

# Filtri UV Organici

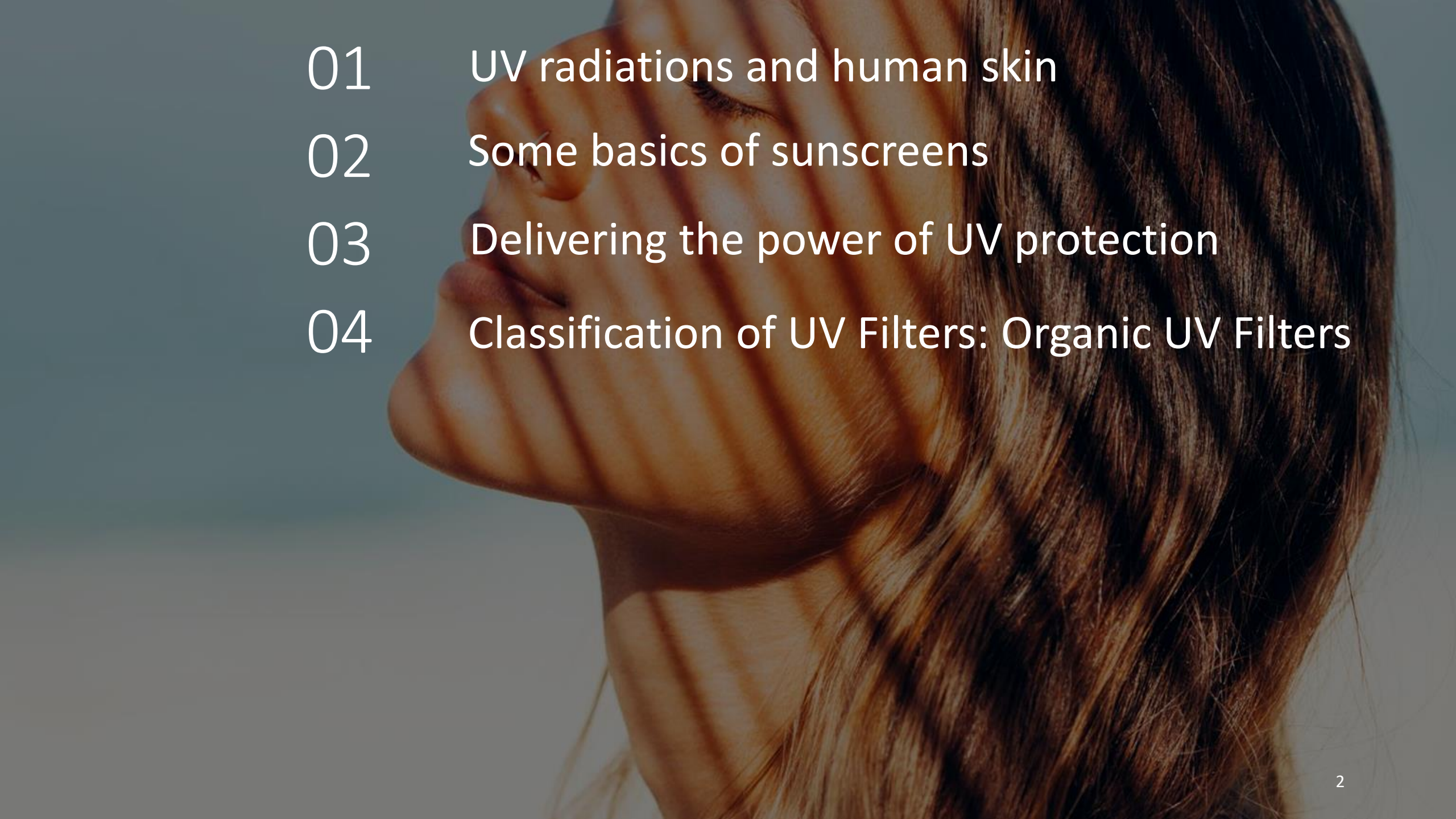
Carmina Casas  
dsm-firmenich



## WORKSHOP SOLARI

Università di Bari, 12 Settembre 2024



- 
- 01 UV radiations and human skin
  - 02 Some basics of sunscreens
  - 03 Delivering the power of UV protection
  - 04 Classification of UV Filters: Organic UV Filters

A hand is shown holding a single slice of an orange. The orange slice is held up against a bright, overexposed background, likely a window or a bright sky, which makes the orange appear very vibrant and glowing. The hand is in silhouette, with the fingers gripping the edges of the orange slice. The overall mood is warm and natural.

01

UV radiations and human skin

# The amazing benefits of the sun!

Sunshine is the best medicine

Relieves stress,  
**makes us feel good!**

Enhances your  
**mood!**  
Phototherapy

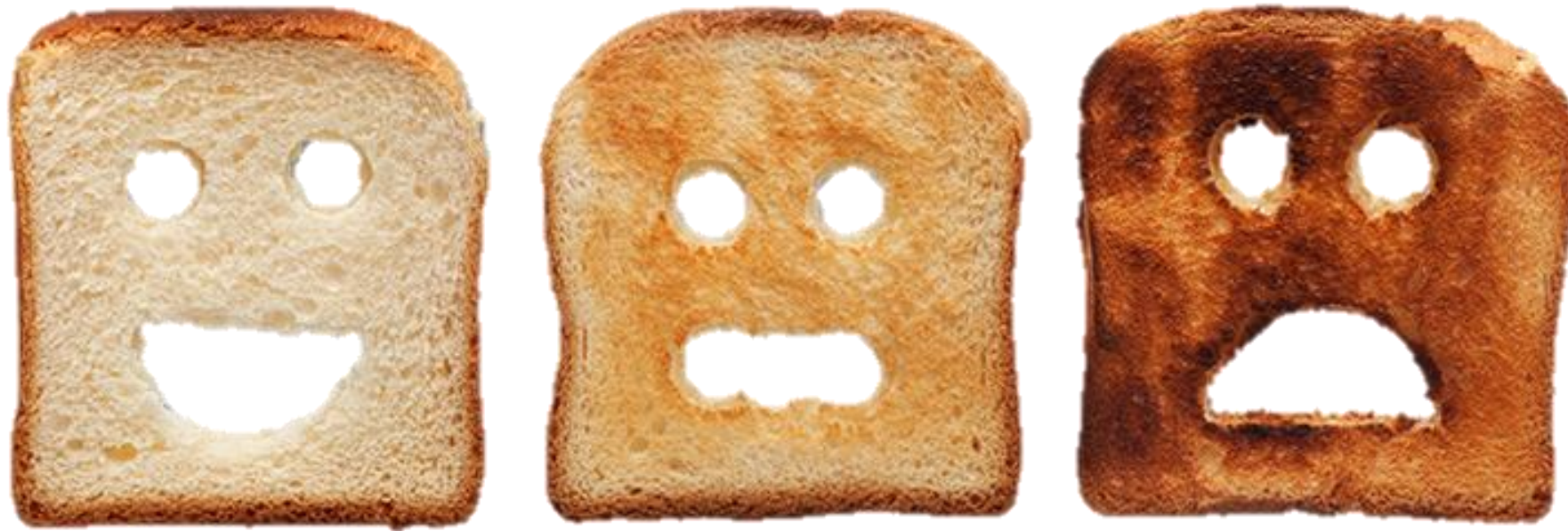
« it restores my  
soul, brings me  
**comfort** and  
keeps me **warm** »

UVB gives us our  
dose of **Vit. D**

Improves your  
**sleep** quality

# Warning – excessive sunlight exposure

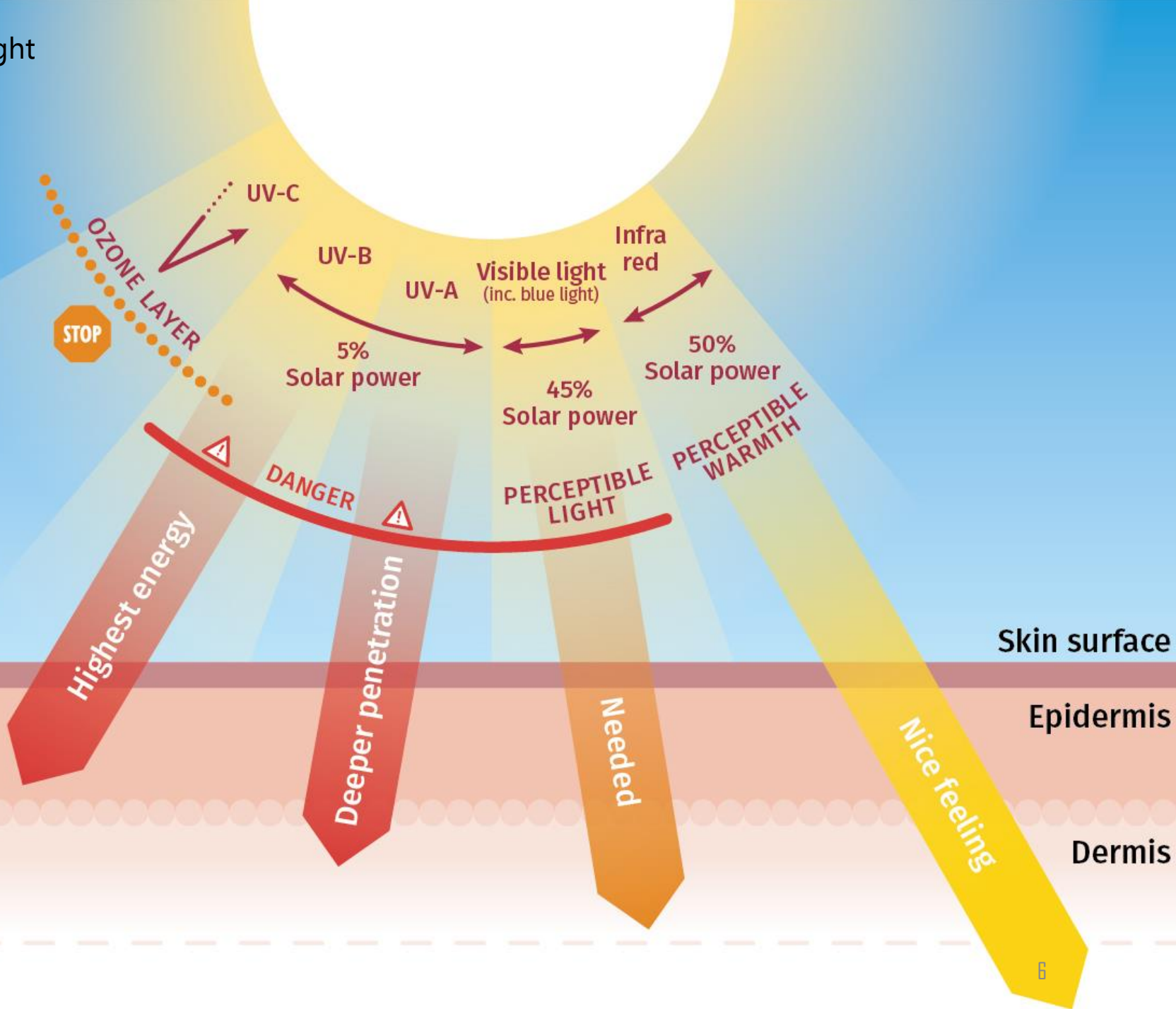
## The harmful effects of the sun on your skin



Sunburn  
Dark spots  
Hyperpigmentation  
Premature skin aging  
Wrinkles  
Photosensitisation  
Sun allergies  
Skin cancer  
.../...



Sunlight is made up of UV, visible and IR light



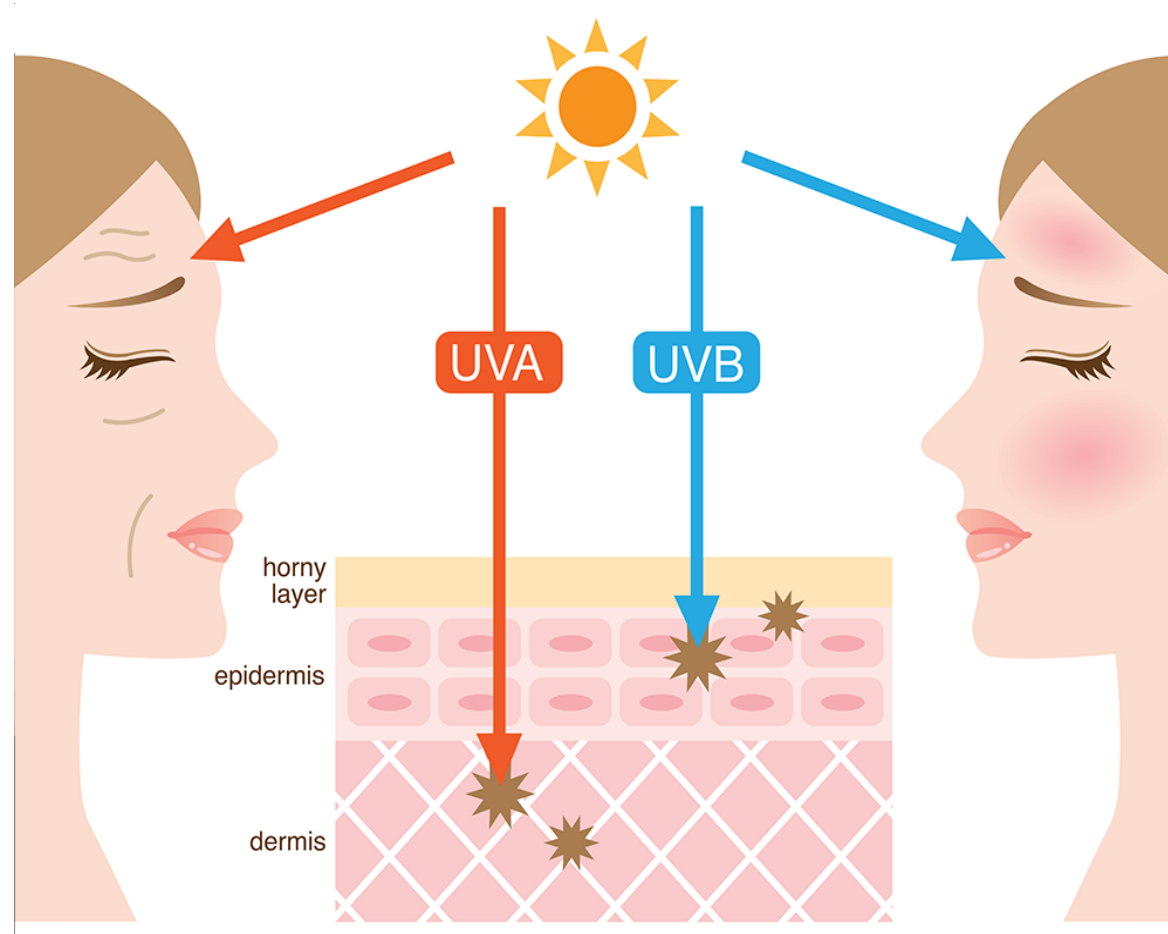
**UVB : 280-320nm**  
**UVA II : 315 – 340 nm**  
**UVA I : 340-400 nm**

# How does the sun affect the skin?

Some UV radiation is necessary. Too much is harmful.

