Optidel Biosystems

The technological revolution in **personalized cosmetic ingredients**

FERULIC_15

Cutting-edge solutions for a technologically demanding sector.

OPTIDEL offers an advanced solution to dissolve and concentrate natural active ingredients with low stability and insolubility, significantly enhancing their bioavailability and efficacy.

Ready-to-use technology for formulation:

Versatile solutions for both hydrophilic and hydrophobic ingredients, even the most unstable or poorly soluble compounds.

Enhances bioavailability and efficacy:

Maximizes stability by up to 90%, increases skin bioavailability by up to 60%, and multiplies efficacy up to fourfold.

Sustainability driven by innovation:

Technological solutions that enable cleaner, more efficient formulations with a lower environmental impact.

Adapted to today’s market:

Protects actives from degradation and enables the development of customized formulas aligned with the latest trends.

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Ferulic_15

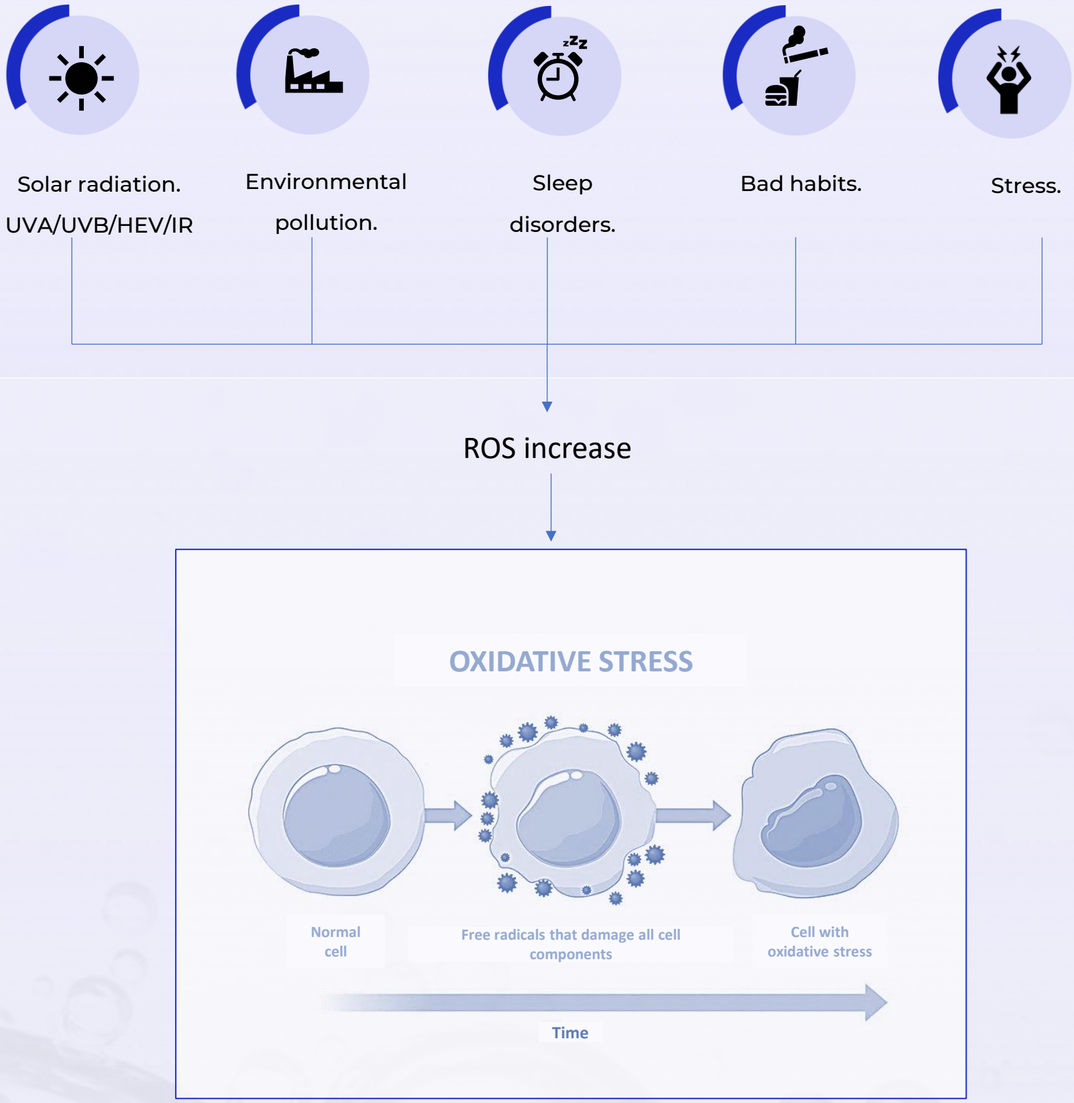
Next-generation cellular antioxidant technology

