*IFSCC 2025 full paper (**IFSCC2025-979**)*

Epidermal fasting as a new cosmetic approach to provide well-aging benefits to skin

Isabel Ramos [1], Begoña Sanjuán [1]

[1] Ayuna Less is Beauty Research, Bit Beauty SL, Sant Feliu de LLobregat (Barcelona, Spain)

1. Introduction

We operate within a culture that emphasises "more": increased actives, ingredients, steps, and promises. However, this raises a critical question: might the key to attaining genuinely healthy, resilient, and youthful skin reside not in the addition of numerous elements, but in their strategic reduction? Epidermal fasting proposes a novel category in cosmetics, grounded in the science of cell fasting, biohormesis, and restorative processes mediated by rest.

Rest is essential for repair and, consequently, for healing processes. Our bodies constantly receive information, both about what is happening internally and in our surrounding environment, generating incessant signals that help us adapt to an ever-changing world. Today's stimulus-rich lifestyle presents a challenge to our regenerative capacity. Another, far less well-known way to allow our bodies to rest is through curative diets. These approaches focus on natural, balanced nutrition, emphasising the significant contribution of plant-based components—particularly in raw form—and regulated food intake via fasting, which also helps eliminate unnecessary and potentially toxic components. Such practices promote detoxification and deep cleansing while simultaneously activating innate self-regeneration mechanisms. They also involve avoiding deficiencies of essential nutrients, within a concept known as "undernutrition without malnutrition." The individual undertaking fasting should also pay close attention to their sensations, and develop an understanding of the process and reactions their body will experience. Fasting is a naturally occurring physiological mechanism that has evolved as part of our adaptation to environments with scarce food resources. These coping strategies enable the body to function by utilising energy reserves and adjusting various systems in standby mode. When food once again becomes abundant, the metabolism reactivates, initiating a powerful regenerative process.

Over the past decades, scientific research has demonstrated the remarkable effects of therapeutic fasting on systemic health, including improvements in metabolism, reductions in inflammation, DNA repair, stem cell regeneration, and immune rejuvenation. [1] Evidence shows that fasting can counteract pathological processes, enhance metabolic function in age-related disorders, and reduce inflammation across various conditions.2 Key benefits include improved ageing biomarkers, immune renewal, and stimulation of progenitor and stem cells.

Consequently, fasting cycles are a powerful tool for modulating key regulators of cell protection and tissue regeneration, with the potential to reverse or mitigate immunosuppression and immunosenescence caused by chemotoxicity and ageing.

The beneficial effects of nutrition are mediated by epigenetic mechanisms, signalling pathways regulating cell growth and ageing, and intercellular communication molecules.[3]4 Key pathways such as IGF-1, mTOR, and PKA, when inhibited, activate protective, detoxifying, and regenerative processes. 56[7] These mechanisms enable a rapid, adaptable cellular response, reducing pro-growth signals during fasting and enhancing resistance to toxins and stress. As a result, mitochondrial function, DNA repair, and autophagy are improved, while stem cell-driven regeneration is stimulated. Overall, caloric restriction promotes greater resistance, delays ageing, and encourages self-renewal.[8] Mitochondrial health, DNA repair and autophagy are enhanced, while at the same time stem cell-mediated regeneration is promoted.[2] This means the overall effect of a reduced calorie intake involves increased resistance, a delay in ageing-related changes, and the promotion of self-renewal.[9]

Fasting diminishes levels of insulin and leptin, as well as inflammation. At the cellular level the key triggers are reduced levels of insulin and IGF-1 (Insulin Growth Factor-1), and a consequent reduction in the stimulation of its receptor in the cell membrane (IGFR).10 In situations of overnutrition, this mediator triggers a set of coordinated gene expression and cell metabolism effects, leading to a reduction in the FOXO family of transcription factors. These are responsible for regulating resistance to cell stress and ageing (see diagram). In addition, there is a clear connection between the metabolic pathways mediated by IGF-1 and the pro-ageing mechanisms of PKA.[4] Therefore, the main intracellular signalling pathways that are reduced when fasting are[11]:

- PI3K/Akt/mTOR. Akt is a kinase that binds directly to the FoxO family of transcription factors, which regulate protection mechanisms such as autophagy, DNA repair, the ubiquitin-proteasome system, and other stress-resistance genes. Specifically, TORC1 senses high concentrations of nutrients and energy (ATP), which is also stimulated by growth factors and stress, modulating protein synthesis and activating AGC kinases like PKA. The TORC1/S6 K1 signalling pathway regulates glucose equilibrium, insulin sensitivity, adipocyte metabolism, body mass, energy balance, and ageing.