## **UVA**(ging) *Associated with skin aging.*

Causes **free-radical and DNA damages**.  
Affects elastin in the skin.  
Leads to **fine lines, wrinkles**, sun-induced skin aging such as **dark spots**, as well as **skin cancer**.



## **UVB**(urning) *Associated with sunburn.*

And causes **DNA damage** which greatly increases **skin cancer** risk.

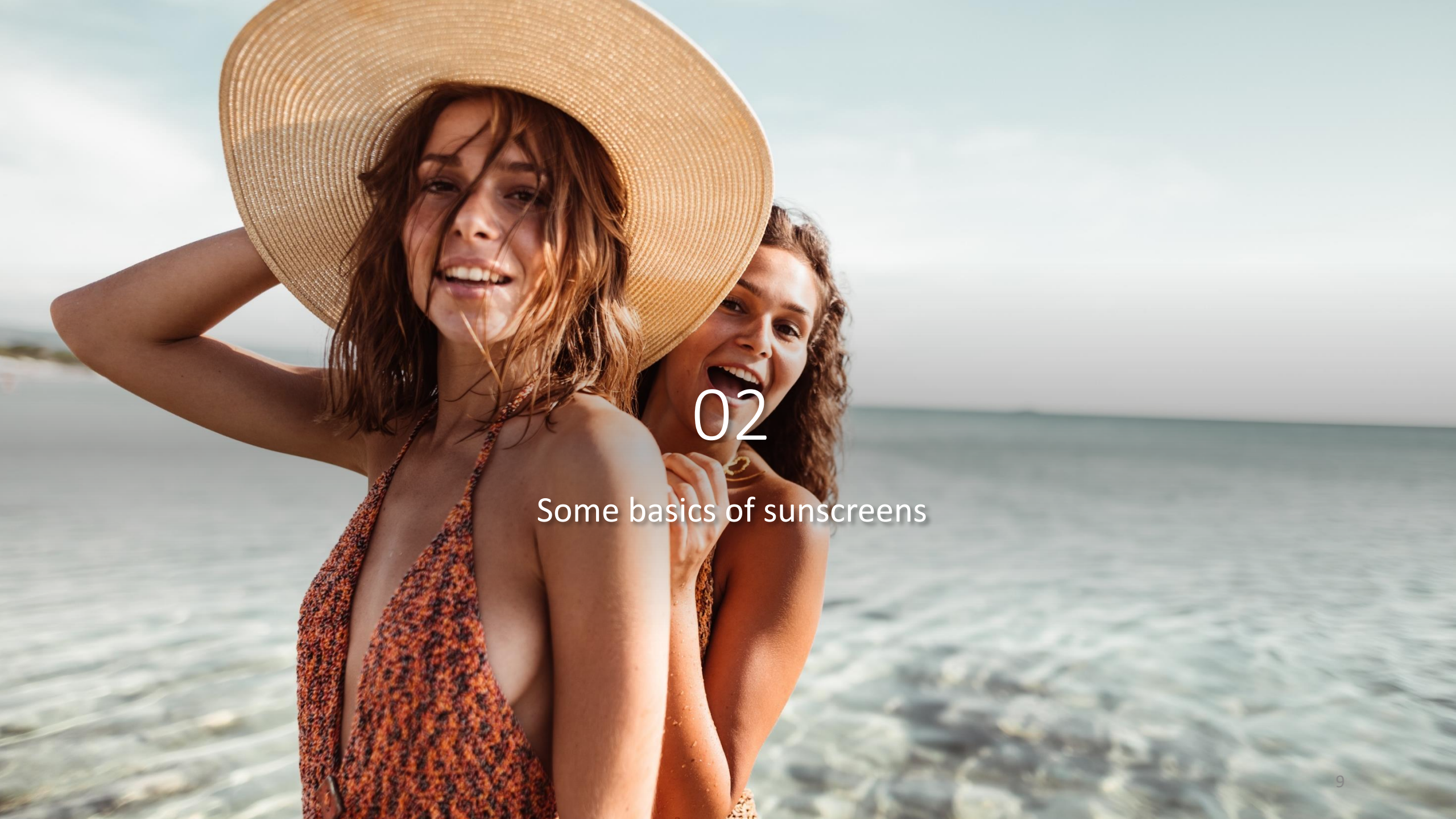


# Skin cancer awareness

- According to WHO statistics, currently, between 2 and 3 million non-melanoma skin cancers and **132,000** melanoma skin cancers occur globally each year.
- About **90%** of non-melanoma skin cancers are associated with exposure to ultraviolet (UV) radiation from the sun.
- **Every hour**, about 6 people die from melanoma worldwide.





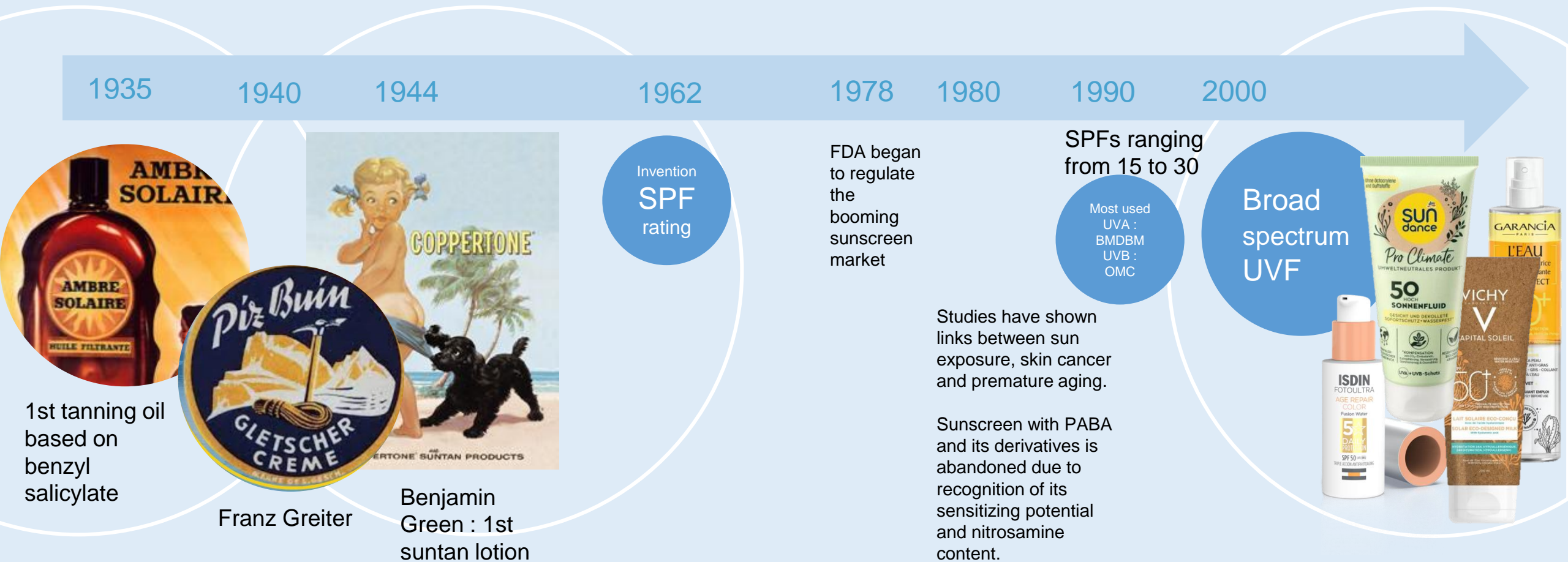


02

Some basics of sunscreens

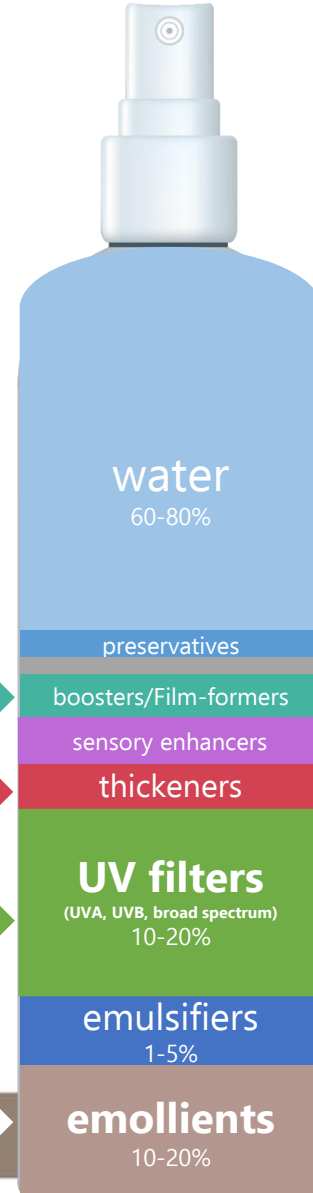
# The history of sunscreen

## How sunscreen and sun care evolved over the last 100 years?



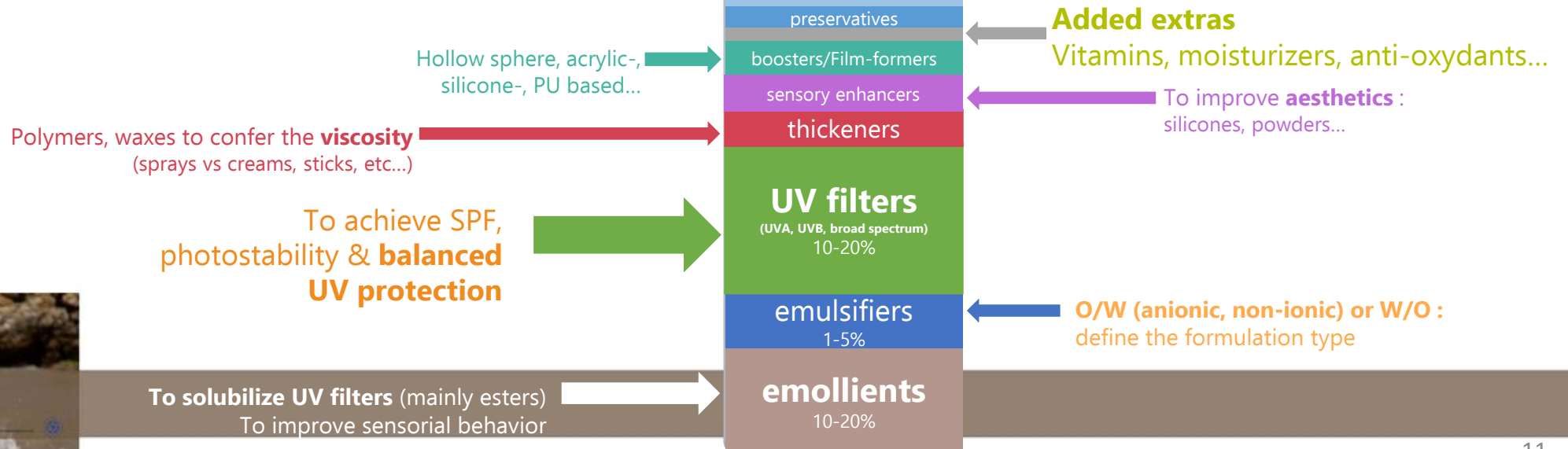
# An insider's look at a sunscreen formulation

Expansion in requirement influences formulation structure



## Ingredients\* of a typical sun protection product SPF 30

\*non-exhaustive list | Pawlowksi and Petersen-Thiery, 2020

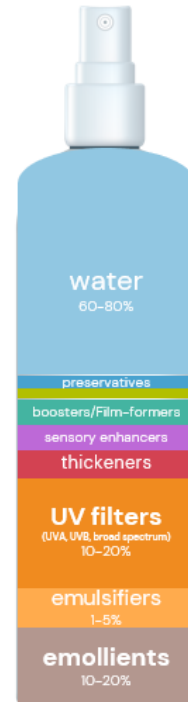


# UV-filters are the key constituents in sunscreens

that protect human skin from detrimental solar radiation.

UV-filters mean substances which are exclusively or mainly intended to protect the skin against certain UV radiation **by absorbing, reflecting or scattering** UV radiation

UV-filters are added to sunscreens and other cosmetics in order to **prevent or minimize the harmful effects of UV radiation**



Ingredients\* of a typical sun protection product SPF 30

\*non-exhaustive list



# What does the SPF stand for?

Sun Protection Factor

SPF is a relative measure of how long a sunscreen will protect you **from UVB rays**.  
SPF doesn't account for UVA rays.



