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## Development of a new SPF50+ photoprotection product to protect against post-inflammatory hyperpigmentation using an ecobiological approach

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### INTRODUCTION

A photoprotection product is often used after certain aesthetic procedures, particularly to prevent post-inflammatory hyperpigmentation (PIH). The aim of the studies carried out was to develop a new repairing SPF50+ photoprotection product, formulated based on the ecobiological approach, which considers the skin as a living ecosystem interfacing with its internal and external environment and preserves its natural biology.

### MATERIALS & METHOD

- Study of the skin microbiome:** metagenomic analysis via 16S rRNA gene sequencing of the skin microbiomes of 20 subjects. After disinfection with ethanol, the product was applied, with a control area free of any product.
- Transepidermal water loss (TEWL) and partial pressures:** assessment of the effect of the product containing the complex of active ingredients on the epidermal "skin barrier" function by studying transepidermal water loss (TEWL) on 10 healthy subjects using a Tewameter TMHex<sup>®</sup> and by measuring transcutaneous O<sub>2</sub> and CO<sub>2</sub> partial pressures on 21 subjects using a TCM5 radiometer fitted with a combined oxygen/carbon dioxide sensor (TC Sensor 84).
- Non-comparative clinical study:** assessment of the tolerance and efficacy of the photoprotection product (used twice a day for 14 days) following a laser procedure on 31 subjects with an average age of 28 years and with persistent pigmented spots, with an overall score composed of 3 sub-scores from 0 to 4 (inflammation, PIH scar appearance, soothing effect) in addition to instrumental evaluations (TEWL, Visia<sup>®</sup>).

