



Rona

Eusolex®

UV-Pearls™ OMC

Sunglasses for the Skin™



Introduction

Protecting the skin from the adverse effects of UV radiation has become a major goal in skin care. A number of classic performance UVA and UVB filters are currently available on the market as organic and inorganic sunscreens.

Eusolex® UV-Pearls™ - UV filters entrapped in micro-capsules - are new sun protection agents. The unique micro-encapsulation technology used entraps the organic sunscreen chemicals in sol-gel silica glass. Up to now, researchers have failed to encapsulate cosmetic raw materials efficiently; however, effective and tight encapsulation has now been achieved. The first available product is Eusolex® UV-Pearls™ OMC, encapsulated Ethylhexyl Methoxycinnamate.

Eusolex® UV-Pearls™ OMC – Sunglasses for the Skin™. Applying the capsules to the skin is analogous to wearing sunglasses to protect your eyes.

Hydrophobic UV filters for the aqueous phase

The unique encapsulation creates aqueous dispersions irrespective of the solubility of the UV filter.

New opportunities for the cosmetic formulator!

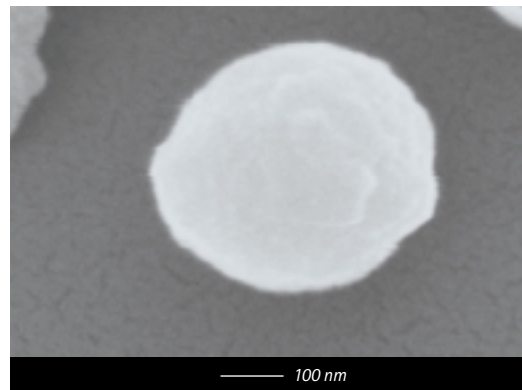
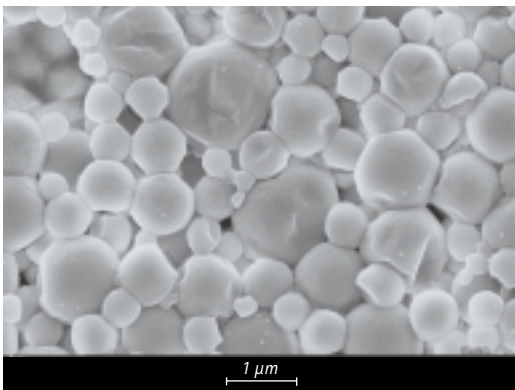
UV filter combinations with improved photo-stability

Encapsulated sunscreen in the water phase leads to physical separation of BMDDBM/Avobenzon and OMC.
Increased overall photo-stability of the sunscreen!

Reduced dermal uptake and low allergy potential

Encapsulation keeps the organic filter on top layers of the skin.
Eusolex® UV-Pearls™ are non-irritant to the skin!

