Effect of prebiotic approaches to the skin conditions among different user groups

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Introduction:

The interest in human skin microbiome has shown a big increase in the recent years for the dermatological and also cosmetic fields. Skin microbiota is known to be made up of trillions of microbes, derived from thousands of different strains that live together in an ecological community. The cutaneous microbiota can provide vital functions to the skin, such as host protection against pathogens, barrier function improvement, modulation of the skin immune system and skin nutrition. The microbiota-skin communication helps obtain a microbial balance that is linked to a more protected healthy skin. To joining the growing trend of skin microbiome, many cosmetic companies have been working to deliver innovative microbiota-inspired products using prebiotic/postbiotic approaches for a maintained healthy state of the skin. Current studies have demonstrated the linkage between skin microbiome and barrier function. However, few studies have correlated skin microbiome to the overall skin conditions and skin texture. In this study, an heptapeptide which favors microbial diversity and balance, along with a Bacillus ferment extract were investigated to study their combined effects to ageing skins.

Materials & Methods:

1. Test information

Forty healthy females aged from 26-55 were participated in the in-vivo study. Participants were required to apply the active/placebo cream twice a day for 28 days.

2. Test product

The placebo cream is a simple gel cream. The active cream is the same cream base with 2% Bacillus ferment extract solution (solution with 0.1% bacillus ferment) and 3% Acetyl Heptapeptide-4 solution (solution with 0.05% Acetyl Heptapeptide-4).

3. Test design

Single-blind, randomized, self-comparison between the baseline value and the measured values after using product, placebo-controlled and half-face study.

Test environmental conditions: 21±1°C Temp. and 50±5% relative humidity.

4. Efficacy evaluation parameters

Parameters	Methods	Evaluation sites
Facial image	Visia-CR	Whole face
Skin elasticity (R2)	Cutometer, MPA580	Cheek
Crow's feet wrinkle number	Primos CR	Next to eye
Wrinkles underneath the eye—number and length	Primos CR	Underneath the eye
Skin pores depth	Primos CR	Cheek
Skin roughness-Sa	Primos CR	Cheek
Safety and adverse effect evaluation	Dermatologist	Whole face

5. Statistical analysis

Analysis of the intra-group and inter-group difference between the baseline value (D0: the day before applying the test products) and the measured values at each follow-up time (D0T2h: 2 hours after applying the test products; D28: the 28th day after applying the test products) were performed by ANOVA test. SPSS 21.0 was used for the data analysis. P-value < 0.05 were considered significant.

Results & Discussion:

1. Whole group (Age 26-55)

a) Wrinkles underneath the eye

After application for 28 days, the wrinkle number has been decreased by 34.02% for the active group and 32.85% for the placebo group when compared to the baseline (D0). For the wrinkle length, the parameter has been decreased by 12.29% for the active group and 10.19% for the placebo group. Statistical analysis shows significant difference ($p<0.05$) between active group and placebo group for both wrinkle number and wrinkle length.

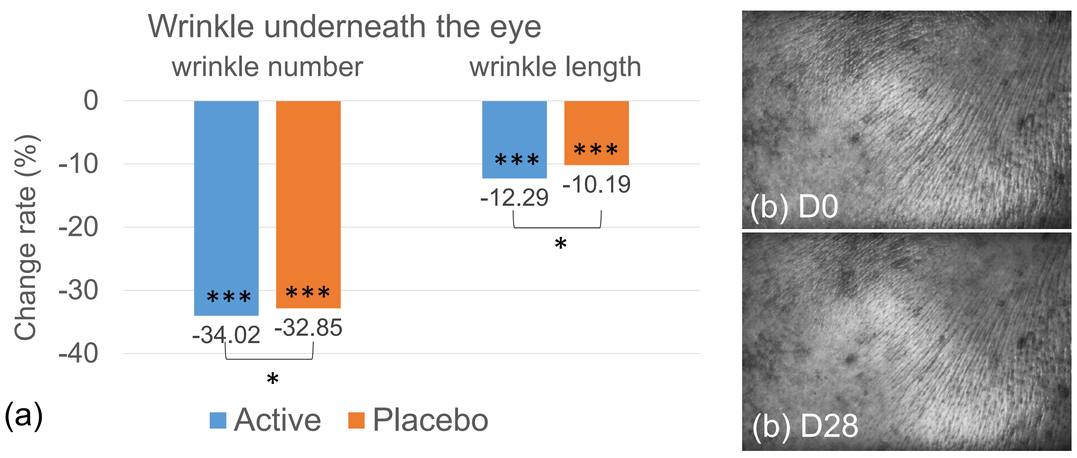

Figure 1. Wrinkle underneath the eye after application for 28 days. (a) statistical analysis for wrinkle number and wrinkle length; (b) Primos CR image example of one testing candidate at D0 and D28.

2. Selective group: younger group (Age 26-40) & sensitive skin group

For younger group (Age 26-40), skin pore depth of the cheek area and skin roughness were evaluated by Primos CR before and after application for 28 days. Compared to the baseline, the average pore depth and skin roughness have been significantly decreased by 6.84% and 7.21%, respectively, for the active group. While for the placebo group, there were no statistical significance for these two parameters ($p>0.05$).

For sensitive skin group, after 28 days application, the length of the wrinkles underneath the eye area has been decreased by 13.62% for the active group, while the placebo group has been decreased by 9.45%. There was statistically significant difference between the two groups ($p<0.01$). For the Crow's feet wrinkle, the wrinkle number has been significantly decreased by 4.67% for the active group while for the placebo group, there was no statistical significance between D0 and D28. In addition to the wrinkle reduction around the eye areas, a reduction of overall skin redness and acne scarring was also noticed for sensitive skin groups.

Figure 2. Image of a sensitive skin candidate at the age of 32.

Conclusions:

Skin microbiota made up of trillions of microbes, is derived from thousands of different strains that live together in an ecological community. The main functions of the skin microbiota is its contribution to the role of the skin as a protective barrier through different mechanisms including bacterial competition, modulation of skin immune system, influence the structure and function of the skin [1].

The heptapeptide is an active ingredient targets to strengthen vulnerable urban skin, by promoting microbiota balance, diversity and an increase in beneficial bacteria, associated with a healthier skin in higher contact with nature. In addition, the ingredient favors the enhancement in beneficial bacteria on the skin. While the Bacillus ferment extract is a prebiotic-approach active ingredient obtained through biotechnology isolated from a natural clay close to a natural park in Spain. It helps to reduce P. acnes biofilm formation involved in acne and also inflammatory response upon the presence of P. acnes, helping alleviate acne-prone skin.

When working together, surprisingly it has been found that the actives had unique anti-ageing effects through microbiota treatment. After application of the active cream for consecutive 28 days, a significant increase in skin elasticity and a reduction of under-eye wrinkles and Crow's feet have been observed. For younger group (aged from 26-40), in addition to skin elasticity and wrinkle reduction, a significant improvement on skin pores and overall skin roughness was also observed. For sensitive skin groups with defective barrier function, a reduction of overall skin redness and also acne scarring was noticed in the in-vivo testing. It has been proved that the combination of the heptapeptide and the bacillus ferment extract can effectively help to maintain a microbial balance and finally improve the overall skin conditions among different user groups including characteristics such as hydration, skin elasticity, skin roughness, pores and wrinkles.

Acknowledgments:

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References:

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