A new-generation active ingredient with antioxidant and photoprotective properties for firmer, protected, and radiant skin.

The impact of oxidative stress on the skin

Oxidation is a natural process that deteriorates tissues and accelerates skin aging. External factors such as UV radiation or pollution intensify this damage, making signs of aging more visible.

When reactive oxygen species (ROS) exceed the skin's natural antioxidant defenses, progressive damage occurs in DNA, epidermal lipids, and structural proteins, compromising cellular health and function.



✨ Oxidative Stress: Cellular imbalance with visible impact

Oxidative stress compromises the integrity of skin cells, accelerating tissue deterioration and promoting the appearance of visible signs of skin aging.

CELLULAR CONSEQUENCES

Degradation of collagen and elastin fibers

DNA damage

Slowing of cellular metabolism

Weakening of the skin barrier function

VISIBLE CONSEQUENCES

Loss of hydration

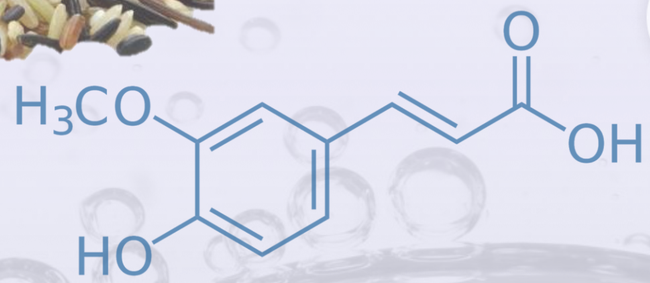
Wrinkles and loss of firmness

Dark spots

Dull skin

Ferulic_15: Antioxidant and Photoprotective Biological Shield

Ferulic acid (C10H10O4) is a phenolic acid derived from cinnamic acid. It is a plant-based cosmetic ingredient with very effective antioxidant properties. It plays a crucial role in protecting the skin from oxidative stress, and therefore helps prevent premature skin aging.



Maximum concentration and efficacy: Optidel keeps the active ingredient stable and bioavailable for superior results.

Total versatility: The easiest and most effective way to add ferulic acid to a wide range of cosmetic formulations.

Protection and beauty in one step: Antioxidant and photoprotective power for firm, protected, and radiant skin.

Your secret to the “glass skin” effect: Flawless, radiant, and glowing skin.

The ferulic acid used by Optidel Biosystems is extracted and purified from rice bran (Oryza sativa L., Gramineae) and its germ.

how does it work?

🧪 Advanced antioxidant power.

Neutralizes free radicals and protects against oxidative stress (UV, pollution, lifestyle)[1]

✨ Depigmenting and Revitalizing Action.

Helps reduce dark spots and brings radiance, even tone, and glow to the skin.[4]

🫧 Cell Protection and Anti-senescence.

Acts on mechanisms of cellular damage and aging, prolonging the vitality of skin cells.[2]

🌿 Soothing and Anti-inflammatory Effect.

Reduces inflammation, redness, and irritation, especially after sun exposure.[1]

⏳ Prevention of Aging.