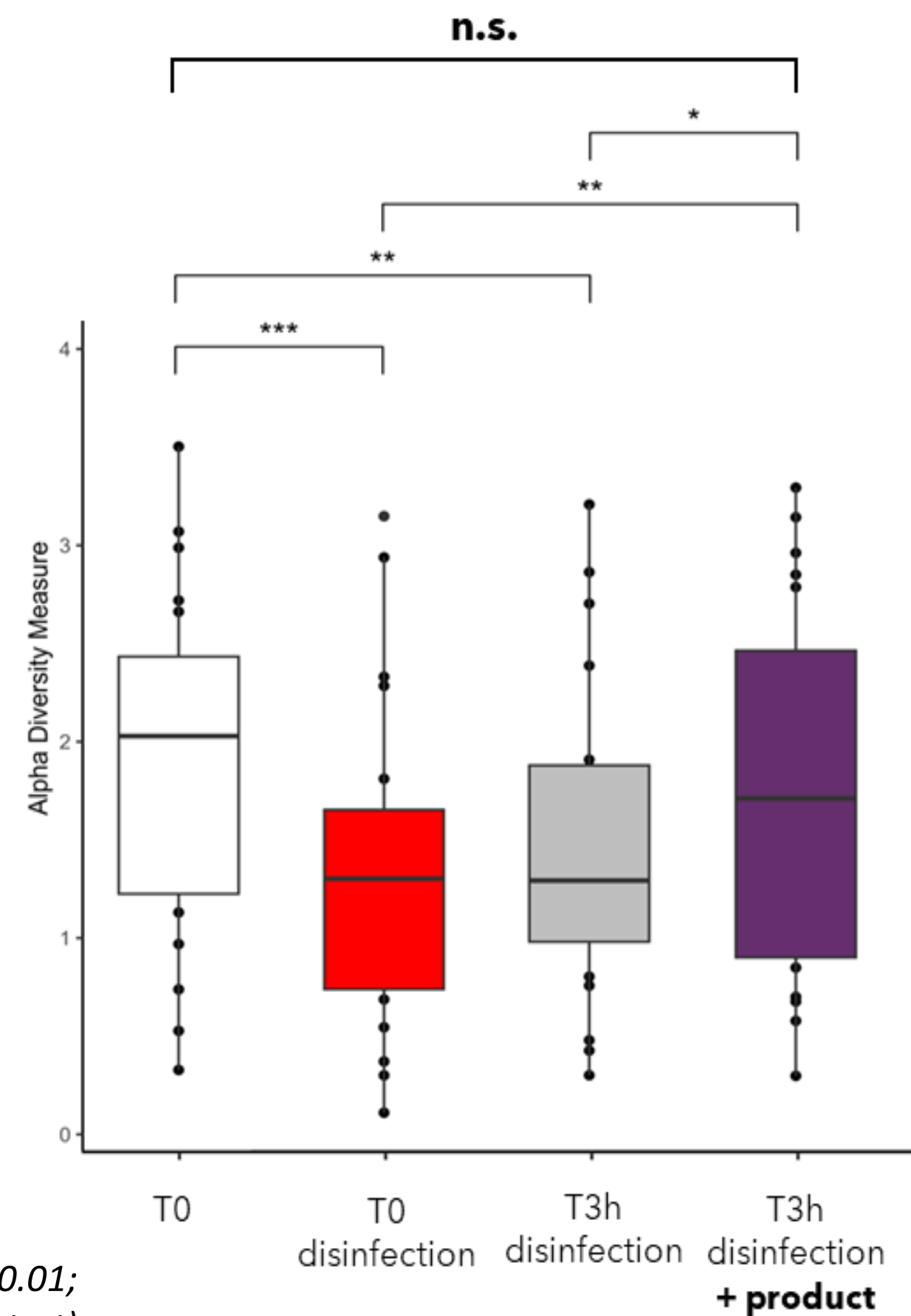
### RESULTS

#### Skin microbiome: cutaneous microbial diversity restoration

A study of the **Shannon index** showed **restoration of diversity to the cutaneous microbiome**, which is essential for protecting the epidermis (recruitment of immune cells, production of antimicrobial peptides, inhibition of biofilm formation) and controlling skin inflammation. This effect was noted as early as 3 hours after disinfection, whereas loss of microbiome diversity persisted in the untreated area.

Thanks to its ultra-moisturising ecobiological formula, the photoprotection product helps to **recreate an environment that is conducive to restoring diversity to the cutaneous microbiome**: high concentration of **biomimetic ingredients** (80%) including squalane and maintenance of an **acidic physiological skin pH**.

n.s.: not significant; \*p<0.05, \*\*p<0.01; \*\*\*p<0.001 (Wilcoxon test)



