P0397

Enhanced Skin Condition in Atopic Dermatitis Through Multi-Omics Analysis of an Emollient Cream with Rhealba® Oats and Helichrysum

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INTRODUCTION

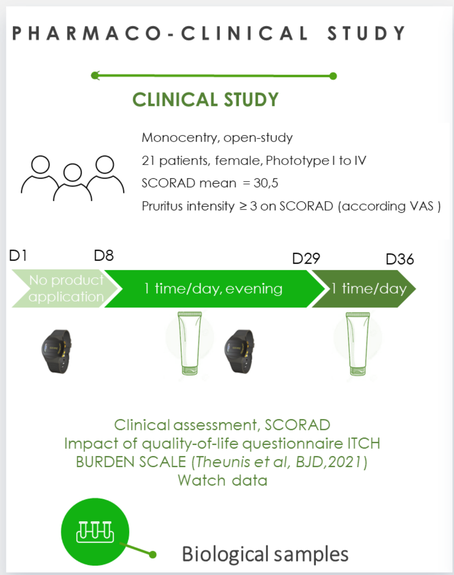
Atopic dermatitis (AD) is a chronic inflammatory skin condition characterized by itchy, red, and swollen skin. It affects millions of individuals worldwide, significantly impacting their quality of life. Despite advances in understanding the pathophysiology of AD, the precise mechanisms underlying its development and progression remain incompletely understood. Recent research has highlighted the potential of metabolomics and lipidomics—a comprehensive study of small molecules and metabolic pathways—as a powerful tool to unravel complex biological processes and identify novel biomarkers for various diseases.
The aim of this study was to investigate the impact of emollient cream containing Rhealba® Oats and Helichrysum on cutaneous metabolome to evaluate the improvement of atopic dermatitis skin conditions.

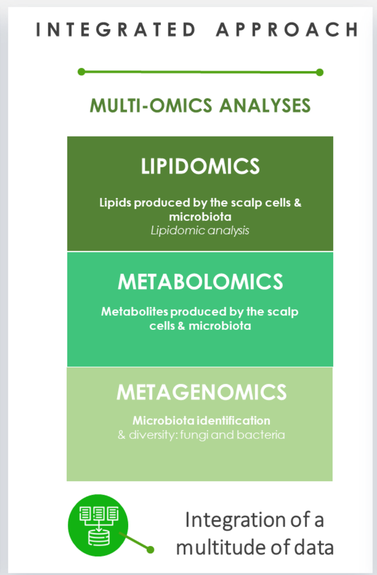
MATERIAL & METHODS

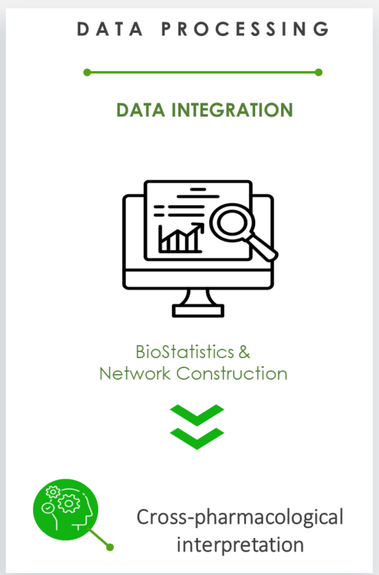
A monocentric, open-labelled study was conducted on 21 women with mild to moderate AD (Mean SCORAD 30.5) with a 7-day period without product application followed by 28 days of daily cream application of Rhealba® Oats/ Helichrysum emollient cream.

Evaluations included assessment of AD severity, pruritus and sleep quality.

Skin surface samples (swabs and tape stripping) were taken before (D8) and after treatment (D36) for microbiota, metabolites, and lipidomic analysis.
Metabolomics was done by Metatoul, Toxalim, INRAe using UHPLC-HRMS, processed with XCMS and W4M, and mapped with Metexplore. Lipidomics was done by Lipotype using a QExactive mass spectrometer with LipidXplorer software. Microbiota sequencing was done by GeT-PlaGe, INRAe Toulouse, amplifying the V1V3 region from genomic DNA.







