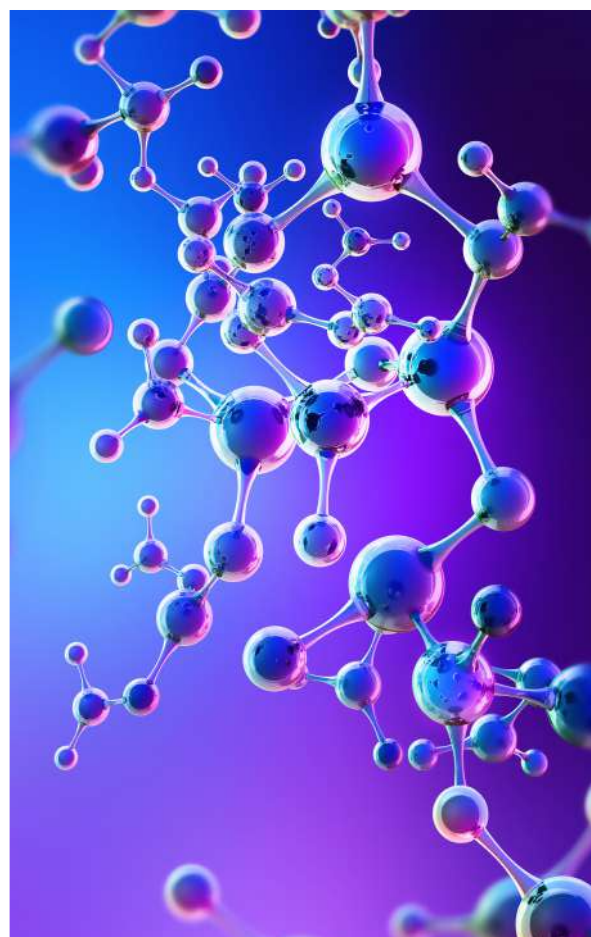


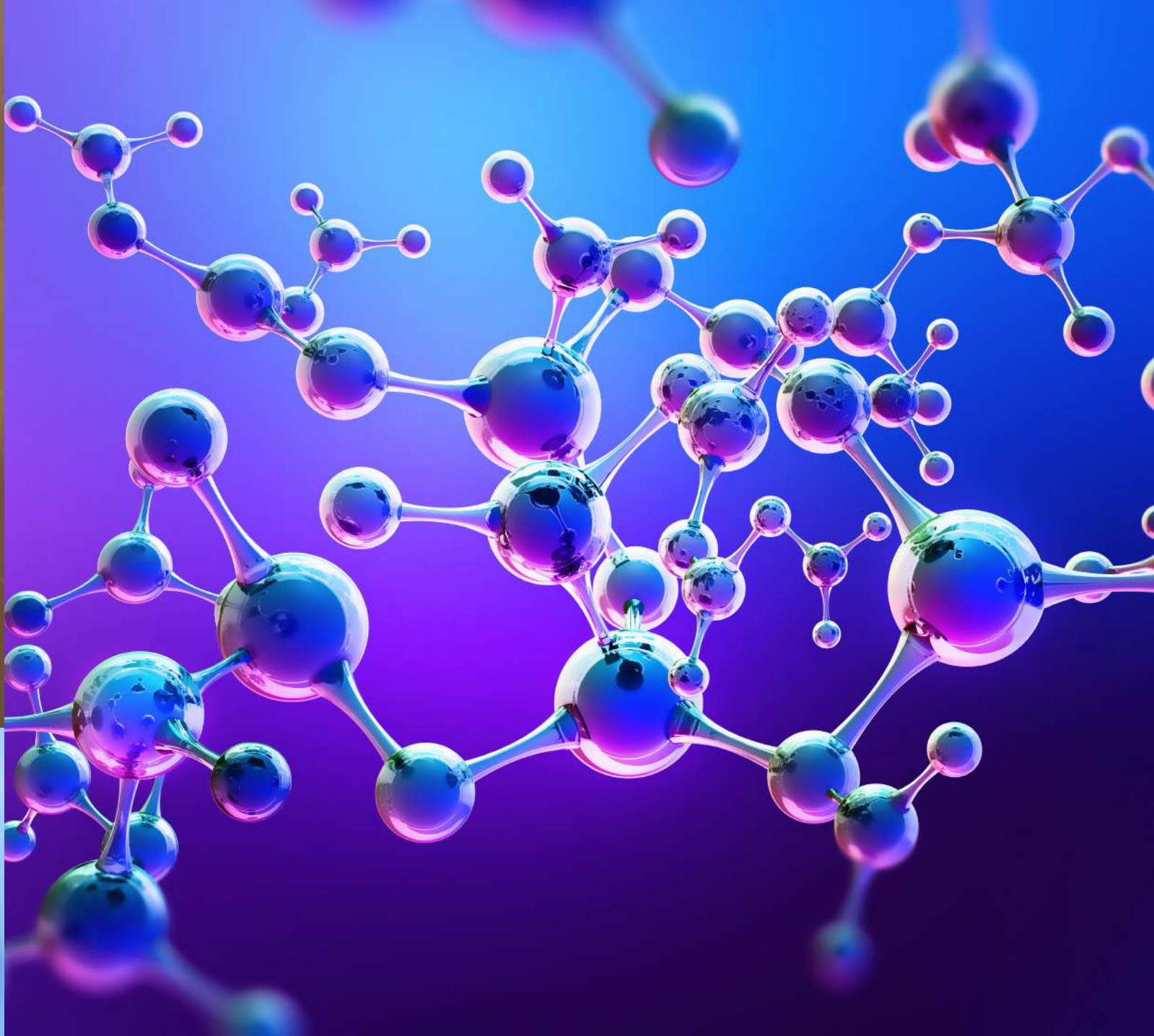


BROCHURE

BIOTECH & BIOMIMETIC

ACTIVES





BROCHURE

BIOTECH & BIOMIMETIC

ACTIVES

In today's cosmetics market, consumers demand clean, sustainable, and high-performance products with proven safety.

Kalichem leads this evolution, using advanced biotech and biomimetic technologies to create active ingredients for modern skincare.

Our portfolio centers on innovative platforms such as:

- **PDRN/DNA Technology** marine and vegan-sourced high-purity PDRN acts across skin layers, supporting epidermal renewal and deep regeneration.
- **Postbiotics from Biofermentation** a patented technology for sensitive and aging skin. These actives support immune balance, skin barrier strength, microbiome health, and overall skin wellness.
- **Biomimetic Peptides** mimicking physiological functions, these peptides trigger lifting and anti-wrinkle effects for non-invasive rejuvenation.
- **Stabilized Glutathione** a unique system enhancing this antioxidant oligopeptide's activity for brightening, detox, and anti-aging results.
- **Biomimetic Minerals** modeled on human tissue minerals, these actives boost mineral SPF and enhance skin radiance.

By uniting biotech innovation with biomimicry, Kalichem enables formulators to create next-generation cosmetics where efficacy meets clean beauty. Our actives ensure performance, safety, and sustainability perfectly aligned with today's conscious consumer values.

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PDRN/DNA Technology

KALICHEM'S KNOW HOW



PDRN MANUFACTURING

Decades long expertise

Kalichem pioneered PDRN production for personal care applications, by offering a pharmaceutical grade with superior quality thanks to a vanguard and futuristic manufacturing facility.



Our Advantages

Hyperchromicity

is the index of preservation of the native double stranded DNA conformation, key element to increase the efficacy of the PDRN. According to Pharmacopoeia (*FSRu, XI, ed.1-2), PDRN hyperchromicity value should be >37%.

PRODUCT	HYPERCHROMICITY(%)
KALINAT PDRN	41.7%
PDRN COMPETITOR 1	23.10 %
PDRN COMPETITOR 2	23.37 %
PDRN COMPETITOR 3	31.87 %

Chemical Purity

Kalichem's multi-step purification significantly reduces contaminants and increases purity:

Heavy Metals: $\leq 1\text{ppm}$, compared to $\leq 25\text{ppm}$ in other products.