SEM micrographs of the air-dried Eusolex® UV-Pearls™ OMC capsules



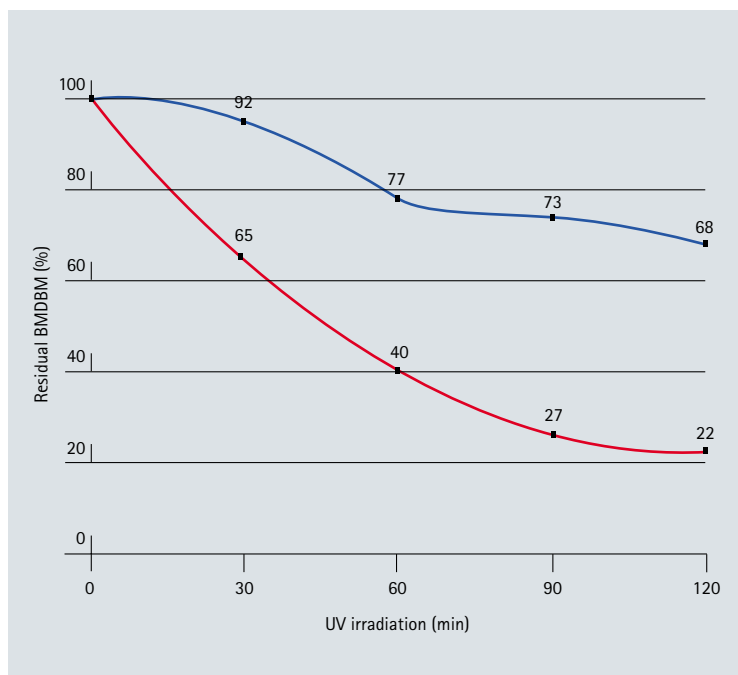
Product features

New application possibilities with hydrophobic UV filters

The hydrophilic nature of the capsule wall can be adjusted irrespective of the solubility of the UV filter. It is now possible to incorporate hydrophobic UV filters into the aqueous phase and even into purely aqueous cosmetic formulations. In addition, the unpleasant skin feel often experienced on application of preparations containing hydrophobic UV filters is eliminated.

Improved photo-stability of Avobenzone (BMDBM) due to Eusolex® UV-Pearls™ OMC

Certain UV filters, in particular dibenzoylmethane derivatives, exhibit reduced photo-stability in cosmetic formulations. By encapsulating these filters, it is possible to increase the photo-stability of the overall formulation.



UV filters in O/W formulations:

— 3% BMDBM / 7.5% encapsulated OMC (Eusolex® UV-Pearls™ OMC).

— 3% BMDBM / 7.5% free OMC.

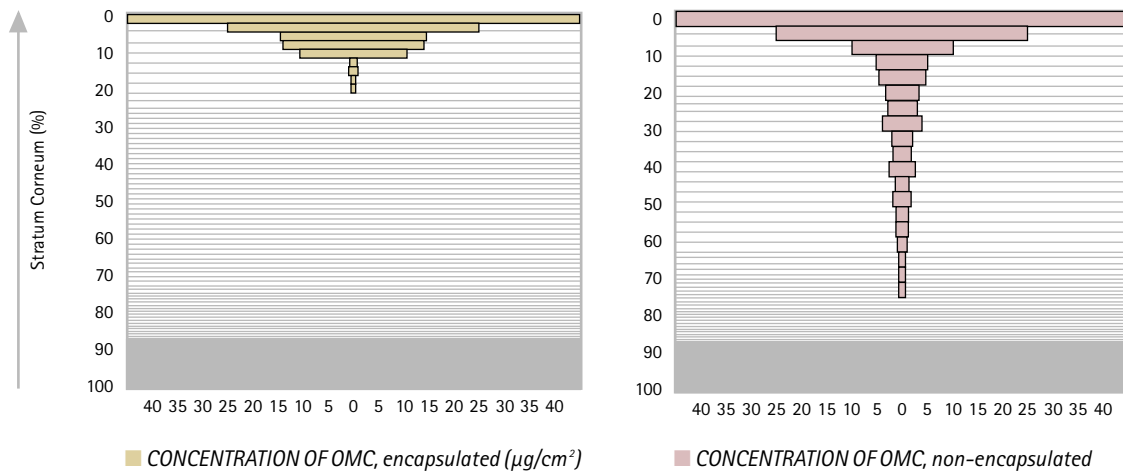
After 120 minutes of irradiation, almost 70% of the UV filter remains, while only 25% remains if BMDBM comes into contact with OMC. This clearly indicates that the physical separation of the two filters prevents side effects.



Presence of Eusolex[®] UV-Pearls[™] OMC on the skin

Cutaneous distribution of organic UV filters in the different human skin layers as well as the irritation potential associated with topical application are currently under discussion. The encapsulation of the substances proposed here, however, eliminates these effects.

The distribution of OMC in the stratum corneum of porcine skin, serving as a model for in vivo human skin applications, was determined. An emulsion was applied and evenly distributed with a gloved finger. After pressure application, strips were made from the marked area. As a result, freely formulated OMC was distributed up to a depth of 15 μm , while encapsulated OMC could only be detected up to a maximum of 5 μm .



