New multiple Nanoemulsion “Hydro-Tops” for dermal Drug Delivery – an Alternative to Liposomes

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Abstract

Multiple water-in-oil-in-water nanoemulsions (W/O/W emulsion) achieve new interest in dermal application because hydrophilic, amphiphilic and lipophilic active ingredients can be encapsulated in these vesicles. Sopharcos` new encapsulation technology – the “Hydro-Tops” – offers a carrier system based on one skin-friendly emulsifier derived from sunflower and allows an easy production by high pressure homogenization.

Green tea is one of the most widely consumed beverages and has gained attention due to its relevant content of polyphenols like epigallocatechin gallate (EGCG). Dermal applications of EGCG showed pharmaceutical effects like antioxidative properties, prevention of UV-induced damages and anticarcinogenic effects as well as cosmetic ones like inhibition of acne and skin aging. Only an encapsulation of EGCG leads to penetration of this polyphenol into the skin and also prevents changes in colour over the time.

The encapsulation of EGCG in Hydro-Tops leads to an improved stability and an excellent penetration efficacy even with different formulations compared to liposomes. The use of higher lipid concentrations in the Hydro-Tops facilitate a much higher loading of actives and determine also the penetration behavior and long lasting effects. The anti-oxidative power of EGCG in the epidermis was much higher than with flexible liposomes depending on the formulation (ESR measurements).

Hydro-Tops are stable in a DAC basis cream (German medicine codex) which means no degradation of the vesicles and release of APIs. The penetration of the vesicles out of this formulation effects good bioavailability of APIs in the deeper skin after dermal application**.**

Under investigation further benefits of using Hydro-Tops as dermal drug delivery carrier (e.g. for Hydrocortisone and proteins with high molecular weight) will be presented and discussed.

Biography

Dr. Gabriele Blume studied biology and biotechnology at the University of Essen where she graduated in 1985.

Subsequently, she continued with PhD studies at the technical University of Munich, finishing her dissertation in 1991 with the subject “Systemically applied liposomes in the medicine”. Then she moved to the University of Utrecht (Netherlands) in order to take a post-doc position dealing with the “chemical modification of liposomes to enhance specific targeting” **(Stealth liposomes)**. In 1992 she started working for IDEA GmbH (Munich) as manager R&D, which means the development and characterisation of topically applied liposomes **(Transfersomes)** for the pharmaceutical industry. In 1996 she changed to ROVI GmbH (Schlüchtern) as Vice president R&D for the development of **Flexible liposomes (ROVISOME)** for the cosmetic and pharmaceutical industry.

2010 Gabriele Blume founded the company Sopharcos. She developed different carrier systems e.g. **Hydro-Tops** and **Lipo-Tops** for dermal applications depending on the APIs and penetration behavior. 4 Types of these dermal drug delivery systems are patented in Europe and 2 ones also in USA.