RESULTS

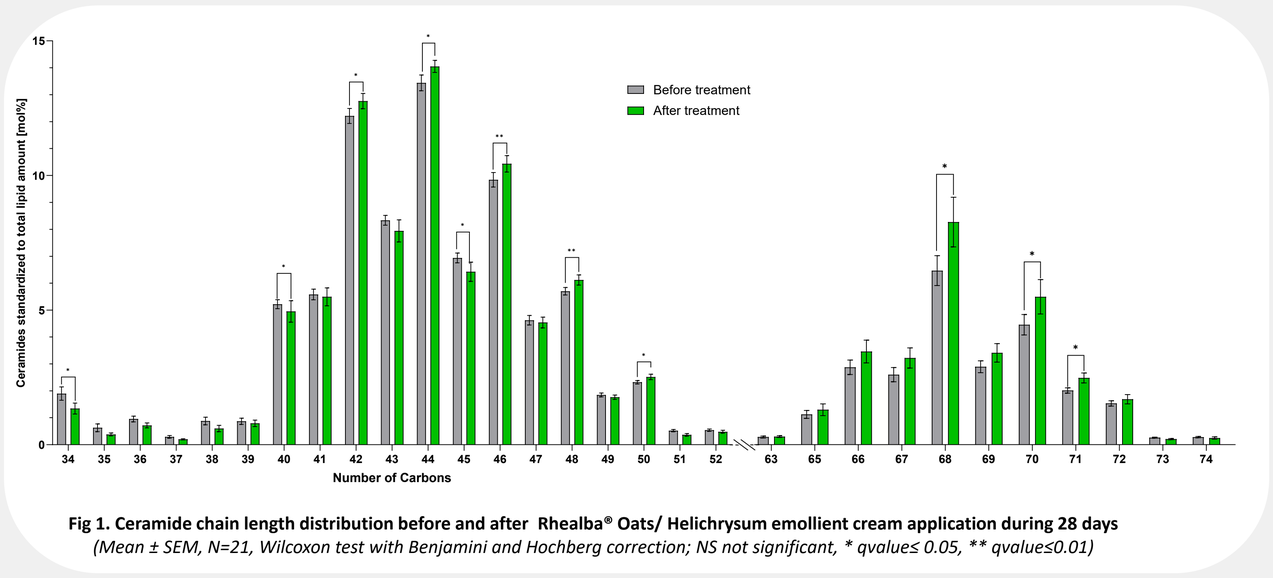


Fig 1. Ceramide chain length distribution before and after Rhealba® Oats/ Helichrysum emollient cream application during 28 days
*(Mean ± SEM, N=21, Wilcoxon test with Benjamini and Hochberg correction; NS not significant, * qvalue≤ 0.05, ** qvalue≤0.01)*

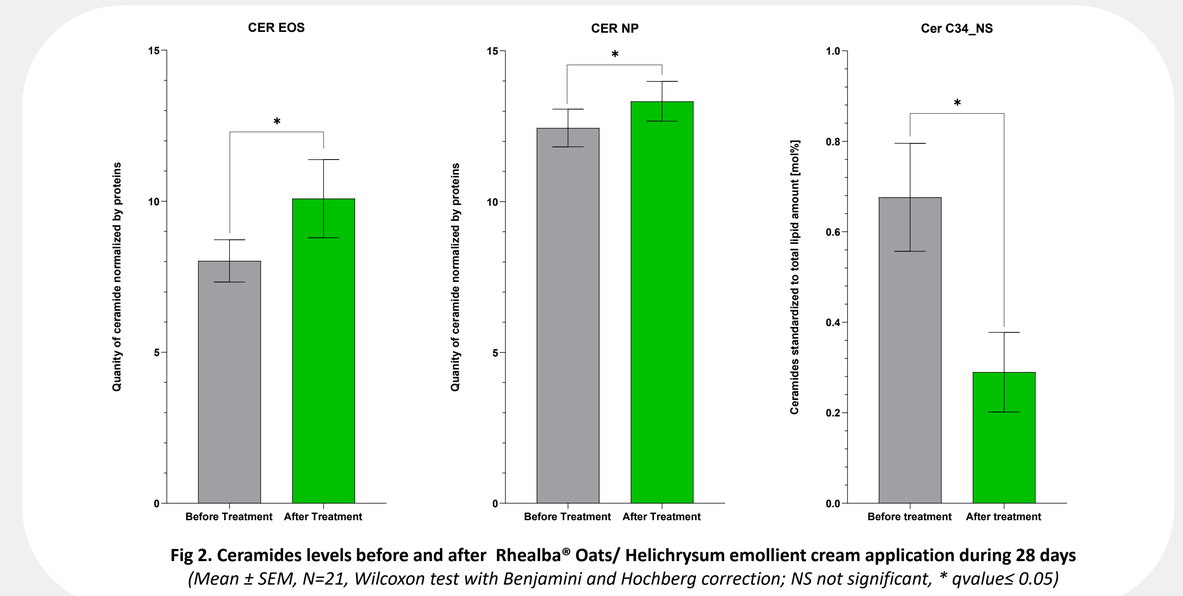
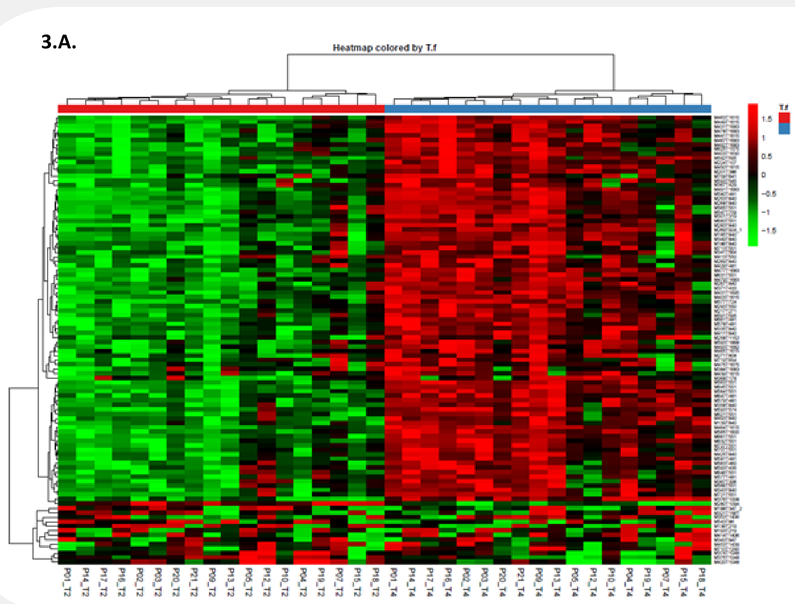