- A(AC/PKA). A reduction in this provokes the regulating and protective effects of stem cells; stimulating their self-renewal and regeneration.[7][10] PKA can phosphorylate FOXO directly and negatively regulate it, which has a profound effect on the stress resistance of stem cells, their self-renewal, and the maintenance of their pluripotency.[1] PKA is implicated in stem cell differentiation. Fasting encourages the self-renewal of stem cells.

In addition to these signalling pathways, the activation of the IGF-1 receptor has been shown to trigger the production of reactive oxygen species (ROS) at a cellular level, increasing oxidative stress and having the capacity to inflict significant damage.
All these markers are also essential elements in skin metabolism. Skin cells have IGF-1 receptors that, when activated, act negatively on FOXO and stress resistance, with analogous results. It has been demonstrated at the cutaneous level that intermittent fasting can accelerate wound repair, both in the fibre-contraction phase and in reepithelialisation, and increased numbers of collagen fibres are also detected.[1] This activity is related to an increase in the

activity of monocytes and macrophages stemming from a change in the immuno-endocrine system, both during and after fasting.

In summary, the primary mechanisms of fasting are:

- ↓ IGF-1 → ↑ FOXO → ↑ self-repair.
- ↓ mTOR y PKA → ↑ Stem cell activity
- ↓ ROS → ↑ Cellular resilience and longevity.

Building on these key discoveries, this study introduces a novel approach to skincare, inspired by the self-regeneration mechanisms triggered by fasting. Just as systemic fasting reduces excess stimuli to promote internal repair, topical fasting can stimulate the skin's innate regeneration processes, offering a new strategy for effective Well-Ageing.[12]

The problem: Excessive skin stimulation

Traditional cosmetics have been founded on the paradigm of overstimulation: energisers, retinoids, peptides, growth factors, exfoliants, acids... all aimed at forcing the skin's cells to produce more, to operate faster, and to never pause. However, this approach carries a significant cost: oxidative stress, silent inflammation, chronic sensitivity, and cellular exhaustion. The skin cannot regenerate effectively if it is never given the opportunity to rest.

This "skin overnutrition" triggers the production of reactive oxygen species (ROS), which act as secondary intracellular messengers. As described above, when ROS levels exceed a certain threshold, they enhance insulin sensitivity through oxidative modifications of its receptor. Consequently, excessive stimulation increases the oxidative capacity of skin cells and their susceptibility to stress, similar to the effects of high insulin and IGF-1 levels observed in hypercaloric diets. Compounds that stimulate cutaneous cells, such as retinoic acid, have been shown to elevate intracellular ROS.[13] Conversely, plant-derived compounds with antiproliferative properties not only protect against oxidative damage but also aid in restoring cellular defense mechanisms.

The alternative: Epidermal Fasting

Epidermal fasting does not signify abandoning skincare; rather, it represents a paradigm shift in its approach. Inspired by principles of therapeutic fasting, this methodology harnesses the skin's innate capacity to detoxify, protect, regulate, and ultimately regenerate autonomously, fostering a restorative process driven by the skin's intrinsic self-renewal mechanisms. The core principles of epidermal fasting are reducing unnecessary stimuli, eliminating extraneous chemical interferences, and creating space for the skin to regenerate naturally. To translate the concept of fasting into skincare, it is integrated into the ritual through both the application method—which promotes the clearing of negative thoughts, fostering connection, and mindful attention to sensations—and through the formulation of products, which should emphasise the focus on both formulation and associated rituals.

1. Formulation: minimalist and functional

- Fasting involves eliminating toxins and detoxifying. Therefore, it is essential to adopt a **"free from unnecessary or toxic ingredients"** approach, applying the **precautionary principle**: if there is any doubt, the ingredient is removed. Excluded in this study are components such as acrylic polymers, acrylamides, and carbomers, as well as silicones, PEGs, PPGs, and their derivatives including propoxylated and ethoxylated compounds. The formulation also avoids parabens, EDTA, BHT,

synthetic fragrances, and artificial colours. Hormonal sunscreens, talc, triclosan, formaldehyde, and isothiazolinones are excluded, along with active agents like retinol, hydroquinone, kojic acid, and arbutin. Additionally, nanomaterials, irradiated ingredients, halogenated preservatives, and amines with potential nitrosamine formation are eliminated, reflecting a strict safety and ethical stance aimed at minimising exposure to questionable substances.

