aura*firm S*

DATA PACK

POSTBIOTIC ACTIVE TO RESTORE A DISRUPTED MICROBIOME

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info@oatcosmetics.com 2 Venture Road, Chilworth, Southampton, SO16 7NP, UK Tel: +44 (0)2380 767228

INGREDIENT PROFILE

aura*firm* S is a postbiotic active which restores a disrupted skin microbiome. The key characteristics of this active ingredient include:

- Amino acids and bioactive peptides which enhance/support the metabolic functions in the epidermis.
- Hydroxy carboxylic acids such as lactic acid which provide hydration.

*Product image for illustration purposes only, actual product may vary

INTRODUCTION

Oat Cosmetics' **aura***firm* ingredients are a family of active ingredients created by the fermentation of Oat COM, our advanced colloidal oatmeal, using proprietary cultures of *Lactobacillus*.

FERMENTATION

aura*firm* S is made by the fermentation of 25% of Oat COM (our advanced colloidal oatmeal). Oat COM is fed to the *Lactobacillus* strain which undergoes a patented fermentation process where Oat COM is completely converted to biomass and organic acids. Fermentation breaks down the cell wall structures of the oat, leading to the release or synthesis of bioavailable molecules as various antioxidant compounds and amino acids. These antioxidant compounds can act as free radical terminators, metal chelators, singlet oxygen quenchers or hydrogen donors to radicals. The fermentation results in:

- **aura***firm* P (5-10 % of Oat COM), a filtered paste
- **aura***firm* N (1-5 % of Oat COM), a filtrate
- **aura***firm* S (1-2 % of Oat COM), a clear serum

PROFILING

aura*firm* S is a mobile, crystal clear, slightly straw-coloured liquid, rich in highly active water-soluble molecules. This ingredient has been centrifuged and finely filtered to produce a powerful postbiotic material which gives a rapid boost to a disrupted microflora. As well as giving benefits to the microbiome, aurafirm S improves radiance and complexion. This ingredient is ideal for clear, colourless products such as serums and toners.

PREBIOTICS

Molecules that promote the growth of beneficial microorganisms on the skin and provide a healthy and balanced diet or skin microbiota. Prebiotic molecules in **aura***firm* S are:

Phenolic Compounds:
Polyphenols are secondary metabolites with antioxidant and anti-inflammatory activity. Phenolic acids are a key class of polyphenols. The fermentation of Oat COM increases the antioxidant capacity of **aura***firm* S.

Ectoin:
Ectoin is a natural substance which is produced by bacteria to protect against extreme conditions. It promotes hydration of the epidermis by maintaining the correct water balance and prevents the dehydration of the epidermis. As a result, the skin appears smooth and soft.

POSTBIOTICS

Range of metabolites produced by live bacteria during the fermentation process that help to regulate the composition of the skin microbiome ecosystem. Postbiotic molecules in **aura***firm* S are:

*Indicative Typical values

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aura*firm* S Profile

AHAs:
Strains of *Lactobacilli* can produce α-hydroxy acids (AHAs) to exhibit pH-adjustments and antibacterial activity against most dermal pathogenic bacteria. **aura*firm*** S contains hydroxy acids, particularly lactic acid. Lactic acid can exfoliate, by breaking down and dissolving the structure of dead skin cells, without causing sensitivity. Lactic acid stays on the outer layers of the skin due to its large molecular size where it works to lift and remove dead skin cells to reveal brighter, more even skin. It also adds moisture to the outer layers of the skin.

	aura*firm* S
Organic Acids*	4,000 mg/kg

Amino Acids:
Amino acids, which are important to the metabolic activity of the living epidermis, are essential in maintaining the integrity of the skin barrier, for protein synthesis and nutrient absorption. Microorganisms synthesise amino acids in order to grow, develop and perform all routine metabolic functions[1]. **aura*firm*** S supplies the skin with essential amino acids, mainly glutamic acid and proline.

	aura*firm* S
Amino acids*	5,500 mg/kg
of which	
Glutamic acid*	1,500 mg/kg
Proline*	500 mg/kg

Bioactive Peptides:
The fermentation process produces peptides that help with the cellular renewal of the skin. Peptides have high bioavailability and are involved in the modulation of cell proliferation, cell migration, inflammation and protein synthesis and regulation.

	aura*firm* S
Bioactive Peptides*	5,000 mg/kg

CONCLUSION

Fermentation is the enzymatic decomposition and utilisation of nutrients, particularly carbohydrates, by microbes. The process of fermentation enhances the accessibility of actives in Oat COM and this is responsible for the development and improvement of **aura*firm*** S, a fermented product. The levels of bioactive compounds can be modified during fermentation by the metabolic activity of Lactic acid bacteria and enzymes derived from oat. The fermentation process induces structural breakdown of oat cell walls leading to the liberation and synthesis of various bioactive compounds. Fermentation allows greater bioavailability of potentially protective and reparative molecules. This increase in bioavailability is achieved due to the breakdown of into peptides and amino acids, many of which are small enough to penetrate past the stratum corneum[3,4]. Oat COM, a colloidal oatmeal, contains proteins, polysaccharides, and vitamin B. It has been widely accepted as a prebiotic for gut health and data suggests benefits for the skin too as demonstrated in our studies. In addition, Oat COM exhibits prebiotic benefits to enhance growth of healthy bacteria on the skin, its composition makes it an optimal starting material for fermentation.

*Indicative Typical values

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FT-IR Analysis

BACKGROUND

Fourier–transform infrared spectroscopy (FT-IR) was used to profile and create a molecular fingerprint for **aura*firm*** S.

METHOD

FT-IR analyses molecules that absorb light in the infrared region of the electromagnetic spectrum. This absorption corresponds specifically to the bonds present in a compound. The absorption spectrum obtained from the FT-IR analysis indicates the presence of various chemical bonds and functional groups in the sample. FT-IR was used to characterise **aura*firm*** S due to the range of functional groups, side chains and cross-links involved, all of which will have characteristic vibrational frequencies in the infrared range.