Protects structural proteins like collagen and elastin, reducing the expression of degradative enzymes (MMP-1 and MMP-3) and preserving the extracellular matrix.[3]

1 Graf E. (1992). Antioxidant potential of ferulic acid. Free radical biology & medicine, 13(4), 435–448. https://doi.org/10.1016/0891-5849(92)90184-i

2 Hahn, H. J., Kim, K. B., Bae, S., Choi, B. G., An, S., Ahn, K. J., y Kim, S. Y. (2016). Pretreatment of Ferulic Acid Protects Human Dermal Fibroblasts against Ultraviolet A Irradiation. Annals of dermatology, 28(6), 740–748.

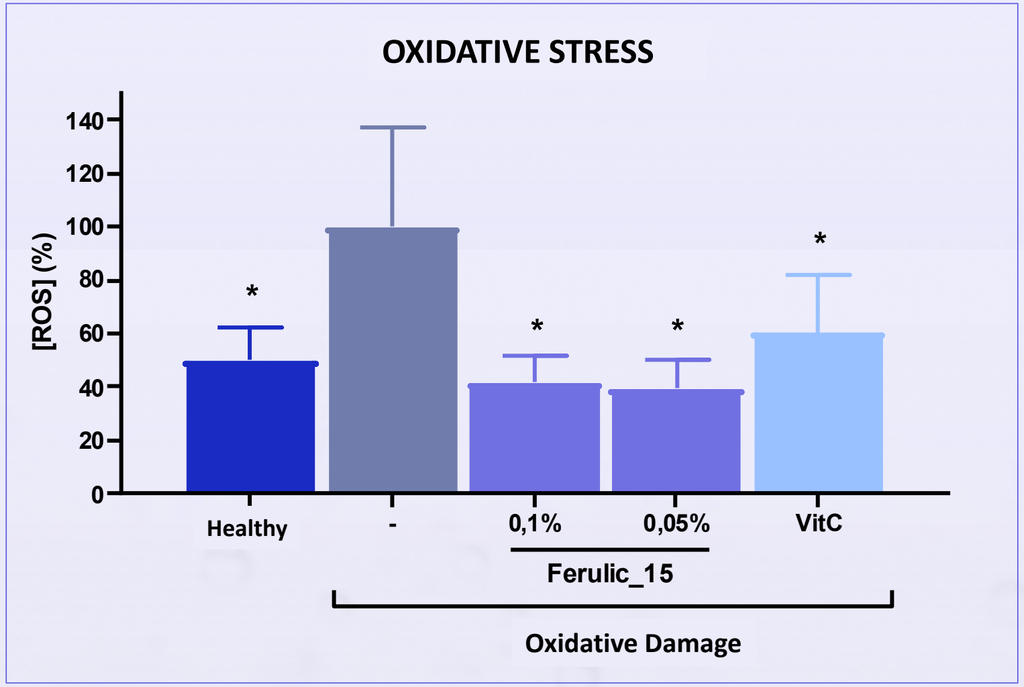
3 Pluemsamran, T., Onkoksoong, T., y Panich, U. (2012). Caffeic acid and ferulic acid inhibit UVA-induced matrix metalloproteinase-1 through regulation of antioxidant defense system in keratinocyte HaCaT cells. Photochemistry and photobiology, 88(4), 961–968. https://doi.org/10.1111/j.1751-1097.2012.01118.x

4 Park, H. J., Cho, J. H., Hong, S. H., Kim, D. H., Jung, H. Y., Kang, I. K., y Cho, Y. J. (2018). Whitening and anti-wrinkle activities of ferulic acid isolated from Tetragonia tetragonioides in B16F10 melanoma and CCD-986sk fibroblast cells. Journal of natural medicines, 72(1), 127–135. https://doi.org/10.1007/s11418-017-1120-7

Intracellular antioxidant effect: ROS activity test

Ferulic_15 completely prevents the formation of free radicals (ROS), surpassing the antioxidant efficacy of vitamin C by 35%.