Product stability

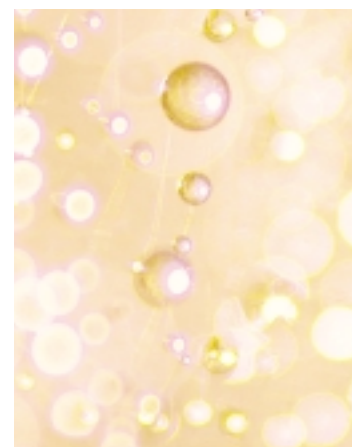
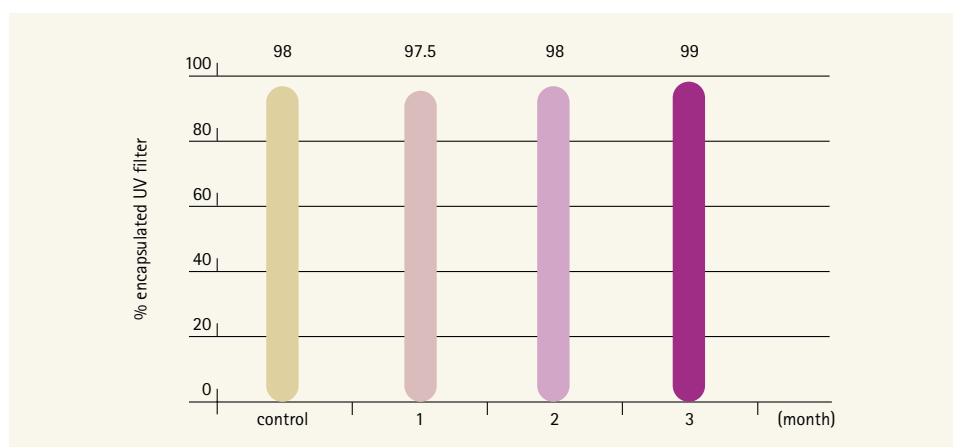
To achieve the above-mentioned effects, it is essential for the capsules to be sufficiently stable and not to release the encapsulated active ingredient (UV filter) into the surroundings. From a practical point of view, release of the hydrophobic sunscreen is in any case unlikely due to its presence in the aqueous phase.

Both the capsules and an aqueous suspension of the capsules were subjected to a number of stress conditions such as:

- Temperature
- Stability after complete drying
- Pressing through different spray heads and actuators
- Ultra-turrax shear stress
- Spreading with different forces
- Centrifugation

The stability of the capsules was checked by dispersing the Eusolex® UV-Pearls™ OMC in a cosmetic oil. Any released OMC can be determined in the oil; however, all stability tests carried out showed no such release. Eusolex® UV-Pearls™ OMC are hence extremely stable. A representative result for the capsules is shown below.

Stable Eusolex® UV-Pearls™ OMC at 45 °C



Even after a storage period of 3 months, release of OMC from the Eusolex® UV-Pearls™ OMC dispersion could not be determined. The capsules remained stable.

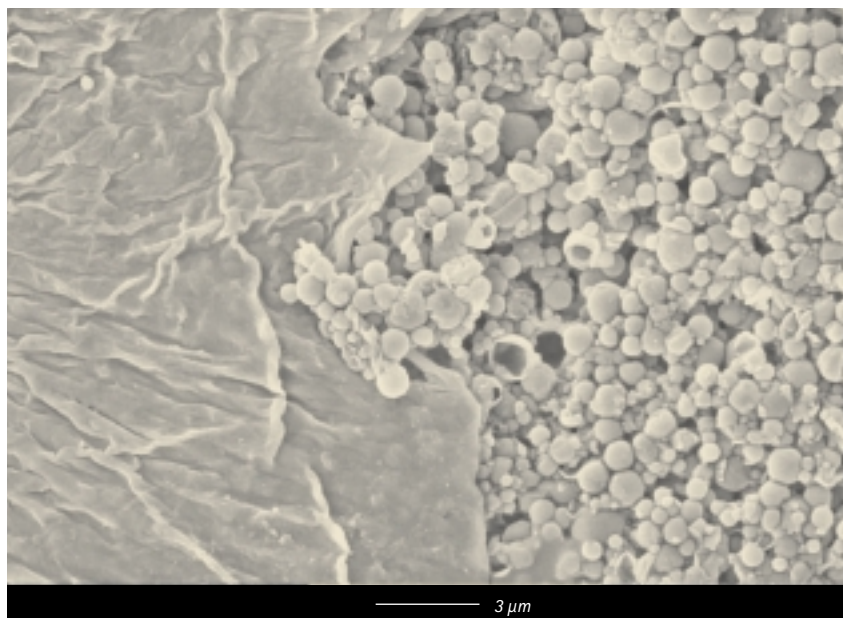
Product stability during topical in vivo application