Time until **unprotected** skin will burn

How long your skin is **protected** with sunscreen SPF 30

It would take 30 times longer to burn than if you weren't wearing sunscreen (a factor of 30 times longer, hence SPF30)



This is how much sunscreen you should actually apply

**2mg/cm<sup>2</sup> of sunscreen**



**Use 2 fingers for**

- Face & neck
- Chest
- Belly
- Upper back
- Lower back
- Each arm, thigh and lower leg & foot



# Amount of sunscreen applied by consumers



**Average 0.5 mg/cm<sup>2</sup>**

42 volunteers on the beach,  
*Bech-Thomsen N, Wulf HC. 1993*



**Median 0.5 mg/cm<sup>2</sup>**

photosensitive patients, *Azurdia RM, Pagliaro JA, Diffey BL, Rhodes LE., Royal Liverpool University Hospital 1999*



**Median: 0.79 mg/cm<sup>2</sup>**

*Neale R, Williams G, Green A., Queensland, Australia 2002*



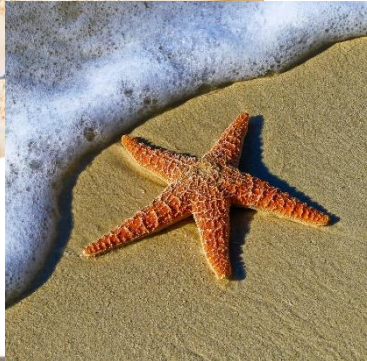
**Median: 0.39 mg/cm<sup>2</sup>**

148 students, *P. Autier, M. Boniol, G. Severi, J-F. Doré, 2003*



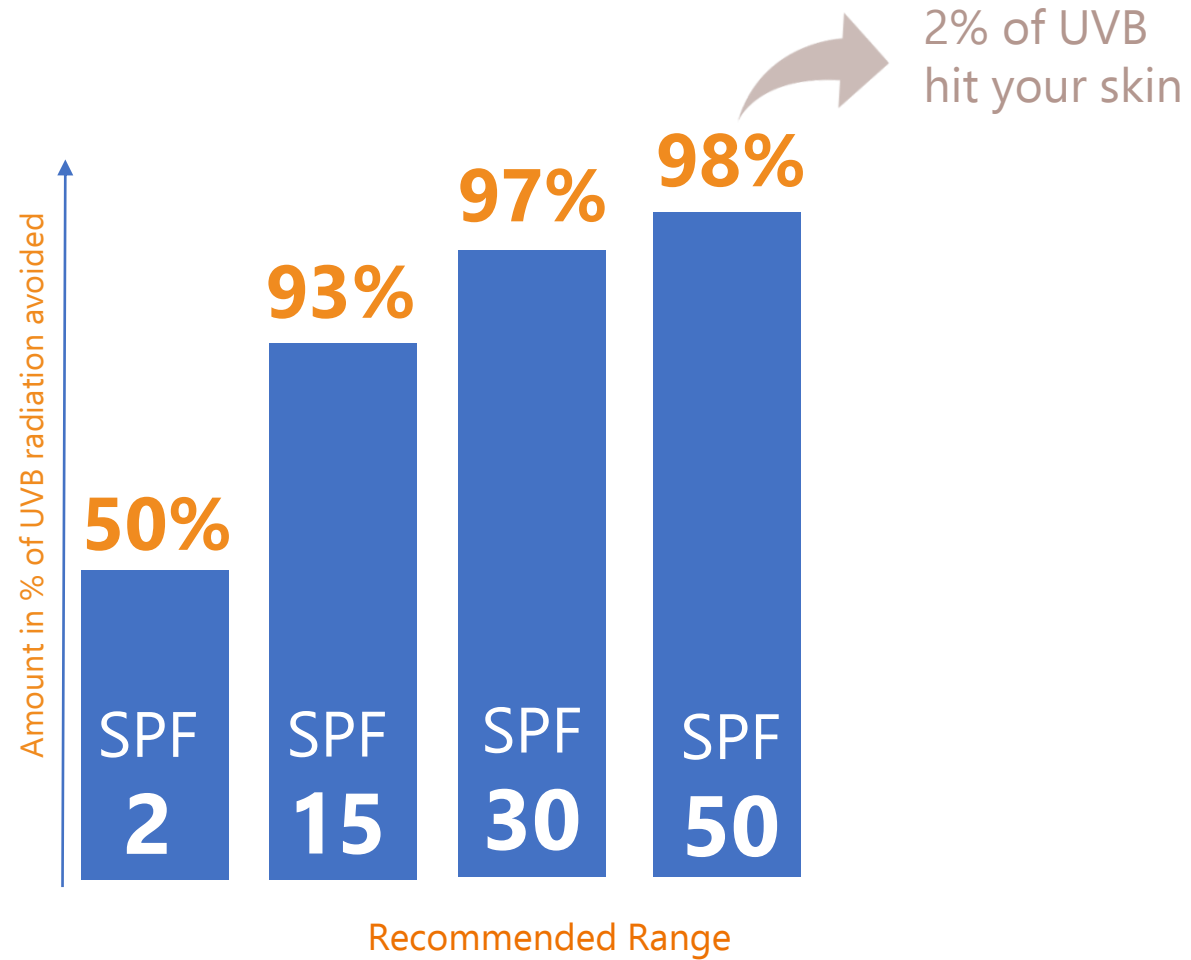
**Average: 0.79 mg/cm<sup>2</sup>**

20 sun seekers, SPF 15, Hurghada, Egypt)  
*Petersen, B. , Datta, P. , Philipsen, P.A. , Wulf, H.C., 2013*




# What's the difference between SPF 30 and SPF 50?

A SPF 50 blocks 98% of UVB







« **UV-filters** »  
means substances  
which are exclusively  
or mainly intended to  
protect the skin  
against certain UV  
radiation by  
**absorbing, reflecting  
or scattering** UV  
radiation

03

Delivering the power of UV protection

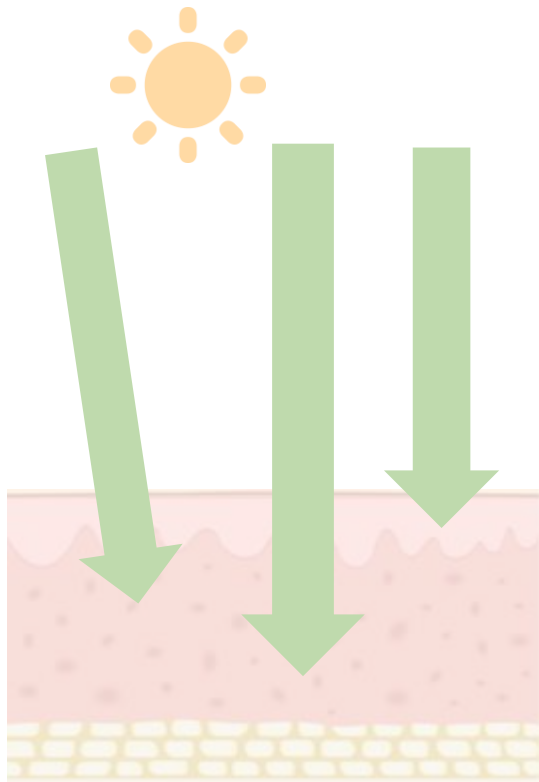
# Essential Characteristics of an Effective UV Filter

- 1.High UV Radiation Absorption Capacity:** An effective sunscreen should block both UVA and UVB rays effectively.
- 2.Stability to Radiation:** It must be resistant to degradation by ultraviolet light to maintain its effectiveness during sun exposure.
- 3.Resistance to External Factors:** It should be resistant to sweat, water, and other environmental factors to ensure long-lasting protection.
- 4.Environmental Respect:** Preferably, it should be biodegradable or environmentally friendly, minimizing harm to ecosystems, especially marine environments.
- 5.Skin Compatibility:** It should not cause irritation or allergic reactions and should have a good toxicological profile, ensuring safety for human use.
- 6.Sensory Properties:** It should be colorless, odorless, and tasteless for a pleasant user experience.
- 7.Non-Greasy:** An effective sunscreen should not leave an oily feeling on the skin.
- 8.Ease of Incorporation in Formulations:** It should be soluble and easy to incorporate into various galenic formulations, such as creams, lotions, or sprays.

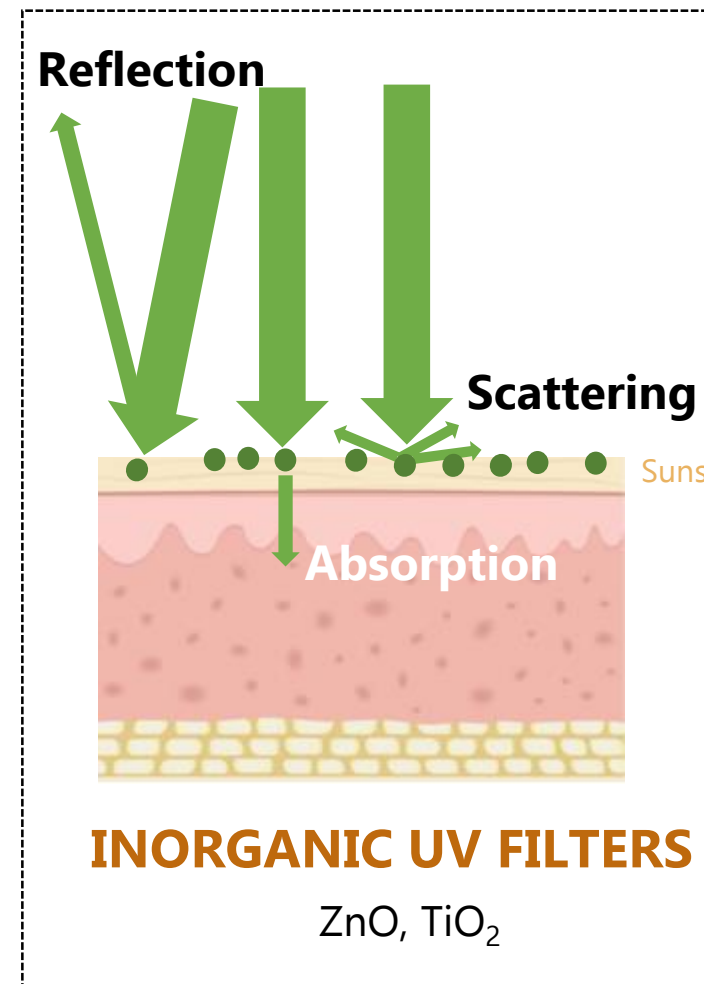
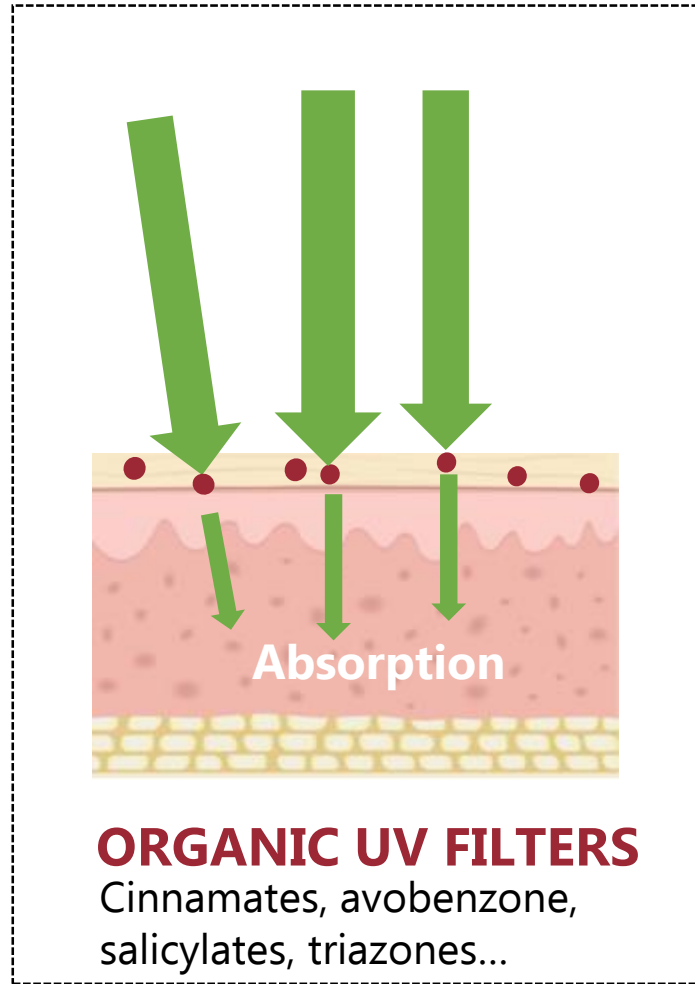


# UV filters: organics vs inorganics

Reduce the amount of UV light that penetrates the skin



**NO SUNSCREEN LAYER**



Sunscreen layer





04

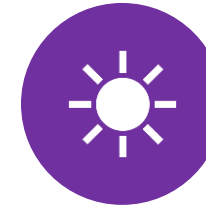
## Classification of UV Filters: Organic UV Filters

# Classification of UV Filters

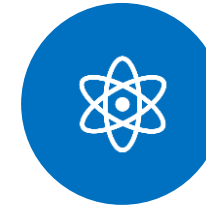
The predominant classification of UV filters divides them into inorganic and organic compounds. Organic filters are commonly referred to as "chemical," in contrast to inorganic filters, which are characterized by their "physical" mechanism. However, this terminology can be misleading, as it suggests the existence of filters that are not "chemical."



ORGANIC: CHEMICAL COMPOUNDS THAT ABSORB UV RADIATION



ORGANIC PARTICLES: PRIMARILY ABSORB UV LIGHT BUT CAN ALSO REFLECT AND SCATTER A FRACTION OF UV RADIATION.



INORGANIC OR MINERAL: PARTICLES THAT REFLECT, SCATTER, AND ABSORB UV RADIATION.



BIOLOGICAL: ANTIOXIDANT AGENTS THAT PROTECT DNA..



# UV Filters

The European Union authority has issued regulations for the inclusion of UV filters in sunscreens. This decision is based on a thorough analysis of data from studies covering key areas such as acute, subchronic, and chronic toxicity, reproductive toxicity, genotoxicity, photogenotoxicity, carcinogenicity, irritation, sensitization, phototoxicity, and photosensitization. Additionally, the environmental impact of these filters has been carefully evaluated.

