Multifunctional Effects of Lactococcus Ferment Lysate care for healthy scalp

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Abstract:

Scalp health' is meaning the length, lustre and health of your hair depends on the skin that covers your head. With stress and pollution levels consistently creeping up and up. it's hardly surprising we've all got scalp issues on our mind. Each hair grows from, and through, an individual follicle which surfaces on your scalp. Sebum is also produced by each individual follicle via the sebaceous gland, the amount of which will vary from person to person. It is essential that the follicle and the scalp, at point of exit, are clean, clear, healthy and maintained. Follicles that are full of sebum (oil) or blocked by dead or flaking skin will have an impact on the quality of hair growth. In this study, we screened the cosmetic substances which Improve scalp environment. In the result, we found Lactococcus Ferment Lysate addresses those processes of particular importance for the scalp. Making the scalp more robust will make it less sensitive. Improving its barrier function helps it lock in water much more effectively. Scalp becomes more moisturized. Lactococcus Ferment Lysate also addresses excessive sebum production, which is another important concern for many consumers.

Background:

Aeported that the most prevalent fungal species found in the dandruff scalps were M. restricta and M. globosa; according to Paulino et al. [1] In addition to fungi, human scalp is also colonized by bacterial populations [2] but their association with dandruff has not been shown earlier. When compared with normal scalp, the scalp with dandruff had a decreased population of Cutibacterium and an increased population of

Staphylococcus. [3] According to this, we think that the micro ecology of scalp can be changed by adjusting the flora of scalp. Therefore we use a product obtained from a lysate of Lactococcus lactis, which essentially contains the cell debris of this bacterium – such as cell fragments, like DNA, metabolites, cytoplasmic compounds, and cell wall materials. In an in vivo study on 40 volunteers with reported problematic scalp. We found Lactococcus Ferment Lysate can make the scalp more robust will make it less sensitive.

Methods:

The oiliness and overall condition of the scalp was assessed objectively by an expert grader who employed SebufixR and CorneofixR technologies (both: Courage + Khazaka, Germany). The assessments took place after completion of the 4-week treatment where the volunteer had not washed his/her hair in the 48 h before the analysis to avoid the artificial effects of the shampoos which would be obtained if the analysis were performed shortly after washing their hair. The placebo and the sample with 3% Lactococcus Ferment Lysate, were provided by Mageline Biology Tech Co., Ltd."

Results:

General scalp condition was assessed by an expert grader as described above. After the 4-week treatment with the shampoos, the results were clear: the scalp of the volunteers who had washed their hair with the shampoo containing Lactococcus Ferment Lysate showed healthier scalp compared to those who had washed their hair with the placebo - the improvement was 55% and 45% respectively. The placebo had reduced the oiliness of the scalp only by less than 5%, the shampoo with Lactococcus Ferment Lysate had reduced this negative aspect by more than 30%. After 4 weeks of using the shampoos,80% of the volunteers who used the shampoo with Lactococcus Ferment Lysate reported that their scalp felt healthier. The percentage was only 60% for the placebo shampoo. Interestingly, 85% of the volunteers who had used the

shampoo with Lactococcus Ferment Lysate stated that their scalp felt less oily, whereas this was true for only 50% of the other group

Conclusion:

General scalp condition was assessed by an expert grader as described above. After the 4-week treatment with the shampoos, the results were clear: the scalp of the volunteers who had washed their hair with the shampoo containing Lactococcus Ferment Lysate showed healthier improvement was 55%, had reduced the oiliness of the scalp more than 30%, 85% of the volunteers who had used the shampoo with Lactococcus Ferment Lysate stated that their scalp felt less oily.

Keywords:

Scalp health, Lactococcus Ferment Lysate, Scalp

Introduction:

Probiotics are considered important roles in skin health, wellbeing, and microbiome-associated skin disease. Some specific probiotic strains, including Bifidobacterium, Saccharomyces, Enterococcus, Bacillus, and Lactobacillus, have been demonstrated for health benefits. [4] However, both in the field of science and industry, the term “probiotics” is mainly narrowed to the group of lactic acid bacteria (LAB).[5] Lactic acid bacteria can decompose macromolecular substances in food, including degradation of indigestible polysaccharides and transformation of undesirable flavor substances. Meanwhile, they can also produce a variety of products including short-chain fatty acids, amines, bacteriocins, vitamins and exopolysaccharides during metabolism.[6] INCI: Lactococcus Ferment Lysate, based on a lysate of Lactococcus lactis. This probiotic lactic acid–producing bacterium is grown under specific conditions, after which the obtained cells are lyzed, a process involving the killing and destruction of the bacterial cells. The Lactococcus Ferment Lysate which essentially contains the cell debris of this bacterium – such as cell fragments, like DNA, metabolites, cytoplasmic compounds.

