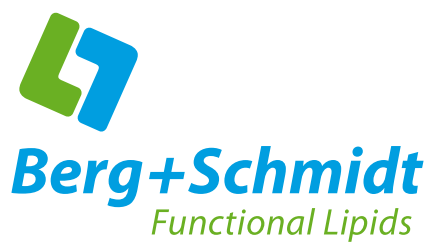




BergaCare SmartLipids
The solution for:

- Penetration enhancement
- Restoration of the natural skin barrier
- Controlled and prolonged release
- Protection of sensitive actives



BergaCare SmartLipids

*The new generation of
advanced delivery systems*

Active ingredients in skin care: high bioavailability, excellent tolerance, uncomplicated formulation

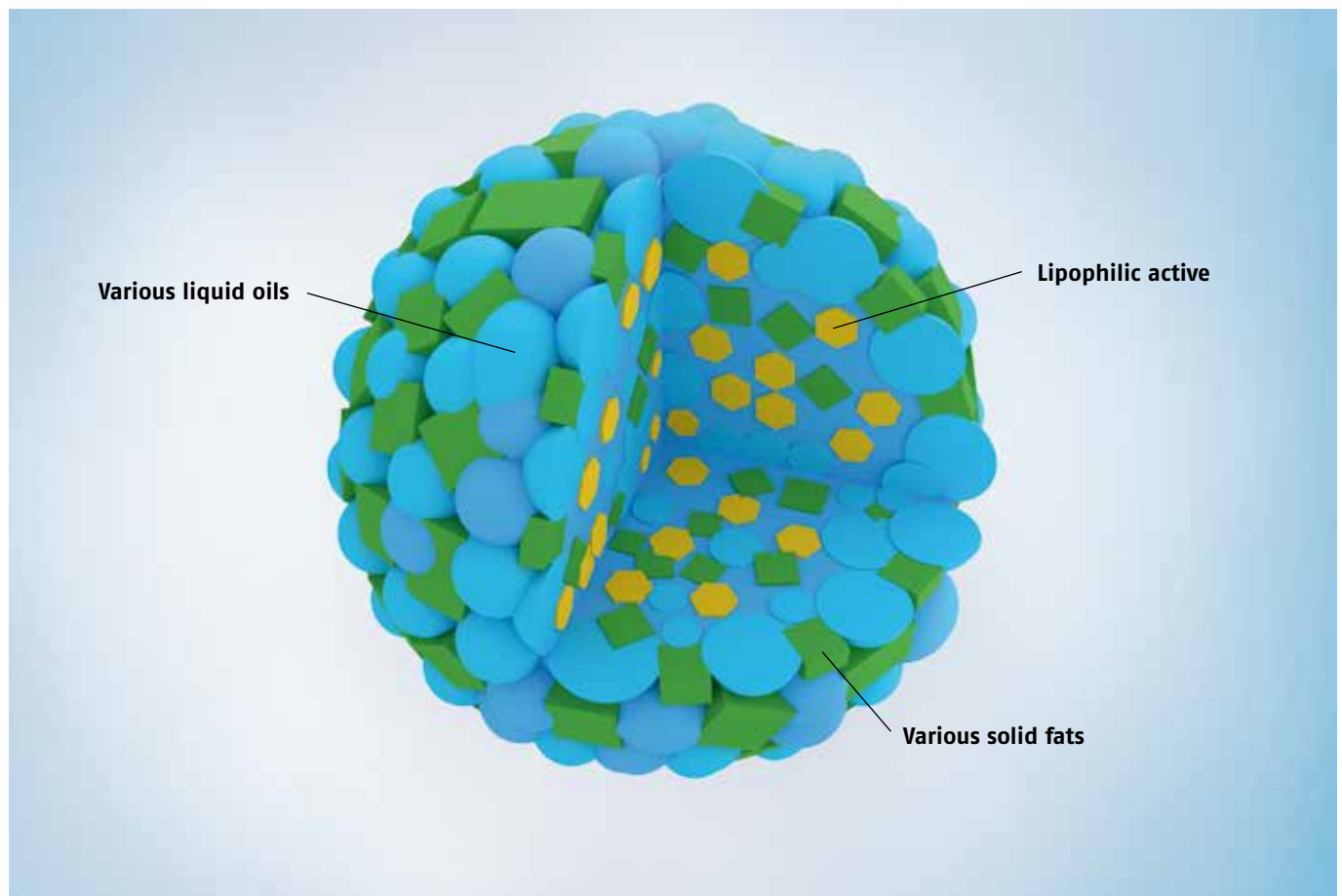
There are many active ingredients that are of great value in cosmetic use. However, their effectiveness and cost efficiency are limited. Many cosmetic manufacturers are therefore interested in delivery systems to compensate for those weaknesses.

