32nd IFSCC Congress
London 19–22 September 2022

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An innovative cosmetic formulation can restore the integrity of the skin barrier and the microbiota of sensitive, irritated and sensitized skin.

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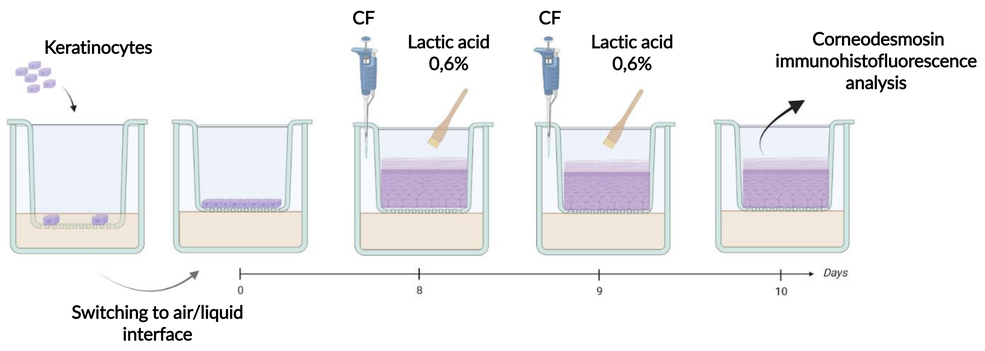
Introduction:

Several factors can sensitize the skin, from external factors, such as extreme cold and heat, to the aesthetic procedures. This sensitization can cause damage, affecting the skin's protective barrier and unbalancing its microbiota [1]. Simultaneous modulation of different biological processes is the key to ensure fast and efficient recovery. Hence, it is important to use multi-repair agents that help in the process of repairing sensitized skin, either by relieving symptoms or stimulating healing [2,3]. Restoration and maintenance of the microbiota that was altered during such events is also essential for a good recovery [4,5]. Therefore, a cosmetic formulation (CF) containing a combination of active ingredients that has a synergistic effect in the three stages of the healing process: panthenol, niacinamide, bisabolol, hyaluronic acid, tocopherol and a prebiotic molecule, α-glucan was developed to repair, soothe and moisturize sensitive, irritated and sensitized skin, balancing and protecting the skin microbiota. This research aimed to evaluate preclinical efficacy of the CF in corneodesmosin (CDSN) expression and the clinical efficacy in skin regeneration and microbiota maintenance and regeneration.

Materials & Methods:

Evaluation of corneodesmosin (CDSN) expression



Evaluation of cellular regeneration by reflectance confocal microscopy

Parameters evaluated: Epidermal thickness, Dermal papilla depth, Keratinocytes morphology, Reflectance of the granular layer and Skin surface irregularity.

7 female participants (30-59 years) phototype (Fitzpatrick) I a IV Intact face skin

→ Cellular images of faces participants were captured with the Confocal Laser Reflectance Microscope (Vivascope® 1500)

→ Jessner Peel Application

Use of the CF 2x/day for 14 days

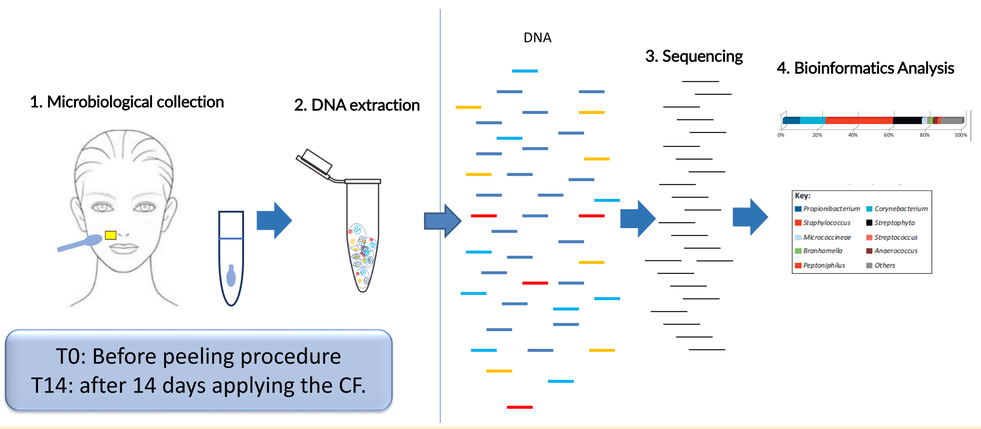
14-days, open-label, randomized, controlled, comparative clinical study

T0

The images were taken in the malar region on one side of the face of selected participants following randomization.

T14

Evaluation of the restoration and maintenance of the microbiota



T0: Before peeling procedure
T14: after 14 days applying the CF.