The entire human body surface, including hair and skin, is colonized by a wide variety of microorganisms, including bacteria, fungi, and viruses [7-8]. The scalp surface also provides a distinct micro environment to the microbiome, primarily arising from the host skin's physiological conditions, which include sebum content, moisture, pH, and topography of the hair. In general, skin sites are roughly classified into three groups, based on their microenvironments, which are: moist, dry, and sebaceous groups. Among these skin site groups, scalp belongs to the sebaceous group. Sebaceous glands of the scalp produce a large amount of oily sebum [9]. These studies showed that the major bacterial genera on the scalp are Cutibacterium (Propionibacterium) and Staphylococcus. When compared with normal scalp, the scalp with dandruff had a decreased population of Cutibacterium and an increased population of Staphylococcus. [3] Since bacteria can change the state of the scalp, does the use of microbial active substances have the same effect. To verify this, we used Lactococcus Ferment Lysate in an in vivo study on 40 volunteers with reported problematic scalp. we found Lactococcus Ferment Lysate addresses those processes of particular importance for the scalp. Making the scalp more robust will make it less sensitive. Improving its barrier function helps it lock in water much more effectively. Scalp becomes more moisturized. Lactococcus Ferment Lysate also addresses excessive sebum production, which is another important concern for many consumers

Materials and Methods:

A shampoo containing 3% Lactococcus Ferment Lysate was tested against the same shampoo without Lactococcus Ferment Lysate (placebo, vehicle) in an in vivo study on 40 volunteers with reported problematic scalp. Twenty volunteers tested the placebo shampoo, and 20 volunteers tested the shampoo with Lactococcus Ferment Lysate. During 4 weeks the volunteers washed their hair with the shampoos on alternate days. The volunteers were requested to wash their hair for at least 2 minutes every time before rinsing out.（figure1~5）

Formulations Information

Aqua	72.837	69.837
Sodium laureth Sulfate	19	19
Cocamidopropyl betaine	6.5	6.5
Lactococcus Ferment Lysate	/	3
Polyquaternium-44	0.3	0.3
Sodium Chloride	0.75	0.75
Sodium Benzoate	0.4	0.4
Potassium Sorbate	0.2	0.2
Citric Acid	0.013	0.013
Total	100	100

1. Sebufix ® and Corneofix® introduce

   Sebufix ®: In addition to well-established quantitative measurements of sebum, the use of Sebufix® is more qualitative. The foils are available in a convenient feeder and can be easily removed. Very fast measurement without glue has no occlusive effects on the skin, thus avoiding incorrect results. The measurement is not affected by the skin's hydration level (sweating).

   Corneofix®: Corneofix® is a special adhesive tape collecting corneocytes (flakes of dead cells). The number, size and thickness of the corneocytes indicate the desquamation/hydration level of the stratum corneum. When mounted on the Visioscan® camera, the desquamation can be evaluated by its software.

2. The oiliness and overall condition of the scalp was assessed objectively by an expert grader who employed Sebufix® and Corneofix® technologies (both:Courage + Khazaka,Germany). When Sebufix® collector foil is applied to the skin, the sebum becomes visible as transparent spots. Skin with low oil content shows few small spots, whereas oily skin is visualized by numerous large spots. Corneofix® collector foil was used for harvesting superficial corneocytes. Number, size and thickness of the corneocytes indicate the condition of the skin surface (desquamation and hydration level). The assessments took place after completion of the 4-week treatment where the volunteer had not washed his/her hair in the 48 h before the analysis to avoid the artificial effects of the shampoos which would be obtained if the analysis were performed shortly after washing their hair.