File creation date: 08/09/2024

<https://ec.europa.eu/growth/tools-databases/cosing/reference/annexes/list/VI>

## ANNEX VI, Last update: 29/08/2024

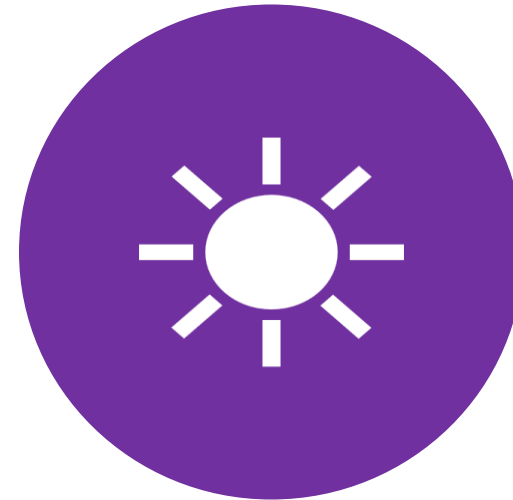
### LIST OF UV FILTERS ALLOWED IN COSMETIC PRODUCTS

Reference Number	Substance identification				Conditions			Wording of conditions of use and warnings	Update date
	Chemical name / INN / XAN	Name of Common Ingredients Glossary	CAS Number	EC Number	Product Type, body parts	Maximum concentration in ready for use preparation	Other		
2	N,N,N-Trimethyl-4-(2-oxoborn-3-ylidenemethyl) anilinium methyl sulphate	Camphor benzalkonium methosulfate	52793-97-2	258-190-8	6%				15/10/2010
3	Benzoic acid, 2-hydroxy-, 3,3,5-trimethylcyclohexyl ester / Homosalate	HOMOSALATE	118-56-9	204-260-8	7,34 %	From 1 January 2025 cosmetic products containing that substance and not complying with the conditions shall not be placed on the Union market. From 1 July 2025 cosmetic products containing that substance and not complying with the conditions shall not be made available on the Union market.			11/11/2022
4	2-Hydroxy-4-methoxybenzophenone / Oxybenzone	BENZOPHENONE-3	131-57-7	205-031-5	a) 6% b) 2,2% c) 0,5%  Footnote 1: However, cosmetic products containing '2-Hydroxy-4-methoxy-benzophenone/Oxybenzone' and complying with the restrictions set out in Regulation (EC) No 1223/2009 as applicable on 27 July 2022 may be placed on the Union market until 28 January 2023 and be made available on the Union market until 28 July 2023.	a) If used at 0,5 % to protect product formulation, the levels used as UV filter must not exceed 5,5 %. b) If used at 0,5 % to protect product formulation, the levels used as UV filter must not exceed 1,7 %.	For a) and b): Contains Benzophenone-3 (*)  Footnote (*): Not required if concentration is 0,5 % or less and when it is used only for product protection purposes.		29/07/2024
5	Moved or deleted								03/10/2016





ORGANIC



ORGANIC  
PARTICULATES



# Classification of Organic Sunscreen Filters by Composition

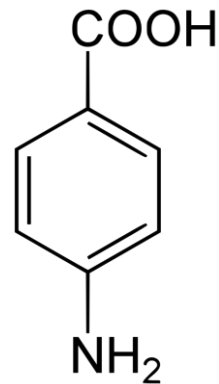
1. PABA (Para-aminobenzoic acid) and its derivatives	2. Salicylic acid derivatives	3. Cinnamic acid derivatives	4. Acrylates
5. Benzophenones (aromatic ketones)	6. Anthranilates (ortho-aminobenzoates)	7. Dibenzoylmethanes (substituted diketones)	8. Benzylidene camphor derivatives
9. Benzimidazole and benzotriazole derivatives	10. Triazine derivatives	11. Polysilicons	12. Cyclic merocyanines





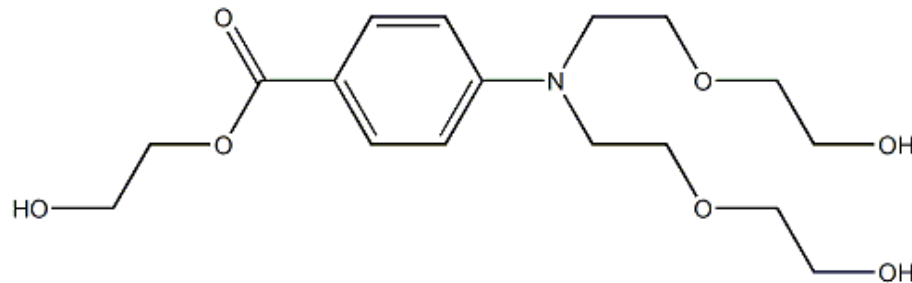
# 1. PABA (Para-aminobenzoic acid) and its derivatives

UVB



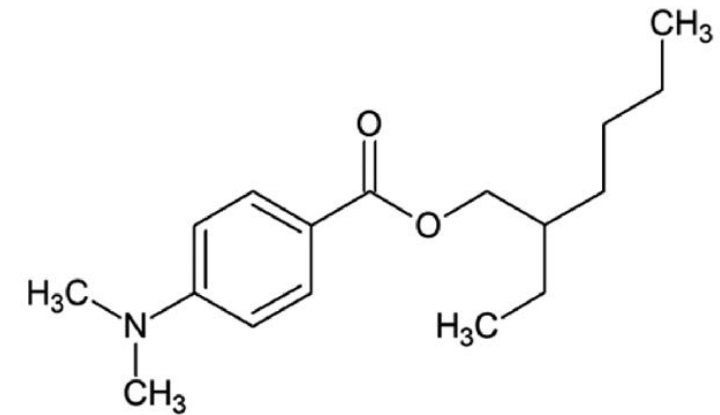
Patented in 1943, PABA was one of the first active ingredients used as a UV filter. Studies in the early 1980s suggested that PABA might increase the risk of cellular damage from UV rays. Based on these studies, as well as issues with allergies and staining of clothing, PABA fell out of favor as a sunscreen ingredient.

Padimate A (isoamyl dimethyl PABA) was withdrawn in Europe in 1989 and was never approved by the FDA.



**PEG-25 PABA**, Polyethylene glycol 4-aminobenzoate (Uvinul® P 25)

Annex VI, reference number: 13



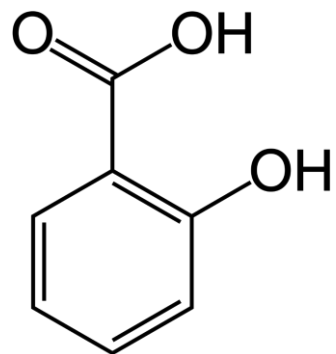
**Padimate O**, 2-ethylhexyl dimethyl PABA

Annex VI, reference number: 21

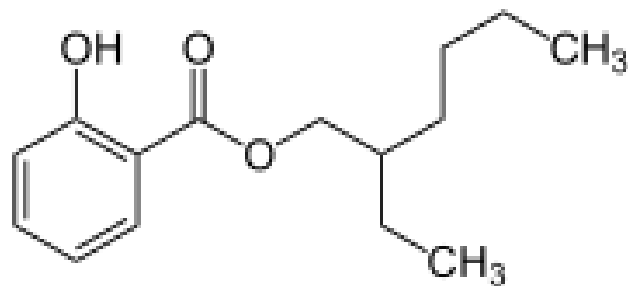


## 2. Salicylic Acid Derivatives

UVB

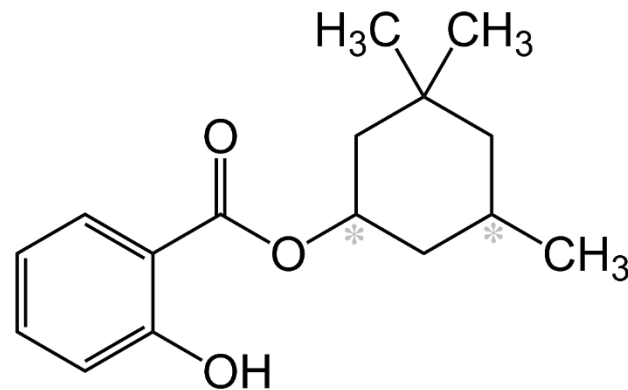


Benzyl salicylate, triethanolamine salicylate, potassium salicylate, amyl salicylate, p-isopropylphenyl salicylate, 4-isopropylbenzyl salicylate



**Ethylhexyl salicylate** ( $\lambda_{\max}$ : 305 nm)

Annex VI, reference number: 15

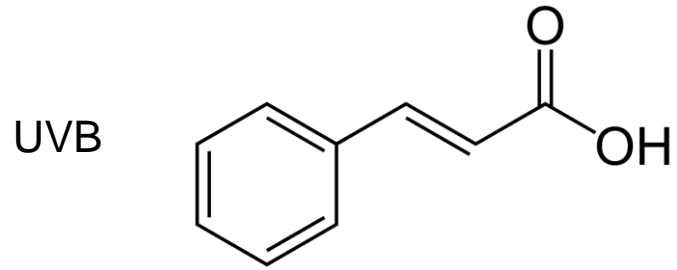


**Homomenthyl salicylate / Homosalate** ( $\lambda_{\max}$ : 305 nm)

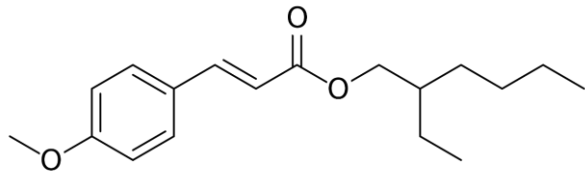
Annex VI, reference number: 3



### 3. Cinnamates, derivatives of cinnamic acid

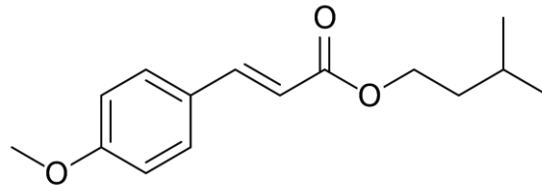


There are 17 cinnamates described, with the most common ones being:



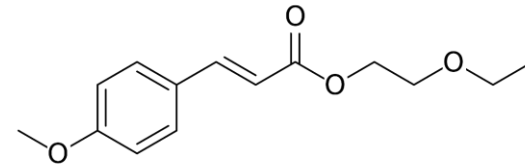
**Ethylhexyl p-methoxycinnamate** ( $\lambda_{\max}$ : 310 nm)  
USAN: Octinoxate

Annex VI, reference number: 12



**Isoamyl p-methoxycinnamate** ( $\lambda_{\max}$ : 308 nm)  
USAN: Amiloxate (NeoHeliopan® E-1000)

Annex VI, reference number: 14



**2-Ethoxyethyl p-methoxycinnamate** ( $\lambda_{\max}$ : 289 nm)  
USAN: Cinoxate (It was approved by the FDA in 1961 but is no longer commonly used in cosmetic formulations.)



### 3. Cinnamates, derivatives of cinnamic acid

#### OCTYL METHOXY CINNAMATE (OMC)

Supplied As > 98% Trans Isomer

	<u>Lamda Max</u>	<u>Extinction Coefficient</u>
Trans	310 nm	19,900
Cis	~312 nm	~10,000

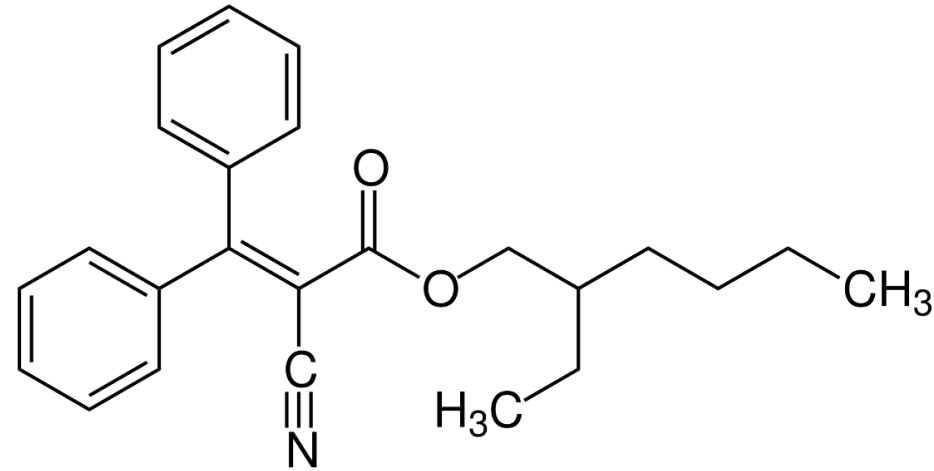


<u>Trans/Cis</u>	<u>Absorbance Efficiency</u>
100/0	100%
70/30	85%
50/50	75%



# 4. Acrylates: Octocrylene

UVB-UVA



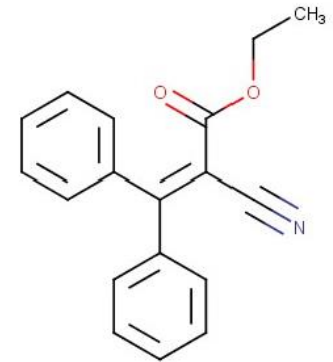
**Octocrylene : 2-ethylhexyl 2-cyano-3,3-diphenyl-2-propenoate** ( $\lambda_{\max}$ : 280 - 320 nm)

Annex VI, reference number: 10

Other acrylates:

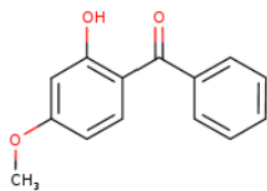
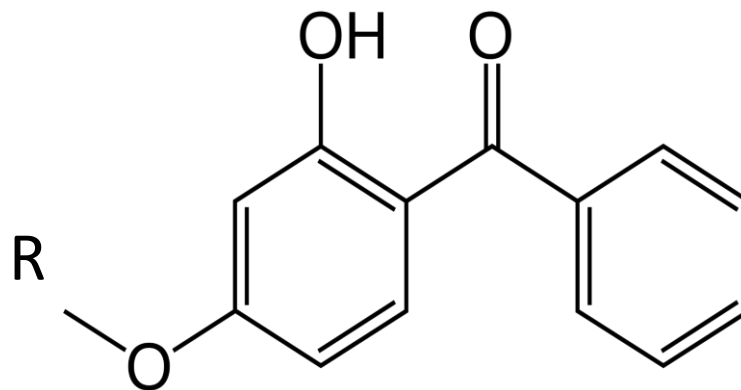
2-Ethylhexyl 2-Cyano-3,3-Diphenyl acrylate

2-Cyano-3,3-Diphenyl acrylic acid

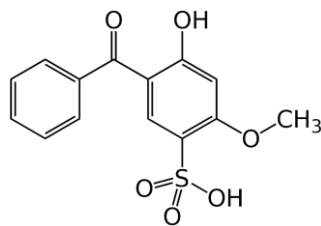


# 5. Benzophenones (aromatic ketones)

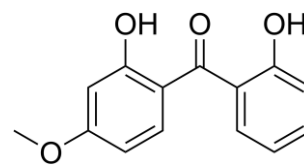
UVB-UVA



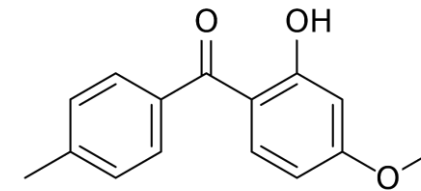
**Oxybenzone (3)** ( $\lambda_{\max}$ : 285 - 325 nm)  
Annex VI, reference number: 4



**Sulisobenzone (4 & 5)** ( $\lambda_{\max}$ : 286 - 440 nm)  
Annex VI, reference number: 22



**Dioxibenzone (8)**

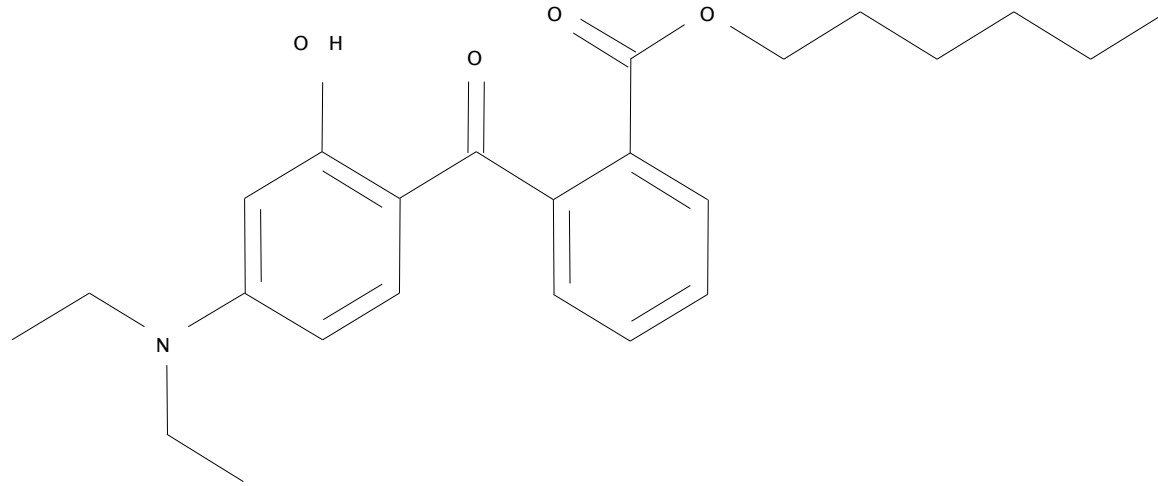


**Mexenone (10)**



# 5. Benzophenones

UVA I



**Diethylamino Hydroxybenzoyl Hexyl Benzoate (DHHB)** is not registered with the FDA as a sunscreen filter but is approved as a cosmetic ingredient. Its extinction coefficient in ethanol is at least 910 ( $\lambda_{\text{max}}$ : 354 nm).

