Technical Information

Skinolance®

Intended use

Active for skin care

Benefits at a glance

- Strengthens the natural microbial shield
- Re-balances the skin microbiota
- Improves the skin barrier function
- Enhances the overall skin quality

INCI (proposed PCPC name)

Lactobacillus extract, Propylene glycol, Water

Chemical and physical properties (not part of specifications)

Appearance	Colorless to slightly yellow liquid, slightly turbid
Solubility	Water soluble
pH	~5.5

Properties

The skin as our largest organ hosts approx. one million bacteria per cm². This sounds scary? Maybe... But IT'S A GOOD THING! This collection of millions of tiny organisms plays an important role in skin's functioning. Within recent years of skin research it was found that the stratum corneum is not the only barrier protecting our skin from environmental influences. The existence of an additional defense line supporting to protect the human body was proven: the skin microbiota. Commensal skin bacteria keep our skin immune system functioning and protect our skin against pathogens. A strengthened microbial shield and a favorable ratio of the skin's beneficial microbes are important for a balanced and healthy skin.

These findings explain a new skin health trend using ingredients strengthening commensal skin bacteria.

Evonik Nutrition & Care GmbH offers a carefully selected extract of the lactic acid bacterium *Lactobacillus brevis*! The aqueous extract is based on probiotic science and strengthens the microbial shield by stimulating the growth of skin's beneficial microbes. By this, Skinolance® supports a balanced and healthy skin.

In vitro efficacy

Determination of growth promotion of *S. epidermidis*

The lactic acid bacterium *Lactobacillus* is well known for its probiotic health benefits and is already used in food applications. Based on the probiotic trend and with the knowledge that *Lactobacillus* spp. are also essential for a healthy development of our skin microbiota shortly after birth, hundreds of *Lactobacillus* strains were screened for beneficial activity on skin microbes, especially on growth promotion of one of the most important "helpers" on our skin, *Staphylococcus epidermidis*.

Skinolance® was identified as the best extract out of 400 *Lactobacillus* spp. strains!

Method: Growth promotion of *Staphylococcus epidermidis* was a first indication to select most active *Lactobacillus* strains using agar diffusion tests. To test the growth promoting effect pre-cultured lactobacilli were filled into pre-cut holes and growth of the indicator strain *S. epidermidis* was detected as the formation of black rings around the holes due to reduction of tellurite by metabolically active *S. epidermidis* cells (study details available on request).

Results: A special *Lactobacillus brevis* strain showed strongest growth promoting activity on *S. epidermidis* and was further investigated.

Figure 1 shows an example of the growth promoting effect of Skinolance® on agar plates containing *S. epidermidis*

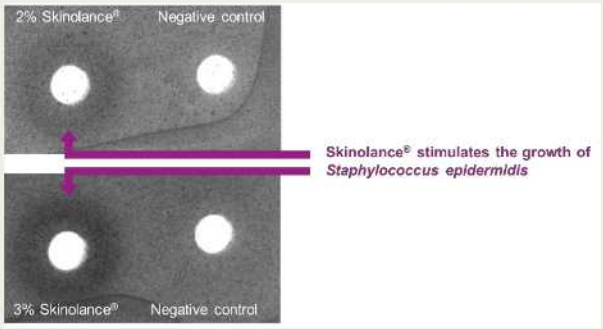

Figure 1: Growth of *Staphylococcus epidermidis* on agar plates; black rings around holes indicate a stimulation of metabolic activity.

Growth promotion of various skin microbes

Growth kinetics of different skin microbial strains were monitored to determine the impact of *L. brevis* extract in a liquid co-incubation assay.

Method: Samples containing *L. brevis* extracts and respective controls were incubated for 14 hours at 37°C in aerobic atmosphere. Optical density at 600 nm was determined to evaluate bacterial growth.

Results: In addition to the special indicator strain of *S. epidermidis*, which was used for general testing, growth promotion of further *S. epidermidis* strains as well as *Staphylococcus warneri, Staphylococcus hominis, Staphylococcus haemolyticus* and *Staphylococcus capitis* (all isolated from skin) was analyzed. All strains tested showed the same positive response to *Lactobacillus brevis* extract (see table 1).

Microorganisms	Growth promotion by *L. brevis* extract
Staphylococcus epidermidis (9 different strains)	✓
Staphylococcus captis	✓
Staphylococcus haemolyticus	✓
Staphylococcus horminis (3 different strains)	✓
Staphylococcus warneri	✓
Staphylococcus aureus	NO
Candida albicans	NO

Table 1: Growth promotion of various microbes by *L. brevis* extract.