In order to demonstrate the stability of the Eusolex® UV-Pearls™ capsules after topical application to human skin, scanning electron microscopy was used. This method is suitable for analysis of the Eusolex® UV-Pearls™ OMC, which remain on the surface of the outermost stratum corneum.

The capsules remain intact

A representative SEM micrograph of the first tape strip after topical application of Eusolex® UV Pearls™ OMC on the forearm of a volunteer.

At the left-hand side, a corneocyte can be observed whereas on the right-hand side the Eusolex® UV Pearls™ OMC particles can be clearly seen.



Technical data

Approx. 38 % OMC in a white aqueous dispersion

INCI: Water (Aqua), Ethylhexyl Methoxycinnamate, Silica, PVP, Chlorphenesin, BHT

pH: 3.8 – 4.2

Particle size: D(90) < 2.5 μm

Formulation guidelines

In order to ensure the homogeneity of the suspension, Eusolex® UV-Pearls™ should be stirred well before use with a suitable stirrer. During formulation, Eusolex® UV-Pearls™ do not require any special handling. The aqueous suspension can easily be incorporated into the aqueous phase. There is full compatibility with the full range of organic Eusolex® UV filters and inorganic UV filters, namely Eusolex® T products. Eusolex® UV-Pearls™ have excellent heat stability and can even be added after emulsification of the formulation.

Suggested applications:

Eusolex® UV-Pearls™ are suitable for:

- Emulsions such as O/W and W/O; micro-emulsions; multiple emulsions; W/Si.
- Opaques gels based on hydrocolloids such as Carbomer, Xanthan Gum etc.

Eusolex® UV-Pearls™ are invisible to the naked eye when applied on to the skin due to their 'natural' transparency and size. Their inertness and low allergy potential make them ideal for use in:

- Sun care products
- Sun care formulations for children and infants
- Sun care formulations for users with sensitive skin
- Daily skin care products
- Make-up and foundation creams containing sun protection

Stability

Temperature: Excellent stability up to 80 °C; do not freeze.
pH: Stable in the normal cosmetic pH range.
Light: Yellowish discoloration in the absence of any other UV filters may occur.

Use level

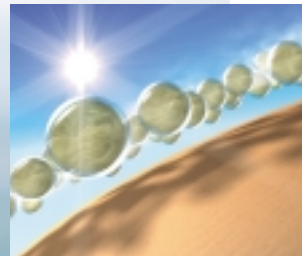
Based upon the regulatory status of Ethylhexyl Methoxycinnamate (OMC).

Use level of the suspension is 1 - 26 % in EU; 5.2 - 19.7 % in the US.

Recommended use level in

Day care products: 5 - 15 %

Sun care products: up to maximum concentration.



UV-Pearls™ is a trademark of Sol-Gel Technologies Ltd., of which Merck has acquired a minority shareholding and worldwide distribution rights for the patented inert sol-gel glass micro-particles.

For further information such as our detailed technical brochure and formulation booklet, please refer to the addresses listed overleaf.

The information given and the recommendations made herein are based on our research and are believed to be accurate, but no guarantee of their accuracy is made. This information is intended to be helpful, but no warranty is expressed or implied as to the results obtained from use of the formulation, procedure or products suggested herein or the suitability of a formulation, procedure or product for customer's specific purpose. Neither is any permission or recommendation to practice any invention covered by patent either expressed or implied, nor is any warranty given, expressed or implied, that the use of a product by customer does not infringe third parties' intellectual property rights.

Ordering information: Eusolex® UV-Pearls™ OMC
Cat. No. 130802

1 kg, 30 kg

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