RESULTS

Figure 1:
aura*firm* S **Infrared Spectrum**

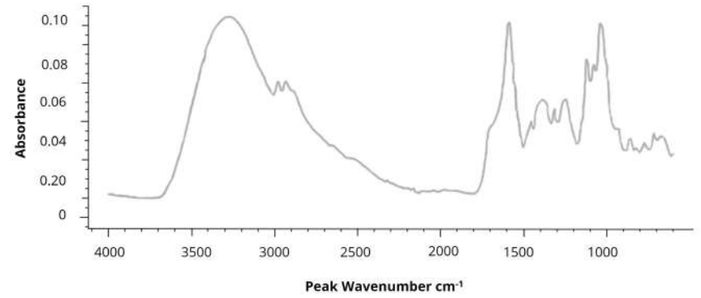


Figure 2:
Wavenumber Assignment of aura*firm* S **Infrared Spectrum**

Peak Wavenumber (cm^{-1})	Associated Chemical Bond
3300-3400	O-H
2900-2950	C-C bonds close to a double bond C=O or particularly C-H bond stretching
1610-1720	C=O or C=C
1300-1400	C-H
1050	C-O
860	C=C-H
680-780	Aromatic C-H

CONCLUSION

The peaks around 3300 cm^{-1}, 2900 cm^{-1}, 1720 cm^{-1} and 1050 cm^{-1} represent hydroxy carboxylic acids such as lactic acid. This type of compound is the major component of the sample. The bonds around 1610 cm^{-1} and 860 cm^{-1} are likely to correspond to the preservative sorbic acid and the peaks around 680- 780 cm^{-1} to the preservative benzoic acid .

Independently tested by Campden BRI, Apr 2019.

*Typical values may vary

info@oatcosmetics.com 2 Venture Road, Chilworth, Southampton, SO16 7NP, UK Tel: +44 (0)2380 767228

Viability Of *Lactobacillus* Bacteria: Flow Cytometry

BACKGROUND

A study was performed to confirm the viability and the number of *Lactobacillus* bacteria in **aura***firm* S using flow cytometry.

METHOD

Using a flow cytometer, **aura***firm* S was passed through a laser light beam to measure the interaction of its components with the light. Fluorescent markers are bound to the *Lactobacillus* cells and the fluorescence intensity represents the count of bacteria. As with the confocal microscopy, SYTO 9 and propidium iodide were used; the bacteria are dead and will therefore show up red. The concentration of bacteria was calculated using counting beads as a reference. Three replicates were analysed and an average was taken.

RESULTS

Figure 1:
***Lactobacillus* Bacteria Count in aura*firm* Grades**

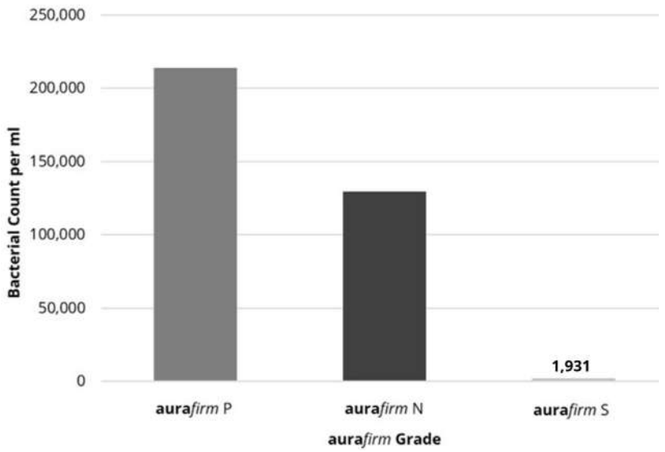
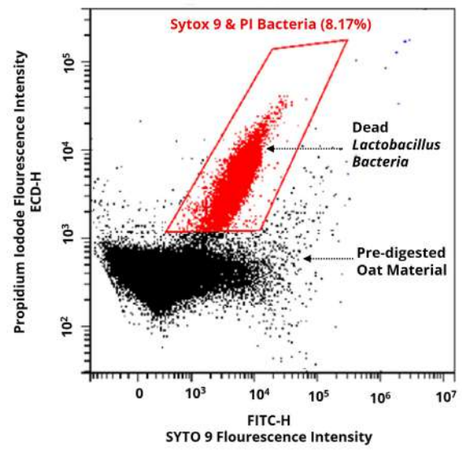


Figure 2:
Visualisation of *Lactobacillus* Bacteria in aura*firm* S



CONCLUSION

The absence of intact bacteria in **aura***firm* S confirms that the *Lactobacillus* bacteria were lysed during the additional refining step, with *Lactobacillus* membranes broken down and the inner content of the bacterial cell released into the solution. DNA that is no longer contained within an intact bacterium cannot be observed under confocal microscopy or flow cytometry.

info@oatcosmetics.com 2 Venture Road, Chilworth, Southampton, SO16 7NP, UK Tel: +44 (0)2380 767228

MODE OF ACTION

We have used sophisticated technology to undertake a gene expression analysis. This part of the data pack displays the genes stimulated and consequently their effects on the skin mechanisms produced by **aura***firm* S.

info@oatcosmetics.com 2 Venture Road, Chilworth, Southampton, SO16 7NP, UK Tel: +44 (0)2380 767228

BACKGROUND

This study was performed to understand how **aura***firm* S influences gene expression when applied topically on the skin.

METHOD

Tissue Model – A 3D in vitro skin model containing epidermal keratinocytes and dermal fibroblasts were used for the study.