- Designed to preserve the integrity of both the skin and its microbiome
- Based on active ingredients that mimic the mechanisms of fasting, activating the skin's natural self-repair and regeneration processes. The formulation includes phyto-peptides derived from turmeric root and *Centella asiatica*, along with plasmas rich in plant cell factors from carrot, *Arabian cotton*, and pomegranate stem cells; as well as *Lactobacillus ferment*, coconut extract, and organic lemon water. These ingredients activate cellular protection pathways, reduce ROS levels, and enhance the regenerative activity of stem cells. *In vitro* studies on skin cell activity have demonstrated that these active ingredients can mimic the metabolic effects of fasting under stress conditions and possess the capability to: protect human epidermal progenitor cells from oxidative stress, enhancing skin wellbeing markers such as β-endorphins, and reducing inflammatory mediators (IL-1α, IL-1β, IL-4, IL-6, IL-8, IL-10, IL-13, MCP-1, INF-γ, and TNF-α), protect human dermal fibroblasts and dermal fibres from the production of reactive oxygen species (ROS) in response to various stressors (UVA, UVB, visible light, infrared), and accelerate the healing process.
- Avoiding nutritional deficiencies and providing adequate hydration, contributing essential lipids present in organic oils and butters.

2. Mindful Ritual

- Slow, attentive, and connected application.
- Cleansing as a symbolic act of release.
- Full awareness of tactile sensations.

This study designed three independent clinical trials to demonstrate the skin-related benefits of fasting, achieved through a formulation and ritual inspired by fasting principles.

2. Materials and Methods

Participants: Healthy women aged between 28 and 69 years, with no significant health issues or ongoing pharmacological or hormonal treatments, and not pregnant or breastfeeding. The cosmetic product, supplied by the study sponsor, was formulated with a combination of stem cell extracts (from turmeric root, *Centella asiatica*, carrot, *Arabian cotton*, and pomegranate), *Lactobacillus ferment*, coconut extract, and organic lemon water.

2.1. Evaluation of Overall Rejuvenation (30–50 years)

A clinical study involving 20 female participants aged 30–50 years, conducted over 28 days. Parameters assessed included: skin elasticity (Courage & Khazaka, Cutometer R2), redness (Courage & Khazaka, MultiskinCenter 750), and wrinkles, roughness, and skin colour (Miravex Antera).

2.2. Evaluation of Facial Contour Definition (sensitive skin, 35–65 years)

A clinical study involving 24 female participants aged 35–65 with sensitive skin. Participants exhibited signs of sagging or lack of facial contour definition, along with decreased firmness

(measured by ptosis of the lower face), scored from 1 to 4. The study duration was 56 days, during which participants followed a guided application ritual.

Parameters assessed included: the remodeling effect on facial volume (EvaFACE3D) – evaluated on a sensitive skin panel.

2.3. Evaluation of Microbiome Equilibration

A study involving 22 women aged 28–69 years, with a mean age of 58. Participants used the facial product twice daily over a 28-day period. To minimise variability associated with different skin conditions, only participants with normal skin, without dryness, oiliness, or sensitivity, were included.
Parameters were measured before the start and at the end of the study, with comparative analysis of the obtained values between the two time points.

Microbiota sampling was performed using swabs, which were immediately processed for microbiological analysis. The swabs were streaked onto agar plates (Columbia, YGC, Baird-Parker, Sa-CHR, Slanetz-Bartley) using the streak-plate method with selected growth media. Colonies were transferred to Columbia Agar, and subsequent identification involved microscopy (Gram staining), simple biochemical tests for catalase and oxidase, and identification using the RapID ONE, STAPH, CB, STR, NF, and ANA biochemical test kits (Oxoid), as well as the API 50CHB system (BioMérieux), alongside several selective agars.
Parameters analysed included: identification of present strains, quantification and monitoring of shifts in strain populations, and calculation of the Shannon diversity index.

Statistical analysis. Friedman Test for repeated measures and linear mixed effects models (LMM).Se establece un nivel de significación de 0,05 (intervalo de confianza del 95%) para todos los análisis. * $p<0.05$.

3. Results

3.1. Evaluation of Overall Rejuvenation (30–50 years). Results are shown in Table 1.

Table 1. Global rejuvenation results (elasticity, redness, wrinkles, roughness, dark spots)

Parameter	14 days (%)	28 days (%)
Elasticity	+13*	+21*
Redness	-19*	-27*
Wrinkles	-9*	-14*
Roughness	14*	28*
Dark spots	-10*	-20*

3.2. Evaluation of Facial Contour Definition (sensitive skin, 35–65 years). Results are shown in Table 2.

Table 2. Improvement in facial oval contour.

