

HYBRID – Photostable UVA protection

For sun protection and daily care products

The European Commission's recommendation of 22 September 2006 is intended to ensure greater safety and transparency of sunscreens.

In future, sun protection products shall no longer only protect against sunburn, but also offer protection against all dangerous UV rays that cause premature skin ageing. Until recently, the cosmetics guideline has only included regulations on sunburn-inducing UVB rays. With the new recommendation, every sunscreen shall now also protect against UVA rays. These long-wave rays cause the skin to age prematurely, and possibly also impair the immune system. They are also considered a significant risk factor in the creation of certain types of skin cancer.

Now, there is also a new specification for the sun protection factor, where the UVA filter must be coupled to the UVB filter and must equate to at least one third of the UVB protection offered in the SPF.

This new regulation, which will probably become law in 2009, presents new challenges for the many cosmetics manufacturers who formulate sunscreen preparations or daily care products with sun protection.

Truly sufficient UVA protection can only be achieved using certain substances such as titanium dioxide, zinc oxide or the worldwide registered Avobenzone (INCI: Butyl Methoxydibenzoylmethane), also known as BMDDBM.

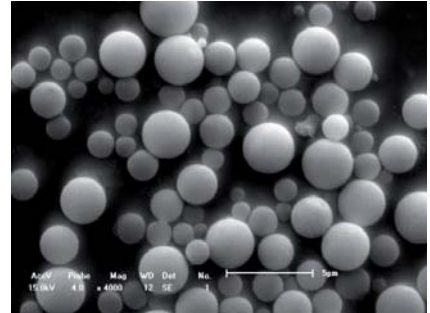
Unfortunately, these products are not easy to formulate. Formulas with a high titanium dioxide content, for example, are always rated badly in terms of feel, transparency and spread; the approval status of zinc oxide is still a limitation; and it is well known that Avobenzone is not photostable.

The stability of Avobenzone is especially difficult to guarantee when conventional aluminium oxide coated titanium dioxides are used in formulas to achieve higher sun protection factors. The photostable combination with octocrylene so far patented has recently come under fire following new tests on this substance.

The saviours of the sun cosmetics formula in this situation are the HYBRID UVA filters developed by SUNJIN.

The worldwide approved Avobenzone is encapsulated in polymethylmethacrylate (PMMA) together with octyl salicylate or 2-ethylhexyl 4-methoxycinnamate, and thereby protected against reactions with other ingredients and the resulting negative effects on the formula.

The texture additive PMMA isolates the UVA filter and has a positive effect on the feel of the formula.



Product	Composition		Particle Size (μm)
Hybrid ABOS	BMDDBM (Avobenzone) Octyl Salicylate PMMA (Polymethylmethacrylate)	25 – 30 % 5 – 8 % 62 – 70 %	2 – 7
Hybrid ABOMC	BMDDBM (Avobenzone) 2-Ethylhexyl 4-methoxycinnamate PMMA (Polymethylmethacrylate)	25 – 30 % 5 – 8 % 62 – 70 %	2 – 7



The advantages of the hybrid UV filter system:

- **No potential for irritation**

The encapsulation reduces dermal resorption, thereby reducing the potential for irritation. Unlike organic UV filters, which penetrate into the skin and absorb the UV radiation, the contents of the hybrid systems rest on the skin's surface and form a practically invisible physical barrier against UV rays, comparable to the protective function of pigments. Irritation of the skin was tested using an in vivo patch test. (Data can be requested).

- **Improved photostability**

The Avobenzone contained in the hybrids is so effectively isolated by the stable PMMA polymer matrix that contact between the UV filters – the cause of instability and odour problems – can be ruled out entirely.

- **Easy working into formulas and improved formula stability**

The hybrids can be worked into the finished emulsion, while Avobenzone on its own has only limited solubility. The products can be used across a broad pH spectrum.

- **Improved feel**

Many organic filters are very oily and leave behind an unpleasant, sometimes sticky feel on the skin.

The hybrids have the excellent feel properties of PMMA, which is frequently used as a texture additive, and therefore lend the formula a soft-touch effect.

Test results

Formula	# 1	# 3	# 4	# 5
HYBRID ABOMC	-	-	10	-
HYBRID ABOS	-	-	-	10
BMDBM	3	3	-	-
Octocrylene	-	3	-	-
Octyl Methoxy Cinnamate	7	7	6.5	6.5
Octyl Salicylate	-	-	-	-
PMMA-S	10	10	-	-
C 12-15 Alkyl Benzonate	30	27	33.5	33.5
Vaseline	50	50	50	50
SPF (instant → after 85.7 MED) 20.1 →	10.4	26.1 -> 25.3	19.4 -> 20.2	19.6 -> 23.4
UVA/UVB ratio 0.86 →	0.94	0.84 -> 0.86	0.88 -> 0.87	0.83 -> 0.78
Boots Star Rating 4	→ 5	4 -> 4	4 -> 4	4 -> 3
Average UVA-PF 17.6 →	10.6	27.1 -> 22.6	18.8 -> 20.2	16.7 -> 17.1
Critical wavelength 378 →	380	376	379 -> 379	378 -> 377

Test results

Not photostable

Photostable