P0383

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RESTORING MICRIBIAL BALANCE : A NOVEL EMOLLIENT WITH *AQUAPHILUS DOLOMIAE* EXTRACT-G1 AND DEXTRAN SODIUM SULFATE REDUCES *S. AUREUS* VIRULENCE AND SHIFTS THE SKIN MICROBIOTA

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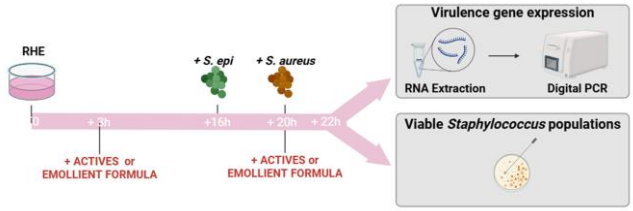
INTRODUCTION

Atopic dermatitis (AD) is a chronic inflammatory skin disorder exacerbated by *Staphylococcus aureus* colonization. As the dysbiosis state sets up, the microbiome no longer benefits from the positive role of the commensal communities, such as *S. epidermidis*. Targeted antivirulence strategies offers a promising approach to managing skin dysbiosis by disarming *S. aureus*, without killing it. Among these, the SaeRS two-component system (TCS), a key regulator of *S. aureus* virulence, emerges as an ideal target for the development of novel strategies to treat skin conditions like atopic dermatitis, without disrupting the commensal skin microbiota. A recent study has shown that a new emollient containing an association of *Aquaphilus dolomiae* extract-G1 (ADE-G1) with dextran sodium sulfate (DSS) significantly inhibits the SaeRS system (**P0382**). This study presents the effects of the actives (ADE-G1 + DSS) prior and after formulation on bacterial growth and on key virulence genes expression governed by SaeRS.

METHODOLOGY

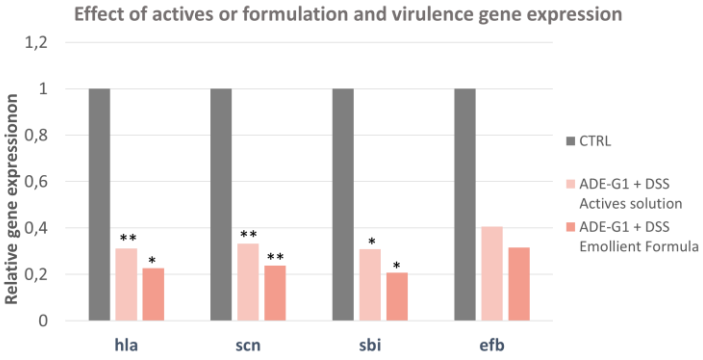
An experimental model based on Reconstituted Human Epidermis (RHE) co-colonized with *S. epidermidis* and *S. aureus* was developed to assess the efficacy of topical formulas and their actives in promoting *S. epidermidis* adhesion while counteracting *S. aureus* proliferation by using viable cell counts on selective media
Simultaneously, digital PCR (dPCR) analysis was conducted to investigate the anti-virulent effects on *S. aureus* virulence gene expression.

IN-VITRO RHE MODEL CO-COLONIZED WITH *S.AUREUS* AND *S.EPI*



RESULTS

VIRULENCE EXPRESSION

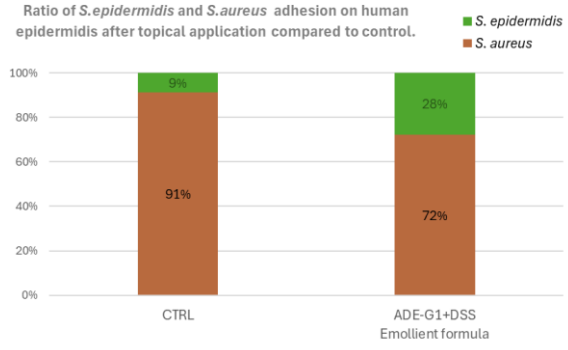


** p<0.1, **p<0.05 , *** p<0.01*

ADE-G1 + DSS significantly repressed virulence genes linked to toxin synthesis (α-toxin : -68%), and to innate immune evasion factors (*sbi : -69% ; scn : -67%*).

This effect was higher when active ingredients were in formulation reinforcing the potential of the formulas as an effective strategy to reduce *S. aureus* virulence, without impacting its viability.

STAPHYLOCOCCUS POPULATIONS



By comparison to control, the results showed that the adhesion of *S. epidermidis* was notably enhanced by the association of ADE-G1 and DSS in the emollient formula (+19%, p<0.05), even in a model where *S. aureus* was predominant.
This highlights the efficacy of this new emollient in rebalancing the growth ratio of *Staphylococcus* species, promoting *S. epidermidis* colonization while limiting *S. aureus* proliferation.

CONCLUSIONS

By reducing the expression of key virulence genes, the new emollient, containing ADE-G1 and DSS, weakens *S. aureus* without inducing selective pressure and accelerates bacterial clearance by the host, providing a more holistic approach to fighting infections through natural clearance. Additionally, this product helps restore a more balanced skin microbiota.
These new findings, have confirmed the new emollient as a promising antivirulence strategy for improving skin immune function, reducing inflammation, and preventing AD flare-ups commonly associated with *S. aureus*.