Proteins: $\leq 0.7\%$ vs $\leq 2\%$ in other products.

PRODUCT	DNA CONTENT (%)
KALINAT PDRN	98.34 %
PDRN COMPETITOR 1	77.96 %
PDRN COMPETITOR 2	83.98 %
PDRN COMPETITOR 3	86.75 %

Our PDRN selections

- **KALINAT PDRNs**
- Marine derived PDRN
- Marine PDRN is included in the family of Kalinat PDRN.
- The marine sources are:
 - **Salmon**
 - **Sturgeon** (exclusive know how)
 - **Tuna** (patent)
- **KALIGEN**
- Yeast PDRN derivatives
- PDRN/YEAST/PLANT derivatives "NUCLEOBIOTICS" with an exclusive 90% purity level.



Kalinat AW Powder

Ideal for medical device and cosmeceuticals

INCI:

Sodium DNA

- ✓ Immediate skin lifting perceivable since the first application
- ✓ Anti-wrinkle action
- ✓ Damaged skin regeneration and repair at all physiological levels (face, body, intimate area, hands, feet)
- ✓ Skin thickness increase, replumping and cell renewal action
- ✓ Native collagen increase, ideal for post procedure treatment
- ✓ Photoageing prevention, reduction of oxidative stress and UV damage repair
- ✓ Elasticity enhancer, ideal for stretch marks and scars treatments
- ✓ Skin microcirculation stimulation (targeting under-eye puffiness and dark circles onset)

Anti-wrinkle

In Vivo & In Vitro tests

IMAGE ANALYSIS OF SKIN REPLICAS

TO (BEFORE TREATMENT)



T8W (AFTER 8 WEEKS)



Skin wrinkles were measured on skin imprints prepared with a quick hardening resin and image analysis of skin replicas. The test was made on 20 subjects, 2 daily applications of a base cream with 0.25% PDRN.

− 35%

ELASTASE
(Enzyme degrading elastin)

KALINAT AW
@0,25%

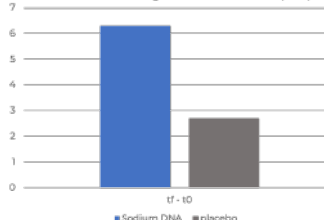
+ 33%

STEM CELLS
Promoting regeneration

KALINAT AW
@0,01%

IN VIVO TEST: WRINKLE DEPTH ANALYSIS

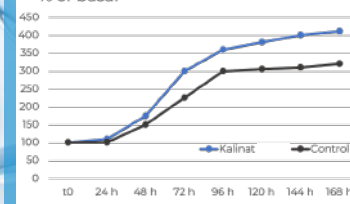
Delta change of wrinkle decrease (mm)



Kalinat AW decreases wrinkle depth by 135% when compared to a placebo treatment after 8 weeks, along with an immediately perceived lifting action. Its activity derives from multiple mechanisms including regulation of fibroblasts, elastase and stem cells metabolism.

IN VITRO TEST MTT ANALYSIS ON SKIN FIBROBLASTS

% of basal



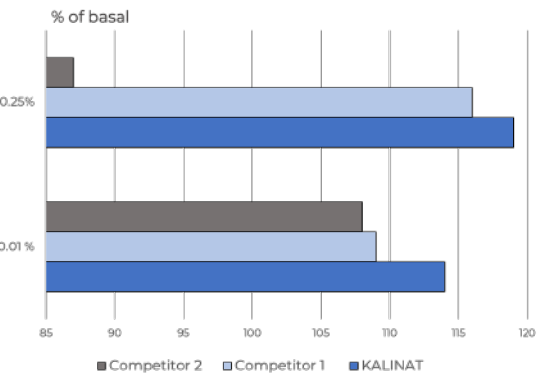
Kalinat AW @0,01% (10 µg/ml) has been proven to increase the proliferation of fibroblasts consistently at every measurement carried daily for one week. Fibroblasts are the skin cells able to produce collagen, elastin and GAGs enabling to strengthen the dermis framework.

PH OF USE	% OF USE	APPLICATIONS	SOURCING	FORMULATION TIPS	PRODUCT FORM
4.5 ÷ 8.0	0.1 ÷ 0.25	All products in cosmetics and medical devices areas	Biotechnology	Presolubilize in water and add the solution to the emulsion, hydrolyte, etc. by thorough stirring in cold process	• Powder

Comparison vs PDRN competitors

keratinocytes proliferation and skin repair features

KERATINOCYTES PROLIFERATION



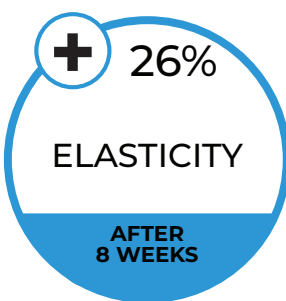
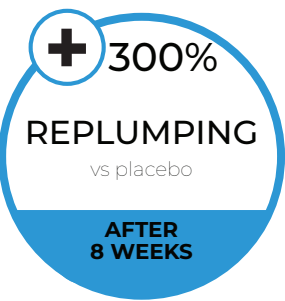
Kalinat AW promotes a higher proliferation increase of skin keratinocytes when compared to other market references containing PDRN.

Its superior interaction with keratinocytes is likely linked to its morphological characteristics, specifically the preservation of its native structure (described by its hyperchromicity value).

Kalinat also proved superior performance in skin repairing and regeneration action vs other PDRNs in the Masson staining histological test.

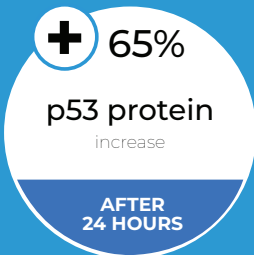
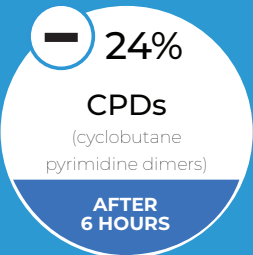
Skin elasticity and replumping

In vivo tests



Kalinat AW, increases R2 parameter (overall elasticity, measured by cutometer) +26% compared to the beginning of the treatment. It also provides a variation of skin thickness mean values 3 folds higher (+300%) than placebo and +10% compared to the beginning of the treatment. These results back-up the claims of elasticity enhancing and replumping.

PHOTOAGEING: reduction of CPDs through immune system p53 protein



After sun exposure, UV rays can damage skin cells DNA through the formation of cyclobutane pyrimidine dimers (CPD), that require an immediate fixing. The repairing process of CPDs is triggered by an immune system protein (p53 protein). Kalinat AW targets this protein by increasing its levels immediately after the CPD onset (its action peak was detected at 6 hours).

The p53 protein promotes the physiological DNA repair through the activation of the NER system (nucleotide excision repair system).

Kalinat PDRN

Ideal for cosmetics applications

INCI:

Sodium DNA, hydrolyzed DNA

- ✓ **Immediate skin lifting** perceivable since the first application
- ✓ **Anti-wrinkle** action
- ✓ **Bio-revitalizing, radiance and fatigue-reduction** skincare
- ✓ **Pro longevity formulations** focused on metabolic and antioxidant activity
- ✓ **Energizing**, stimulates ATP production and mitochondrial activity
- ✓ **Skin microcirculation stimulation** (targeting under-eye puffiness and dark circles onset)

Anti-wrinkle

In Vivo tests

ANTI WRINKLE TEST

T0 (BEFORE TREATMENT)



T4W (AFTER 4 WEEKS)



The bioenergetic, antioxidant and protein-supporting activity of Kalinat PDRN translates into a visible wrinkle improvement after 4 weeks.