Fig 2. Ceramides levels before and after Rhealba® Oats/ Helichrysum emollient cream application during 28 days
*(Mean ± SEM, N=21, Wilcoxon test with Benjamini and Hochberg correction; NS not significant, * qvalue≤ 0.05)*

Application of Rhealba® Oats/ Helichrysum emollient cream improves skin barrier function by increasing the synthesis of long-chain ceramides and acyl-ceramides, while reducing short-chain ceramides, notably chain length below C42.
The study also revealed a significant increase in the levels of CER EOS, an essential component of the skin's lamellar structure. A decreased of C34 carbons ceramides and ceramides NS is observed, these two types of ceramides are link to inflammatory state in AD patients . These changes contribute to strengthening and protecting skin barrier function, reducing skin dryness, and balancing ceramide levels in pathologies such as atopic dermatitis.



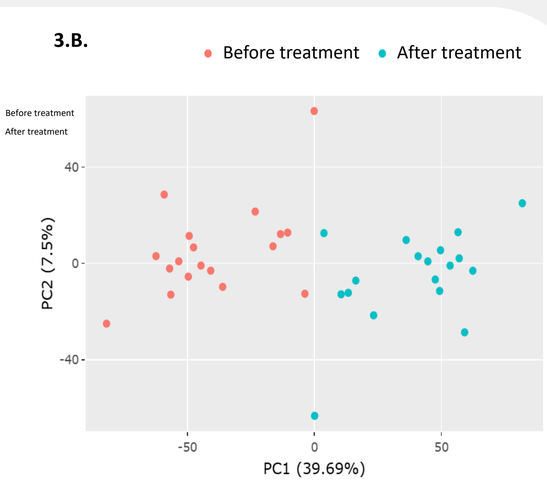


Fig 3A and B. Heat map and PCA with multilevel approach colored group before and after Rhealba® Oats/ Helichrysum emollient cream application during 28 days

Rhealba® Oats/ Helichrysum emollient cream application resulted in a marked increase in tryptophan metabolism and microbiota diversity.
Additionally, indoles derivates and kynurenine were increased and can act on skin inflammation.
Rhealba® Oats/ Helichrysum emollient cream application improves inflammatory environment of the skin and the skin barrier, also appears to influence microbiome diversity and tryptophan metabolism by increasing kynurenine and indoles derivates.
These results correlate with clinical assessment showing a significant decrease of the TEWL (D8 to D36: -48,4%, p<0,005).
AD severity (SCORAD) decreased by 53.2% (D1 to D36; p<0.0001), with notable reductions in pruritus and sleep disturbances (74.1% and 85.6%, respectively, D1 to D36; p<0.0001).

CONCLUSION

The application of Rhealba® Oats/ Helichrysum emollient cream significantly improves skin conditions in women with mild to moderate atopic dermatitis over 28 days. The treatment enhances tryptophan metabolism, microbiome diversity, and increases indole derivatives and kynurenine, which may reduce skin inflammation and cytokines production.
Furthermore, the emollient cream improves skin barrier function by increasing long-chain ceramides and acyl-ceramides while reducing short-chain ceramides, notably CER NS.

J. Theunis et al, 2022, Development and preliminary validation of the patient-reported Chronic Itch Burden Scale assessing health-related quality of life in chronic pruritus