Annex VI, reference number: 28

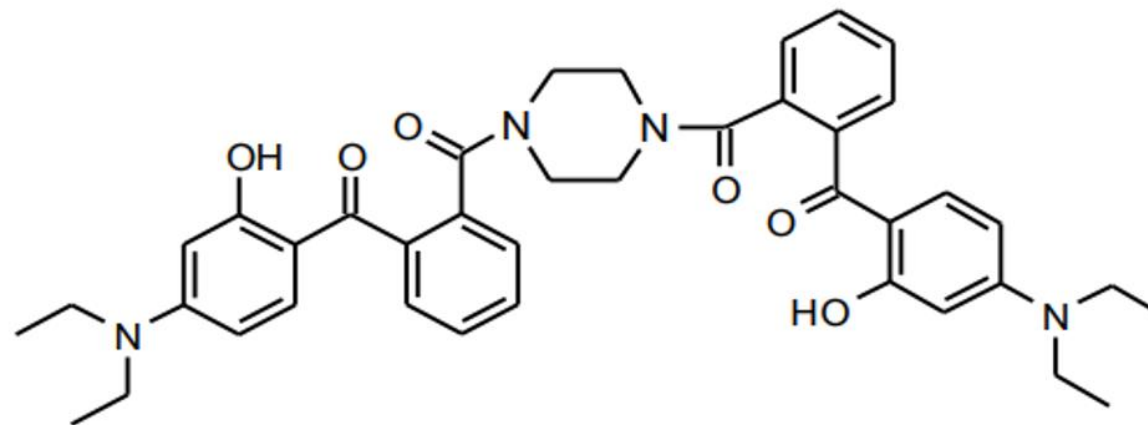
Another soluble form:

Ethylhexyl methoxycinnamate and Diethylamino Hydroxybenzoyl Hexyl Benzoate; UVA-I and UVB.



# 5. Benzophenones

UVA I-VIS

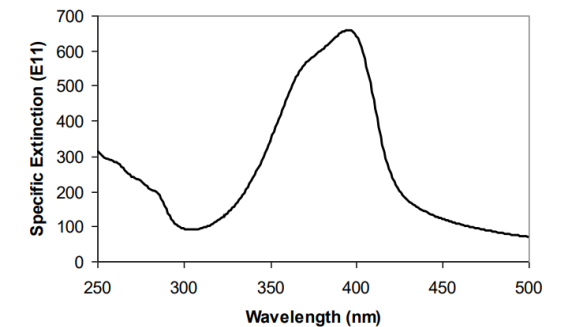


UV – visible absorption spectrum

## Bis-(Diethylaminohydroxybenzoyl Benzoyl) Piperazine (nano y no nano) – BDBP or HAA299

It is the latest filter approved by the SCCS as of November 2022. Patented by BASF.

Annex VI, reference number: 33 y 34 (nano)



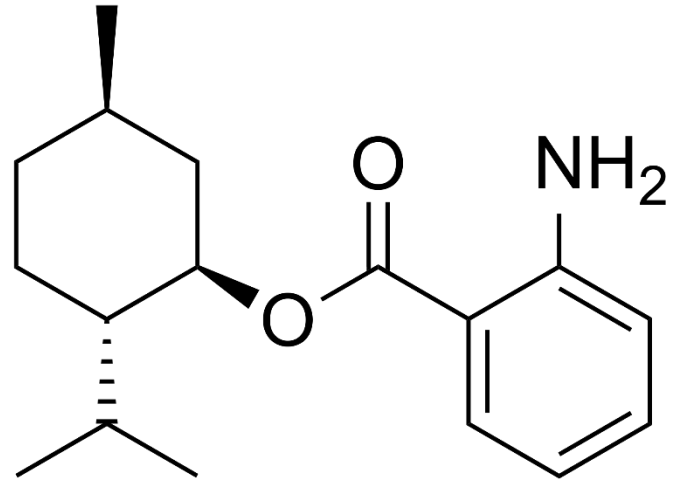
The SCCS has stated that the use of HAA299 (non-nano, micronized or non-micronized, with an average particle size distribution of around 134 nm or larger) at concentrations up to 10% as a UV filter in cosmetic products does not pose any systemic toxicity risk to humans. The available data indicate that HAA299 (nano) is a practically insoluble material with very low dermal and oral absorption. Due to its very low systemic availability, it is unlikely to exert genotoxic or systemic reproductive effects. The NOAEL of 1000 mg/kg/day suggests that the material poses low overall toxicological concern. Given the low dermal penetration and systemic toxicity, a safety margin (MoS) calculation is not appropriate in this case. The SCCS considers that HAA299 (nano), as covered within the provided specifications (minimum purity of 97%, average particle size in terms of number of particles equal to or greater than 50 nm), is safe for use as a UV filter in dermally applied cosmetic products up to a maximum concentration of 10%.





## 6. Anthranilates (ortho-aminobenzoates)

UVA

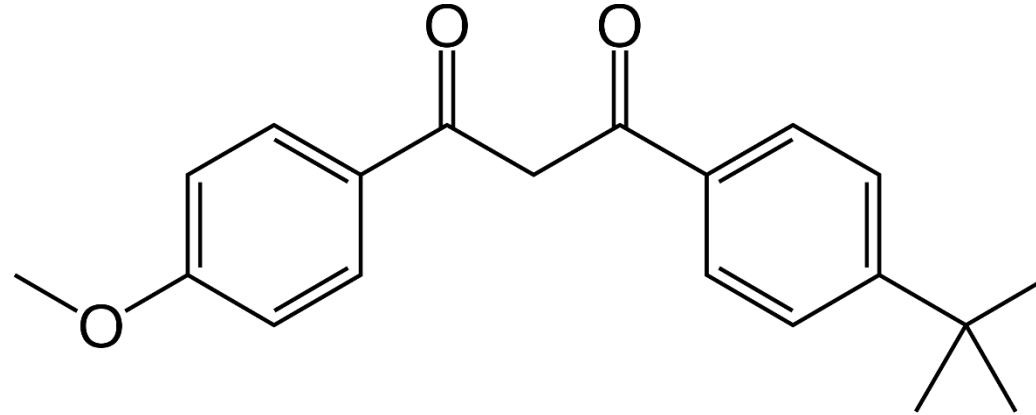


**Menthyl anthranilate**, USAN: Meradimate; Menthyl-o-aminobenzoate; ( $\lambda$  max 336 nm)



## 7. Dibenzoylmethanes (substituted diketones)

UVA

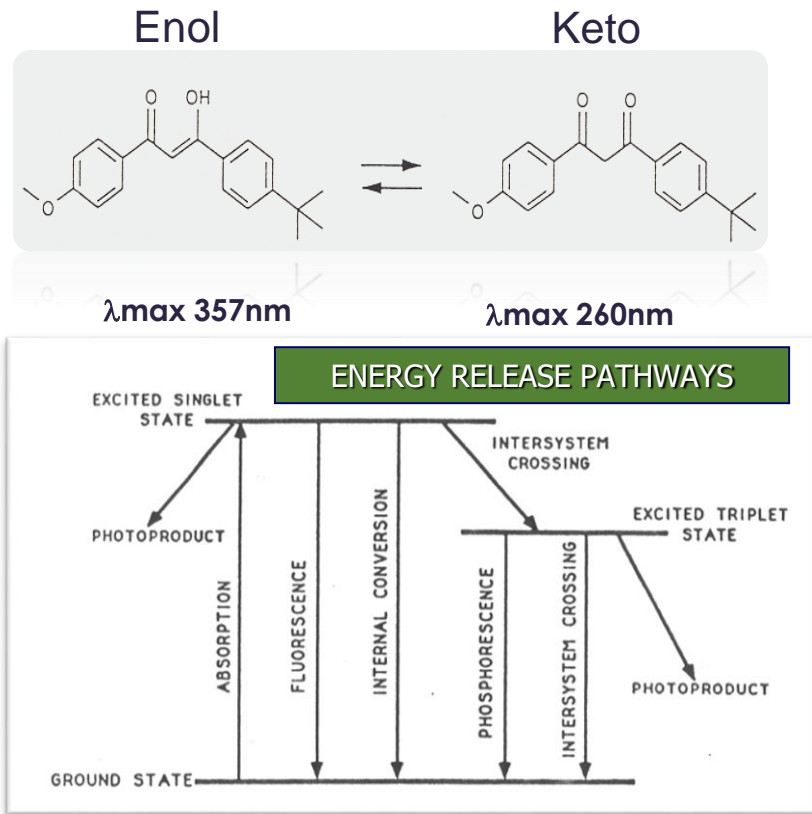


**Butyl Methoxydibenzoylmethane, USAN: Avobenzone ( $\lambda_{\text{max}}$ : 357 nm)**

Annex VI, reference number: 8



# 7. Photostabilization of Avobenzone



Kochevar, I.E., Basic Principles of Photomedicine and Photochemistry

## UV Filters:

- Octocrylene
- Polysilicone-15 (Parsol® SLX)
- Methylbenzylidene camphor (MBC)
- Bemotrizinol (Bis-Ethylhexyloxyphenol Methoxyphenyl Triazine, BEMT)
- Bisotrizole (Methylene Bis-Benzotriazolyl Tetramethylbutylphenol, MBBT)
- Ecamsule (Terephthalylidene Dicamphor Sulfonic Acid, Mexoryl® SX)

## Others

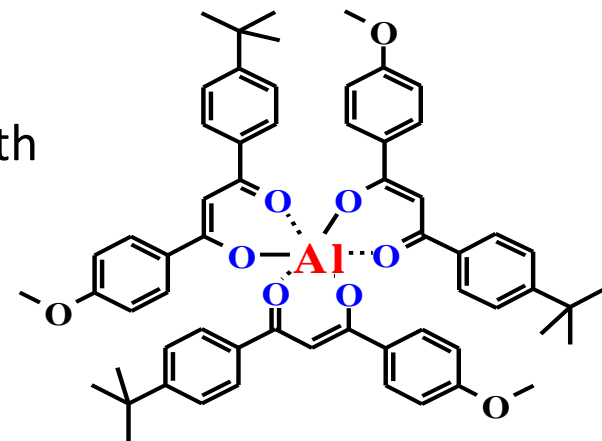
- Butyloctyl Salicylate (HallBrite BHB)
- Hexadecyl Benzoate
- Butyloctyl Benzoate
- Undecylcrylene Dimethicone (HallBrite PSF)
- Diethylhexyl Naphthalate (Corapan TQ)
- Diethylhexyl Syringylidene Malonate (OxyneX ST)



# 7. Chemical Stability of Avobenzone

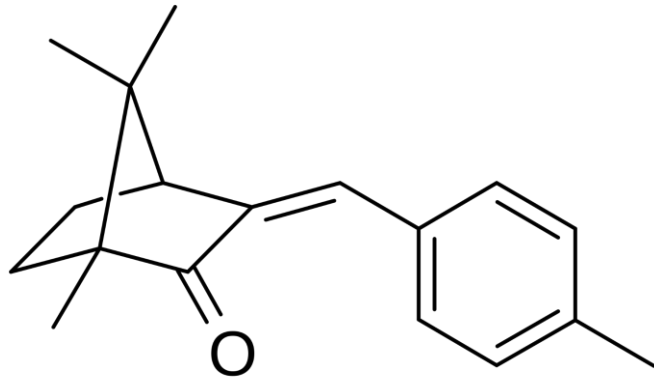
## Points to Consider:

- Solubility:** It is crucial to ensure solubility to prevent crystal formation. Other liquid filters or high-capacity emollients are commonly used.
- Incompatibility with Metal Ions:** The use of EDTA (in both phases) is recommended to prevent interactions with metal ions.
- Avoid Formaldehyde and Formaldehyde Donors:** Be cautious with preservative systems that contain formaldehyde or formaldehyde donors.
- Incompatibility with TiO<sub>2</sub> Coated with Al<sup>3+</sup>:** Avobenzone is not compatible with titanium dioxide (TiO<sub>2</sub>) coated with aluminum (Al<sup>3+</sup>).