— 15%

WRINKLE
AREA

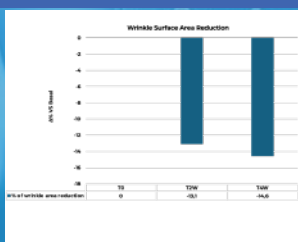
KALINAT PDRN
@0,25%

— 18%

WRINKLE
LENGTH

KALINAT PDRN
@0,25%

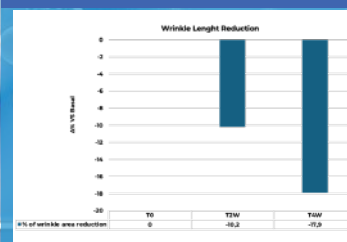
WRINKLE SURFACE AREA REDUCTION



After treatment with 0.25% Kalinat PDRN lotion, a reduction in total wrinkle surface area was observed over time.

These results indicate a progressive improvement in wrinkle morphology following Kalinat PDRN application.

WRINKLE LENGTH REDUCTION



Following treatment with 0.25% Kalinat PDRN lotion, a progressive reduction in wrinkle length was observed.

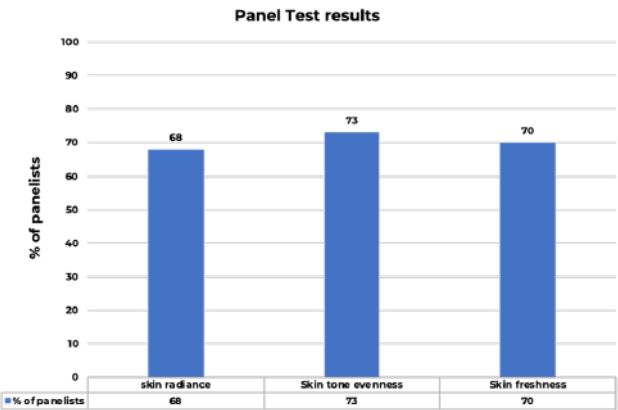
These data confirm a continuous improvement in wrinkle morphology over time, indicating a smoothing effect on skin microrelief.

PH OF USE	% OF USE	APPLICATIONS	SOURCING	FORMULATION TIPS	PRODUCT FORM
4.5 ÷ 8.0	0.1 ÷ 0.25	All products in cosmetics and medical devices areas	Biotechnology	Presolubilize in water and add the solution to the emulsion, hydrolyte, etc. by thorough stirring in cold process	• Powder

Kalinat PDRN perceived efficacy

4 weeks treatment

SELF ASSESSMENT



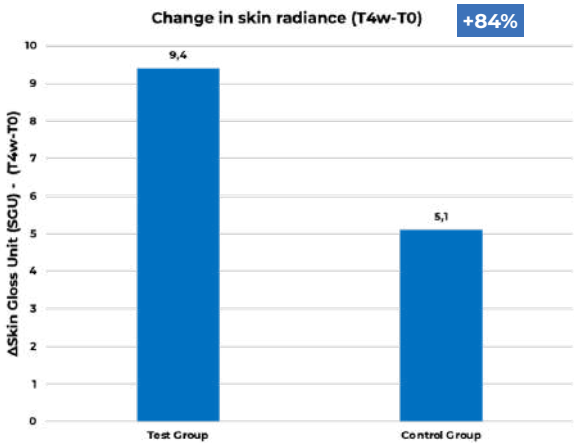
% OF PANELISTS REPORTING PERCEIVED IMPROVEMENT

- 68% noticed an overall improvement in skin appearance
- 73% reported enhanced skin vitality and radiance
- 70% observed a smoother and less fatigued skin look

Bio-revitalizing action: radiance and energizing

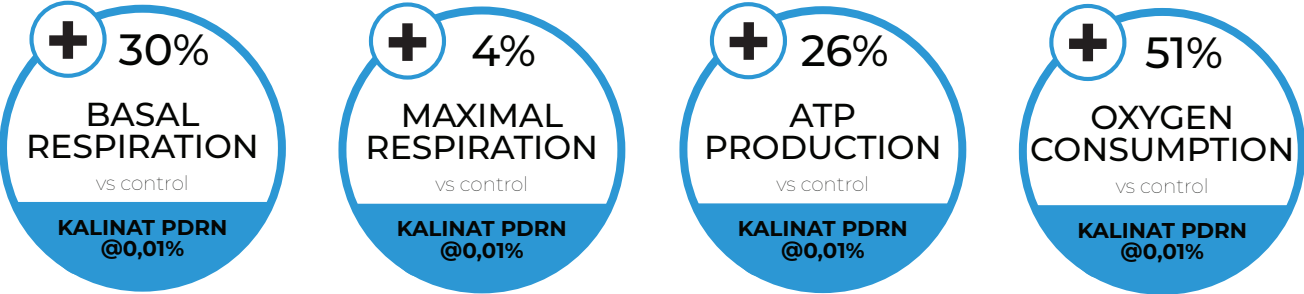
In vivo & In vitro tests

SKIN RADIANCE (IN VIVO)



- After 4 weeks treatment with an emulsion with Kalinat PDRN @0,25%, a significant increase (+84%) in skin radiance was recorded in the test group in comparison to the control group.
- Skin radiance was measured by using a Glossymeter.
- Radiance and glowing features are correlated to PDRN energizing action: in vitro tests carried out with Kalinat PDRN @0,01% vs control show significant improvements of cells metabolism, energy production and respiration.

Energizing action: in vitro tests



Kaligen: **vegan PDRN**

INCI:

Hydrolyzed DNA, Cichorium intybus root extract, yeast extract

- ✓ **Anti-wrinkle**, elasticity enhance and skin thickness increase
- ✓ Actively stimulating cellular regeneration and accelerating skin renewal
- ✓ **Microcirculation control**, reduction of redness, flushing, erythema
- ✓ Replumping action, skin renewal, rejuvenation effect
- ✓ Skin flaws fix (**pimples, teleangiectasia, under eye bags, dark circles**)
- ✓ **Stimulating collagen** synthesis, tissue repair and cellular turnover

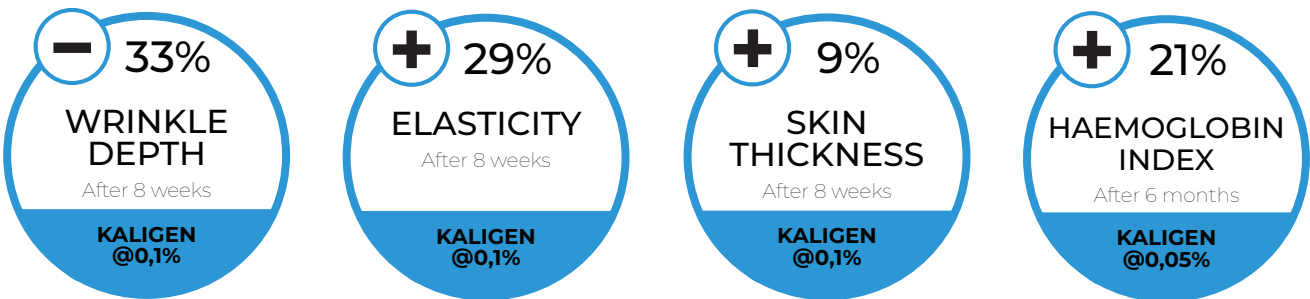
Description

Technology

Kaligen is a biomacromolecular complex, mainly composed of vegan PDRN fragments, designed to enhance cellular regeneration and support skin health.

These substances, defined “nucleobiotics”, are produced with an exclusive biotechnological process which boosts nucleic acids synthesis (**BioNucleMax Technology**).