Results:

1. Scalp condition:

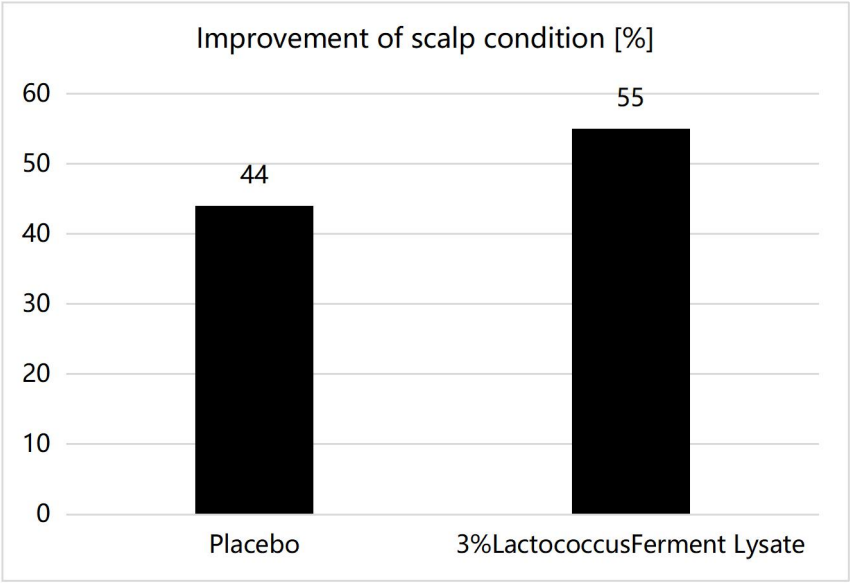


Figure1: Improvement of scalp condition (%)

General scalp condition was assessed by an expert grader as described above. After the 4-week treatment with the shampoos, the results were clear: the scalp of the volunteers who had washed their hair with the shampoo containing Lactococcus Ferment Lysate showed healthier scalp compared to those who had washed their hair with the placebo - the improvement was 55% and 45% respectively (Figure 1)

2. Scalp oiliness

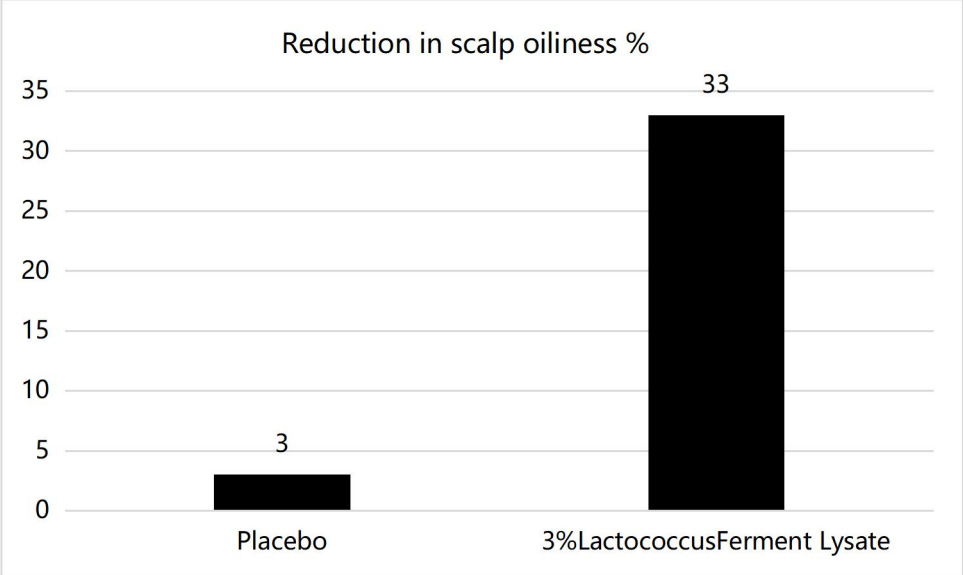
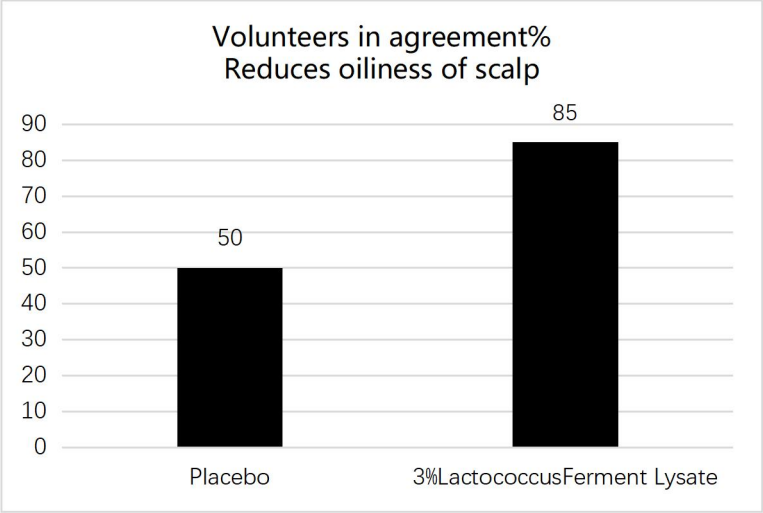