# 8. Camphor Derivatives

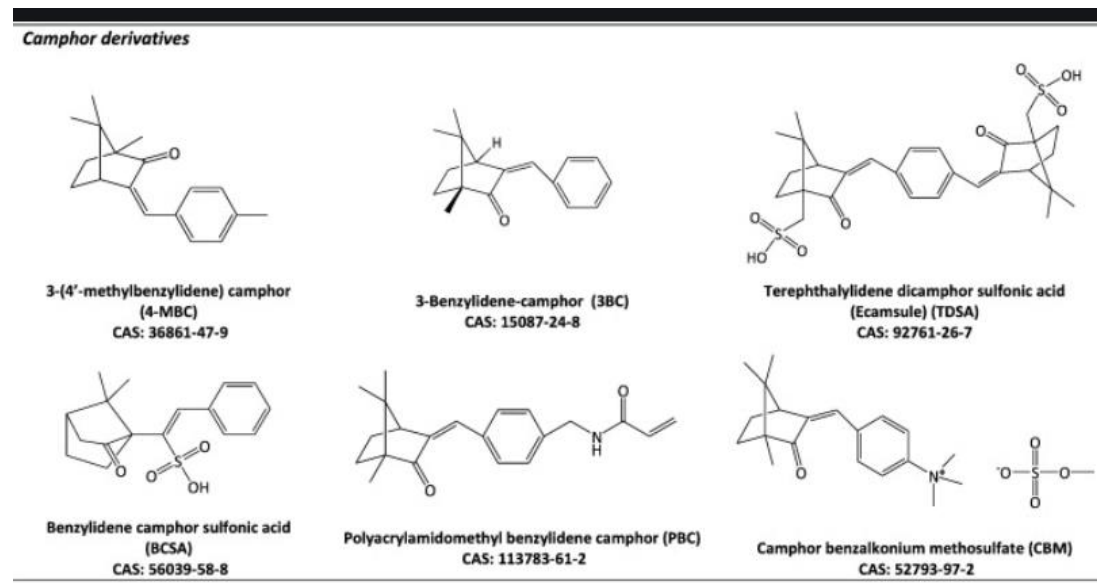
UVB



**4-Methylbenzylidene camphor**, USAN:  
Enzacamene ( $\lambda_{\text{max}}$ : 302nm)

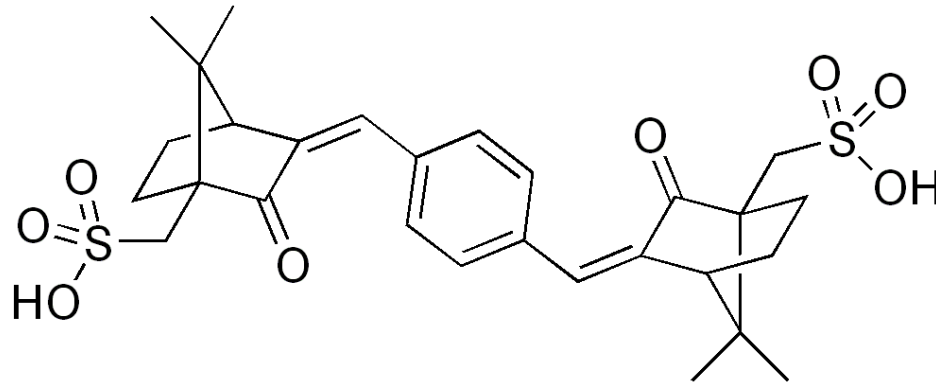
Annex VI, reference number: 18

- 4-methylbenzylidene camphor (4-MBC) (18)
- Terephthalidene dicamphor sulfonic acid (TDSA), Mexoryl® SX (7)
- Camphor benzalkonium methosulfate (CBM), Mexoryl® SO (2)
- **3-benzylidene camphor (3BC), (9), removed**
- Benzylidene camphor sulfonic acid (BCSA), Mexoryl® SL (9)
- Polyacrylamidomethyl benzylidene camphor (PBC), Mexoryl® SW (11)



## 8. Camphor Derivatives

UVA-WS



**Terephthalilydene Dicamphor Sulfonic Acid,**  
USAN: Ecamsule (**Mexoryl® SX**) ( $\lambda_{\text{max}}$ : 338  
nm)

Annex VI, reference number: 7

Not registered with the FDA as a sunscreen filter, approved at 5%  
with the FDA's New Drug Application (NDA), in combination with:

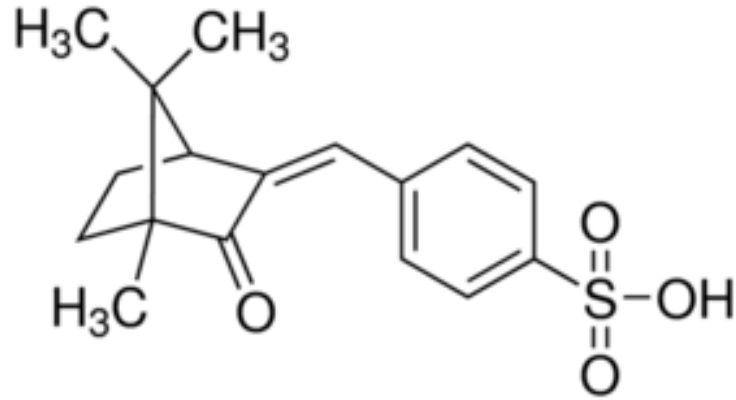
**Filtros UV:** Avobenzone 2%, Ecamsule 2%, Octocrylene 10%

It is a derivative of benzylidene camphor, known for its excellent photostability. Although there are several UV filters with the commercial name **Mexoryl®**, only two of them are widely used: **Mexoryl® SX** (water-soluble) and **Mexoryl® XL** (INCI Drometrizole trisiloxane, oil-soluble). Together, they provide a synergistic effect in sun protection. The patents are held by L'Oréal (1982).



# 8. Camphor Derivatives

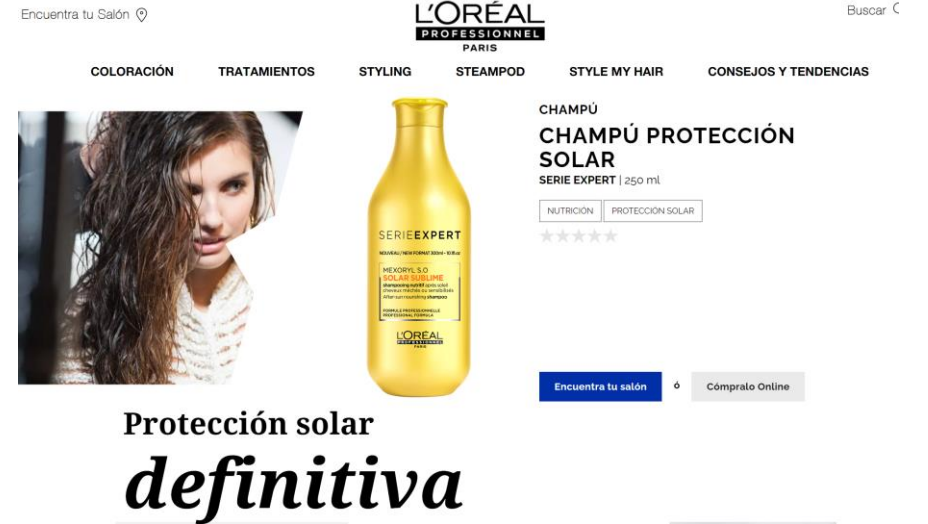
## UVB-WS



**Camphor Benzalkonium Methosulfate, N,N,N-Trimethyl-4-(2-oxoborn-3-ylidenemethyl) anilinium methyl sulphate (Mexoryl® S.O)**

Annex VI, reference number: 2

Yellow to yellow green liquid (aqueous solution at 30%)



Encuentra tu Salón 📍 Buscar 🔍

COLORACIÓN TRATAMIENTOS STYLING STEAMPOD STYLE MY HAIR CONSEJOS Y TENDENCIAS

CHAMPÚ  
**CHAMPÚ PROTECCIÓN SOLAR**  
SERIE EXPERT | 250 ml

NUTRICIÓN PROTECCIÓN SOLAR

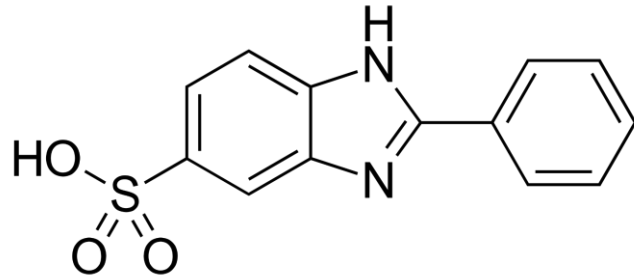
★★★★★

Encuentra tu salón 📍 Compralo Online

Protección solar  
*definitiva*

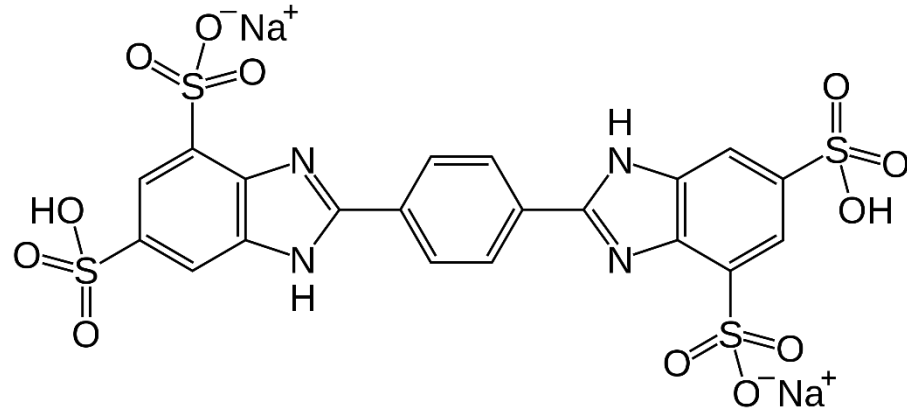


## 9. Benzimidazole and benzotriazole derivatives



**Phenylbenzimidazole Sulfonic Acid (PBSA),**  
USAN: Ensulizole, UVB-WS ( $\lambda_{\max}$  304 nm)

Annex VI, reference number: 6



**Disodium Phenyl Dibenzimidazole Tetrasulfonate (DPDT),**  
USAN: Bisdisulizole disodium, UVA II-WS ( $\lambda_{\max}$ : 335 nm)

Annex VI, reference number: 24

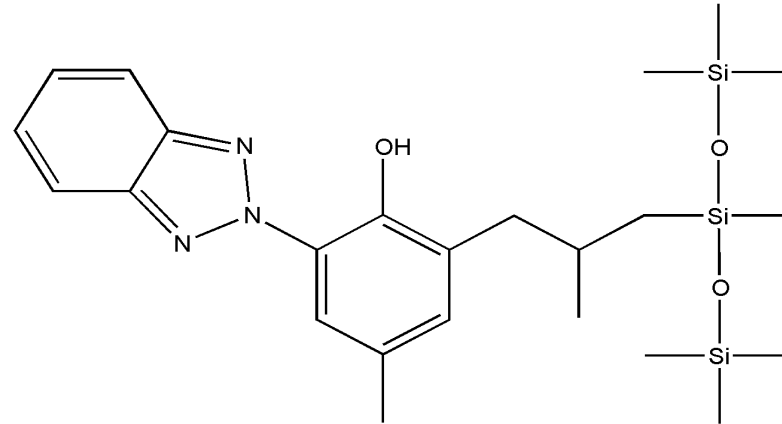
Not registered with the FDA as a sunscreen filter. Neo Heliopan® AP is a highly effective and photostable UVA II filter with a UV absorbance (1% / 1cm) of at least 770 around 335 nm. It shows synergistic effects with oil-soluble UVB filters in combination with the UVA absorber, allowing the formulation of very broad-spectrum UVA protection products. It has an excellent safety profile, including extremely low skin penetration, and is suitable for transparent water-based sunscreen products, such as gels or sprays, and for sun protection with sunscreens.





# 9. Benzimidazole and benzotriazole derivatives

UVB-UVA



**Drometrizole Trisiloxane (Mexoryl® XL).** Not registered with the FDA as a sunscreen filter but approved as a cosmetic ingredient. It is a broad-spectrum photostable filter with absorption maxima at 303 nm and 344 nm.

Annex VI, reference number: 16

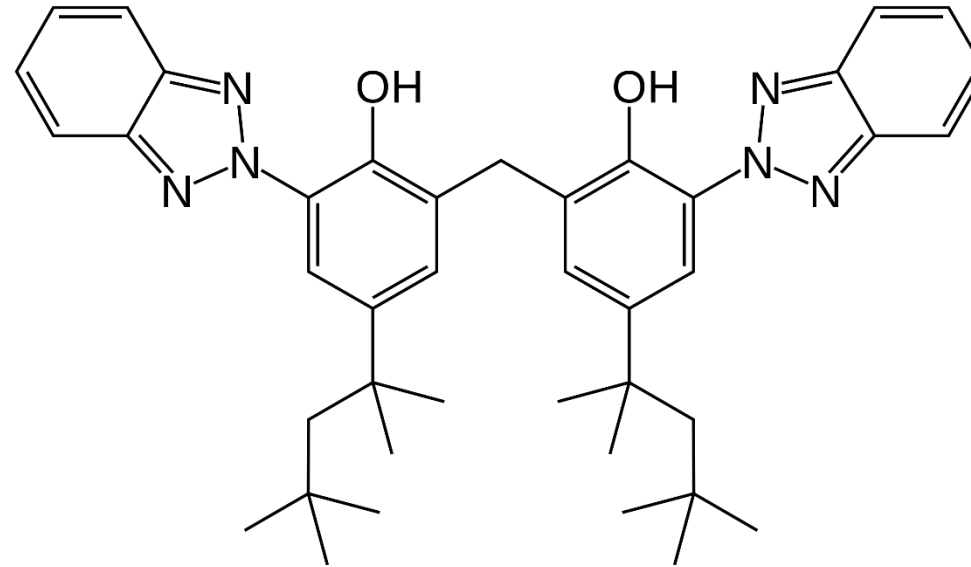


Marketed as **Mexoryl® XL** by L'Oréal, it is a broad-spectrum UV filter with two absorption peaks: one at 303 nm (UVB) and another at 344 nm (UVA). Like **Mexoryl® SX** (Ecamsule), it is used exclusively in products owned by L'Oréal. Drometrizole trisiloxane and Ecamsule are often used together as they exhibit a synergistic effect in protection.



## 9. Benzimidazole and benzotriazole derivatives

UVB-UVA



**Methylene Bis-Benzotriazolyl Tetramethylbutylphenol (nano or no-nano) or MBBT, USAN: Bisotrizole.**

50% microfine aqueous dispersion. Not registered with the FDA as a sunscreen filter but approved as a cosmetic ingredient. It is a broad-spectrum photostable filter with absorption maxima at 305 nm and 360 nm.