BergaCare SmartLipids can address major challenges which formulators face in this area. For example:

- Actives can have limited bioavailability when applied topically in a conventional O/W or W/O formulation.
- When applied to the skin at high concentrations certain actives can cause irritation, but on the other hand could show great effectiveness if their release were controlled.
- Some labile actives can become instable on contact with water and/or oxygen if not sufficiently protected.
- Some ingredients are intended to have a certain effect on the skin surface, but their penetration deeper into the epidermis must be prevented.
- Dermatological product develops can also run into problems because of difficult ingredient processing or solubility.

All these issues combined with rising consumer expectations on product effectiveness need to be addressed with advanced delivery systems. BergaCare SmartLipids offer an ideal solution for many challenges.

Fig. 1: The advanced technology of the SmartLipids delivery system



BergaCare SmartLipids: the concept

BergaCare SmartLipids are submicron particles consisting of a complex mix of solid and liquid fat compounds (Fig 1). They are carefully designed to obtain an imperfect crystal structure, so that lipophilic actives can be encapsulated and protected within them.

BergaCare SmartLipids are supplied as a watery suspension. Their melting point is higher than skin temperature.

High loading capacity and firm inclusion of actives:

An effective encapsulation system should have a loading capacity as high as possible and avoid expulsion of actives during shelf life. The lipids constituting BergaCare SmartLipids are selected to maximize encapsulation capacity. The particle matrix created by the complex mixture prevents the reorganisation of an unordered α to a structured β modification. This permits firm inclusion of the actives in the particle matrix and ensures optimum protection, during storage as well as in the final cosmetic product.

Physical stability:

In conventional encapsulation technologies, the stability and integrity of the delivery system in the final products are frequently open to question.

BergaCare SmartLipids is a new type of delivery system that minimises the risk of degradation. It consists not of fluid vesicles, but of solid particles – at room and skin temperature.

The integrity in finished products is quantitatively easy to prove by DSC analysis (Differential Scanning Calorimetry). The available data show a very high physical stability, even at a stress storage temperature of 40 °C.

Protection of actives:

BergaCare SmartLipids delivery systems are in a physical solid state. In contrast to liquid oil droplets or liposomes, the solid state slows down the exchange of incorporated actives with the surrounding water phase, in which degradation often takes place. The solid matrix also protects against e.g. oxygen. Chemically labile actives such as retinol can be thus stabilised within BergaCare SmartLipids.

Fig. 2: The skin during application of an emulsion with BergaCare SmartLipids

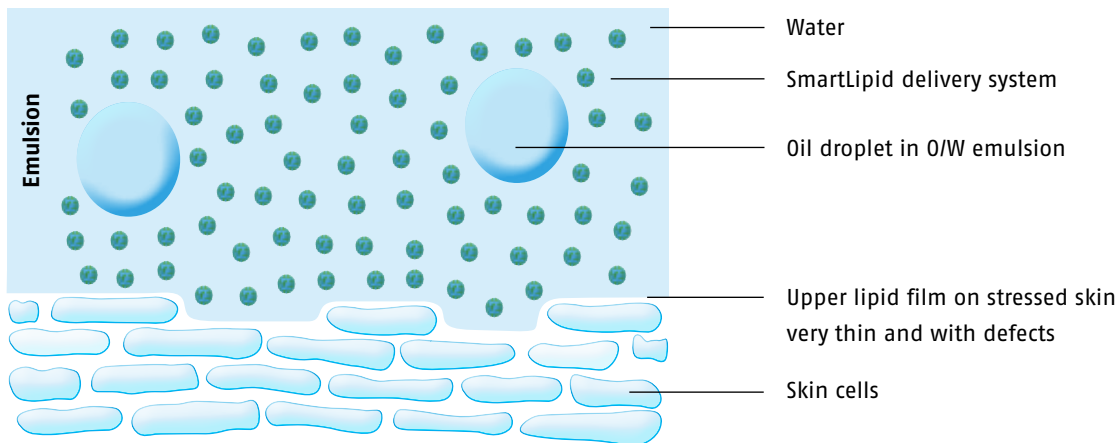
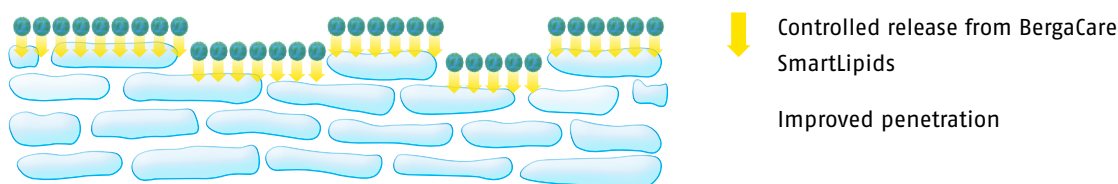


Fig. 3: Functioning of BergaCare SmartLipids



BergaCare SmartLipids on the skin

Restoration of the natural skin barrier:

When applied to the skin, BergaCare SmartLipid particles form an even, slightly occlusive lipid film (Fig 2 and 3). This reinforces the stratum corneum and minimises transepidermal water loss (TEWL). The delivery system itself thus has a positive effect on the skin.