In vivo tests: anti-aging and microcirculation control

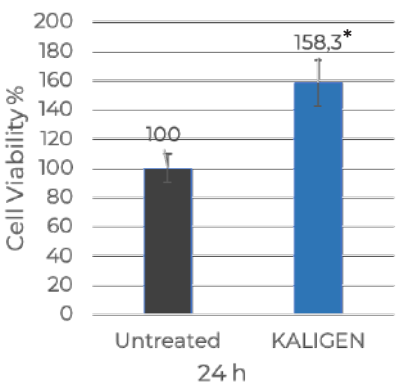


PH OF USE	% OF USE	APPLICATIONS	SOURCING	FORMULATION TIPS	PRODUCT FORM
4.5 ÷ 8.0	0.05 ÷ 0.25	All products in cosmetics and medical devices areas	Plant & Biofermentation	Presolubilize in water and add the solution to the emulsion, shower gel etc. by thorough stirring in cold process	• Powder • >90% Purity



In vitro multi-level action evaluation

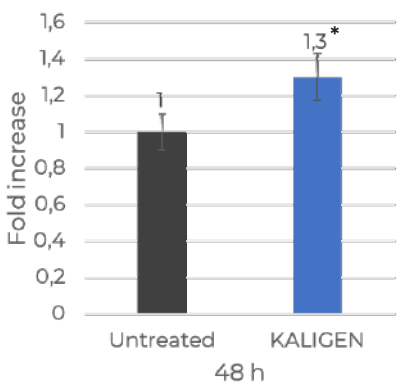
CELL PROLIFERATION



Cells (human fibroblasts) were treated with the sample for 24 hours. Cell viability was measured by MTT assay. (Insulin was used as positive control).

***Statistically significant**

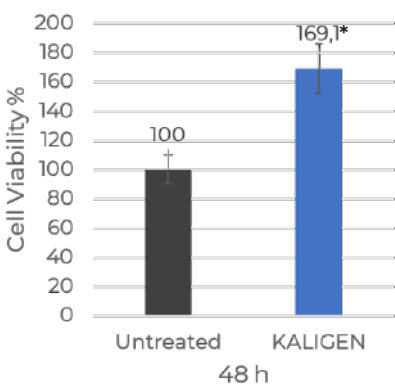
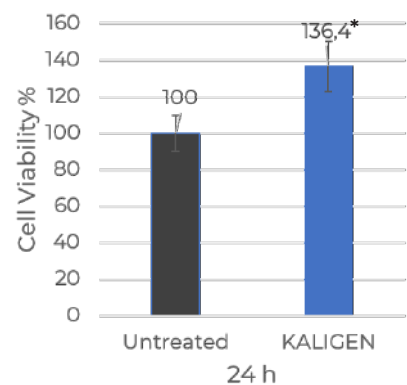
COLLAGEN EXPRESSION



Gene expression changes were analyzed by Real-Time PCR. (TGF- β 1 was used as positive control).

***Statistically significant**

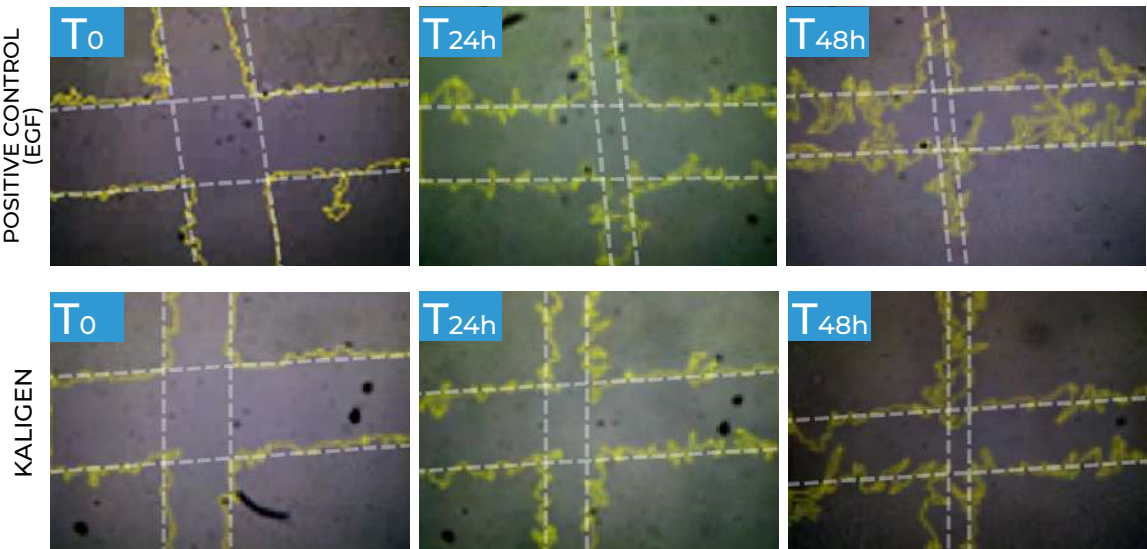
PROTEIN SYNTHESIS STIMULATION



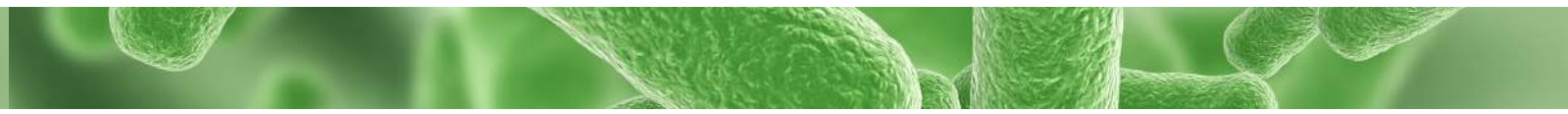
Cells (human fibroblasts) were treated with the sample for 24 & 48 hours. Protein content was measured by Bradford assay. (Insulin was used as positive control).

*** Statistically significant**

SKIN REPAIR



The in vitro scratch assay measures a substance's effectiveness in promoting skin repair over time by observing fibroblasts migration to close a gap.



Kalibiome Postbiotics

TECHNOLOGY DETAILS



University Research
& Kalichem R&D



Patented
fermentation process



Postbiotics for
Cosmetics & Personal Care

KALIBIOME
POSTBIOTIC RESEARCH FOR MICROBEAUTY

Kalibiome technology is the result of the collaboration between University and Kalichem R&D.

Kalibiome postbiotics are oligopeptides, fatty acids, and biosurfactants (patented composition), released by *Lactobacillus Paracasei*, following a controlled bio-fermentation (patented process).

These molecules are the actual «messengers and effectors» of bacteria's beneficial actions on the skin.

Their use resets the potential side effects of probiotics.

Kalibiome Postbiotics features

- Reproducible pure substances complex
- Free of bacteria, bacterial residual cell and antigens, thus no interference with cosmetics preservatives
- Total absence of side effects and maximum tolerability*
- Preservative free, storage at room temperature
- Powder form (white, water soluble, colorless, odorless)
- Low concentration of use required (0.1 ÷ 0.5 %)

*Safety tests carried out: Skin irritation potential on RHE, Patch test, skin sensitizing potential, H-CLAT method, ocular irritation (natural red uptake cytotoxicity method), phototoxicity potential. All Kalibiome postbiotics showed no irritation, no allergic reaction, no sensitizing potential, predicted absence of eye irritation.



Microbiome **actives** landscape

BREAKDOWN OF KALIBIOME ADVANTAGES

Kalibiome Vs Prebiotics

- Higher specificity of action
- No risk of feeding pathogen bacteria
- Specific activity on a broader range of biological targets, thanks to its selected actives composition

Kalibiome Vs Probiotics

- Higher formula stability (no interference with preservatives)
- No toxicity (absence of toxins, antigens, living bacteria, cell fragments)
- Storage at room temperature, no refrigeration

Kalibiome Vs Paraprobiotics

- Higher formula stability (no interference with preservatives), no risk of premature tyndallized bacteria activation
- No toxicity (absence of toxins, antigens)
- No skin/bacteria cross talking required to get beneficial actions

Kalibiome Vs Lysates

- More concentrated, refined and reproducible postbiotic composition
- Selected actives composition driven by functional target desired
- Lower concentration of use in formula
- Optimized organoleptic features

Our **Skin Care** Selection

Kalibiome Sensitive

Specific for sensitive, atopic skin and skin affected by microbiome unbalance (C.acnes, S.Aureus, etc.)