Annex VI, reference number: 23 y 23<sup>a</sup> (nano)

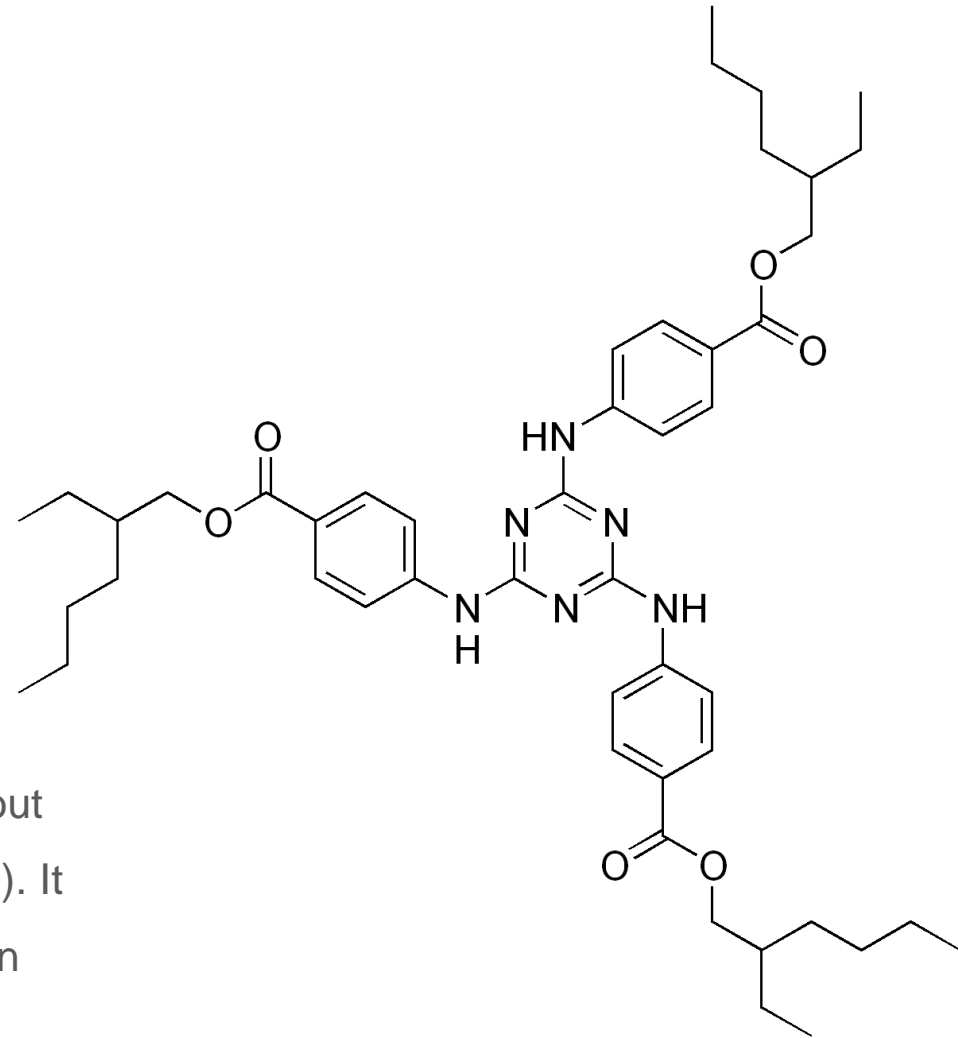


# 10. Triazine derivatives

UVB

## Ethylhexyl Triazone (EHT).

Not registered with the FDA as a sunscreen filter but approved as a cosmetic ingredient. ( $\lambda_{\max}$  314 nm). It has a high specific extinction coefficient ( $> 1500$ ) in ethanol.

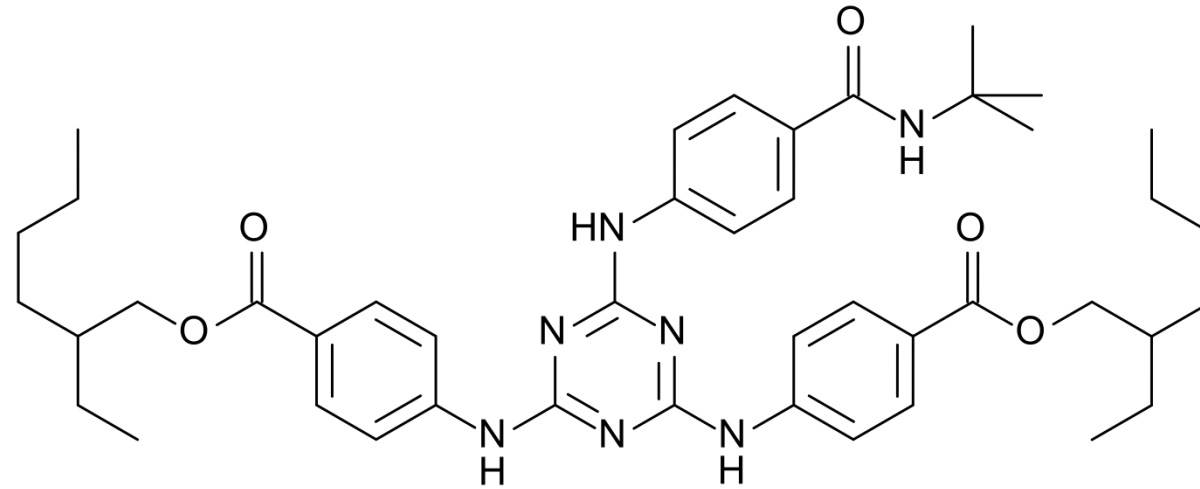


Annex VI, reference number: 15



## 10. Triazine derivatives

UVB



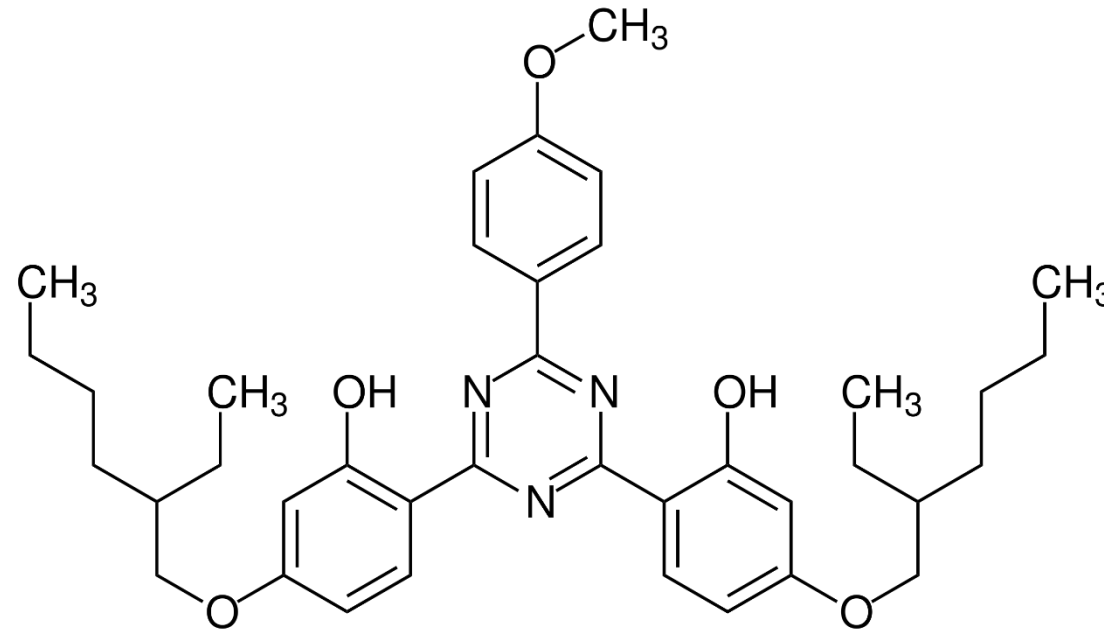
**Diethylhexyl Butamido Triazone (DBT)**, USAN: Iscotrizinol. Not registered with the FDA as a sunscreen filter but approved as a cosmetic ingredient. ( $\lambda_{\max}$  311 nm). It has a high specific extinction coefficient (minimum 1470) in ethanol.

Annex VI, reference number: 17



## 10. Triazine derivatives

UVB-UVA



**Bis-Ethylhexyloxyphenol Methoxyphenyl Triazine (BEMT)**, USAN: Bemotrizinol. Broad-spectrum photostable. Not registered with the FDA as a sunscreen filter but approved as a cosmetic ingredient. TEA process ( $\lambda$  max: 310 nm, 340 nm).

Annex VI, reference number: 25

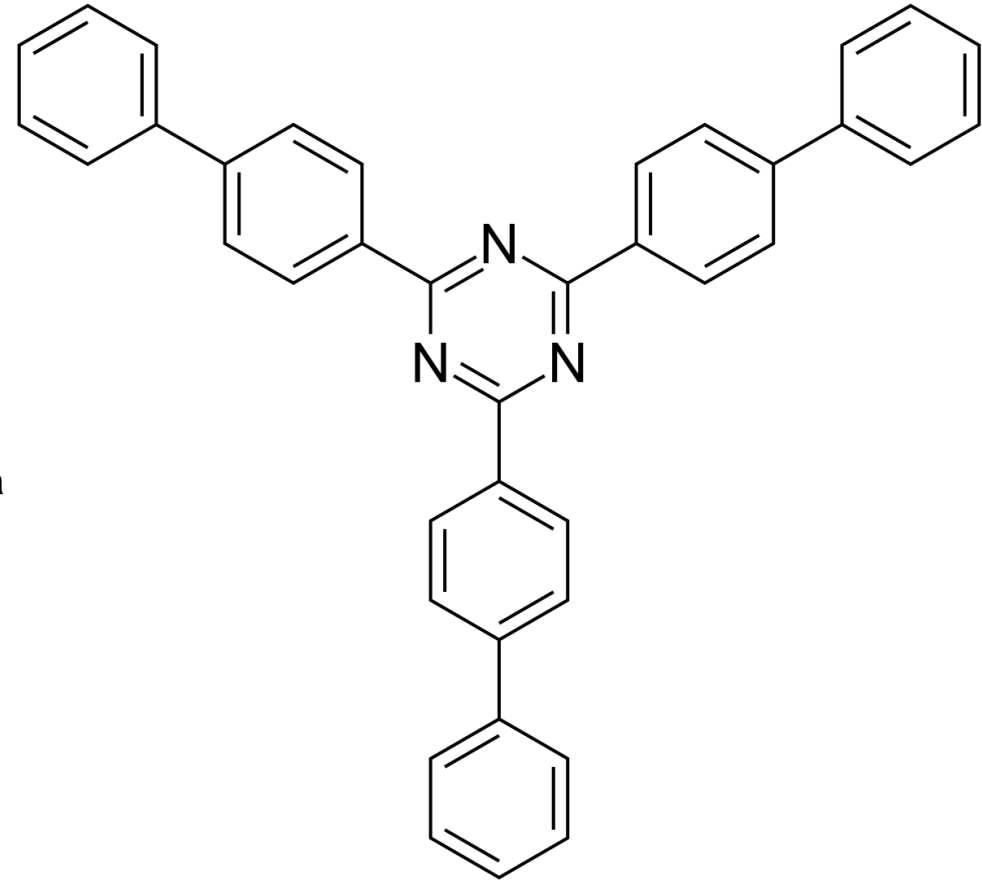


# 10. Triazine derivatives

UVB-UVAII

**Tris-Biphenyl Triazine\* (nano) (TBT).** Broad-spectrum photostable. Not registered with the FDA as a sunscreen filter but approved as a cosmetic ingredient. ( $\lambda$  max: 290 nm, 340 nm).

Annex VI, reference number: 29



\* Tinosorb® A2B: Liquid dispersion, INCI: Tris-Biphenyl Triazine (and) Aqua (and) Decyl Glucoside (and) Butylene Glycol (and) Disodium Phosphate (and) Xanthan Gum



# 10. Triazine derivatives

## UVB-UVAII

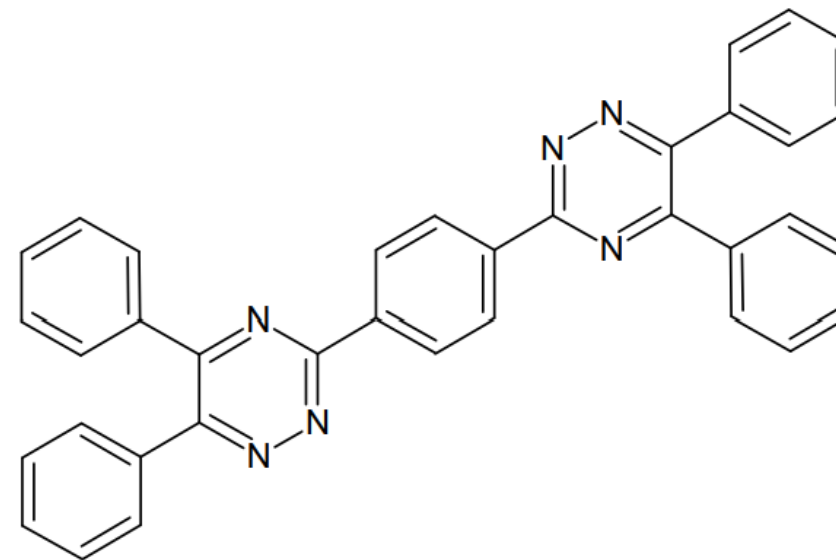
**Phenylene Bis-diphenyltriazine (PBDT), S86,**

Approved in July 2018. Broad-spectrum photostable. Not registered with the FDA as a sunscreen filter. ( $\lambda_{\text{max}}$ : 290 nm, 340 nm).

Annex VI, reference number: 31

INCI Name	Trade Name	CAS number	%
Water	-	7732-18-5	45.0 - 55.0
Phenylene Bis-Diphenyltriazine	TRIASORB	55514-22-2	40-50
PPG-1-PEG-9 Lauryl Glycol Ether	Eumulgin L	154248-98-3	approx. 4.5
Benzoic acid	Benzoic Acid	65-85-0	0.2-0.3

Ref. 28, 33, 78 (submission I)



## TRIASORB - Trademark, owner PIERRE FABRE DERMO-COSMETIQUE

SCCS considers Phenylene Bis- Diphenyltriazine, S86, safe for use as a UV-filter in sunscreen products **at a concentration up to 5%**. Because of the insoluble nature of S86 and as no data were provided on safety via inhalation exposure, the SCCS considers its use safe only in dermally applied products and not in products that would lead to inhalation exposure.