Even under basal conditions, it showed an additional improvement of **+10%,** confirming its **high potency as a cellular antioxidant shield.**



ROS production (percentage) in the HaCaT keratinocyte cell line obtained in the antioxidant assay after 4 hours of exposure to tBPH with the test ingredient at the indicated concentrations. The positive control, tBPH insult, represents the cells exposed to the oxidizing agent tBPH alone. Bars represent the mean of six technical replicates from an independent assay. Error bars represent the standard deviation. Statistical significance * $p < 0.005$.

Photoprotective efficacy.

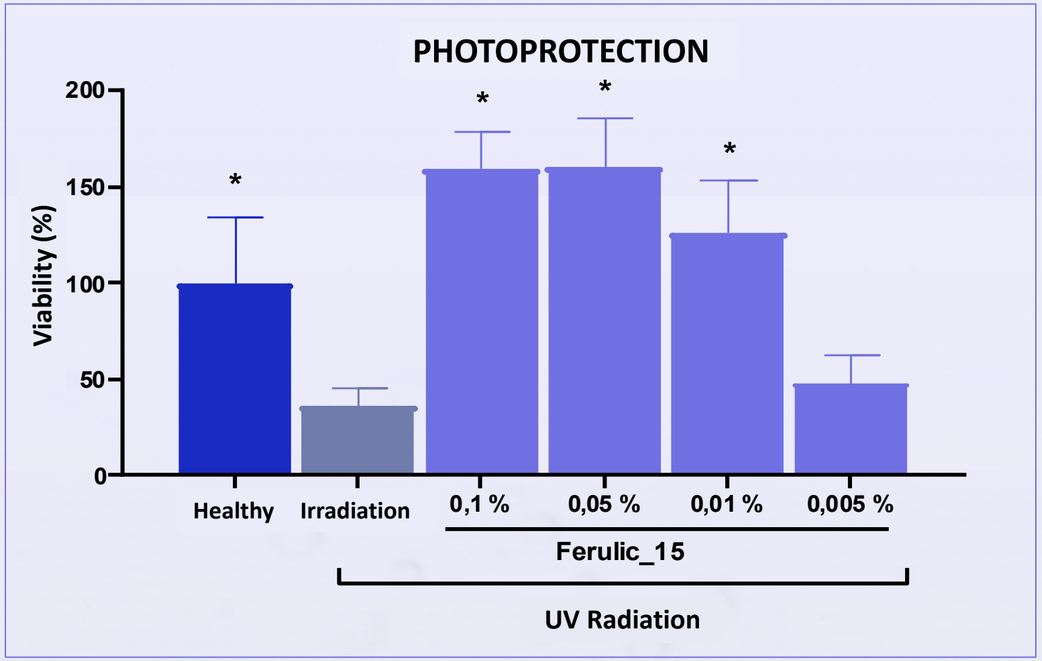
Ferulic_15 provides exceptional cellular protection against sun damage

FERULIC_15 **multiplies** the skin's natural photoprotection by **4.5 times** after sun exposure: from 35.75 (damaged skin) to over 160.

It not only protects: it repairs and enhances skin defense, surpassing healthy skin protection by

Immediate booster effect: even at low concentrations, FERULIC_15 raises protection to maximum levels.

Shielded and renewed skin against solar damage.



