Ethylhexyl Methoxycinnamate

ALSO-CALLED-LIKE-THIS: Octinoxate, Octyl Methoxycinnamate
WHAT-IT-DOES: sunscreen
IRRITANCY: 0
COMEDOGENICITY: 0

Official CosIng Information

Details

A clear, oil-soluble, "cosmetically-elegant" liquid that is the most commonly used **chemical sunscreen.** It **absorbs UVB radiation** (at wavelengths: 280-320 nm) with a peak protection at 310nm.

It only protects against UVB and **not UVA rays** (the 320-400 nm range) – so always choose products that contain other sunscreens too. It is **not very stable** either, when exposed to sunlight, it kind of breaks down and loses its effectiveness (not instantly, but over time - it loses 10% of its SPF protection ability within 35 mins). To make it more stable it can be - and should be - combined with other sunscreen agents to give stable and broad-spectrum protection (the new generation sunscreen agent, Tinosorb S is a particularly good one for that).

Regarding safety, there are also **some concerns** around Octinoxate. In vitro (made in the lab not on real people) and animal studies have shown that it may produce hormonal (estrogen-like) effects. Do not panic, the studies were not conducted under real life conditions on real human people, so it is probably over-cautious to avoid Octinoxate altogether. However, if you are pregnant or a small child (under 2 yrs. old), choose a physical (zinc oxide/titanium dioxide) or new-generation Tinosorb based sunscreen, just to be on the super-safe side. :)

Overall, Ethylhexyl Methoxycinnamate is an old-school chemical sunscreen agent. There are plenty of better options for

sun protection today, but it is considered "safe as used" (and sunscreens are pretty well regulated) and it is available worldwide (can be used up to 10% in the EU and up to 7.5% in the US).

Butyl Methoxydibenzoylmethane

Goodie

ALSO-CALLED-LIKE-THIS: Avobenzone
WHAT-IT-DOES: sunscreen

Official CosIng Information

Details

The famous Avobenzone. It is a special snowflake as it is **the only globally available chemical sunscreen agent that provides proper UVA protection** (in the US, new generation sunscreen agents are not approved because of impossible FDA regulations). It is the global gold standard of UVA protection and is the most used UVA sunscreen in the world.

It gives very good protection across the whole UVA range (310-400 nm that is both UVA1 and UVA2) with a peak protection at 360 nm. The problem with it, though, is that it is **not photostable** and degrades in the sunlight. Wikipedia says that avobenzone loses 36% of its UV-absorption capacity after just one hour of sunlight (yep, this is one of the reasons why sunscreens have to be reapplied after a few hours).

The cosmetic's industry is trying to solve the problem by combining avobenzone with other UV filters that enhance its stability (like octocrylene, Tinosorb S or Ensulizole) or by encapsulating it and while both solutions help, neither is perfect. Interestingly, the combination of avobenzone with mineral sunscreens (that is titanium dioxide and zinc oxide)

is not a good idea. In the US, it is flat out prohibited as avobenzone becomes unstable when combined with mineral sunscreens.
As for safety, avobenzone has a pretty good safety profile. It counts as non-irritating, and unlike some other chemical sunscreens, it shows no estrogenic effect. The maximum concentration of avobenzone permitted is 5% in the EU and 3% in the US.

Benzophenone-3

Icky

ALSO-CALLED-LIKE-THIS: Oxybenzone
WHAT-IT-DOES: sunscreen
IRRITANCY: 0
COMEDOGENICITY: 0

Official CosIng Information

Details

A **chemical sunscreen agent** that absorbs UVB and short UVA rays (280-350nm) with its peak protection at 288 nm. Unlike many other chemical sunscreens, it is **highly stable but** its UV absorbing abilities are **weak** so it always has to be combined with other sunscreen agents for proper protection. More often than not, it's **used as a photostabilizer** rather than a proper sunscreen agent as it can protect formulas nicely from UV damage.

Regarding safety, BP-3 is somewhat **controversial**. First, its molecules are small (228 Da) and very lipophilic (oil loving) and these properties result in **very good absorption**. The problem is that you want sunscreens on the top of your skin and not in your bloodstream, so for BP-3 this is a problem. In fact, it absorbs so well that 4 hours after application of a sunscreen product with BP-3, it **can be detected in urine**.

Another concern of BP-3 is that it shows **some estrogenic activity**, though it's probably not relevant when applied topically to the skin. Estrogenic activity was confirmed only in-vitro (in test tubes) and when taken orally by lab animals, and not when used topically as you would normally. In fact, a 2004 follow-up study to examine the estrogenic effect of sunscreens when used topically on the whole body found that "the endogenous levels of reproductive hormones were unaffected" (even though BP-3 could be detected both in plasma and urine, so its absorption is no doubt too good).

If that was not enough, Wikipedia claims that BP-3 is nowadays the most common allergen found in sunscreens, and the always-trustworthy smartskincare writes that "[benzophenones] have been shown in some studies to promote the generation of potentially harmful free radicals".

On the up side, sunscreens are pretty well regulated in several parts of the world, and BP-3 is considered "**safe as used**" and is an allowed sunscreen agent everywhere. It can be used in concentrations of up to 10% in the EU and up to 6% in the US. **Overall**, BP-3 is probably our least favorite sunscreen agent and we prefer sunscreens without it. However, if you find a formula that you love and contains BP-3, we do not think that you should throw it away. A sunscreen with BP-3 is definitely better than no sunscreen.