The screening process revealed Skinolance® as the probiotic star extract out of 400 *Lactobacillus* strains! Overall, it was shown that Skinolance® re-balances the skin microbiota and strengthens the natural microbial shield.

In vivo efficacy

Study on dry skin

Method: To evaluate the effects of Skinolance® on human skin, an in vivo study was conducted. In a randomized double-blind half-side study, 30 panelists (mean age: 39 years) applied twice daily either a vehicle formulation or a cream containing *Lactobacillus brevis* extract (used test concentration corresponds to approx. 2% Skinolance®) on their right leg. The left leg remained untreated. Transepidermal water-loss was determined at baseline and after 4 weeks of application using a Tewameter TM 210 (Courage & Khazaka). In addition, microbial analysis of the skin was performed by tape stripping. At baseline and after 4 weeks of application tapes were transferred to a selective indicator medium (SAID agar).

The following microorganisms could be identified based on colony color formation (*S. epidermidis*, *S. capitis* = white colonies; *S. xylosus* = purple colonies, *Micrococcus* = yellow colonies, *S. aureus* = green colonies).

Furthermore, a clinical assessment was performed. Experts examined overall skin quality with a special focus on skin roughness.

Results: An induction in commensal skin bacteria by application of *Lactobacillus brevis* extract after 4 weeks was shown. Overall counting of colonies indicated a strong increase after 4 weeks by using the active formulation whereas only a minor increase in number of colonies could be seen with the vehicle formulation (figure 2).

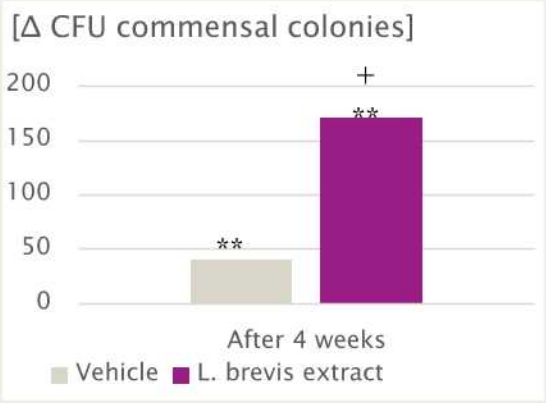

Figure 2: Counting of skin microbes after 4 weeks of application (statistical significance: ** $p<0.01$ vs. baseline, + $p<0.05$ vs. vehicle). The used test concentration of *L. brevis* extract corresponds to approx. 2% Skinolance®.

Figure 3 shows microbial growth on selective agar medium.

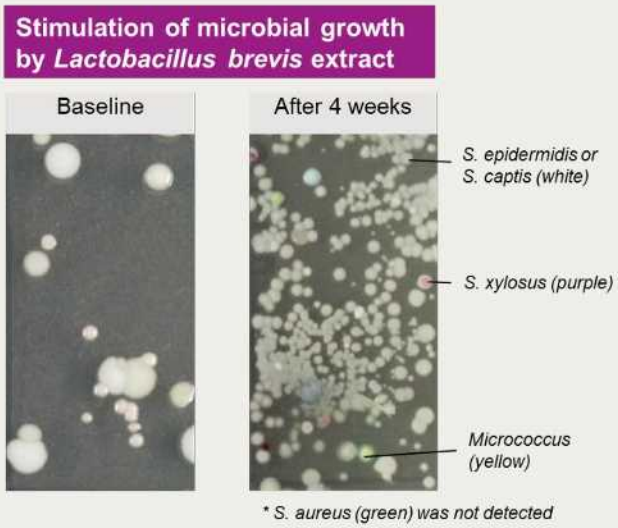

Figure 3: Tape strips of skin surface were transferred to agar plates with selective medium.

It can be seen that microbial growth of a variety of "good" skin microbes could be stimulated by application of *Lactobacillus brevis* extract. There was no indication of growth stimulation of *S. aureus* during the study.