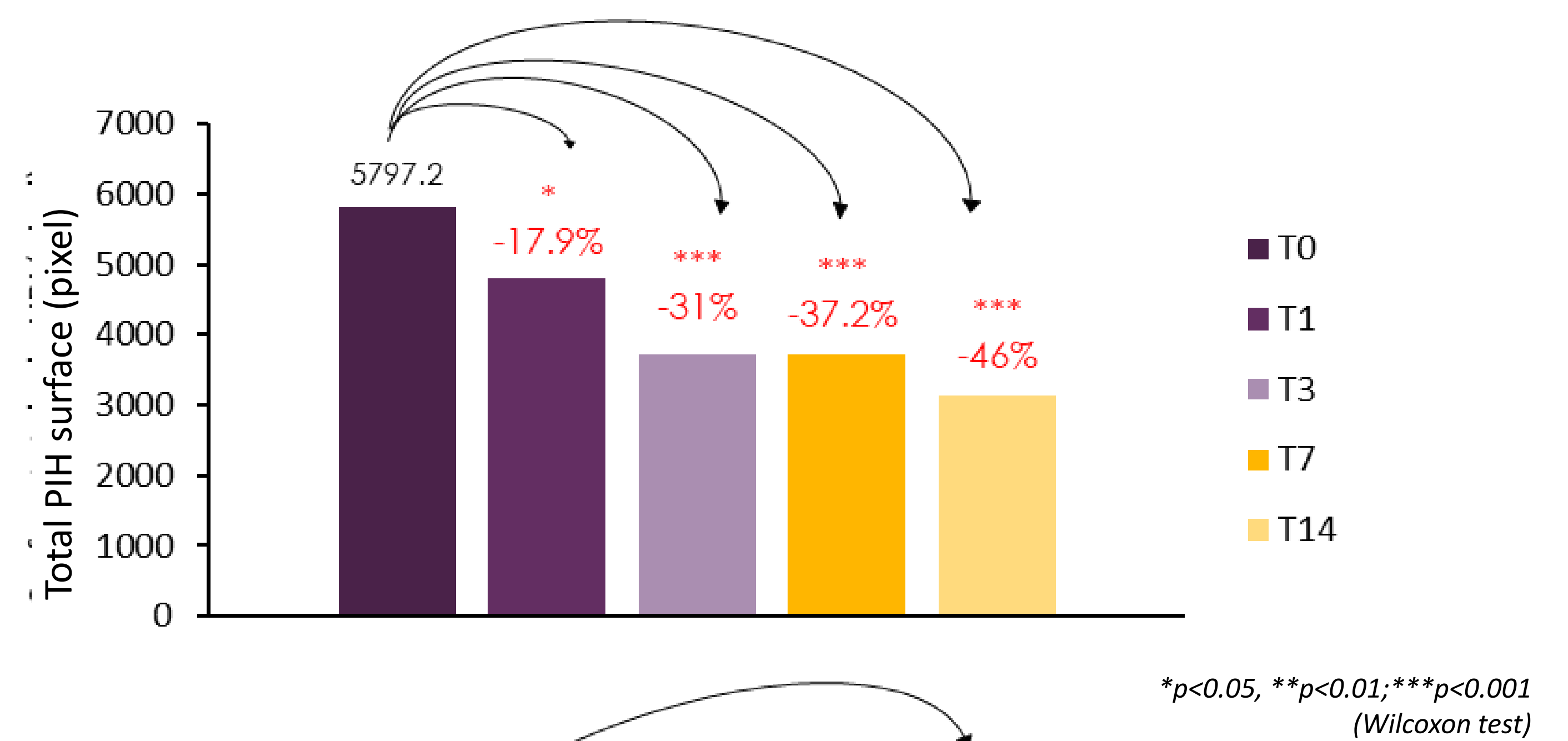
#### TEWL and partial pressure: skin barrier preservation

**A significant improvement in TEWL** compared with the untreated area demonstrated the effect of the photoprotection product on "barrier function" after applying blotting paper (-21.4%) and after rubbing to alter the barrier (-7.8%).

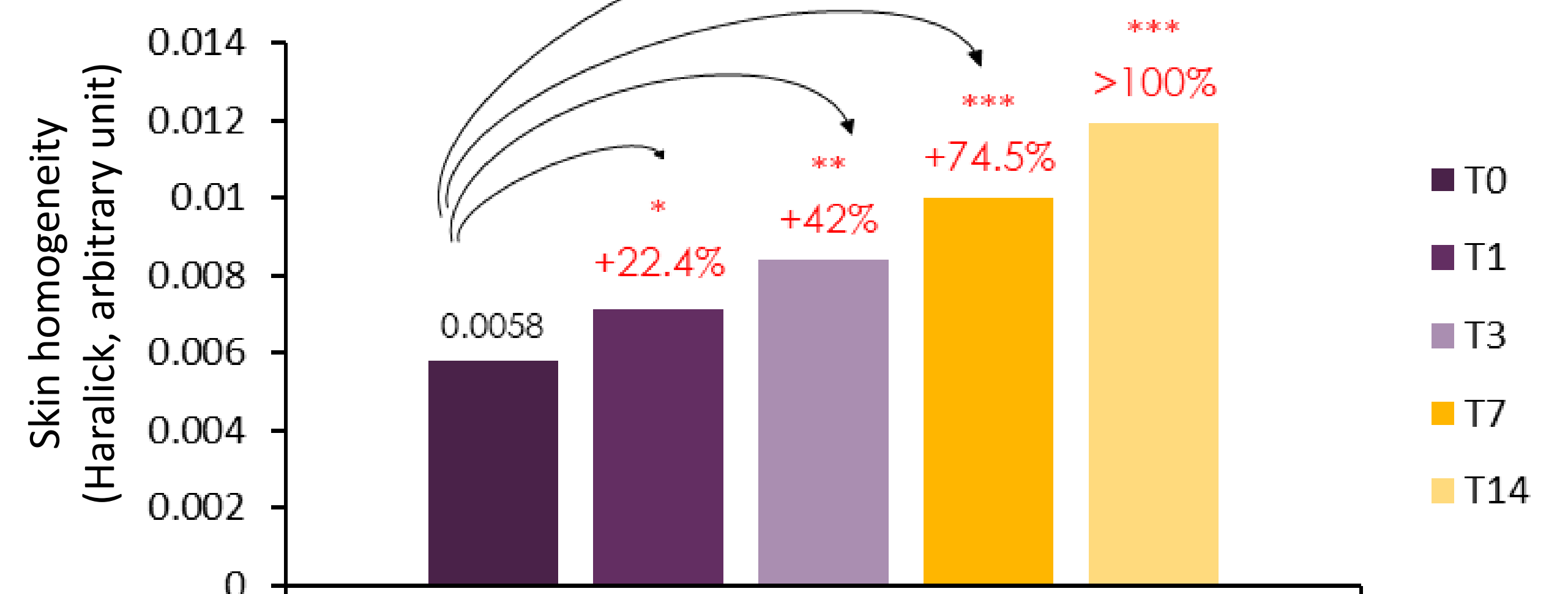
**The absence of any change in O<sub>2</sub> and CO<sub>2</sub> partial pressure** demonstrated the preservation of the skin's ability to breathe in the presence of the product.