Kalibiome Age

Specific for anti-ageing and skin redensification

Kalibiome Ecogenetic

Specific for daily microbiome and immune system homeostasis



Kalibiome Sensitive

INCI:

Lactobacillus ferment, Mannitol (new exclusive INCI variants available)

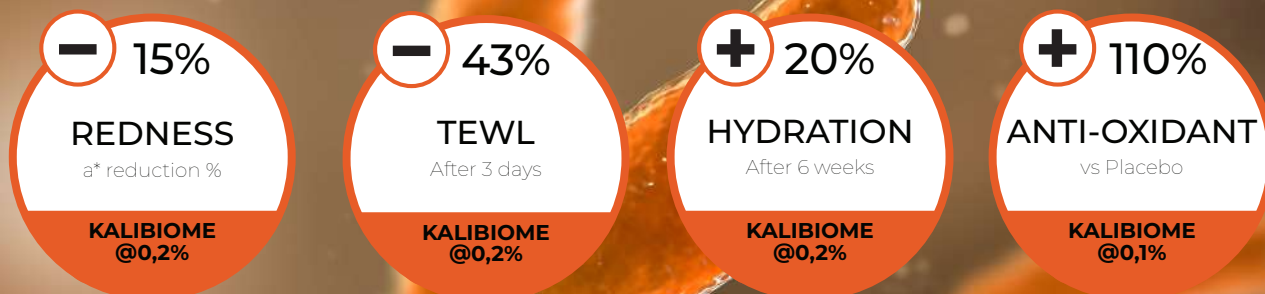
- ✓ Specific for **sensitive, blemish prone and atopic skin treatments** at all physiological level (face, body, intimate area, hands, feet), including **baby care**
- ✓ **Itching reduction, dereddening and soothing** action through immune system regulation
- ✓ **Skin barrier integrity, compactness and hydration** increase, **free radicals scavenging** action
- ✓ Ideal for all **anti-inflammaging** applications
- ✓ Ideal for **treatments of skin affected by unbalanced microbiome** (S.Aureus, C.Acnes, Corynebacterium spp, P.Aeuruginosa, Candida Albicans, Gardnerella Vaginalis, Demodex folliculorum, etc.)
- ✓ Support treatment for **acnes, atopic dermatitis, couperose, furunculosis, candidiasis, bacterial vaginosis, etc.**

In Vivo & In Vitro tests

TEWL and Redness (a*) tests: carried out with chromameter on 15 Caucasian women, dosage: 0,2% application twice daily; change was analyzed 72 hours after removal of SLS patches.

Hydration test carried out with corneometer CN825 on 20 Caucasian women, dosage: 0,2% application twice daily.

Anti-oxidant test carried out in-vitro through DPPH test vs placebo in cosmetic serum application, dosage: 0,1%.

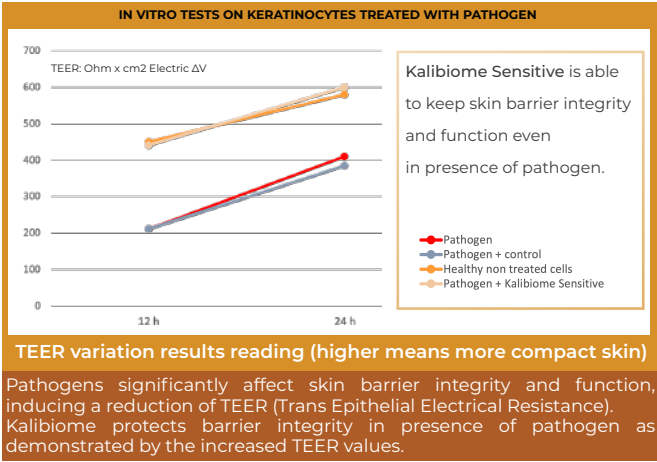


Immune system Cytokines regulating inflammation:

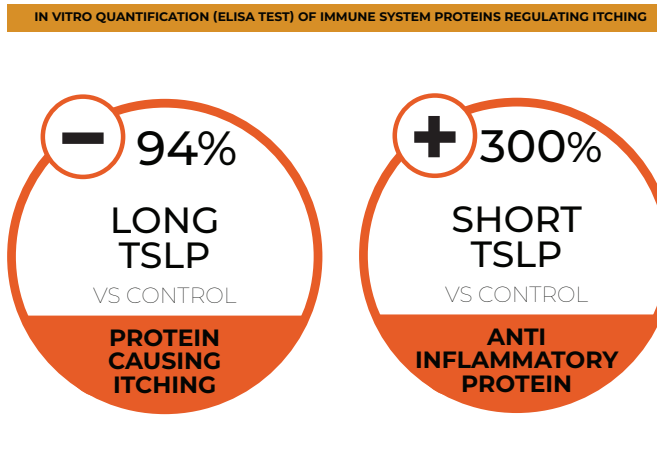
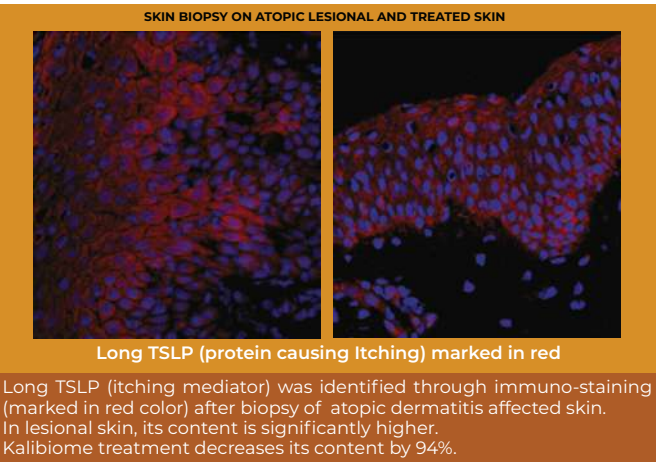
Kalibiome proved to finely regulate the expression of several Cytokines involved in inflammation; among these, Interleukin 10 (IL10), Interleukin 12p40 (IL12p40), Interleukin 6 (IL6), Interleukin 8 (IL8), CCL-MCP-1. Data available upon request.

PH OF USE	% OF USE	APPLICATIONS	SOURCING	FORMULATION TIPS	PRODUCT FORM
4.5 ÷ 8.0	0.1 ÷ 0.5	All products in cosmetics and medical devices areas	Biofermentation from Lactobacillus Paracasei	Presolubilize in water and add the solution to the emulsion, hydrolyte, etc. by thorough stirring in cold process	- Powder

SKIN BARRIER INTEGRITY



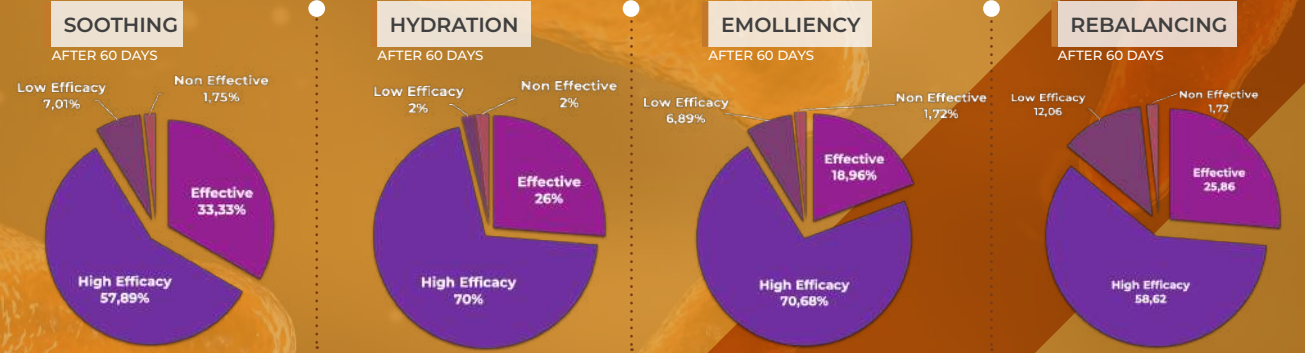
ITCHING REDUCTION



IN VIVO TESTS (75 CHILDREN WITH ATOPIC DERMATITIS)