Results & Discussion:

Evaluation of corneodesmosin (CDSN) expression

In response to the stress with lactic acid, the expression of CDSN strongly decreased (-72%). On the other hand, with 0.2% CF, a limited diminution of CDSN expression in response to lactic acid (-38% vs. -72% in untreated stressed RHEs) was observed.

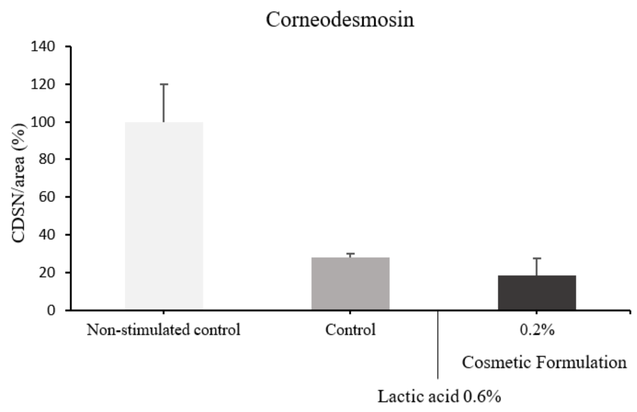


Figure 1: The data represent the intensity of corneodesmosin staining related to the epidermis area (mean ± standard error of the mean of three replicates).

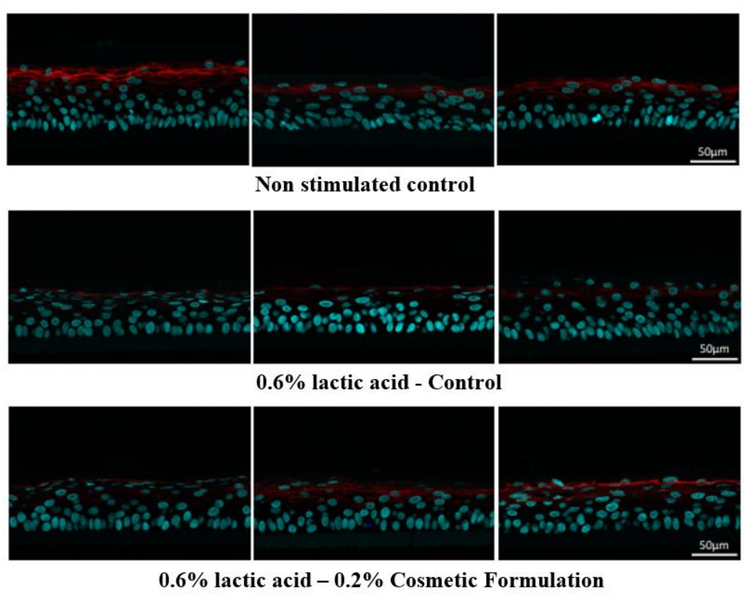


Figure 2: Representative images of the effect of CF on CDSN expression in lactic acid-stimulated RHE. Cell nuclei (Blue) and CDSN (red).

Evaluation of cellular regeneration by reflectance confocal microscopy

The data suggest that the use of CF promotes cell proliferation, in addition to an improvement in the pattern of the dermal-epidermal junction and a better organization of the keratinocytes, resulting in a better structuring of the basal layer and cellular renewal. The increase in the granular layer reflectance indicates deep hydration and greater nutrition of the region, while the significant reduction in the surface irregularity parameter represents a more cohesive and, therefore, more uniform stratum corneum.

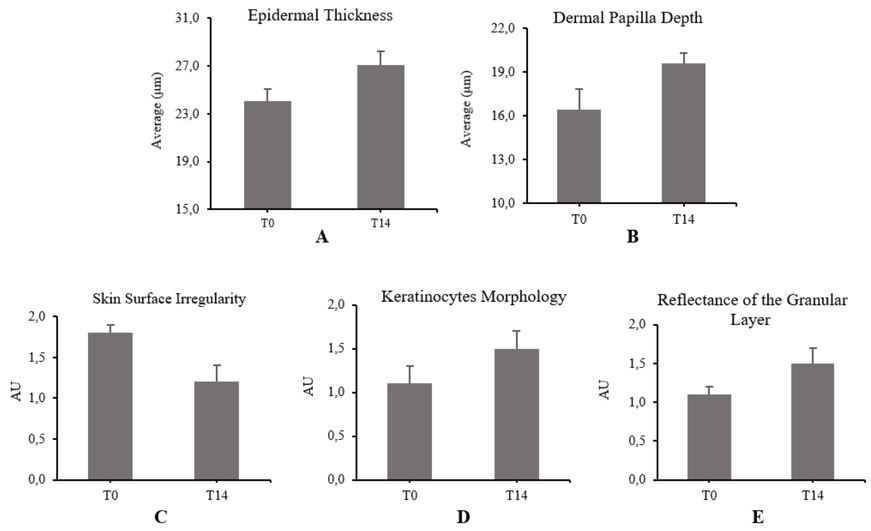


Figure 3: Effect of the evaluated treatment with the cosmetic formulation (CF) on participants subject to Jessner peel. Mean ± standard error of seven participants.