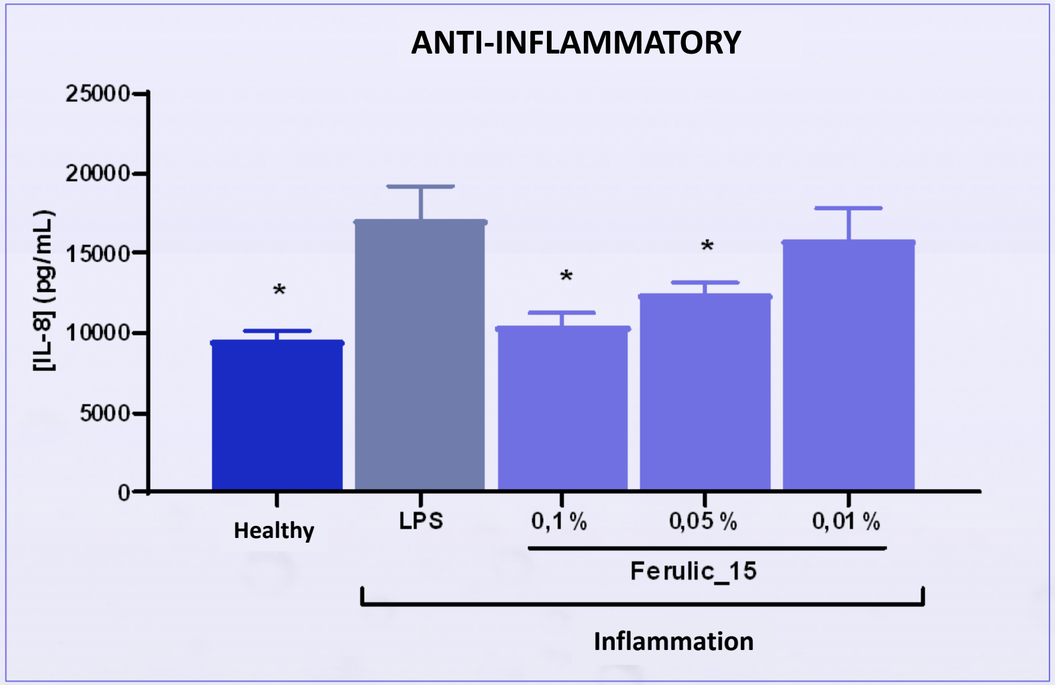
In vitro assay conducted on human keratinocytes (HaCaT) to evaluate the reparative capacity against sun damage. The cells were irradiated with simulated sunlight and treated with different concentrations of the compound for 24 h. Cell viability was measured using the MTT assay.

Anti-inflammatory activity.

Proven anti-inflammatory action

- **-89% IL-8 at 0.1% concentration** → levels close to baseline
- **−62% IL-8 at 0.05% concentration**

Ferulic_15 effectively and dose-dependently reduces IL-8 production, a key marker of the inflammatory process, validating its use as a **soothing and anti-inflammatory active** in advanced cosmetic formulations.



In vitro assay conducted on differentiated human monocytic cells (THP-1), stimulated with LPS to induce inflammation. The compound was applied at different concentrations for 24 h, and its effect was evaluated by measuring IL-8 levels via ELISA. The reduction of this pro-inflammatory cytokine confirmed its anti-inflammatory action.

Structural protection of the skin

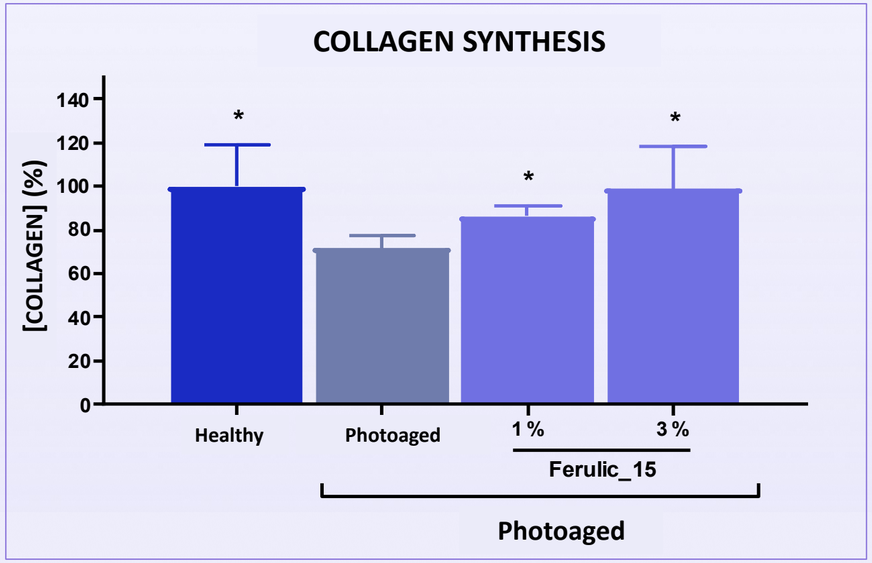
Ferulic_15 protects the extracellular matrix and preserves the skin's firmness, elasticity, and youthfulness.

