Impact of sunscreens on the human skin microbiome

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Abstract

Background: Only a few studies investigated potential effects of light/UV on cutaneous microorganisms being far from any systematic understanding. Especially, the in vivo situation after application of sun protection has not been investigated.

Methods: An in vivo study mimicking a vacation application scenario was designed and the skin microbiome analyzed before and after.

Results: The average skin microbiome of the participants was found to be stable in its composition over the duration of the study.

Conclusion: Formulas containing the tested combination of UV filters have no impact on the healthy skin microbiome.

Keywords: skin microbiome; SymProBiome; sun; UV filter, microbiome-friendly

Introduction.

The skin is the first layer of defence of our body towards the environment. It is essential to protect us from physical and biological impact. At the same time, the skin is a flourishing ecosystem inhabited by different microorganisms that co-evolved with the human host, leading to a beneficial symbiosis between the skin and its microbiome. The awareness of the need to apply sun protection is rising as more and more people start considering skin aging and skin cancer. At the same time, consumers concern about the human and environmental safety of UV filters. Accordingly, comprehensive studies on the safety profile of UV filters

are needed. Only a few studies investigated potential effects of light/UV on cutaneous microorganisms being far from any systematic understanding [1-3]. Many consumers already expect that their sun care formula maintains the skin microbiome balance or respects the microbiome.

Materials and Methods.

We performed an in vivo study to investigate the impact of sunscreens on the human skin microbiome. Emulsions containing different UV filter combinations as well as a placebo without any UV filter were applied to the forearms of 23 healthy persons. The O/W emulsions (beside the placebo) contained the following UV filters Bemotrizinol (BEMT), Ethylhexyl Triazine (EHT), Ethylhexyl Salicylate (EHS) and Phenylbenzimidazole Sulfonic Acid (PBSA). The difference is in the addition of Octocrylene (OCR) / Homosalate (HMS) and / or Disodium Phenyl Dibenzimidazole Tetrasulfonate (DPDT). The products were applied three times daily for a duration of two weeks to mimic the regular application during a summer vacation. At the beginning before the first application and after two weeks application the microbiome was sampled with swabs on a skin area of 4cm x 4cm (Figure 1). The samples were analysed with 16S rRNA sequence analysis.

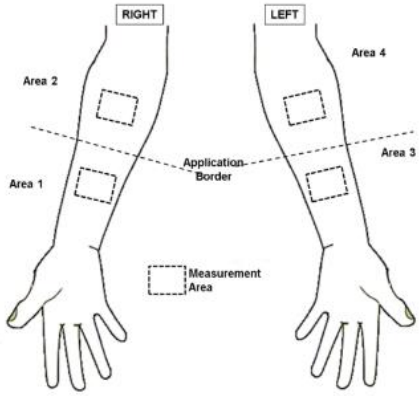

Figure 1: Emulsions were applied on the forearm on an area of 4cm x 4cm.

Results. The skin microbiome of the participants was found to be stable in its composition over the duration of the study. While typical representatives of a healthy skin microbiome

were identified, their average contribution was not impacted neither by the placebo emulsion nor by any product containing UV filters.

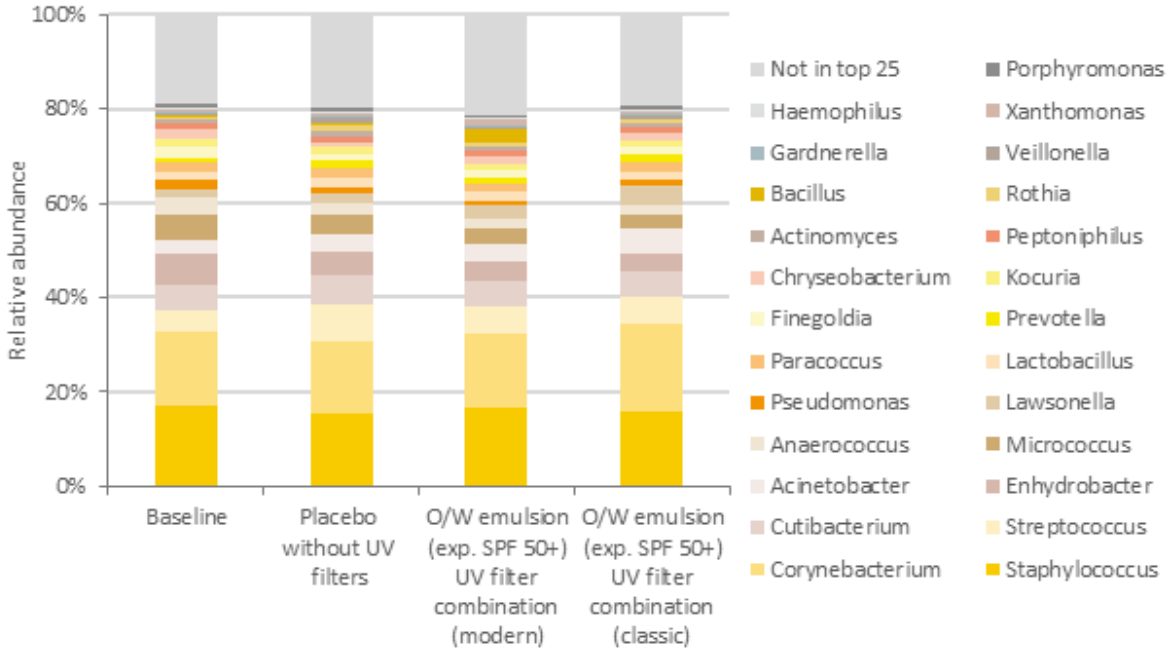

Figure 2: Average microbiome composition (top 25 genera).

Discussion. We have demonstrated that formulas containing the tested combination of UV filters have no impact on the healthy skin microbiome.

Conclusion. This outcome fulfils the customer expectation regarding save sun care products. It further confirms that it is possible to develop safe cosmetic ingredients that respect and support the natural ecosystems of the human body with their microbiomes.

Conflict of Interest Statement.

NONE.

References.

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