Parameter	0 days	42 days	56 days
% Change compared to D0		- 7%	-9%*
% of panelists showing improvement		67%	74%

*$p<0.05$

After 56 days of continuous use of the product, subjective evaluations indicated that 87.5% of panelists experienced increased skin elasticity, soothing, and hydration, while 83.3% observed significant improvements in skin texture, with a brighter and healthier appearance.

3.3. Evaluation of Microbiome Equilibration

Identification and quantification of microorganisms.Results shown in Table 3.

Table 3. Variation of relevant species present in the microbiome throughout the study.[1]

Cepa	% variation D28-D0
Acinetobacter spp.	25.7
Corynebacterium spp.	34.3
Cutibacterium spp.	21.5
Micrococcus luteus	87.0
Staphylococcus total	130.4
Staphylococcus epidermidis	62.0
Staphylococcus saprophiticus	12.3
Staphylococcus auricularis	0.0
Staphylococcus hominis	71.4

[1]Relevant species: Present in at least 30% of the volunteers and with a relative abundance greater than 0.01%.

The relative abundance remains stable at 28 days, with an average variation of 0.23%.

Diversity indices: the average across volunteers remains stable, with a slight increase of 0.095 (14%), which is not statistically significant. Therefore, it can be concluded that overall diversity is maintained, preserving the balance of a healthy microbiota and enhancing the proliferation of the most beneficial species.
In more than 50% of the tested samples, the product supports the growth of commensal microflora. No growth of pathogenic microflora was observed before or after application.

4. Discussion

The findings of this study demonstrate that the product, inspired by the principles of fasting, exerts significant Well-Ageing effects on the skin. Over a 42-day period of continuous use, participants showed notable improvements across multiple parameters: a reduction in wrinkles, enhanced elasticity and radiance, improved texture and homogeneity, and a visible decrease in pigmentation spots. These effects collectively resulted in an average reduction of facial volume by 7%, indicating a remodelled and lifted facial contour. Notably, this was observed in a panel comprising sensitive skin, suggesting that the approach is suitable for all skin types, including delicate or sensitive skin.

Concurrently, there was a positive impact on the skin microbiome. The microbiota composition was maintained in a state of equilibrium, with the relative abundance of key species remaining stable at 28 days. Moreover, the diversity indices showed no significant change, affirming that the product supports microbiome stability. Importantly, the growth of beneficial commensal microorganisms was observed in over 50% of samples, while no pathogenic species proliferated before or after application. This aligns with the claim that the product supports the skin’s native microbiota, which plays a crucial role in maintaining skin health and resilience. These microbiome results are particularly relevant given emerging evidence linking fasting to the modulation of the gut microbiome and immunome. Fasting has been shown to influence

gut microbial populations by enriching metabolite production, such as propionate, and enhancing gene functions involved in mucin degradation and nutrient utilisation.14

In summary, the combined data affirm the efficacy of the product in reducing visible signs of ageing, remodels facial volume, and maintains a balanced microbiome—potentiating the skin's natural regenerative and protective functions. These outcomes highlight the potential of fasting-inspired topical formulations not only to soothe and repair but also to support long-term skin health through microbiome preservation and modulation.

5. Conclusion.

Based on the accumulated evidence, it is clear that true innovation in skincare does not stem from the addition of more products or aggressive stimulation, but from understanding what the skin truly needs—its natural capacity for self-regulation and healing. The concept of epidermal fasting exemplifies this paradigm shift, aligning with the principle that "true innovation does not lie in adding more, but in knowing what to eliminate."

The results observed demonstrate that the skin benefits from respectful support that restores balance. Visible improvements in skin elasticity, texture, and firmness, along with the maintenance of microbiome stability, reinforce the idea that the skin's innate regenerative potential can be optimised when left to heal naturally.

This approach marks the beginning of a new era of well-ageing—one that honours the skin's physiology, promotes genuine regeneration, and fosters awareness that caring for skin should be about teaching it to be itself again. We are invited to embrace silence, balance, and authentic renewal—listening to the skin's own voice in a world that constantly tries to speak for it. Epidermal fasting is not a fleeting trend; it is a fundamental shift towards a more conscious, respectful, and sustainable skincare philosophy.

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