



INFECTIOUS DISEASES (BACTERIAL, FUNGAL, VIRAL, PARASITIC, INFESTATIONS)

EFFECT OF TOPICAL SKIN CARE PRODUCTS ON THE STRUCTURE AND DIVERSITY OF THE HUMAN SKIN MICROBIOME

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Background: The skin supports a delicate ecosystem of diverse microbiota which interact with the internal body environment. Imbalances from the healthy state can be linked to several dermatologic diseases. Interest is growing in the role of pre- and probiotics which have the ability to optimize, maintain and restore the microbiota of the skin. Little is known about the efficacy of topically applied prebiotics, although, topical application is assumed to enhance natural defense barriers of the skin. Probiotics and prebiotics are used widely topically but their mechanism of actions on the local lipids and microbiome is poorly understood.

Objective: To study the effects of topical nature-based prebiotics and probiotics on facial skin microbiome.

Methods: Thirty healthy subjects (aged 20-45 years) underwent a one-week washout with Cetaphil cleanser. Subjects were then treated twice daily for one week with one of four different prebiotic or probiotics [Bacillus coagulans BC30 ferment (BCF); Polyfructose extracted from chicory root (PF); Lysate of Lactococcus lactis (LL); Prebiotic complex of α-glucooligosaccharides, β-fructooligosaccharides, and inactivated Lactobacilli probiotic bacteria (OSL)] or vehicle control. Sebumeter measurements and microbiome swabs were collected at pre-, post-washout and after one-week treatment. 16S V3-V4 amplicon sequencing was performed on microbiome samples.

Results: BCF tended to increase diversity ($p = 0.18$) and decrease the relative abundance of Cutibacterium acnes. While they did not alter the overall pre-existing diversity of the skin microbiome, PF and OSL trended towards increased sebum excretion and appeared to support growth of Cutibacterium acnes. Sebum production was shown to negatively correlate to diversity in a less oily population.





Conclusion: Topically applied bacterial extracts, lysates, ferments, and prebiotics may modulate the skin microbiome, including altering diversity and enhancing particular taxa. Each ingredient has distinctive effects on skin microbiome and sebum excretion rate; and should be taken into account for desired skin benefits.