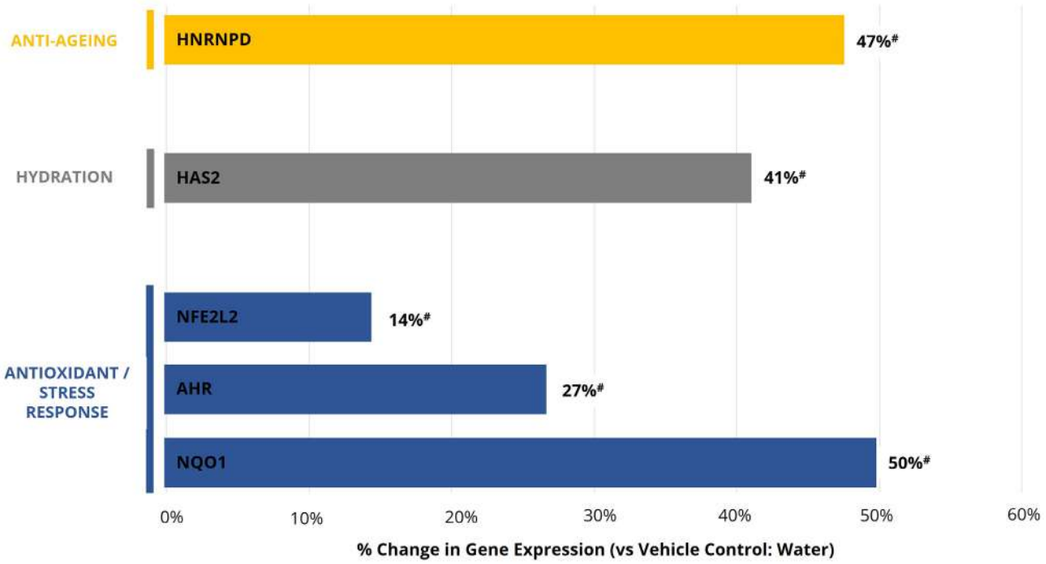
Test Groups and Time Points - 1% **aura***firm* S diluted in water and water (vehicle control) were used as the test material groups. After 48 hours of application of the test materials (after 24 hours, the tissue models were rinsed and treatment were reapplied), the tissue samples were collected and analysed (RNA isolation and cDNA synthesis).

Gene Expression Analysis - This study included 4 biological replicates per test group. The gene expression analysis was performed using a qPCR-based array that contains genes that regulate a range of skin functions. Each gene measurement was duplicated.

RESULTS

Figure 1:

Statistically Significant Changes in Gene Expression After Applying 1% aura*firm* S for 48hrs



(Unpaired t-test, Significance: #=p<0.1 (90%), N=4)

The results show that 1% **aura***firm* S increases the performance of genes that play an important role in skin biology.

Gene Modulation
and Biological Activity

IN VITRO

The gene functions and their interpretations are summarised in the following table:

Gene Function	Gene ID	Interpretation
Anti-Ageing	HNRNPD	Protective effects on telomeres. Maintains normal ageing[1]
Hydration	HAS2	Associated with skin hydration and barrier homeostasis[2]
Antioxidant and Stress Response	NFE2L2	Induces antioxidant responses[3]
	AHR	Induces antioxidant response and regulates inflammatory pathways.
	NQO1	Regulates cell proliferation and differentiation. Associated with antioxidant detoxification. Protects against oxidative damage[4]

CONCLUSION

Topical application of 1% **aura***firm* S can stimulate the expression of genes involved in mitigating hydration mechanisms and preventing antioxidant mechanisms. The relevance was on major signs of facial stress response and hydration:

- Maintenance of skin barrier homeostasis
- Induction of antioxidant responses
- Positive effect on skin hydration

EFFICACY ON SKIN

aura*firm* S is a postbiotic active which restores a disrupted microbiome. This part of the data pack provides information on the studies performed to evaluate the efficacy of **aura***firm* S on the skin.

The studies demonstrated that **aura***firm* S rebalances the skin microbiota which has been altered due to harsh cleansers. It provides excellent skin hydration, in the short and the long term.

IN VITRO

Skin Microbiome:
Bacterial Adhesion and Growth

BACKGROUND

An in vitro study was performed to evaluate the effects of **aura***firm* S on the growth and adhesion of microorganisms. The bacterial communities used in this study represent cutaneous microflora.

METHOD

To monitor the influence of **aura***firm* S on the growth and adhesion of three different bacterial communities, 3 cultural plates were cultivated in a 48-wells plate in the presence and absence of **aura***firm* S. Three different bacterial communities, representing the most abundant phylum, were used in the study:

- *Staphylococcus epidermidis* (Firmicute – representing 24% of skin bacteria)
- *Corynebacterium spp.* (Actinobacteria - representing 52% of skin bacteria)
- *Pseudomonas aeruginosa* (Proteobacteria - representing 16% of skin bacteria)

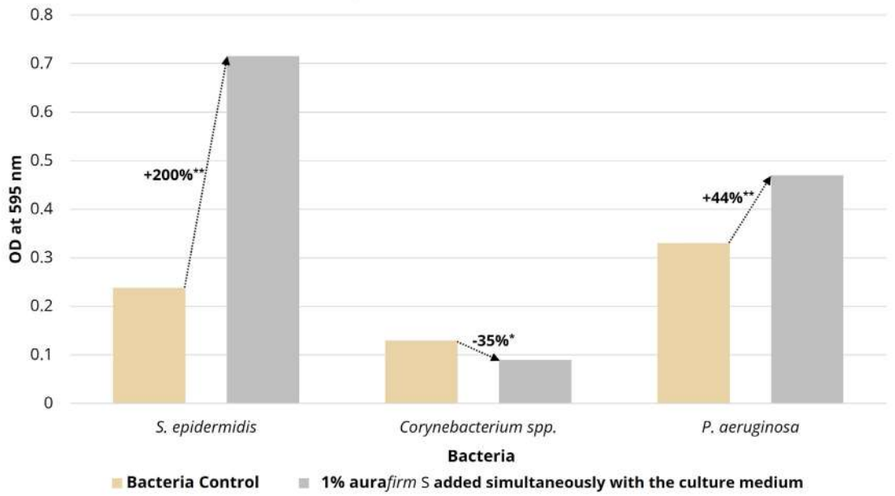
A culture medium with known quantity of each bacteria (colony-forming unit, CFU/ml) was added to the wells of the 3 plates as well as **aura***firm* S, at a concentration of 1% (diluted with culture media), this addition corresponded to the following conditions:

- Simultaneously with bacteria in the culture medium (during bacterial adhesion)
- 8 hours after the culture medium (during the bacterial growth)

After being incubated for 24 hours, the solutions were taken from the wells and optical density (OD) was measured, with a spectrophotometer at 595 nm, to evaluate the quantity of planktonic bacteria.

RESULTS

Figure 1:
Effect of aura*firm* S on Bacterial Adhesion After 24 Hours



Significant: * = p<0.05 (95%), **= p<0.01 (99%)

Independently tested by Bio EC, Jun 2019.

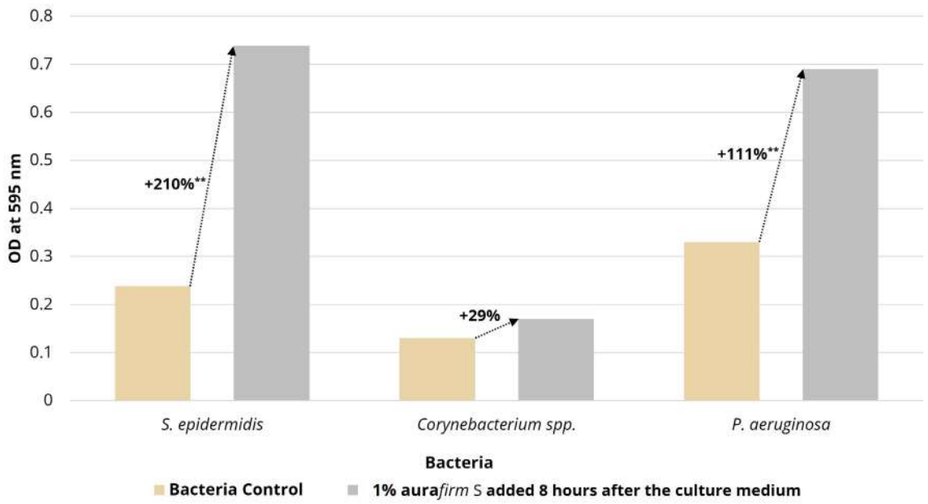
info@oatcosmetics.com 2 Venture Road, Chilworth, Southampton, SO16 7NP, UK Tel: +44 (0)2380 767228

Skin Microbiome: Bacterial Adhesion and Growth

IN VITRO

RESULTS (CONT.)

Figure 2:
Effect of aura*firm* S on Bacterial Growth After 24 Hours



The results show that after 24 hours:

- Application of 1% **aura***firm* S induced a significant increase on the adhesion of *S. epidermidis* by 200%** and significantly increased its growth by 210%**.
- Application of 1% **aura***firm* S induced a significant decrease on the adhesion of *Corynebacterium spp.* by 35%*.
- Application of 1% **aura***firm* S induced a significant increase on the adhesion of *P. aeruginosa* by 44%** and significantly increased its growth by 111%**.

CONCLUSION

The results show that **aura***firm* S induces an increase in growth of all bacteria found on the skin, it is not selective between 'good' and 'bad' bacteria. **aura***firm* S enhanced the adhesion effect and growth of *S. epidermidis* significantly, the most out of all the **aura***firm* grades, showing S would be an exceptional ingredient to apply to the skin after the microbiome had been severely disrupted, for example after washing with harsh soap.

Significant: * = p<0.05 (95%), **= p<0.01 (99%)

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IN VIVO

Effect of aura*firm* S on Disrupted Skin Microbiota

BACKGROUND

Skin bacteria actively work on maintaining an environment favourable to their survival via interactions with the skin.The constant use of harsh cosmetics, disrupts this ecosystem and leads to skin problems such as psoriasis and eczema. Following in vitro analysis, this study was performed to evaluate the ability of **aura***firm* S to rebalance a disrupted microbiota and improve the diversity of the skin microbiota by the determination of the taxonomical composition of microbiota and the calculation of their respective alpha diversity indexes (Observed OTUs, Chao1 and Shannon indexes).

METHOD

Product Treatment

3 Caucasian women aged between 32 and 37 applied 2% **aura***firm* S on their forearms twice-daily (morning/evening) for 11 days, after the application and rinsing of an ordinary solid soap, savon de Marseille to disrupt the skin microflora. The soap was selected to represent an everyday soap, commonly used by a consumer and which is known for being gentle on the skin.

Assessment of Skin Microbiome

DNA Extraction - 2% **aura***firm* S was diluted with distilled water in the laboratory of the test facility: fresh test solutions were prepared every day to avoid microbial contamination. Samples were prepared by swabbing the skin surface (6 hours after the application of products) and then rinsed with phosphate-buffered saline to collect bacteria from the surface. A standardised protocol was used for extraction of RNA from swabs.

Gene Sequence Analysis - For the identification of skin bacteria, a 16S rRNA gene sequence analysis (the Amplicon method)[1] was used. The generated data was compared to a DNA database for taxonomic classification and more than 300 different species of bacteria were identified. This allows an indication to be given of the impact of **aura***firm* S on the whole diversity of skin microorganisms, identify major bacterial phyla and evaluate the ratios between them (skin microbiota balance).

Data Analysis - The bioinformatic analysis data was carried out by detection and elimination of chimeras and the clustering of sequences in Operational Taxonomic unit (OTU) at 97% homology.