Figure 2: Reduction in scalp oiliness (%)

The activity of the shampoos on this aspect was assessed by the expert grader, as de-scribed above, as well. The results obtained with the shampoo containing Lactococcus Ferment Lysate were quite remarkable: whereas the placebo had reduced the oiliness of the scalp only by less than 5%, the shampoo with Lactococcus Ferment Lysate had reduced this negative aspect by more than 30% (Figure 2)

3. Agreement of volunteers l



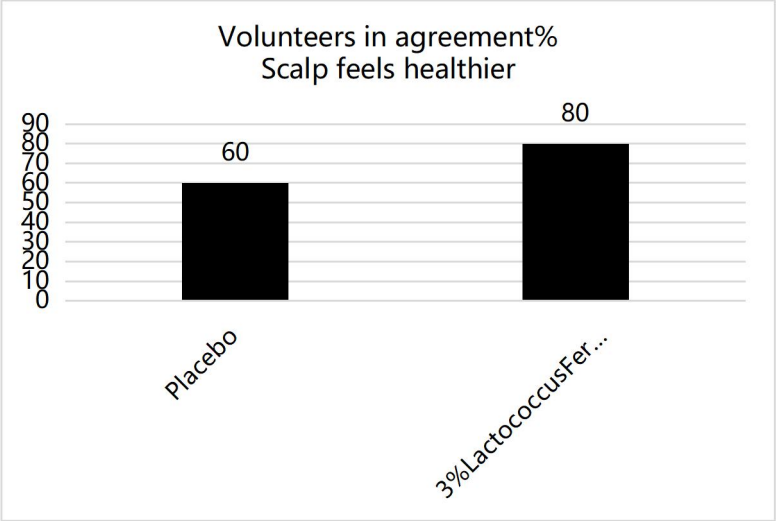


Figure 3: Number of volunteers in agreement with the statement (%)

The volunteers in the study also perceived clear differences between the shampoos. After 4 weeks of using the shampoos,80% of the volunteers who used the shampoo with Lactococcus Ferment Lysate reported that their scalp felt healthier. The percentage was only 60% for the placebo shampoo. Interestingly, 85% of the volunteers who had used the shampoo with Lactococcus Ferment Lysate stated that their scalp felt less oily, whereas this was true for only 50% of the other group (Figure 3)