Release mechanism:

After application on the skin, the submicron BergaCare SmartLipids particles remain in their solid state. Release takes place via solid-phase diffusion from the lipidic particles into the dermal lipid film and the underlying cells. The skin becomes an acceptor compartment.

Penetration enhancement:

The BergaCare SmartLipids form an occlusive lipid film which supports the skin's natural moisture retention and contributes to normal cell function. At the same time, the occlusive film helps actives penetrate the skin and boosts their bioavailability. The occlusion factor can be individually adjusted by varying the quantity of BergaCare SmartLipids particles.

Controlled and prolonged release:

With BergaCare SmartLipids the release rate can be individually controlled by targeted selection of the lipids to give different resulting particle matrix structures. This prevents excessive one-shot concentration on the skin and increases skin tolerability, since only the amount of actives actually needed at a given time is released.

In addition, the submicron particles have a naturally high adhesion to the skin. Their remainability on the skin prolongs the release of active ingredients.

Further properties:

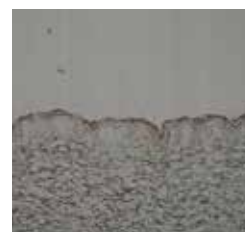
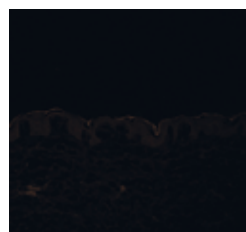
BergaCare SmartLipids is an innovative technology that can be based on natural biodegradable raw materials depending on the actives embedded in it. It can also be developed in conformity to ECOCERT/COSMOS. This advanced technology combines high protection and the ideal release of actives, and is declaration-friendly.



0.2% curcumin in BergaCare SmartLipids penetrates deeply into the skin



2% curcumin in solution in suspension in a gel remains on the skin surface



Curcumin in a cosmetic product marketed in the US, non-detection in the skin





Technical properties:

- High loading capacity
- Release rate adaptable to different needs
- Stabilisation of labile actives
- Easy to introduce into dermal formulations



Marketing:

- Possibility of conformity to ECOCERT/COSMOS
- Possibility of biodegradability
 - Declaration-friendly and renewable ingredients

Description and use

Product description: INCI, CAS and EINECS: depending on the customer's individual lipid combination

Appearance: Watery, opaque suspension

Dosing: 2-10% of the suspension

Processing: To ensure simple addition in formulations, BergaCare SmartLipids are supplied in the form of a watery suspension with low viscosity. The suspension is simply added to

the finished dermal formulation, after cooling to about 30°C in the case of hot production processes.

Application areas: Tailor-made solutions can be developed to individual customer needs. Initial applications are concentrated around the following product areas:

- Antioxidants / anti-aging ingredients
- Whitening agents
- Chemical UV filters



The Technology Centre in Ahrensburg near Hamburg

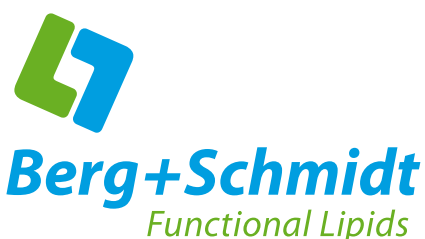
BergCare SmartLipids – the new generation of advanced delivery systems

As a long-established Hamburg company, Berg + Schmidt has almost 60 years of experience in the development and production of lipids.

BergCare SmartLipids is a powerful lipid-based delivery system designed for the protection and controlled release of active substances. It was developed in collaboration with pharmacologist Prof. Rainer Müller of the Free University of Berlin. With BergCare Smart Lipids, Berg + Schmidt takes an academic, scientifically-based development into commercial application.

We tailor the properties of the system to your needs. As a manufacturer of skin care products, you benefit from higher bioavailability and more efficient use of your valuable ingredients.

We will be pleased to use our knowledge to assist you in the development of new formulations with BergCare SmartLipids.



Berg + Schmidt GmbH & Co. KG

An der Alster 81 • D-20099 Hamburg, Germany • Phone: +49 (0)40 284 039-0 • Fax: +49 (0)40 284 039-44 • E-Mail: info@berg-schmidt.de • www.berg-schmidt.de