PARAMETERS	SCORE VARIATION @30 DAYS	SCORE VARIATION @60 DAYS
Edema/Papules	-65%	-81%
Exudation/ Crusts	-65%	-93%
Excoriations	-64%	-82%
Lichenificaton	-51%	-77%
Dry skin	-46%	-64%
Sleep Loss	NO CHANGE	-39%
Itching	-61%	-75%

Evaluations made by 13 pediatricians, on 75 Caucasian children with mild/moderate atopic dermatitis (under corticosteroids treatment), aged between 1 month and 10 years (33% in the first 2 years, 41% between 3-6 years and 26% between 7-11 years old); 42 males and 33 females. **Kalibiome @0.4% cream** was used as topical therapy. All parameters were analyzed at times 0, T1 (30 days) T2 (60 days). **There was a progressive and significant improvement in all parameters and there was a reduction in the overall use of topical corticosteroids between the 1st and second month of the study.**



Kalibiome Age

INCI:

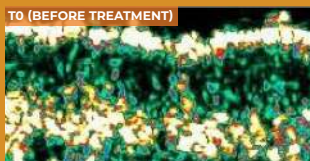
Lactobacillus ferment, Mannitol, Maltodextrin

- ✓ Skin replenishing and dermis redensification
- ✓ Anti-wrinkle (specific for aged sensitive skin)
- ✓ Native Hyaluronic acid and Collagen I production booster
- ✓ Skin repair (ideal for night creams)
- ✓ Elasticity and compactness increase
- ✓ Anti-inflammaging & anti-pollution
- ✓ Suitable for face, body, intimate area care and mucosa

IN VIVO TESTS

SKIN REDENSIFICATION (NATIVE COLLAGEN AND GAG- ANALYSIS)

T0 (BEFORE TREATMENT)



T6W (AFTER 6 WEEKS)

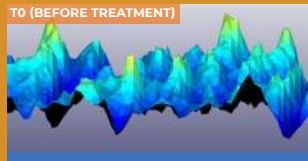


White Fluo. = collagen Green Fluo.=dermal matrix GAGs

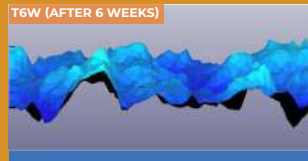
Kalibiome promotes a visible redensifying effect (+38%) related to epidermal and dermal framework strengthening. The dermal replenishment detected is 12 folds higher than placebo.

ANTI-WRINKLE ACTION

T0 (BEFORE TREATMENT)



T6W (AFTER 6 WEEKS)

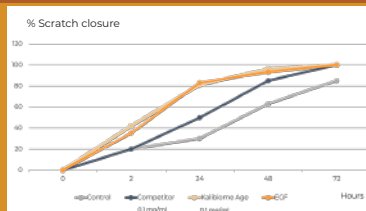


Wrinkle pattern analyzed by skin replicas and image analysis

After a 6 week treatment, Kalibiome Age regularizes the skin surface reducing the depth and width of wrinkles vs placebo by, respectively 6 folds and 3 folds.

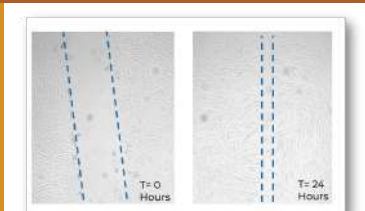
IN VITRO TESTS

IN VITRO SCRATCH TEST ON FIBROBLAST



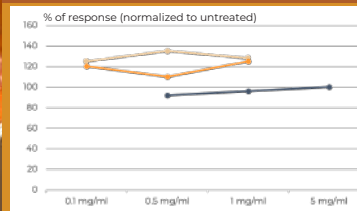
Kalibiome Age shows the same scratch repair pattern of EGF and higher values at every measurement recorded in comparison to a competitor (bacterial ferment active) and a control.

IN VITRO SCRATCH TEST ON FIBROBLAST



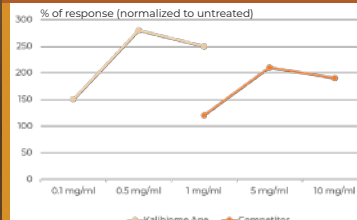
Kalibiome Age postbiotics promotes an effective and quick recovery of skin fibroblast, by stimulating cell proliferation and migration. The results are visible within 24 hours.

IN VITRO TESTS (ELISA) ON PRO-COLLAGEN I



Kalibiome Age increases pro Collagen better than EGF and placebo with lower amount of use required in formula.

IN VITRO TESTS (ELISA) ON EPIDERMAL HYALURONIC ACID



Kalibiome Age increases hyaluronic acid (HA) more efficiently and effectively than a competitor (bacterial ferment).

PH OF USE	% OF USE	APPLICATIONS	SOURCING	FORMULATION TIPS	PRODUCT FORM
4.5 ÷ 8.0	0.1 ÷ 0.5	All products in cosmetics and medical devices areas	Biofermentation from Lactobacillus Paracasei	Presolubilize in water and add the solution to the emulsion, hydrolyte, etc. by thorough stirring in cold process	· Powder

Kalibiome Ecogenetic

INCI:

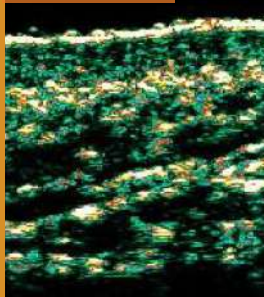
Lactobacillus ferment, Mannitol, Maltodextrin

- ✓ **Derreddening and soothing** through immune system modulation action
- ✓ **Skin firmness** increase through **barrier integrity restoring** , compactness and hydration increase
- ✓ **Dermis replenishing and redensification**
- ✓ **Skin microbiota balancing and purification** against infections from broad range of microbes & virus
- ✓ **Ideal for baby care**
- ✓ **Suitable for face, body, intimate area care and mucosa (cosmetics & medical devices)**

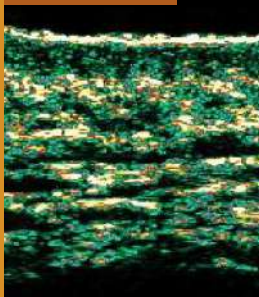
IN VIVO AND IN VITRO TESTS

SKIN REDENSIFICATION (NATIVE COLLAGEN AND GAG- ANALYSIS)

T0 (BEFORE TREATMENT)

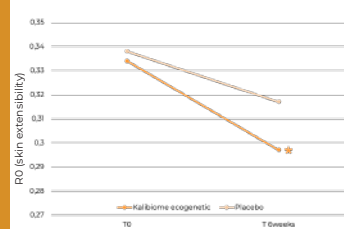


T6W (AFTER 6 WEEKS)



Kalibiome ecogenetic regularizes the epidermal and dermal framework through a consistent restoring of collagen (detectable through the white bands) and extracellular matrix and dermal matrix components (green bands) with an increase of skin echogenicity by 16% after 6 weeks.

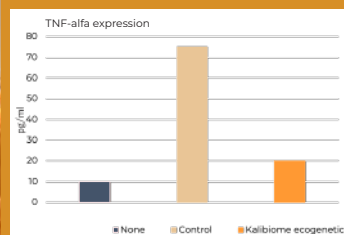
IN VIVO TEST: SKIN EXTENSIBILITY (FIRMNESS) CUTOMETER MPA 580



After a 6 week treatment on 20 Caucasian women, Kalibiome ecogenetic reduces skin extensibility by 11,1 %, with a tangible skin firming action.

The placebo does not show statistically significant action.

