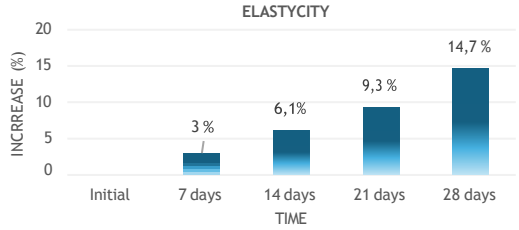
OptiMarine® EPS In-Vivo Efficacy Studies

In vivo clinical studies were conducted to evaluate the dermo cosmetic efficacy of AcquaSea® at 5%, formulated in a unique topical base. The trials were carried out by the Department of Physiology at the University of Murcia, involving up to 20 healthy volunteers per study, under controlled conditions (21 ± 2 °C; relative humidity 45-55%) and in compliance with international standards (ISO/TR 24475:2021, ICH E6). The product was applied daily for 1 to 4 weeks depending on the parameter assessed. OptiMarine® EPS demonstrated rapid, progressive, and well-tolerated effects with no adverse reactions, establishing itself as a safe and multifunctional active ingredient for comprehensive skin care.

Improvement of Skin Elasticity

Objective: To evaluate the effect of daily topical application on skin elasticity.

Method: Instrumental assessment using a Cutometer®. Daily application for 28 days on the forearm and facial area. Measurements were taken at D0 (baseline), D14, and D28 under controlled conditions (21 °C, 50% RH).



Results

- ✓ +14.7% average improvement in elasticity after 28 days
- ✓ Significant improvement already visible at D14 (+9.3%)

OptiMarine® demonstrated progressive efficacy in enhancing skin elasticity, associated with stratum corneum regeneration and reorganization of the epidermal matrix.

Barrier Function Reinforcement (TEWL)

Objective: To evaluate the immediate effect of OptiMarine® on transepidermal water loss (TEWL) as an indicator of improved skin barrier function.

Method: Evaporimeter measurement using a Tewa meter® (Courage + Khazaka). A single application of the gel was applied to a defined skin area. Measurements were taken at baseline, and at 0, 30, and 60 minutes post-application. Environmental conditions were controlled (RH 45-55%), and duplicate readings were performed to enhance reliability.

Results

- ✓ -31% average reduction in TEWL after 60 minutes
- ✓ Significant effect observed as early as 30 minutes (-29%)

The application of OptiMarine® produced an immediate effect on skin barrier integrity, reducing water loss and promoting moisture retention. These findings support its use as an active ingredient in dermo protective formulations.

Sebum-Regulating Efficacy

Objective: To assess the ability of OptiMarine® to regulate cutaneous sebum secretion following daily topical use.

Method: Quantification using a Sebu meter® (photometric analysis) on the forehead area. Weekly measurements were performed on Day 0 (baseline), D7, D14, D21, and D28 under controlled environmental conditions.

Results

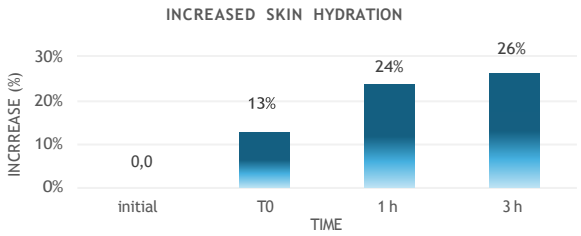
- ✓ Average sebum reduction at D28: -29.2%
- ✓ Most significant results observed between D14-D21
- ✓ Individual reduction range: -14.6% to -51.9%

OptiMarine® demonstrated a progressive and sustained sebum-regulating effect, supporting its use in formulations for combination, oily, or acne-prone skin, with an excellent tolerance profile.

Immediate and Long-Lasting Hydration

Objective: To evaluate the immediate and sustained moisturizing effect of OptiMarine® EPS after a single topical application.

Method: Corneometry (CM825) was used under controlled conditions (21 °C, 50% RH) to assess hydration on a defined forearm area at baseline and 1-3 h post-application, versus untreated control.



Results

- ✓ +26.7% average increase in hydration at 60 min post-application
- ✓ Stable and long-lasting effect maintained for up to 3 hours

OptiMarine® provides immediate, lasting hydration, suitable for sensitive skin. Its action stems from stratum corneum reinforcement and a non-occlusive film-forming effect

Stimulation of Cutaneous Microcirculation

Objective: To evaluate the topical efficacy of OptiMarine® in activating superficial microcirculation, measured through changes in skin temperature (an indirect indicator of capillary blood flow).

Method: Daily application of a gel containing 5% OptiMarine® for 28 days. Weekly surface temperature measurements were performed using thermography. Sessions took place on D0 (baseline), D7, D14, D21, and D28, under controlled conditions (RH 45-55%), with a 15-minute acclimatization period prior to each session.

Results

- ✓ Average overall increase: +14.9%
- ✓ Individual improvement range: +9.8% to +24.8%

OptiMarine® promotes a progressive and sustained enhancement of skin microcirculation, contributing to improved oxygenation and nutrient delivery to cutaneous tissues. The result is skin that appears more radiant, revitalized, and primed for regeneration processes.

PROVEN EFFICACY

Improves skin elasticity and firmness
Firmer tone, more defined contours, and increased skin resilience.

Provides immediate and long-lasting hydration without occlusion
Softer, more supple, and comfortable skin from the very first application.

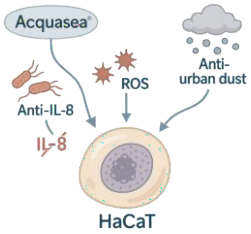
Strengthens the skin barrier and reduces water loss
Protects against external aggressors and enhances skin resilience.