#### Post-laser clinical study: PIH prevention and reduction

**No new PIH lesions and even a reduction in pre-existing lesions (surface area and homogeneity)**



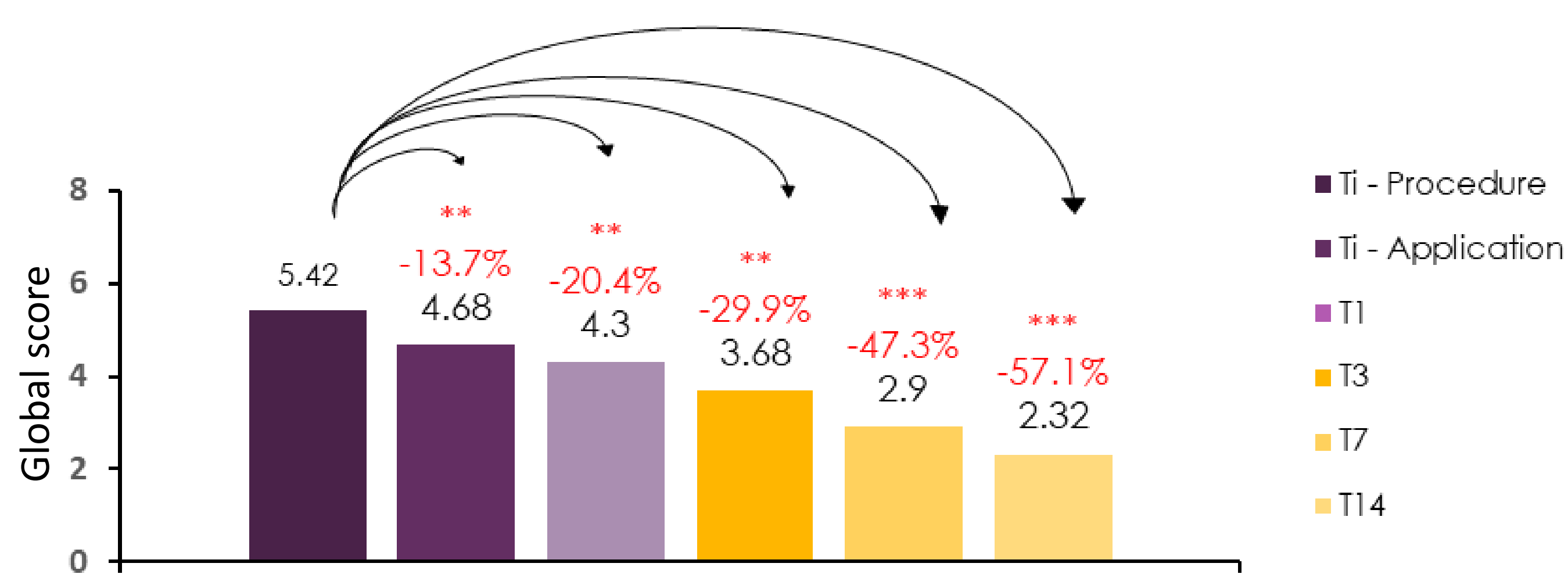
\*p<0.05, \*\*p<0.01; \*\*\*p<0.001 (Wilcoxon test)



These results confirm the investigator's assessment of the **PIH parameter** (significant decreases of -12.8% and -21.8% respectively at T7, T14 vs T0; p<0.01).