4. Agreement of volunteers II

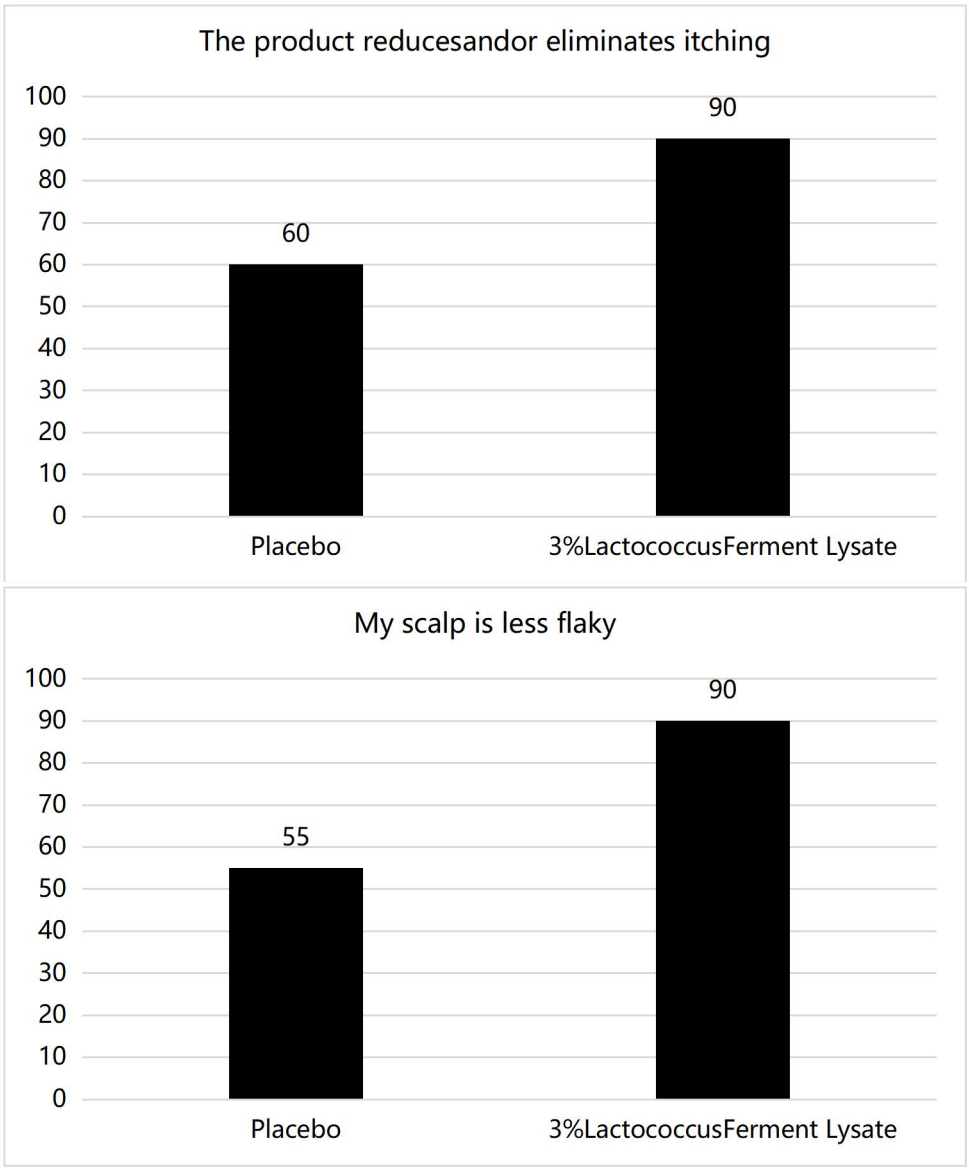


Figure 4: Number of volunteers in agreement with the statement (%)

As for the overall condition of the scalp, the answers of the volunteers were distinctly different. Ninety percent of the volunteers who had used the shampoo containing Lactococcus Ferment Lysate reported that the shampoo had reduced or eliminated itching, compared to 60% of those who had used the placebo. The shampoo with Lactococcus Ferment Lysate had also notice-ably reduced the flakiness of the scalp for 90% of volunteers, compared to 55% of the volunteers who had used the placebo shampoo (Figure 4)

5. Improvement of overall scalp condition

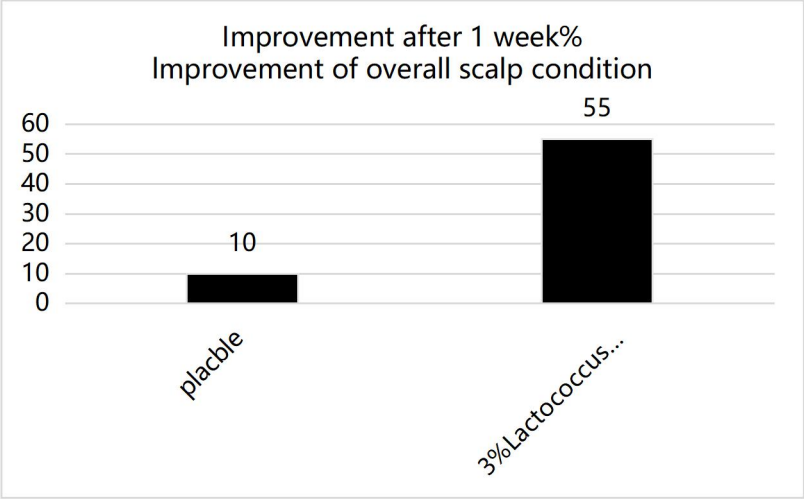


Figure 5: Improvement of overall scalp condition after1 week (% of volunteers in agreement)