Regulates sebum secretion without dryness or barrier disruption
Balanced skin, shine-free appearance, and less visible pores.

Boosts oxygenation and revitalizes the skin from within
Restores radiance, evens out skin tone, and enhances vitality.

Optimarine® In-Vitro Efficacy Studies

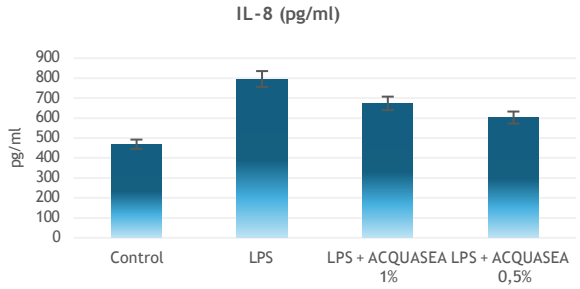
In vitro studies conducted by Zurko Research (Madrid) used human HaCaT keratinocyte cell lines to evaluate the bio functional profile of OptiMarine® under simulated conditions of inflammation, oxidative stress, and pollutant exposure. Concentrations of the active ingredient ranged from 0.5% to 2% and were tested under strict laboratory conditions. Techniques included ELISA for quantifying pro-inflammatory interleukins, flow cytometry for measuring reactive oxygen species (ROS), and fluorimetry to assess detoxifying proteasome activity. Results demonstrated clear antioxidant, anti-inflammatory, and protective effects, confirming its efficacy as a next-generation multifunctional cosmetic ingredient.



In Vitro Anti-Inflammatory Effect

Objective: To evaluate the anti-inflammatory effect of OptiMarine® through inhibition of interleukin IL-8 in inflamed human keratinocytes.

Method: Inflammation was induced using LPS (10 µg/ml) in HaCaT cell lines. IL-8 levels in the cell supernatant were quantified via ELISA. The assay was performed in quintuplicate.



ROS production in the different study groups after 24 hours of incubation. Negative Control, Positive Control (H2O2) and ACQUASEA at 2 concentrations.

Results:

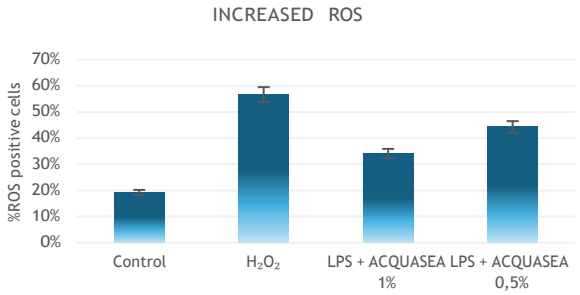
- ✓ IL-8 reduction: -15.3% with 1%
- ✓ IL-8 reduction: -24.3% with 0.5%

OptiMArine® exerts a direct anti-inflammatory effect on human keratinocytes, reducing IL-8 release even under induced inflammation. These results support its use in post-peel products, acne-prone skin, and sensitive or reactive skin care formulations.

Antioxidant Activity (ROS Reduction) In Vitro

Objective: To evaluate the antioxidant capacity of OptiMarine® by measuring its ability to reduce reactive oxygen species (ROS) in human keratinocytes.

Method: Oxidative stress was induced with H_2O_2 (0.5 mM) in HaCaT cells. ROS levels were quantified by flow cytometry using DFFH-DA. The assay was performed in quadruplicate.



Results - ROS reduction vs. oxidized group:

- ✓ -39.7% with 1%
- ✓ -21.8% with 0.5%

OptiMarine® significantly reduces cellular oxidative stress, confirming its direct antioxidant activity. This positions it as an ideal ingredient for protecting skin exposed to pollution, UV light, blue light, or environmental aging.

Anti-Pollution and Detoxifying Activity In Vitro

Objective: To evaluate efficacy across two key parameters: protection against urban pollutants (urban dust) and stimulation of detoxifying activity (proteasome function).

Methods: 1. Cell viability assay (anti-pollution): Oxidative stress induced by urban dust (2 mg/mL); cell viability assessed via MTT assay. Results compared between treated and untreated groups. 2. **Proteasome activity assay (detoxification):** Quantified by fluorimetry to determine the degradation capacity of damaged proteins.

Results: OptiMarine® enhances cell viability under exposure to urban pollutants and strongly stimulates proteasome activity, promoting the removal of damaged proteins. This supports its role as an urban anti-stress and cellular detoxifying agent, ideal for antipollution skincare formulations.

Safety and skin compatibility (HRIPT)

Objective: To assess the cutaneous tolerance and allergenic potential of OptiMarine® after repeated applications under controlled and exaggerated conditions (occlusive patch), following the HRIPT method (Marzulli C Maibach, 1976).

Method: Repeated applications on 67 participants (55 completed the study), applied 9 times over 3 weeks under occlusive patch. Skin reactions were evaluated at 24, 48, and 72 hours. A subsequent re-challenge phase was included. The study was conducted under dermatological supervision.

Results:

- ✓ Mean Irritation Index (M.I.I.): 0.001
- ✓ Classification: Non-irritant - Excellent skin compatibility
- ✓ 0% allergic reactions during re-challenge phase
- ✓ No formation of papules, vesicles, or persistent edema
- ✓ 100% of participants showed no relevant adverse effects

OptiMarine® was well tolerated by 100% of volunteers, with no evidence of sensitization or significant irritation. It meets international regulatory standards (ICH E6, ISO/TR 24475, REGULATION EC 1223/2009) as a safe ingredient for daily topical use, including on sensitive or reactive skin.