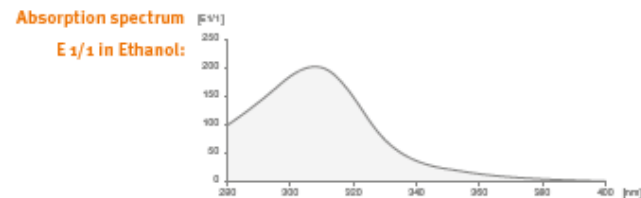


# 11. Polysilicone

## UVB

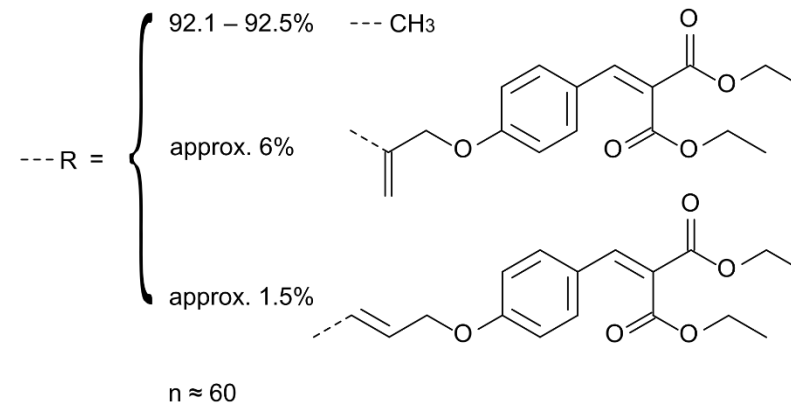
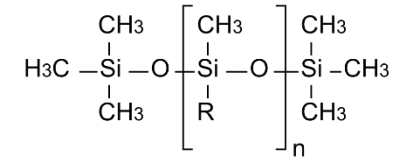
**Polysilicone –15 o Parsol® SLX**, Not registered with the FDA as a sunscreen filter but approved as a cosmetic ingredient. ( $\lambda$  max: 312 nm).

Annex VI, reference number: 26



E<sub>1/1</sub>: 160 – 190

Lambda max: 312 nm



### Silicone structure, dry touch

Liquid, does not crystallize in formulation

Ideal for lightweight and silky-textured sunscreen products

Enhances the distribution of other filters, thereby increasing SPF

Acts synergistically with PBSA for greater UVB protection





# 12. Cyclic Merocyanines

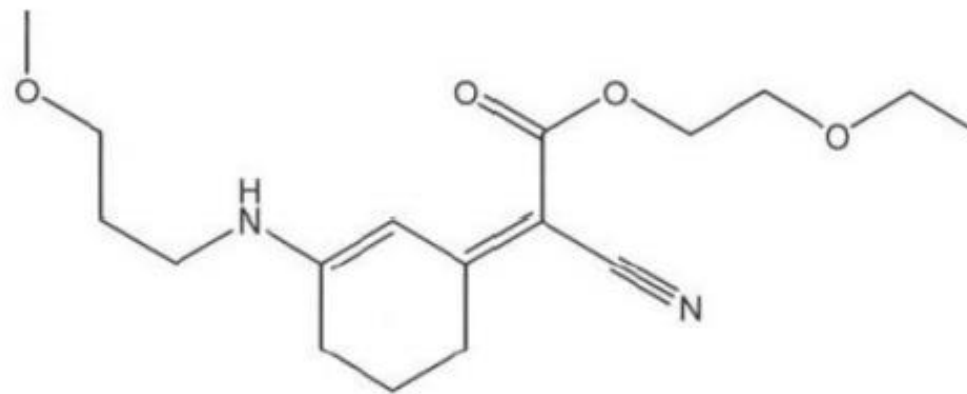
UVAII

## MEXORYL® 400

**Methoxypropylamino Cyclohexenylidene Ethoxyethylcyanoacetate (MCE)**

**(S87)**. Approved by the SCCS, S87, in December 2019 ( $\lambda_{\text{max}}$ : 385 nm). Based on the data presented, the SCCS concluded that the use of ethyl ethylcyanoacetate of methoxypropylamino cyclohexenylidene (S87) as a UV filter in cosmetic products up to a maximum concentration of 3% is safe. In this opinion, inhalation toxicity was not assessed due to the lack of data provided. Not registered with the FDA as a sunscreen filter

Annex VI, reference number: 32



**INNOVACIÓN**

**PIEL SENSIBLE**

MUY ALTA PROTECCIÓN. ULTRA RESISTENTE. INVISIBLE

**QUÉ ES**

Anthelios UVMUNE 400 Fluido Invisible SPF50+ sin perfume: con MEXORYL400, el filtro UV más eficaz contra los rayos UV más insidiosos\*: ULTRA-LARGOS\*\*. Una protección avanzada de amplio espectro (UVB + UVA incluso hasta los UVA ULTRA-LARGOS). Testado en piel sensible y reactiva. Testado en todo tipo de pieles y fototipos. Sin perfume.

\* Los más penetrantes. Imperceptibles en corto plazo, abundantes y durante todo el año.

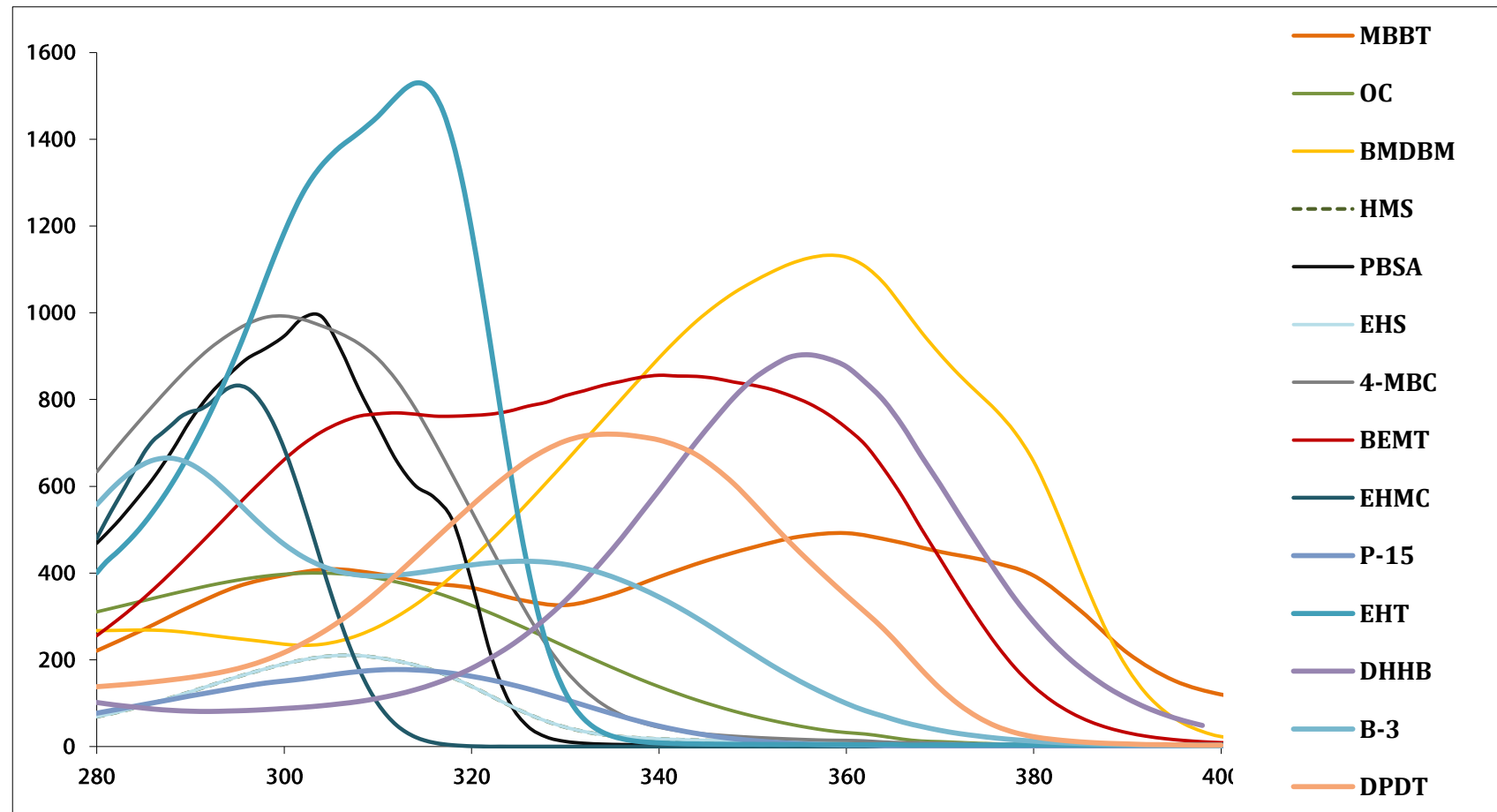
\*\* [340-400nm]UVA largos/[380-400nm]=extremo del espectro al que llamamos UVA ultra-largos.

Ultra resistente: agua, sudor y arena. Tolerancia óptima. No pica en los ojos\*. Invisible, textura ligera. Sin perfume.

\* Formulado para limitar el picor en los ojos.



# Absorption Spectrum of the Most Common UV Filters (in EtOH)

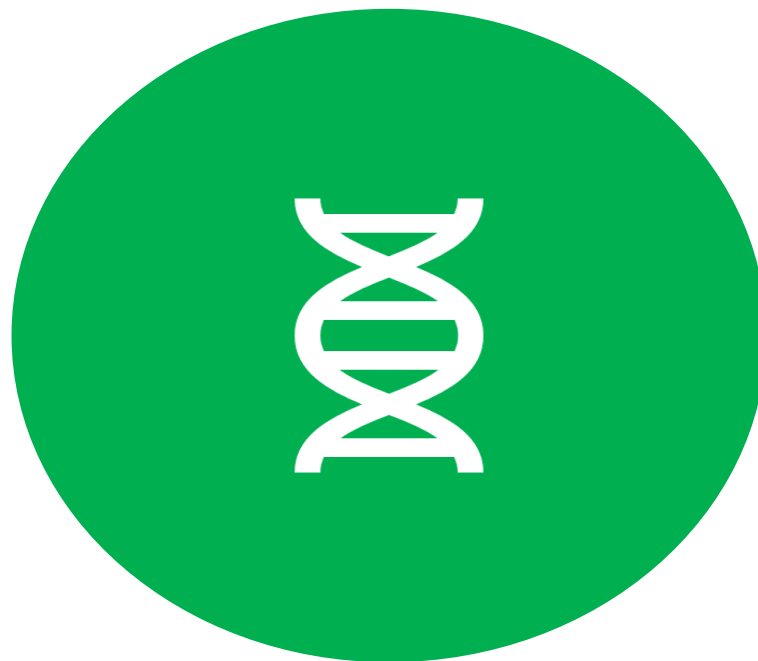


# Only 8 organic UV filters approved worldwide

INCI	EU	USA	Japan
Benzophenone-3	10 %	6 %	5 %*
Benzophenone-4	5 %	10 %	10 %**
Ethyl-Hexyl Methoxycinnamate	10 %	7,5 %	10 %***
Phenylbenzimidazole sulfonic acid	4 %	4 %	3 %§
Homosalate	10 %	15 %	10 %
Octyl Salicylate	5 %	5 %	10 %§§
Octocrylene	10 %	10 %	10 %
Avobenzone	5 %	3 %	10 %§§§

\*5% in C&T, 0.02% eye lines; \*\*  
 1% en C&T, 0.1% eye lines : \*\*\*  
 5% en C&T, 1% eye lines; § 7%  
 en C&T, 1% eye lines, §§ 1% en  
 C&T, 0% eye lines §§§ 2% in  
 C&T, 0.1% eye lines





BIOLOGICAL FILTERS



WORKSHOP  
SOLARI

12 Settembre 2019

10.00 - 12.00

10.00 - 12.00

10.00 - 12.00

10.00 - 12.00

10.00 - 12.00

10.00 - 12.00

# Biological Filters:

They are antioxidant substances that prevent the formation of free radicals and enhance the skin's immune subsystem.

1. **Vitamin C:** Prevents the harmful effects of UV radiation by protecting against lipid peroxidation and increasing dermal collagen.
2. **Vitamin E:** An antioxidant that reduces cellular oxidative stress induced by UV radiation, especially UVB. It prevents skin immunosuppression and the formation of UV-induced pyrimidine dimers.
3. **Carotenoids:** Liposoluble pigments found in plants, algae, some bacteria, and animals. Effective photoprotectors include:
  1.  $\beta$ -Carotene: A precursor to vitamin A that inhibits the production of ROS generated during photooxidative processes and protects the skin against UV-induced erythema.
  2. Astaxanthin: An antioxidant superior to  $\beta$ -carotene and  $\alpha$ -tocopherol, highly effective in eliminating peroxy lipid radicals and inhibiting the concentration of free polyamines induced by UVA radiation.
4. **Green Tea Polyphenols:** Reduces erythema and cutaneous edema, as well as hyperplasia, hyperkeratosis, the number of sunburn cells, and UV-induced pyrimidine dimers.
5. **Flavonoids:** Isoflavones from various plants with antioxidant, estrogenic, and tyrosine kinase-inhibiting properties. Some have shown photoprotective effects:
  1. Genistein: Protects against oxidative damage, apoptosis, and UV-induced immunosuppression.
  2. Red Clover Isoflavonoids: Protects against UV-induced immunosuppression.
  3. Apigenin: Significantly inhibits the carcinogenic effect of UV radiation on the skin.
6. **Polyunsaturated  $\Omega$ -3 Fatty Acids:** Have anti-inflammatory effects through prostaglandins, leukotrienes, and cytokines, as well as antioxidant actions.





THANK YOU!



I WOULD LIKE TO EXTEND MY SINCERE  
GRATITUDE TO SICC AND THE BOARD  
FOR INVITING ME TO SPEAK. IT HAS  
BEEN AN HONOR.



TO ALL THE STUDENTS: I WISH YOU A  
BRIGHT AND SUCCESSFUL FUTURE. KEEP  
STRIVING FOR EXCELLENCE!