The above results of this study clearly show the added benefits of Lactococcus Ferment Lysate. These benefits were objectively observed by an expert grader and, even more importantly, perceived by the volunteers who took part in the study. lt is important for cosmetic products to lead to perceivable benefits as quickly as possible. The results after 4 weeks were convincing, but an important result was already obtained after just 1 week. After 1 week - 3treatments with the shampoo - 55% of the volunteers who had washed their hair with the shampoo containing Lactococcus Ferment Lysate had perceived an improvement in the overall condition of their scalp. Just 10% of the volunteers who had used the placebo shampoo reported the same. (Figure 5)

Discussion.

This study just an in vivo text. It showed Lactococcus Ferment Lysate improving its barrier function helps it lock in water much more effectively. Scalp becomes more moisturized. Also addresses excessive sebum production, which is another important concern for many consumers. But we didn't test the distribution of bacteria on the surface. Next we will use Lactococcus Ferment Lysate in normal scalp and the scalp with dandruff analysis Cutibacterium and Staphylococcus distribution. Study its effect on dandruff

Conclusion.

Effective scalp care is demanding, both from a biological and a formulation point of view. The scalp is unique and presents unique problems, and consumers show high interest in personal care products that are beneficial for their scalp, products which treat scalp dryness, oiliness and sensitivity. When it comes to the application and use of cosmetic products, the average consumer mostly wants convenience. Effective treatment of the scalp with a shampoo is, therefore, eminently important.

The effectiveness of Lactococcus Ferment Lysate for the scalp was tested in a placebo-controlled study where 3% Lactococcus Ferment Lysate was formulated in a shampoo and the vehicle that did not contain Lactococcus Ferment Lysate acted as a placebo. The shampoo with Lactococcus Ferment Lysate clearly outperformed the placebo shampoo in both the objective and subjective analyses of their efficacy.

Acknowledgments.

NONE.

Conflict of Interest Statement.

NONE.

References.

1. Paulino L C , Chi-Hong T , Blaser M J . Analysis of Malassezia microbiota in healthy superficial human skin and in psoriatic lesions by multiplex real-time PCR.[J]. Fems Yeast Research, 2010(3):460-471.
2. Grice E A , Segre J A . The skin microbiome[J]. Nature Reviews Microbiology, 2011, 9(4):244.
3. Saxena R , Mittal P , Clavaud C , et al. Comparison of Healthy and Dandruff Scalp Microbiome Reveals the Role of Commensals in Scalp Health[J]. Frontiers in Cellular and Infection Microbiology, 2018, 8.
4. Tsai Y L , Lin T L , Chang C J , et al. Probiotics, prebiotics and amelioration of diseases[J]. Journal of Biomedical Science, 2019, 26(1).

5. Tripathi M K , Giri S K . Probiotic functional foods: Survival of probiotics during processing and storage[J]. Journal of Functional Foods, 2014, 9:225-241.
6. Wang Y , Wu J , Lv M , et al. Metabolism Characteristics of Lactic Acid Bacteria and the Expanding Applications in Food Industry[J]. Frontiers in Bioengineering and Biotechnology, 2021, 9.
7. Costello E K , Lauber C L , Hamady M , et al. Bacterial Community Variation in Human Body Habitats Across Space and Time[J]. Science, 2009, 326(dec.18):1694-1697.
8. Conlan S , Findley K , Oh J , et al. Topographic diversity of fungal and bacterial communities in human skin[J]. Nature, 2013, 498(7454):367-370.
9. Clavaud C , Jourdain R , Bar-Hen A , et al. Dandruff Is Associated with Disequilibrium in the Proportion of the Major Bacterial and Fungal Populations Colonizing the Scalp[J]. Plos One, 2013, 8(3):e58203.