

THE CHEMISTRY OF SUNSCREEN

Summer sun brings with it the risk of sunburn, so we'll all be slapping on the sunscreen to guard against it. But what are the chemicals that keep you from turning as red as a lobster? This graphic looks at them and how they work.



TYPES OF UV RADIATION

UVA wavelength 320-400nm

Accounts for 95% of solar UV radiation reaching Earth's surface. Penetrates deepest into skin, and contributes to skin cancer via indirect DNA damage.

UVB wavelength 290-320nm

Accounts for 5% of solar UV radiation reaching Earth's surface. Causes direct DNA damage, and is one of the main contributors to skin cancer.

UVC wavelength 290-100nm

Filtered out by ozone in the Earth's atmosphere, and as a result does not reach the surface of the Earth, and doesn't cause skin damage.

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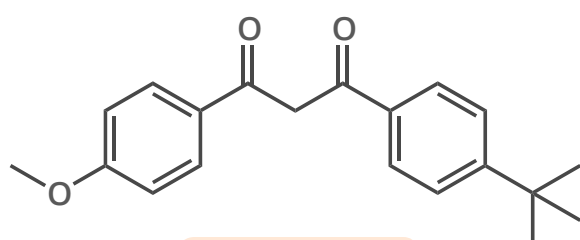
SUNSCREEN ACTIVE INGREDIENTS APPROVED IN THE USA

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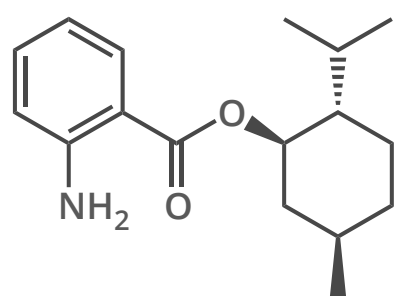
SUNSCREEN ACTIVE INGREDIENTS APPROVED IN THE EU

Inorganic chemicals in sunscreen, such as **zinc oxide** and **titanium oxide**, both absorb and scatter UV light. **Organic chemicals** are also used – the chemical bonds in these absorb UV radiation, with the chemical structure affecting whether they absorb UVA, UVB, or both. Several different chemicals are used in sunscreen to ensure full protection.

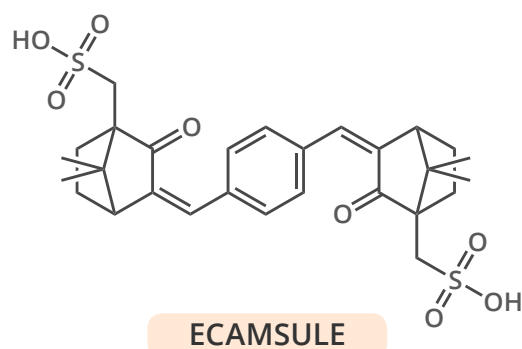
UVA BLOCKERS



AVOBENZONE

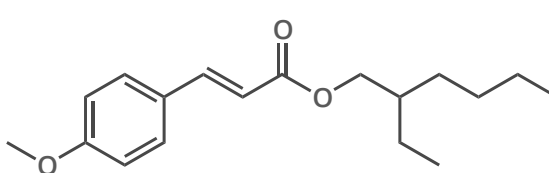


MENTHYL ANTHRANILATE

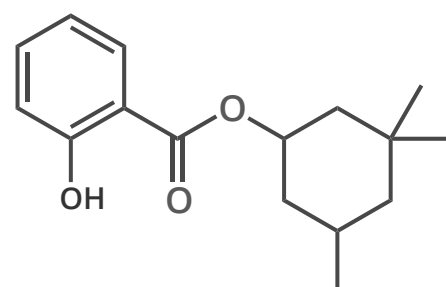


ECAMSULE

UVB BLOCKERS



OCTYL METHOXYCINNAMATE



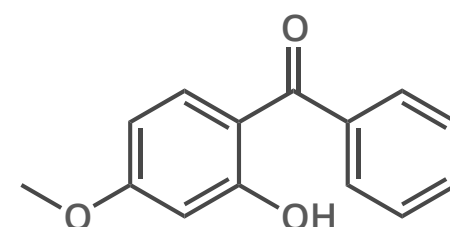
HOMOSALATE

OTHER UVB BLOCKERS

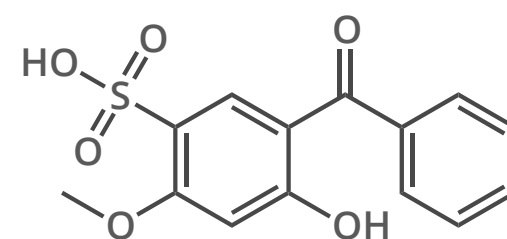
(Italicised = not approved in USA)

PABA	Octylocrylene
Padimate O	Ensulizole
Cinoxate	<i>Octyl triazone</i>
Octyl salicylate	<i>Enzacamene</i>
Trolamine salicylate	<i>Amiloxate</i>

UVA & UVB BLOCKERS



OXYBENZONE



SULISOBENZONE

OTHER UVA & UVB BLOCKERS

(Italicised = not approved in USA)

Dioxybenzone	<i>Neo Heliopan AP</i>
<i>Mexoryl XL</i>	<i>Uvinul A Plus</i>
<i>Tinosorb S</i>	<i>UVA-sorb HEB</i>
<i>Tinosorb M</i>	

All currently approved in EU, Canada & Australia