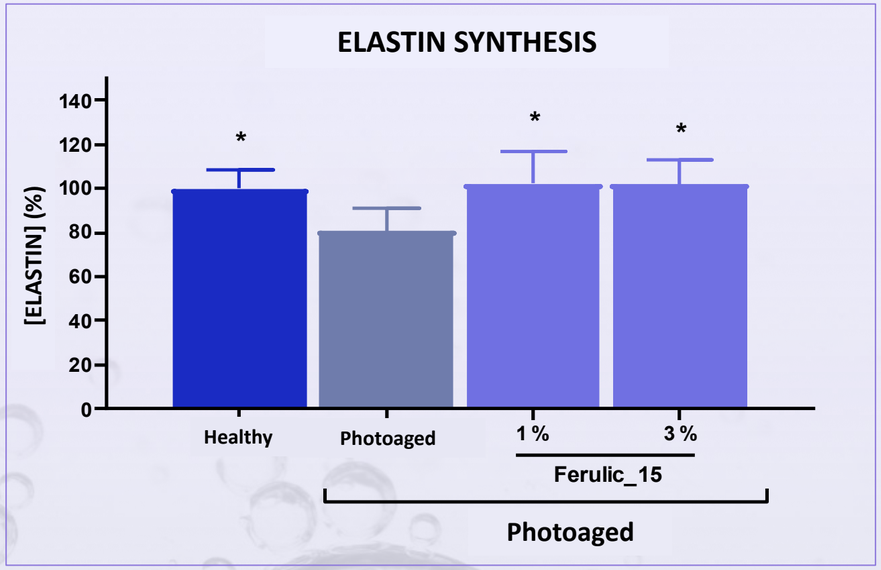
🧬 Collagen

Ferulic_15 shows powerful protective action:
- 1%: recovery up to 86%
- 3%: near-complete restoration to 99%

🧬 Elastin

Ferulic_15 prevents loss by improving baseline levels at both concentrations (1% and 3%).





The ex vivo study evaluated the ability of Ferulic_15 to modulate the extracellular matrix in photoaged human skin explants (Phototype III, 47 years old), subjected to simulated solar irradiation and corticosteroid treatment. Soluble collagen and elastin levels were quantified using specific colorimetric assays, allowing the assessment of the treatment's ability to preserve or restore these key structural components against photoaging-induced damage.

Evaluation of anti-inflammatory activity

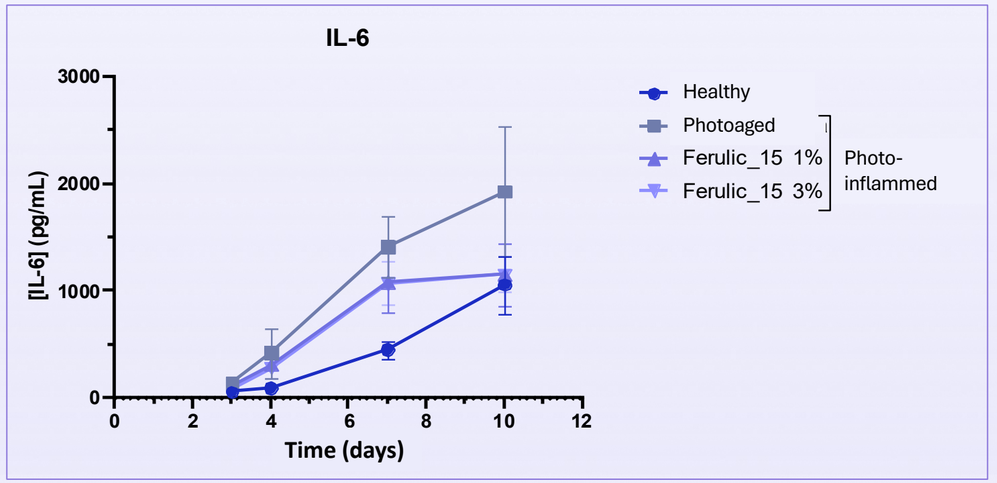
Ferulic_15 shows proven efficacy in reducing key inflammatory markers associated with sun damage, ensuring less inflamed, younger, and more resilient skin.