Measurement of Skin pH

Additionally, pH of the skin was measured using a pH meter, at Day 1 and Day 11, indicating the effect of the test product on the skin microbiota recovery.

RESULTS

The effect of **aura***firm* S on the skin microbiome was analysed using three parameters: Alpha Diversity, Genus Profiling and Skin pH.

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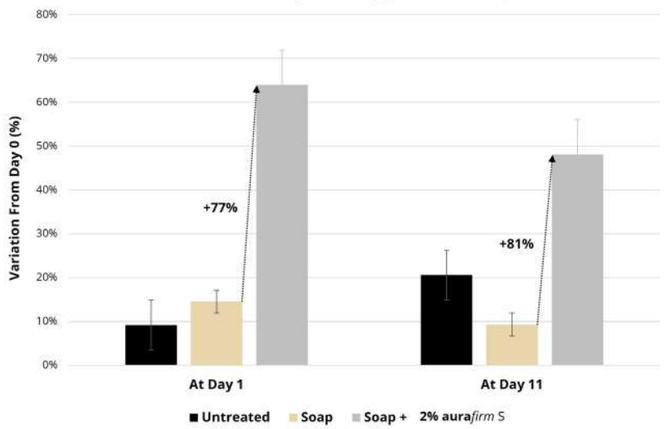
RESULTS: ALPHA DIVERSITY

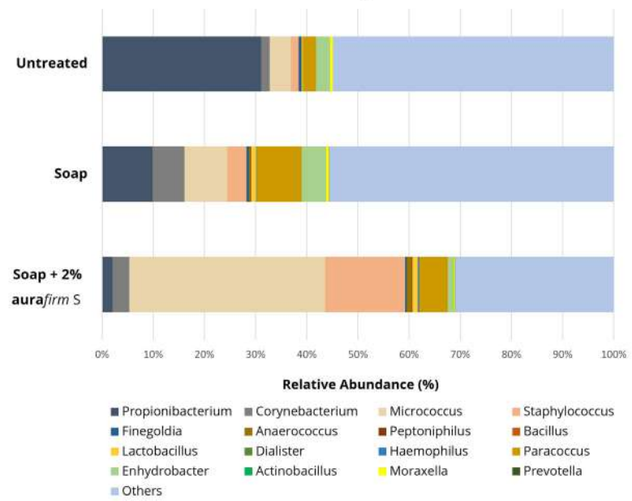
Figure 1:
Evolution of Alpha Diversity (Shannon Indexes)



The Shannon index increases as both the richness (the number of species present) and the evenness (their relative abundances) of the community increase. It is well known that an increased biodiversity results in a healthy ecosystem, therefore an increase in Shannon index indicates a healthier skin microbiome[2]. Results show that washing with soap had a detrimental impact on the skin microflora. This was chosen to represent to washing habits of an average consumer. An imbalance in the microbial community composition and decrease in diversity is representative of 'unhealthy skin'. The increase in Shannon index shows that the skin treated with 2% **aura***firm* S was able to recover faster from the use of soap and increase the diversity of the skin microbiome. At Day 1, 2% **aura***firm* S increased the skin microbial community composition compared to the untreated zone. At Day 11, the soap decreased the microbial diversity of the skin, however application of **aura***firm* S counteracted this effect and increased the diversity compared to soap and untreated.

RESULTS: GENUS PROFILING

Figure 2:
Short Term Effect of aura*firm* S On Stressed Skin



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Effect of aura*firm* S on Disrupted Skin Microbiota

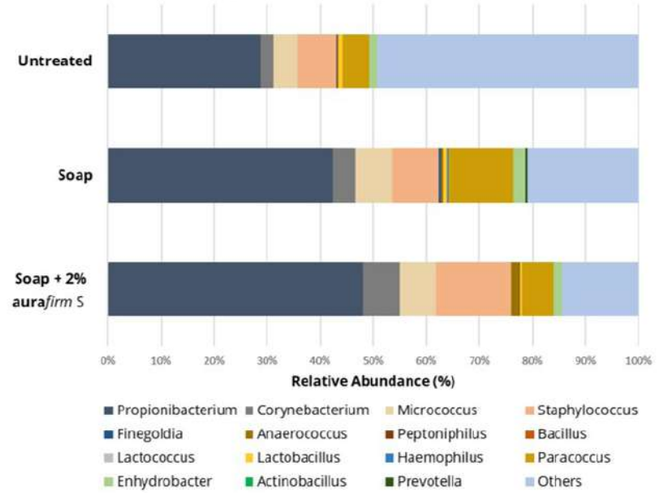
IN VIVO

RESULTS: GENUS PROFILING (CONT.)

The results show that the use of even a gentle soap disrupts the skin microbiota. The application of 2% **aura***firm* S, after the use of soap, had a positive impact and helped to restore the microbiome after the disruption. Anaerobic bacteria, potentially pathogenic for the skin, such as *Finegoldia* and *Peptoniphilus* decreased as well as acidophilic bacteria such as *Lactobacillus*. *Corynebacterium* decreased as well (resulting in an increase in sebaceous gland activity which stimulates sebum secretion) and so did *Propionibacterium* (associated with pathogenic skin disorders). 2% **aura***firm* S increased *Micrococcus* and *Staphylococcus*, which can contribute to regulation of the skin barrier.

In the short term, 2% aura*firm* S helps to rebalance the skin microbiota after disruption with soap.

Figure 3:
Long Term Effect Of aura*firm* S On Stressed Skin



At Day 11, the application of soap disrupts the microbiome less than after 1 day of use. However, 2% **aura***firm* S still has a positive effect on the microbiome compared to the soap, showing an increase in most of the genera. Application of 2% **aura***firm* S increases abundance of *Micrococcus* and *Staphylococcus*. It is observed that *Propionibacterium* and *Corynebacterium* abundance is increased but this is not out of control. In order to maintain a balanced microbiome both pathogenic and non-pathogenic bacteria need to be enhanced.