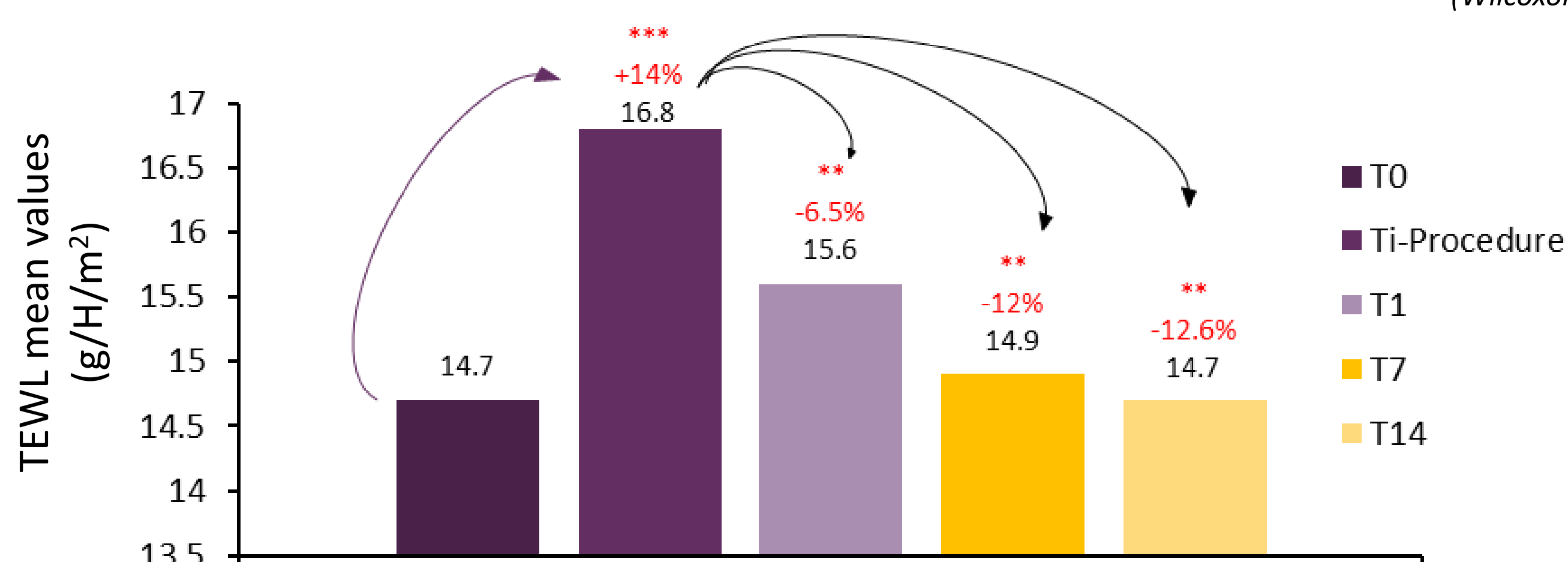
#### Post-laser clinical study: wound healing improvement

**Decrease in the overall healing score with the photoprotection product**



#### TEWL improvement

\*p<0.05, \*\*p<0.01; \*\*\*p<0.001 (Wilcoxon test)



In addition to showing **significant immediate soothing efficacy (Ti)** with a reduction in redness (p<0.001) and burning sensations (p<0.05), the **photoprotection product was very well tolerated**.

### CONCLUSION

This healing SPF50+ photoprotection product, designed using an ecobiological approach, promotes the natural healing process while protecting against UV rays; it respects the skin's ecosystem, in particular its microbiome, for optimal healing without hyperpigmentation.