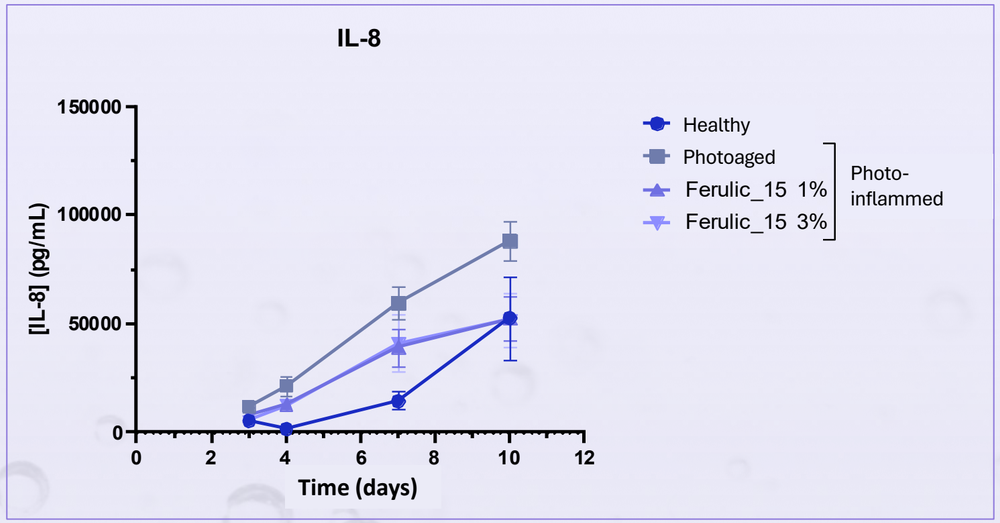
Up to 4 times less inflammation: FERULIC_15 reduces IL-8 and IL-6 levels to match those of healthy skin after 10 days.

Immediate protection: At 72 hours, FERULIC_15 at 3% decreases inflammation by 56% compared to sun-damaged skin (IL-8: 5192 vs. 11853 pg/ml).

Long-lasting effect: After 10 days, skin treated with FERULIC_15 maintains controlled inflammatory markers (IL-6: 1149 vs. 1929 pg/ml in photoaged skin).

Ferulic_15 blocks the inflammatory cascade, protecting the skin from accelerated aging and preserving its biological balance.





To analyze the inflammatory response associated with skin aging and the impact of treatment with Ferulic_15, the concentrations of the pro-inflammatory cytokines IL-6 and IL-8 were measured in the culture supernatant using ELISA assays.

These markers reflect the chronic inflammatory phenotype of aged skin and allow assessment of the compound's anti-inflammatory potential in the ex vivo model.

The reduction of these pro-inflammatory mediators confirms the efficacy of Ferulic_15 in halting persistent inflammatory processes associated with skin deterioration.

Benefits:

Ferulic_15

Next-generation cellular antioxidant technology

✨ Photoprotective action:

Protects against sun damage and effectively repairs the skin, restoring its vitality and preventing photoaging.

Advanced photoprotective power:

Powerful antioxidant action, surpassing vitamin C and strengthening cellular defense against aging and oxidative damage.