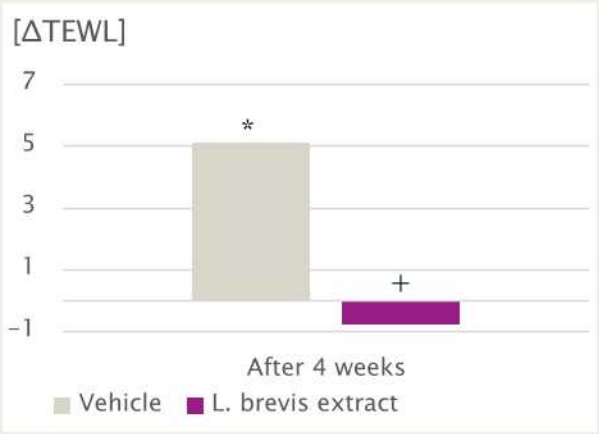

Figure 4: Difference of transepidermal water loss (TEWL) after 4 weeks to baseline values. (statistical significance: * $p<0.05$ vs. baseline, + $p<0.05$ vs. vehicle). The used test concentration of *L. brevis* extract corresponds to approx. 2% Skinolance®.

Transepidermal water loss was increased during the study when the vehicle formulation was applied. The application of the formulation with *Lactobacillus brevis* extract was able to reverse this effect. Slightly decreased TEWL values were statistically significant compared to the vehicle formulation.

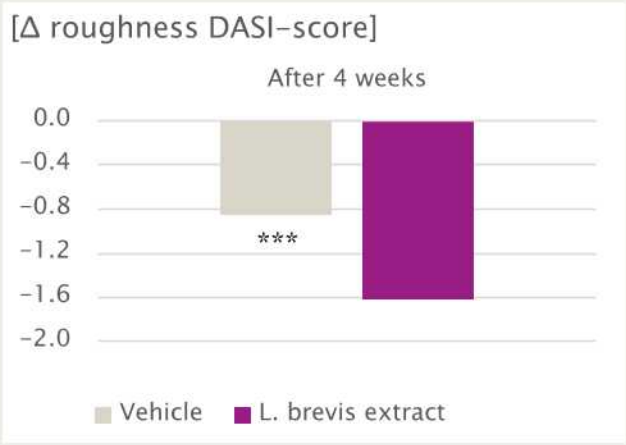

Figure 5: Evaluation of skin roughness by expert grading at baseline and after 4 weeks of application (statistical significance: *** $p<0.001$, ** $p<0.01$ vs. baseline,+ $p<0.05$ vs. vehicle). The used test concentration of *L. brevis* extract corresponds to approx. 2% Skinolance®.

Expert grading of skin roughness showed a significantly reduced grading score after 4 weeks application of *Lactobacillus brevis* extract compared to the vehicle. Moderate symptoms at baseline could be reduced to nearly no symptoms after 4 weeks by *L. brevis* extract.

Overall, it could be shown, that Skinolance® increases the number of commensal bacteria while maintaining the diversity. As a result, the natural physical and immune barrier is strengthened and skin quality is improved.

Preparation

Skinolance® is water soluble and cold processable.

Preparation of emulsions: Skinolance® is added during the cooling process at temperatures below 40 °C.

Recommended pH of the formulation: 4.0 – 6.0.

Recommended usage concentration

1 – 3% (2% clinically tested)

Applications

- Biotic skin care products: facial creams, serums, body lotions
- Possible addition of 'biotic' claim to various applications, e.g. for dry skin, sensitive skin, age prevention, men's care
- Dermocosmetics

Hazardous goods classification

Information concerning

- classification and labelling according to regulations for transport and for dangerous substances
- protective measures for storage and handling
- measures in case of accidents and fires
- toxicity and ecological effects

is given in our material safety data sheets.

A 04/18

Guideline formulation

Equalizing facial creme gel (CD 1050)

Phase A	
TEGOSOFT® AC (Isoamyl Cocoate)	2.00
TEGOSOFT® OER (Oleyl Erucate)	2.00
TEGOSOFT® APM (PPG-3 Myristyl Ether)	2.00
Phase B	
TEGO® Carbomer 341 ER (Acrylates/C10-30 Alkyl Acrylate Crosspolymer)	0.50
HyaCare® (Sodium Hyaluronate)	0.10
Skinolance®	3.00
Verstatil® TBO (Triethyl Citrate; Caprylyl Glycol; Benzoic Acid)	1.50
Water	88.90
Phase C	
Sodium Hydroxide (10 % in water)	q.s.
Phase Z	
Preservative, Perfume	q.s.

Preparation

1. Add phase A to B with stirring.[1)]
2. Homogenize.
3. Add phase C.

[1)] Important:

If phase A has to be charged into the vessel first, phase B must be added **without stirring**.

Evonik Nutrition & Care GmbH
Goldschmidtstraße 100
45127 Essen, Germany
PO Box, 45116 Essen, Germany
Phone +49 201 173 2546
Fax +49 201 173 712546
personal-care@evonik.com
www.evonik.com/personal-care

EVONIK
POWER TO CREATE