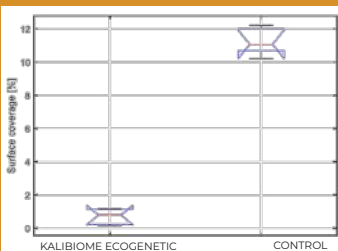
IN VITRO TEST ON TNF-ALFA EXPRESSION



Kalibiome ecogenetic, reduces the expression of TNF-alfa 2.7 folds less vs control.

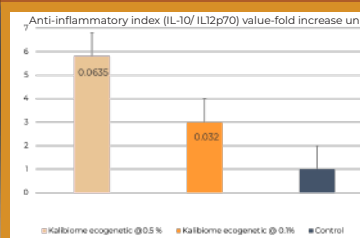
TNF-alfa unbalance can lead to infections, dermatitis, papules, pustules, eczema, etc.

IN VITRO TEST: BACTERIOSTATIC ACTION VS PSEUDOMONAS AERUGINOSA



Kalibiome is able to reduce Pseudomonas colonization exerting a bacteriostatic action given by its biosurfactants, able to physically interfere with their communication systems, reducing drastically their biofilm formation on the analyzed surface.

IN VITRO TESTS ANTI-INFLAMMATORY INDEX



The anti-inflammatory index is a value obtained through the ratio between the modulation of IL10 and IL12p70. Kalibiome increases this index 3/6 folds higher vs the control (with a dose dependent response triggered).

PH OF USE	% OF USE	APPLICATIONS	SOURCING	FORMULATION TIPS	PRODUCT FORM
4.5 ÷ 8.0	0.1 ÷ 0.5	All products in cosmetics and medical devices areas	Biofermentation from Lactobacillus Paracasei	Presolubilize in water and add the solution to the emulsion, hydrolyte, etc. by thorough stirring in cold process	• Powder

Biomimetic Philosophy

"BIOMIMETIC

*is a term pointing out the study of the formation, structure or function of biologically produced substances and biological mechanisms and processes, for the purpose of synthesizing similar products which mimic natural ones"**

*Nathan F Lepora, Paul Verschure, Tony J Prescott-
The state of the art in biomimetics Bioinspir.
Biomim. 8 (2013) 013001

Our biomimetic technologies

● Biomimetic Hydroxyapatite

- Specialties targeted for multiple applications including:
- **SPF boosting**
- **Skin Lightening**
- **Anti Ageing**
- **Deodorants** (see specific brochure)
- **Oral Care** (see specific brochure)

Our Biomimetic skin care selections

● PEPTILIFT

- **Anti wrinkle & Lifting**

• Biomimetic endorphin and CLA (conjugated linoleic acid) based Glutathione delivery system.

● APALIGHT

- **SPF booster**

• Biomimetic hydroxyapatite.

● KALILIGHT

Lightening/Whitening & more

Glutathione stabilized through a biomimetic mineral based delivery system.

Biomimetic Peptides & Stabilized Glutathione

Specialties targeted for multiple applications including:

- **Anti wrinkle, skin lifting and regeneration**
- **Anti ageing and anti inflammaging (anti oxidant, purification, anti pollution)**
- **Skin Lightening**
- **Anti hair loss**

Technologies

Biomimetic Hydroxyapatite

Biomimetic Hydroxyapatite is a mineral whose synthesis implies a complex balancing of several manufacturing parameters. These factors influence the mineral crystal size, shape, functionalizations and biological behavior. The modulation of the functionalized components enables to obtain variable selected targets.

Among the most significant ones:



Reaction temperature



Stirring speed



Reagents molar ratios



Reaction time



Micronization methods

Biomimetic Hydroxyapatite is the result of an exclusive know-how in the modulation of the several parameters involved, with the goal of achieving sophisticated, selective and highly effective biologically-active mineral.

Biomimetic Peptides & Stabilized Glutathione

- **Biomimetic endorphin with botox-like and skin regeneration features**

This biomimetic peptide is highly selective physiological Delta-opioid receptor agonist promoting the relaxation of face mimic neuro-muscular junctions.

This interaction of the opioid system (generally involved in the modulation of wellness, happiness, self-gratification and relaxing feelings) leads to advanced anti-wrinkle and skin regeneration activity.

- **Stabilized Glutathione with anti-inflammaging and purification features**

Glutathione is an extremely reactive and unstable free radical scavenger: it is one of the strongest anti-oxidant components found in the human body and it is involved in multiple immune system regulation and anti-inflammatory mechanisms.

Kalichem introduced on the market 2 different technologies to stabilize and optimize its reactivity through *vehiculation in lipidic (conjugated linoleic acid or mineral HAP) delivery systems*.

Peptilift

INCI:

potassium glutathione isomerized linoleate, sh-pentapeptide-5, aqua

- ✓ Based on a **biomimetic endorphin** (working through botox-like effect and hemidesmosomes and growth factors regulation) **and stabilized Glutathione**
- ✓ Advanced **wrinkle reduction and skin lifting**, outperforming a benchmark botox-like peptide
- ✓ **Skin damage repair**, anti-inflammaging and skin detoxifying
- ✓ **Skin revitalization** through skin growth factors stimulation
- ✓ **Skin retexturizing** (elasticity, replumping and firmness increase, TEWL reduction)
- ✓ **Neurocosmetics concept**: connection between endorphin signalling and skin anti-ageing

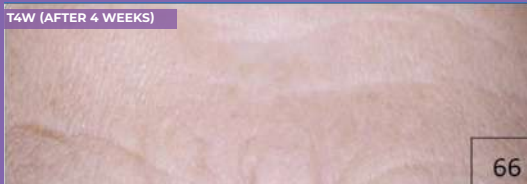
IN VIVO TESTS ON WRINKLES (FOREHEAD, FROWN, NASOLABIAL, CROWS FEET)

FOREHEAD LINES REDUCTION

T0 (BEFORE TREATMENT)

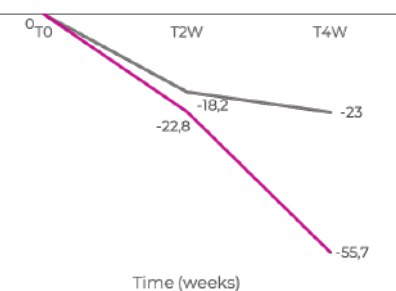


T4W (AFTER 4 WEEKS)



FOREHEAD LINES REDUCTION (2 AND 4 WEEKS TREATMENT)

Δ% FOREHEAD LINES VOLUME/ TIME (WEEKS)



Peptilift reduces forehead lines volume, more effectively than the benchmark, with results superior both after 2 and 4 weeks. The reduction values are respectively 23% and 56%.

NASOLABIAL FOLDS REDUCTION

T0 (BEFORE TREATMENT)

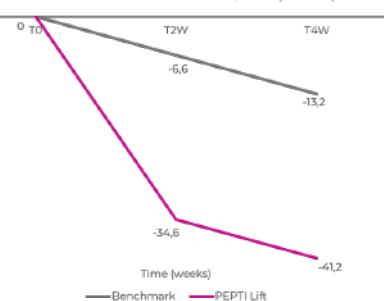


T4W (AFTER 4 WEEKS)



NASOLABIAL FOLDS REDUCTION (2 AND 4 WEEKS TREATMENT)

Δ% NASOLABIAL FOLDS VOLUME/ TIME (WEEKS)

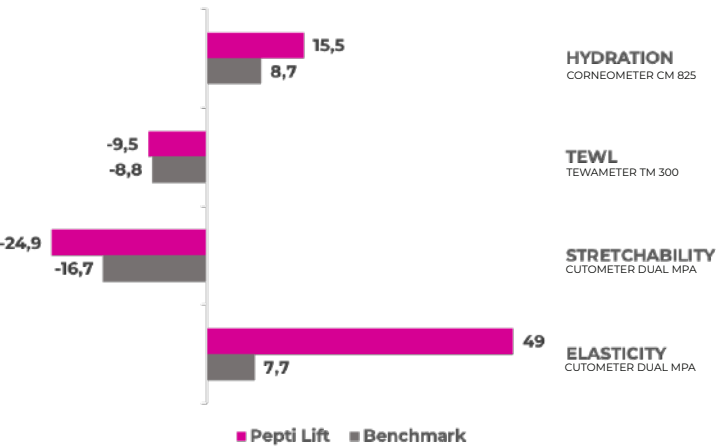


Peptilift reduces nasolabial folds volume, more effectively than the benchmark. The reduction values are respectively 35% and 41%.