In the long term, 2% aura*firm* S helps to rebalance the skin microbiota quicker than without, after disruption with soap.

RESULTS: SKIN pH

The soap used in the study, savon de Marseille (Marseille soap), is a common cleanser used for the face and body. A healthy skin has a slightly acidic environment, averaging between 5.0 and 5.5. This environment is created by the hydrolipidic film, which provides a natural defence for the skin.

Independently tested by Bio EC, Jan 2020.

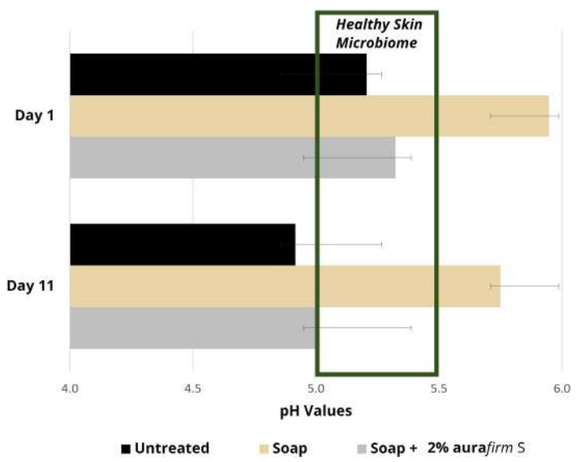
info@oatcosmetics.com 2 Venture Road, Chilworth, Southampton, SO16 7NP, UK Tel: +44 (0)2380 767228

Effect of aura*firm* S on Disrupted Skin Microbiota

IN VIVO

RESULTS: SKIN pH (CONT.)

Figure 4:
Rebalance Of The Skin pH



Ordinary soap has a relatively high pH, which can reach 9.0. As this value increases, it disturbs the natural pH levels of the skin. The hydrolipidic film is therefore put under strain and is unable to play its hydrating and protective role[3].

2% aura*firm* S rebalances the skin pH and leads to a healthy skin microbiome.

CONCLUSION

Skin cleansing is an important part of the daily routine that allows oil, dirt and sebum to be washed from the skin. However, cleansing soap can diffuse into the stratum corneum layer of the skin and disturb the lipid and cellular structures. This study shows that regularly washing the skin, even with gentle cleansers, alters bacterial diversity over time. The application of **aura-*firm* S** can counteract this imbalance and improve skin bacterial quantity and diversity by selectively promoting the growth of certain bacteria on the skin. **aura*firm* S** enables quicker recovery of skin microbiota which has been altered by a soap cleanser. Due to its postbiotic nature, **aura*firm* S** "feeds" the skin microbiota and facilitates its recovery, which is very useful in preserving the skin and microbiome quality. The term 'postbiotic' refers to a range of metabolites produced by live bacteria during the fermentation process. This includes compounds such as short-chain fatty acids, antimicrobial peptides, nutrients and hydroxy acids. **aura*firm* S** acts as a postbiotic when applied to the skin due to its high concentration of organic acids, particularly lactic acid, and is rich in other metabolites which are released after its lysis.

IN VIVO

Skin Hydration

BACKGROUND

When the skin is not hydrated enough, it becomes dry, tight and flaky. The dry flaky cells on the surface don't reflect light and make the skin appear dull and rough. Hydrated skin looks smoother and softer. This study was designed to assess the ability of **aura*firm* S** to improve skin hydration, over 28 days, in comparison to a placebo.

METHOD

Product treatment
Over a period of 28 days, 20 participants, 13 women and 7 men, aged between 20 to 66 years old, with dry skin applied 1% of **aura*firm* S** in a serum and a placebo serum on their forearms. The application was carried out twice a day, both morning and evening. Skin measurements were taken at Day 0 (before application of the treatment), then at Day 1, Day 7 And Day 28.

Measurement of Skin Hydration
A measurement of skin hydration was performed by corneometer CM 825 on the forearms of the participants. Cutaneous hydration measurements are based on electrical capacitance.

Subjective Evaluation
The acceptability of the products was measured by means of a subjective evaluation of the efficacy after application of products.

Dermatological Assessment of Tolerance
A dermatological assessment was performed after 28 days of product application to evaluated possible adverse symptoms that could appear with the use of **aura*firm* S**.

The following formulation was used in this study:

Phase	Trade Name	INCI Name	% w/w
A	Purified Water BP	Aqua	93.40
A	Lecigel	Sodium Acrylates Copolymer, Lecithin	1.40
A	Sodium Gluconate Food Grade USP	Sodium Gluconate	0.20
B	**aura*firm* S**	**Aqua, *Avena sativa* (Oat) Kernel Extract, *Lactobacillus* Ferment, Sodium Benzoate, Potassium Sorbate**	**1.00**
B	Euxyl PE9010	Phenoxyethanol, Ethylhexylglycerin	1.00
C	Surfac MCTG	Caprylic/Capric Triglyceride	3.00

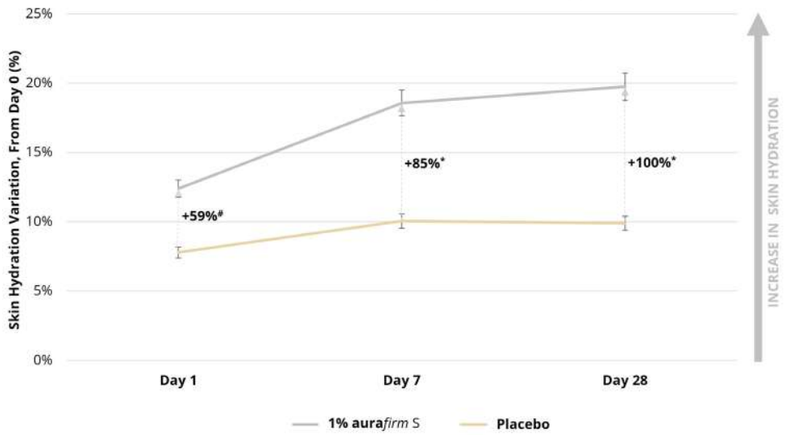
*Placebo formulation was identical minus 1% **aura*firm* S**, remaining % was made up with water.