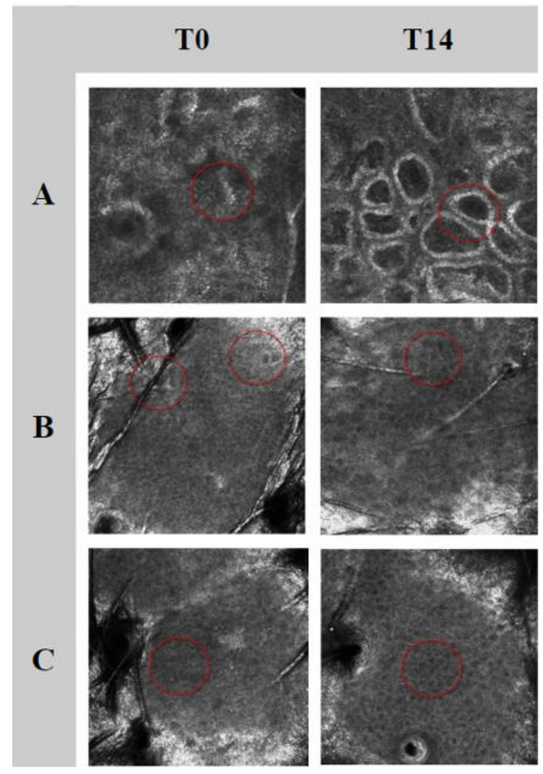


Figure 4: Reflectance Confocal Microscopy images. (A) Dermal papilla. (B) Surface uniformity. (C) Brightness of the granular layer and keratinocyte morphology.

Evaluation of the restoration and maintenance of the microbiota

The metagenomic study showed the maintenance and restoration of the skin microbiota after the use of CF, ensuring the return of the resident microbiota, in addition to bringing more diversity to the microbiota, showing also a postbiotic effect.

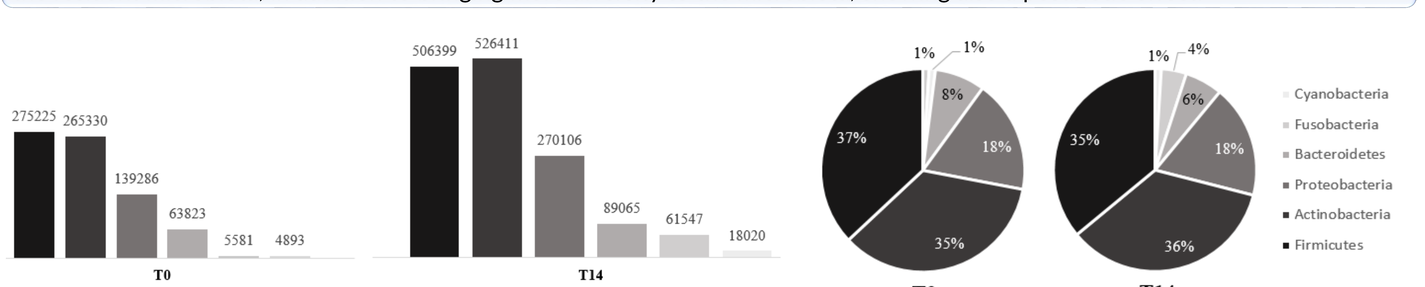


Figure 5: Microbiota composition of participants at times T0 and T14 for the main Phyla in absolute numbers of readings (A) and percentage (B).

Conclusions:

The results obtained suggest that the cosmetic formulation containing panthenol, niacinamide, bisabolol, hyaluronic acid, tocopherol and a prebiotic molecule, α-glucan could restore the integrity of the skin barrier and the skin's microbiota of a sensitive, irritated and sensitized skin, beyond showing a postbiotic effect.

Acknowledgements:

I am grateful for the technical support to execute the assays of Allergisa – Grupo Investiga, Gentros Pesquisa e Desenvolvimento Ltda. and QIMA Life Sciences.

References:

[1] Dreno B, Araviiskaia E, Berardesca E, et al (2016) Microbiome in healthy skin, update for dermatologists. J Eur Acad Dermatol Venereol 30:2038-47. [2] Leight-Dunn H, Chima M, Hoss E (2020) Wound healing treatments after ablative laser skin resurfacing: a review. J Drugs Dermatol 19:1050-1055. [3] Baron JM, Glatz M, Proksch E (2020) Optimal Support of Wound Healing: New Insights. Dermatology 236:1-8. [4] Kirchner S, Lei V, MacLeod AS (2020) The cutaneous wound innate immunological microenvironment. Int J Mol Sci 21:8748. [5] Tomic-Canic M, Burgess JL, O'Neill KE, et al (2020) Skin microbiota and its interplay with wound healing. Am J Clin Dermatol 21: S36-S43.