind people of this either, as the surveys follow one another to show just how poorly this advice is still followed... This is because consumers still have many questions, and almost as many misconceptions, about sunscreen products. Choosing the right sun protection is not that simple. And once the choice is made, you still need to know how to use it optimally to guarantee the maximum safety it can offer.

Explanations, clarifications and reminders of the basics...



SKIN AND SUN: RISKY RELATIONSHIPS

Our skin has a relationship with the sun (and its UV rays) that is sometimes happy, sometimes dangerous, always complex and never harmless. Jean-François Doré, a researcher at Inserm, gave an overview of scientific knowledge on this subject at the 5th meeting of the French Antioxidant Society, which was held on 15 November in Paris. A presentation in a land of contrasts...

An emeritus Director of Research in Inserm, in the Lyon Cancer Research Center, Jean-François Doré has, for a long time, studied the effects of sun on our skins, from the answer of the human melanocytes to UV radiation to how using sunscreens may impact our ways of exposure to sun.

Just for once, he said, he began his conference by detailing the benefits we get from sun... which did not prevent him to point out all of its less positive effects.

When the sun is friendly

A fact is unquestionable: the sun is essential for life on the Earth. Being exposed to sunrays is highly beneficial to the human health.

Good for our morale

Sun has a direct effect on our mood. Not only, because we think, a sunny weather is more agreeable than a rainy greyness, but also because an exposure to UV radiation modifies our physiology, by releasing endorphins.

Endorphins have been discovered in the seventies. Their name comes from “endogenous”, meaning something that is in our body, and “morphine”. These “natural morphines” are, indeed, neurotransmitters released by our brain in psychological or physical stresses situations (efforts, or high-intensity emotions). They link to the brain opiate receptors, and provide an analgesic and euphoriant effect. Less pain, more happiness: endorphins are also called the well-being hormones.

Among the situations that produce most of the endorphins: run a marathon, have sex, exposure to sun ... Or, more rightly, to its UV radiation. In fact, if beaches may be seen as, after Jean-François Doré’s words, “legal immense shoot galleries”, tanning booths have exactly the same effect.

Good for vitamin D

The “vitamin D” is, in fact, a steroid hormone whose the main function is to balance the phosphocalcic metabolism: it is a factor in the absorption of calcium and phosphorus by intestines, as well as in their reuptake by kidneys.

Vitamin D deficiency leads to rickets in children, and to osteomalacia (defective bone mineralization) in adults.

However, vitamin D has also a role in the functioning of something as 200 genes, hence, its importance in some diseases (diabetes, cancers ...)

Skin exposure to sun synthesizes 80 to 90% of the vitamin D we need. UVB radiation induces the manufacturing of the provitamin D3, which is, then, isomerised in vitamin D3 and transported in the overall body for many uses.

Good to fight melanomes?

This may seem paradoxical, but there are, nowadays, arguments that make it possible to think that, even for melanomas (skin cancers) due to sun exposure, this same exposure may also be linked to a better prognosis and to a lower mortality rate.

For instance, some studies have shown that the mortality rate is lower for melanomas diagnosed in summer (when more exposed to UV) than for those diagnosed in winter. A possible role of vitamin D is thought of. Nevertheless, the mechanisms involved in these protective effects are not yet established.

For Jean-François Doré, this hypothesis is not at all enough to continue questioning policies of sun protection, by the name of vitamin D, be it by extending exposures to sunrays, or by using artificial UV radiation in tanning booths.

“A potential lack of vitamin D, and deficiencies, nowadays, are extremely rare,” he says, “shall be compensated for through food, fatty fish being at the top of the list.”

Indeed, sun exposure is always an aggression towards the human species. Ensuing damages are often irreversible.

When sun is harmful

Sun rays are especially aggressive towards two of our organs: eyes and skin.

For our eyes, it is a known source of two diseases.

- Cataract: it is emphasized by the UVB, and even “standard” sunglasses cannot fully protect the eyes. Only the goggles with side-shields offer the right protection.
- Age-related macular degeneration: it could be induced by exposure to blue light. Jean-François Doré warns against the development of LEDs. The white light they produce is, in fact, a blend of yellow and blue radiations...

The effects on our skins

On skins, UV radiation (be it from sun or from artificial sources) has many effects, spread in time.

- The positive immediate effects
 - > Due to the UVB effect, tanning and epidermis thickening are a skin’s defensive reaction. > UVB radiation induces also the synthesis of the vitamin D.
- The negative immediate effects
 - > UVB radiation is a cause of erythema (sun burns).
 - > Sun exposure leads to immunosuppression (impaired immune responses.)
- Long-term negative effects
 - > Along the time and repeated exposures, pigmented lesions may appear: age pigments, lentigines, naevi...
 - > UVA radiation is a cause for the speeding up of cutaneous ageing.
 - > UV radiation is a factor for cancers: basal- and squamous-cell carcinoma, melanomas...

The skin’s defenses

The human species has developed specific responses systems against the sun UV radiation. They are as many ways of protection against its harmful effects.