Calming and antiinflamatory effect:

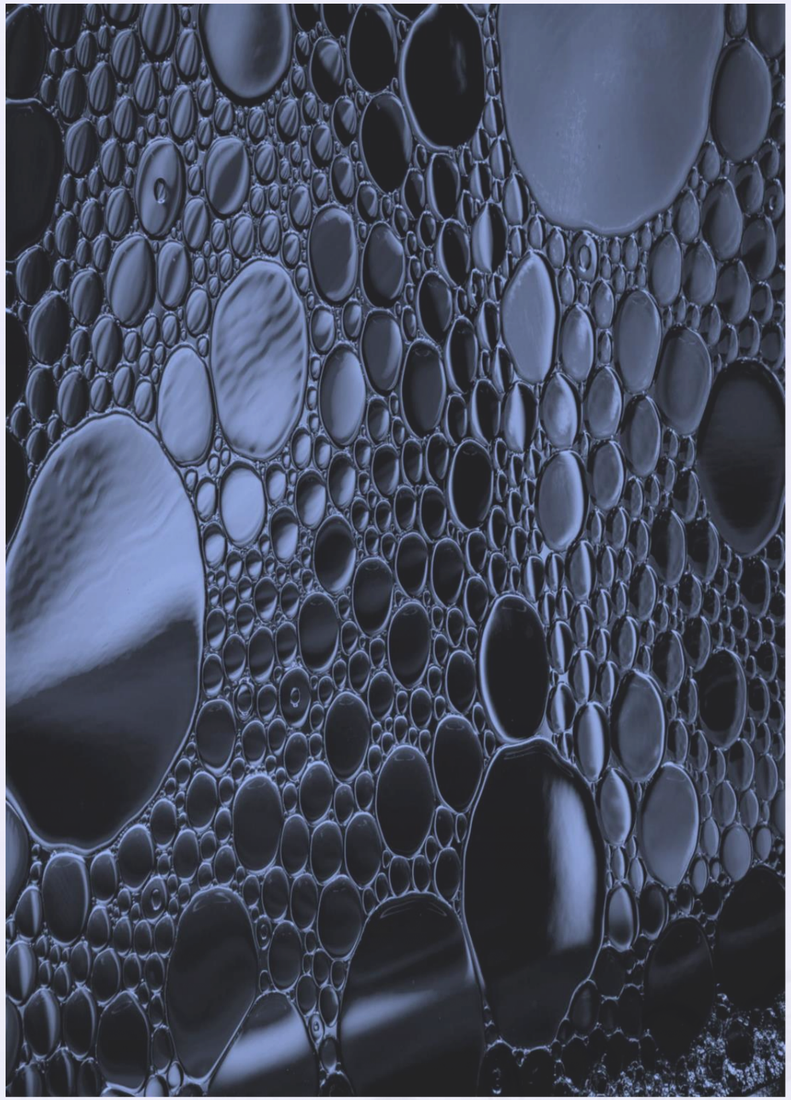
Soothes sensitive skin, reduces irritation, and provides an immediate feeling of comfort thanks to its powerful anti-inflammatory action.

Aging prevention:

Protects and regenerates the dermal matrix, restoring the skin’s elasticity, structure, and vitality.

Cell protection and anti-senescence:

Ferulic_15 neutralizes inflammation, preserves skin youthfulness, and ensures less inflamed, more resilient skin protected from the cellular core.



FERULIC_15: PGIF_15

Application:

▪ O/W creams and lotions ▪ Sunscreen products ▪ Post-procedure or post-sun exposure formulas ▪ Soothing treatments for sensitive or irritated skin ▪ Products for acne-prone or rosacea-prone skin ▪ Anti-aging products

Recommended dosage:

1% - 3%

Formulation tips:

Add in bulk during the final stage of the production process, ensuring the temperature does not exceed 40°C.Add to the mixture and maintain under stirring until homogeneous.

Active % (p/p):

Ferulic acid at 15%.

INCI name

INCI name: Propylene Glycol, Dimethyl Isosorbide, Ferulic Acid.
CAS: 57-55-6, 5306-85-4, 537-98-4/1135-24-657-55-6; 13956-29-1

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