info@oatcosmetics.com 2 Venture Road, Chilworth, Southampton, SO16 7NP, UK Tel: +44 (0)2380 767228

RESULTS

Assessment of Skin Hydration, Short- And Long-Term Effect

Figure 1:
Improvement in Skin Hydration Over 28 Days



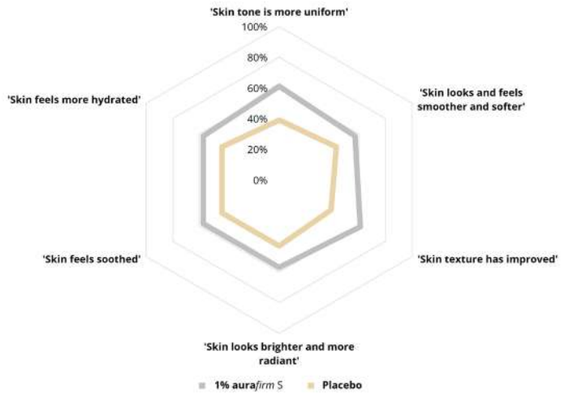
aura*firm* S outperformed the placebo serum in its ability to increase skin hydration in both, the short and the long term.

Application of **aura*firm*** S showed the following results :

- At Day 1 : Skin hydration significantly increased by 12%, as compared to 8%, with the placebo. This increase was up to 58% for one participant.
- At Day 7: Skin hydration significantly increased by 19%, as compared to 10%, with the placebo. This increase in skin hydration was up to 64% for one participant.
- At Day 28: Skin hydration significantly increased by 20%, as compared to 10% with the placebo. This increase in skin hydration was up to 92% for one participant. It was also noticed that the placebo does not provide continuous skin hydration in the long term

Assessment of Subjective Evaluation

Figure 2:
Subjective Evaluation Of The Efficacity Of 1% aura*firm* S After 28 Days



Significant: *=p<0.05 (95%), #= p<0.1 (90%)

Independently tested by Zurko Research, Mar 2022

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Skin Hydration

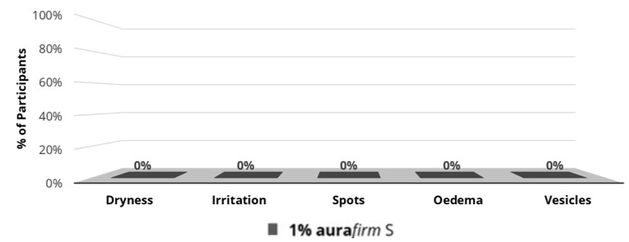
IN VIVO

RESULTS (CONT.)

With 1% **aura*firm*** S, participants noticed that the general feel and appearance of their skin has improved, most likely due to the increase in skin hydration.

Dermatological Assessment of Tolerance

Figure 3:
Skin Alterations With aura*firm* S



After 28 days of use of **aura*firm*** S, none of the participants had a feeling of skin dryness, skin irritation, or the appearance of spots, or the sensation of oedema.

CONCLUSION

Daily exposure to external factors causes loss of moisture from the skin. The key molecule involved in skin moisture is hyaluronic acid that has unique capacity to bind and retain water molecules. **aura*firm*** S upregulates the synthesis of HAS2, which is a critical enzyme-producing hyaluronic acid into the extracellular matrix (demonstrated in the gene modulation and biological activity). These results show that **aura*firm*** S is effective at rapidly improving skin hydration and continues this increase in hydration over 28 days.

Independently tested by Zurko Research, Mar 2022

info@oatcosmetics.com 2 Venture Road, Chilworth, Southampton, SO16 7NP, UK Tel: +44 (0)2380 767228

EFFICACY ON HAIR

This part of the data pack presents the efficacy of **aura***firm* S, when formulated in haircare products. Our Experts' Perception study demonstrates the ability of **aura***firm* S to smooth and condition the hair. The presence of amino acids and peptides in **aura***firm* S, forms a film around the hair shaft, which protects and imparts shine to the hair.

BACKGROUND

Industry hair experts were asked to provide expert analysis on the performance of **aura***firm* S when used as part of a shampoo and conditioner.

METHOD

Product treatment

Shampoo and conditioner products were created using 1% **aura***firm* S and a basic shampoo and conditioner chassis, as well as placebos for both. A set of hair swatches was washed with the shampoo only and a second set of swatches was washed with shampoo and then conditioned.

Assessment of Hair Combability

For dry comb and dry feel assessment, the swatches were dried at 40°C overnight. To analyse wet comb and wet feel, the swatches were gently dried to a level equivalent to towel drying long hair (wet but not dripping).

