NEW EVALUATION METHODS TO ASSESS ANTI-ITCHING EFFICACY: VALIDATION WITH ACTIVATED VIRGIN COCONUT OIL

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1 INTRODUCTION

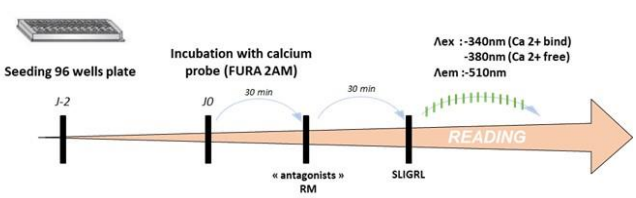
The onset of unpleasant sensations is, at least partly, mediated by cutaneous unmyelinated C-fibers, localized in the epidermis and equipped with sensory receptors called nociceptors. These nociceptors are also present and functional on keratinocytes which play a more and more evidenced role in skin surface perception [1,2,3].

Itching is a complex sensation involving several pathways. Among the main pathways is PAR2 receptor, involved in scalp seborrheic dermatitis[4], atopic dermatitis[5], sensitive skin[6], senile xerosis, activated by proteases such as those produced by microflora.

There is a need to develop new evaluation methods, to select actives with potential soothing properties against itch. The aim of this study was to specifically assess the efficacy of several actives on the of inhibition of PAR2 pathway, through *in vitro* 2D model of keratinocytes and to confirm this efficacy *in vivo* in a clinical protocol with a natural trigger (cowhage) of PAR2 pathway[7].

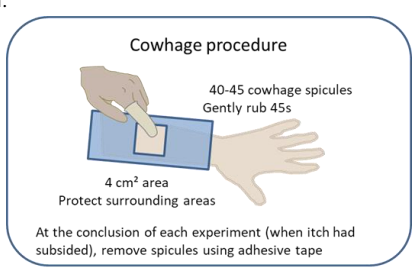
2 MATERIALS & METHODS

In vitro, among several actives, an Activated Virgin Coconut Oil (AVCO), derived from catalytic activity of lipase on Virgin Coconut Oil (VCO), and VCO were evaluated in a 2D keratinocyte model.



Protocol of PAR2 Antagonist Calcium Flux Assay on human keratinocyte cells

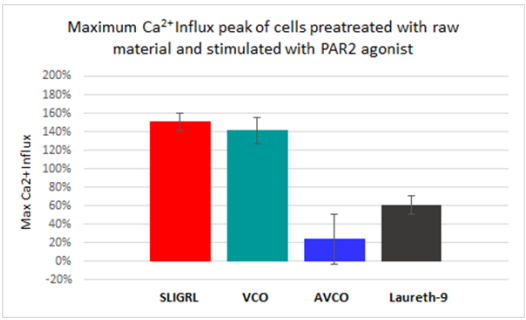
In vivo, a clinical protocol was set up to confirm the soothing efficacy of AVCO 10% in emulsified gel base compared to the cosmetic reference Laureth-9 3%. PAR2 can be specifically triggered by cowhage seedpod spicules. 45 women, 18-50 years old with healthy skin were recruited. The intensity of itching declared by the subjects was recorded every 30 sec using Visual Analogue Scale (VAS) for 20 min after induction.



Procedure for itch induction using cowhage spicules

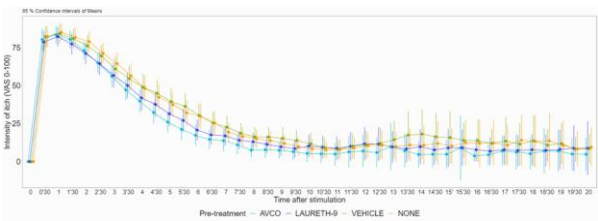
3 RESULTS

In vitro, compared to VCO, AVCO and Laureth-9 displayed inhibition of Ca2+ influx for PAR 2 nociceptor, with a dose effect.

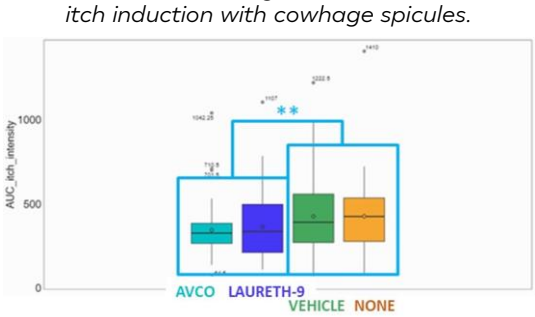


Maximum PAR2 mediated Ca2+ influx peak with or without pretreatment induced by SLIGRL (specific PAR2 Agonist).

In vivo, pre-treating the skin with 10% AVCO and 3% Laureth-9 for 1h under occlusion significantly reduced the duration and intensity (AUC) of itch caused by cowhage compared to vehicle ($p<0.001$, moderate effect) or not pre-treating ($p<0.001$, moderate effect).



Kinetic curve of mean itch intensities (±95% confidence intervals) on a visual analogue scale (0–100 mm) after itch induction with cowhage spicules.



*Areas under curve for itch intensities; **: statistically significant difference ($p<0.001$, moderate effect)*

4 CONCLUSIONS

Compared to Virgin Coconut Oil (VCO), it was demonstrated *in vitro* that AVCO displayed an inhibition of Ca 2+ influx for PAR 2 nociceptor, with a dose effect. Pre-treating the skin with AVCO for 1h under occlusion significantly reduced the duration and intensity (AUC) of itch caused by cowhage compared to pretreating with vehicle ($p<0.001$, moderate effect) or not pre-treating ($p<0.001$, moderate effect). There was no significant difference between AVCO 10% and Laureth-9 3%. This *vitro–vivo* study contributes to assess that inhibition of PAR 2 nociceptor activation is one pathway in the treatment of itching. The next steps would be to compare the soothing efficacy of AVCO versus VCO.

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