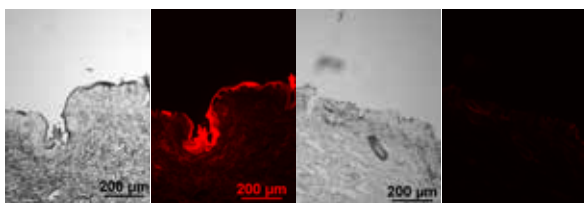


DELSCORE[®]

Delcore is hyaluronic acid chemically modified by oleic acid. On account of its specific chemical structure, Delcore is able to create a polymeric micelle-based delivery system for other active ingredients. Delcore has been shown to act as a delivery system for ingredients of a hydrophobic nature, the penetration of which through the stratum corneum may sometimes be problematic. This results in greater effect for the active ingredient, or maintenance of the current effect, at a lower concentration. The easier technological incorporation of the hydrophobic ingredient into water-based formulations is a bonus. Delcore's unique composition also delivers beneficial effects to the skin. Combined with a suitably chosen active ingredient, it is possible to target a relatively wide range of aged-skin-related problems.

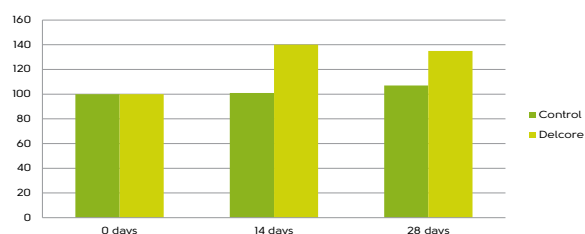
Delivery effect



Penetration of Delcore drug delivery with Nile red; Skin histology, Left: Delcore + Nile red as polymeric micelles, right: Delcore + Nile red as emulsion

Delcore's delivery effect was investigated using a model hydrophobic ingredient – Nile red – chosen for its excellent traceability. As presented by histological images, after eight hours the polymeric micelle-based delivery system of Delcore + Nile red reached deeper layers of the epidermis in comparison with the separate emulsion of Delcore with Nile red.

Self-effectivity of Delcore



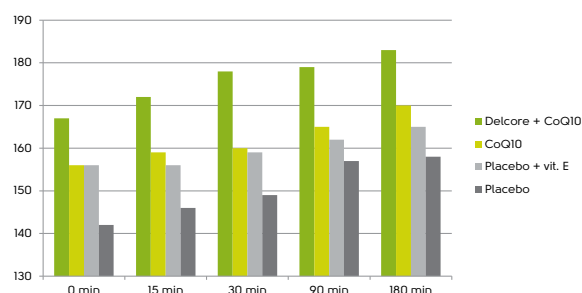
Sebum level after Delcore application/7 volunteers treated with 0.1% Delcore (25-43 years) + 15 volunteers placebo group; daily application for four weeks; measured by MPA 580 Sebumeters

Delcore is not only a functional delivery system to promote the penetration of hydrophobic active ingredients, but even when applied separately reports interesting effects in combating skin aging.

Aging skin is affected by an imbalance in the production of skin sebum, often in the form of its reduced production. The disruption of the oily skin film has a negative impact on other components and functions of the skin and accelerates the development of visible signs of aging.

Delcore is able to increase age-related reduced oiliness and thus slow the aging process (Luebberding et al., 2003).

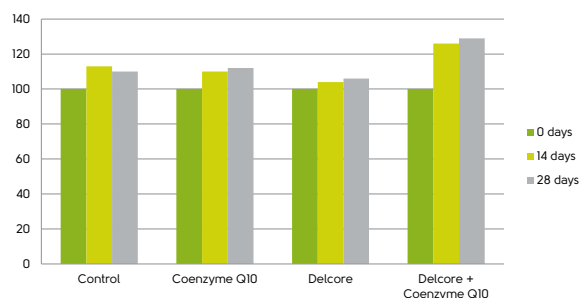
Increase in the effects of the active agent



Antioxidant effect of the Delcore drug delivery system with CoQ10, Measured by MPA 580 in cream, with Colorimeters (DPPH assay, n = 1)

Delcore, by encapsulating CoQ10, boosts its antioxidant activity. CoQ10 is known as fat-soluble antioxidant. Measurements at the final formulation stage showed that a polymeric micelle-based delivery system loaded with CoQ10 had a higher antioxidant effect than CoQ10 itself by 30-50% compared to the placebo. This phenomenon is probably related to the higher resistance of the loaded CoQ10 compared to air oxidation, to which it is normally very sensitive (Lambelet et al., 1992).

Proof of increase in the effects of active ingredients



Impact of the encapsulation of CoQ10 in the Delcore skin hydration system/Group of 6 treated volunteers + 15 placebo control (25-43 years); daily application for four weeks, measured by MPA 580 Corneometers

In the use of the above *in vivo* formulations, it was observed that neither CoQ10 nor Delcore has an inherent fundamental effect on the hydration of the skin of the face compared to a placebo. In the application of a formulation with a polymeric micelle-based delivery system loaded with CoQ10, there was a significant increase in hydration. This is evidently due to the above-mentioned and documented effects (on-site delivery, increased protection – efficacy of the active ingredient carried).

All data were obtained in the relevant *in-vivo* and *in-vitro* measurements and, subject to registration, can be accessed at www.contipro.com/anti-aging

SPECIFICATION: Delcore[®] powder

Origin	semi-synthetic
Appearance	white to slightly yellowish powder or granules
Identification - NMR	presence confirmed
Degree of substitution - NMR (% [mol/mol])*	5-15
Microbial contamination (CFU/g)	≤ 100

* The degree of substitution corresponds to the number of moles of boded fatty acid over the number of moles of all dimers, multiplied by 100

SOURCE

- low molecular weight hyaluronic acid obtained by fermentation is chemically modified by origin method
- non-GMO
- non-animal materials used during the manufacturing process

SOLUBILITY

- fully soluble in water. Speed of dissolving depends on molecular weight and degree of substitution. Delcore with lower degree of substitution dissolves quicker.
- soluble in an aqueous mixture of ethylalcohol, isopropylalcohol
- at low degree of substitution and molecular weight soluble in 0.9% NaCl

COMPATIBILITY AND PROCESSING

- sensitive to heat; heating to 60°C for 60 min. can lead to molecular weight decrease by up to 20% and degree-of-substitution decrease by up to 25%
- sensitive to extreme pH; extreme pH leads to decomposition, further enhanced by heating
- incompatible with cationic substances, e.g. surfactants or polymers (Polyquarternium-4, Polyquarternium-10, etc.)
- foaming in case of a higher degree of substitution

TOXICOLOGY

- non-irritating
- non-cytotoxic
- non-phototoxic

Literature:

Lambelet P, Löliger J, Saucy F, Bracco U. Antioxidant properties of coenzyme Q10 in food systems. J.Agric.Food Chem. 1992; 40(4):581-584.

Luebberding S, Krueger N, Kerscher M. Age-related changes in skin barrier function - quantitative evaluation of 150 female subjects. Int. J.Cosmet. Sci. 2013; 35(2):183-90