The following formulation was used in this study:

Shampoo Formula

Trade Name	INCI Name	% w/w
Euxyl PE9010	Phenoxyethanol, Ethylhexylglycerin	1.00
Disodium EDTA	Disodium EDTA	0.02
Steol CS230K	Sodium Laureth-2 Ether Sulfate	45.00
Surfac B4	Cocamidopropyl Betaine	6.00
Salt Pure Vacuum Dried	Sodium Chloride	1.83
aura*firm* S	**Aqua, *Avena sativa* (Oat) Kernel Extract, *Lactobacillus* Ferment, Sodium Benzoate, Potassium Sorbate**	**1.00**
Deionised Water	Aqua	Up to 100.00

Conditioner Formula

Trade Name	INCI Name	% w/w
Euxyl PE9010	Phenoxyethanol, Ethylhexylglycerin	1.000
Dehyquart A-CA	Cetrimonium Chloride	0.500
Natrosol 250 HHR	Hydroxyethylcellulose	0.400
Citric Acid 50% soln	Citric Acid	0.043
Cutina GMA	Glyceryl Stearate	0.500
Lanette O	Cetearyl Alcohol	2.000
Mineral Oil 350 cst	Paraffinum Liquidum	0.500
Microcare quat BHG	Behentrimonium Chloride, Glyceryl Stearate, Cetearyl Alcohol, Lauryl Alcohol, Myristyl Alcohol	1.000
aura*firm* S	**Aqua, *Avena sativa* (Oat) Kernel Extract, *Lactobacillus* Ferment, Sodium Benzoate, Potassium Sorbate**	**1.000**
Deionised Water	Aqua	Up to 100.00

Independently tested by Chrysalis, Jan 2018

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Experts' Perception Evaluation:
Hair Application

IN VIVO

RESULTS

Shampoo Efficacy: All the shampoos foamed and rinsed out identically. The wet comb conditioning impact of the shampoo containing 1% **aura***firm* S was very noticeable. The shampoo containing 1% **aura***firm* S offered the best effects with good dry comb conditioning and a soft feel.

Conditioner Efficacy: The swatches treated with both shampoo and conditioner containing 1% **aura***firm* S were much better for wet feel when compared to shampoo alone. Dry comb conditioning and feel improved when using the conditioner containing 1% **aura***firm* S. The conditioner containing 1% **aura***firm* S did not adversely affect the shine of the hair.

CONCLUSION

aura*firm* S is moisturising because it contains Vitamin B, which acts as a humectant and penetrates into the deep layers of the hair shaft. The fermentation process breaks down proteins and turns them into amino acids and peptides - smaller molecules which penetrate the cortex of the hair more easily[1]. They are capable of forming a protective film which protects and moisturises the hair shaft, which makes the hair silky and shiny.

Independently tested by Chrysalis, Jan 2018

(Significant: **=p<0.01 (99%))

info@oatcosmetics.com 2 Venture Road, Chilworth, Southampton, SO16 7NP, UK Tel: +44 (0)2380 767228

CREDENTIALS

We conclude the data pack with the following credentials of our active fermented oat ingredient. The HRIPT test has demonstrated **aura***firm S'* hypoallergic and non-irritant capacity.

*Product image for illustration purposes only, actual product may vary

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Human Repeat Insult Patch Test

IN VIVO

BACKGROUND

A Human Repeat Insult Patch Test (HRIPT) was carried out to determine the cutaneous irritation (contact dermatitis) and sensitisation (contact allergy) potential of **aura***firm* S, when applied to the skin of healthy participants.

METHOD

The study consisted of 52 participants (male and female, aged 20-78) and 3 phases: induction, in which 10 patches were repetitively applied over the course of 21 days; incubation, a rest period; and revealing, a challenge phase. Repeated contact with a potential allergen in the formula, if present, generates a series of immunological reactions in the body of the participants and induces a visible reaction on the application site. Any reactions were observed, recorded, and evaluated by a dermatologist to confirm the allergenicity of the product and hence the product's safety.

Repeated Skin Contact Test (Induction Phase): Prior to applying the patches, the test area - upper back, between the two shoulder blades - was carefully examined. A patch containing the test products and the control was applied to the test area and left in contact with the skin for 48 hours. When this first patch was removed at the laboratory 48 hours after application, the observation area was rinsed with water, dried, and examined for any skin changes. Following the examination, a new patch with fresh test product was applied. The test products were applied on the selected zones every second day, over 21 consecutive days.

Rest Period (or Incubation Phase): After the completion of the Induction Phase, a Rest Period of 10 to 14 days took place.

Challenge Phase (or Revealing Phase): The application site used during the Challenge Phase was different to the one used in the Induction Phase. For this phase, the patch was removed at the laboratory 48 hours after application. The test site was cleaned and examined for any signs of intolerance or irritation. Throughout the study, **aura***firm* S was applied at 100%.

RESULTS

aura*firm* S did not produce any signs of cutaneous irritation or skin sensitisation. That is, no participants showed presence of oedema, vesicles, blisters, or ulcerations or reported immediate or delayed reactions such as redness, irritation, itching or other sensations.

CONCLUSION

aura*firm* S can be considered both hypo-allergenic and non-irritant. Furthermore, given the control provided by a dermatologist during the study, the test products may also bear the claim "tested under the control of a dermatologist" or "dermatologically-tested".

info@oatcosmetics.com 2 Venture Road, Chilworth, Southampton, SO16 7NP, UK Tel: +44 (0)2380 767228

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info@oatcosmetics.com 2 Venture Road, Chilworth, Southampton, SO16 7NP, UK Tel: +44 (0)2380 767228

Appendix

Alphabetical list of Standard Skin Panel Gene IDs, Gene Names and Functions:

Gene ID	Gene Names	Associated Function(s) in Skin
AHR	Aryl Hydrocarbon Receptor	Antioxidant / Stress Response
HAS2	Hyaluronan Synthase 2	Hydration
HNRNPD	Heterogeneous Nuclear Ribonucleoprotein D	Anti-Ageing
NFE2L2	Nuclear Factor, Erythroid 2 Like 2	Antioxidant / Stress Response
NQO1	NAD(P)H Quinone Dehydrogenase 1	Antioxidant / Stress Response

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GET IN TOUCH

For more information about **aura***firm* S, or any other enquires about our offerings at Oat Cosmetics, please contact our Sales team at **sales@oat.co.uk**

www.oatcosmetics.com

The University of Southampton Science Park
2 Venture Road, Chilworth, Southampton, Hampshire, SO16 7NP
Phone: +44 (0)2380 767 228
Email: info@oatcosmetics.com