- The epidermis thickening. This is probably the most efficient protection. For instance, it has been reported that people who are very often exposed to sun (outdoor workers...), who have “built” a thicker skin, develop fewer melanomas than people who are intermittently exposed (vacationers exposed

three weeks a year...).

- Tanning. The lower layer of the human epidermis contains melanocytes, cells that produce a black dye, melanin. When exposed to sun, the melanin synthesis is activated, and melanin is, then, transferred to the keratinocytes, in the upper skin's layers. The ensuing dyeing of the skin, tan, is a weapon against the UV radiation entering the skin.

However, these defenses are not always enough, especially against the most harmful effects of sun.

Cutaneous ageing

Solar elastosis, which is seen as a skin that has lost its suppleness and is marked with deep furrows, may require many years to become seeable. However, its process is on its way since the very first exposure. Under UVA radiation, the number of fibroblasts contained in derma decreases. Bit by bit, their ability to synthesise collagen is impaired, and the elastin fibers they produce are modified.

Solar elastosis comes from degraded elastin being laid in the upper layers of the derma. It is more frequent in chronically exposed areas (head and neck), in fair-skinned people, and increases when ageing.

In fact, it is the answer to the cumulative dose of UV absorbed over the years.

Immunosuppression and cutaneous cancers

Exposure to UV radiation, acute with a high level, or chronic with a low level, induces a local and systemic immunosuppression, following complex mechanisms initiated by several photo sensors on the skin surface (DNA, *transurocanic acid*, materials of cells membranes...).

Further, it is recognized as carcinogenic to the human species, leading to non-melanomas cutaneous cancers and to melanomas, less frequent, but far more "harmfull".

In France, there are about 7,500 cases reported every year, and circa 1,500 related deaths.

Cutaneous cancers depend on several factors. For instance, they are more frequent in fair-skinned people; melanomas are more numerous when the persons have been exposed when children, *"At six, the risk is definite,"* Jean-François Doré explains, reminding the audience of the warning advice for young children. *"They MUST be protected, with clothes, hats or caps, sunglasses, and sunscreen on whichever surface of skin is visible!"*

There is obviously a strong relationship between where melanomas appear and the exposed areas.

No doubt in the expert's mind: there is a true link between our behaviour with the sun and the increase of the number of skin cancers.

It occurs that our behaviours have been strongly modified over the years, and not the right way.

Longing for tanning, the key to devastating effects

For millenniums, from his beginning as a species, until the 1930s, man has protected oneself from sun exposure.

Even still in the 19th century, exposure to sun was avoided, especially if a woman from the upper social classes. The link between sun and cancer was still unknown; the reason was only to keep a pale complexion, a sign of aristocracy.

Sun exposure

Then, life behaviours have been modified; holidays in the plain sunlight have developed, and tan became synonymous with well-being, health and social achievement.

Further, between 1925 and 1930, the role of UV radiation for the vitamin D synthesis has been known. Exposure to sun has become very popular. At the same time, the first UV sources used in preventive medicine were placed on the market. Exposure to UV radiation became a public health objective: exposing children to sun was recommended ...

It is only during the second half of the 20th century that the link between UV, cancer and skin ageing has been established. Until when, in June 2009, the International Agency for Research on Cancer (IARC) classified UV in the 100 – 400 nm range in the Group 1 of carcinogenic substances and agents to humans.

Artificial UV radiation

This tanning trend, and the benefits linked to UV exposure have had a further consequence: the development of tanning booths and solariums.

Lowly used before 1980, they became very popular during the '90s. As per a 2006 study, 70% of women, and 50% of people aged from 18 to 50 have already used a solarium at least once in Northern Europe. The trend goes to children and teenagers: eight per cent of the 13 – 19-year-old in Sweden, and 12% in the USA are frequent users.

The results, after an IARC study released in 2006, *“We do have supporting evidence of a causal link between artificial UV radiation and skin cancers, especially for exposure prior to 30.”*

In such a way that the word “epidemic” has been associated with this phenomenon.

“This kind of exposure being recent, the true effect of solariums on the incidence of melanomas will be measured only in the coming years,” Jean-François Doré explains. He has taken part, in 2012, in a study, “Evaluation of the impact of exposure to the UV radiation provided by artificial tanning equipment on the cutaneous melanoma in France”.

Conclusion: from 566 to 2,288 deaths are likely to occur within the next 30 years if the UV exposure of French people in tanning booths is not changed. *“More than the Mediator!”* the expert adds. (Mediator is the French name of a molecule, banned in many countries, but accused to have led to up to 2,000 deaths in France.)

He recommends *“tougher prevention action to decrease the use of UV only for aesthetics purpose”*. In California, solariums are forbidden to under 18 people.

Sunscreen protection: a heated debate!

On the other hand, sunscreens are there to increase the skin defenses against the sun harmfulness, aren't they?

Indeed, Jean-François Doré is very skeptical about their true efficiency.

No study has ever demonstrated any reduction of the risk of non-melanoma cancers when using sunscreens, after his opinion. Neither any has convincingly demonstrated the reduction of the risk of melanoma. Some have even pointed a risk increase!

Longer exposures