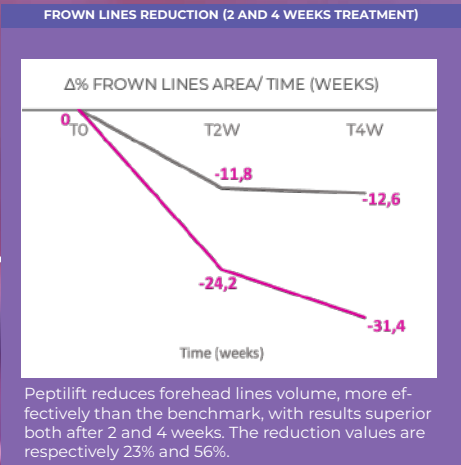
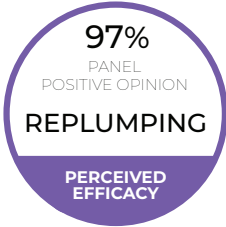


SKIN RETEXTURIZING AND REVITALIZATION PARAMETERS

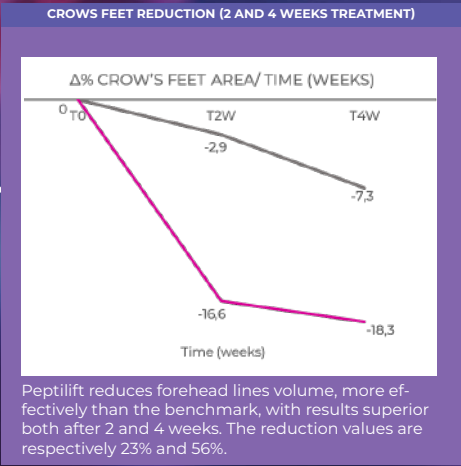
SKIN PROPERTIES IMPROVEMENT IN 4 WEEKS (mean%)



Peptilift improves skin texture by increasing skin hydration, barrier function, firmness and elasticity better than the benchmark (instrumental assessment). Perceived efficacy wise, the panel expressed positive opinion on Peptilift treatment in replumping (97%), firming (94%), hydration (84%) and anti-wrinkle (98%).



Protocol:
*40 volunteers aged between 40-65 years with skin aging signs, subject to Complete Skin Investigation (CSI) to assess the degree of skin aging. Twice daily application of 2 mg/cm2 of a cream with Peptilift (@ 4.0 %) and a cream with a benchmark (@ 4.0 %).
Duration: 4 weeks; measurement averages at the beginning (T0), after 2 weeks (T2W) and 4 weeks(T4W).



Peptilift anti wrinkle tests were published on a peer reviewed scientific Magazine (Journal of Dermatology): reference "Biomimetic endorphin for wrinkle lifting in a daily cosmetic remedy".

pH OF USE	% OF USE	APPLICATIONS	SOURCING	FORMULATION TIPS	PRODUCT FORM
4.5 ÷ 8.0	2.0 ÷ 10.0 (tested at 4.0 %)	All products in cosmetics and medical devices areas	Biotechnology	Add to the end product in cold process and stir	- Water based solution

Apalight

INCI:

Hydroxyapatite

(INCI referred to powdery form; the product is also available in suspension form)



(referred to powdery form)



(referred to powdery form)



- ✓ Internationally patented biomimetic hydroxyapatite for sun care applications
- ✓ Mineral SPF booster performing like inorganic physical filters
- ✓ Specific for hybrid sunscreens; it can also be used in mineral sunscreens (awarded in sunscreen formula of the year at inCosmetics)
- ✓ No blue whitening effect
- ✓ Light texture, no mineral touch perception, photo-stable after irradiation
- ✓ Environment friendly: HAP is part of marine ecosystem
- ✓ Functional sunscreens suitability: anti-wrinkle (-10%) and elasticity enhancing (+10.3%) actions in vivo proven
- ✓ Immediate soft focus effect and oil control

SENSORY AND SUSTAINABILITY

WHITENING EFFECT: COMPARISON VS TITANIUM DIOXIDE



APALIGHT SENSORY ADDED VALUE

Apalight uniqueness relies on its lack of blue-whitening effect and its light flow, leading to an unmatched applicative pleasantness.

It enables to formulate sensory advanced sunscreens, including light formulation also for high SPF values, mineral sunscreen with minimal white effect and consumer friendly emulsion spreadability.

MARINE SPECIES SUSTAINABILITY



COMPARISON VS ZINC OXYDE

100% Compatible with sea ecosystem, coral reef and algae friendly, no ecotoxicity.

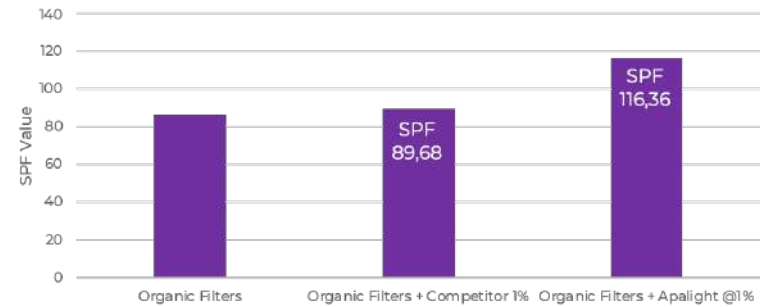
Results are expressed as median lethal concentration (EC50/LC50) in mg L⁻¹ of the tested organisms exposed to ZnO (nano) and Hydroxyapatite, respectively.

Test results show that HAP is not lethal for any of the species considered.

AQUATIC SPECIES	EC50/LC50	
	HYDROXYAPATITE	Nano ZINC OXIDE
D.Tertiolecta	>100	3.04 ± 0.20
T.Fulvus	>100	0.68 ± 0.10
C.Insidiosum	>100	1.93 ± 0.05
G. Aequicauda	>100	0.32 ± 0.16

SPF BOOSTING: COMPARISON VS MINERAL BOOSTER

	Organic Filters content in formula	SPF	SPF % INCREASE
Organic Filters*	100%	86,12	
Organic Filters + Competitor @1%	-10%	89,68	+4,5 %
Organic filters + Apalight @1%	-10%	116,36	+35,11%



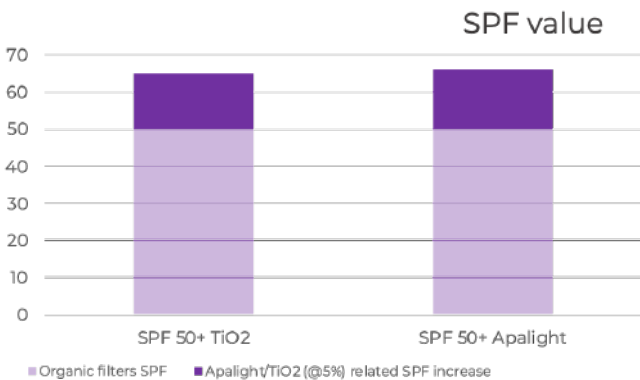
APALIGHT @1% enables to lower organic filters by 10% without compromising SPF, UVA protection factor and critical Lambda.

Apalight outperforms the competitor (Mineral SPF Booster) with a SPF boosting activity 29.75% higher.

* Diethylamino Hydroxybenzoyl Hexyl Benzoate, Bis-Ethylhexyloxyphenol Methoxyphenyl Triazine, Ethylhexyl Triazone, Phenylbenzimidazole Sulfonic Acid, Butyl Methoxydibenzoylmethane

SPF BOOSTING: COMPARISON VS TITANIUM DIOXIDE

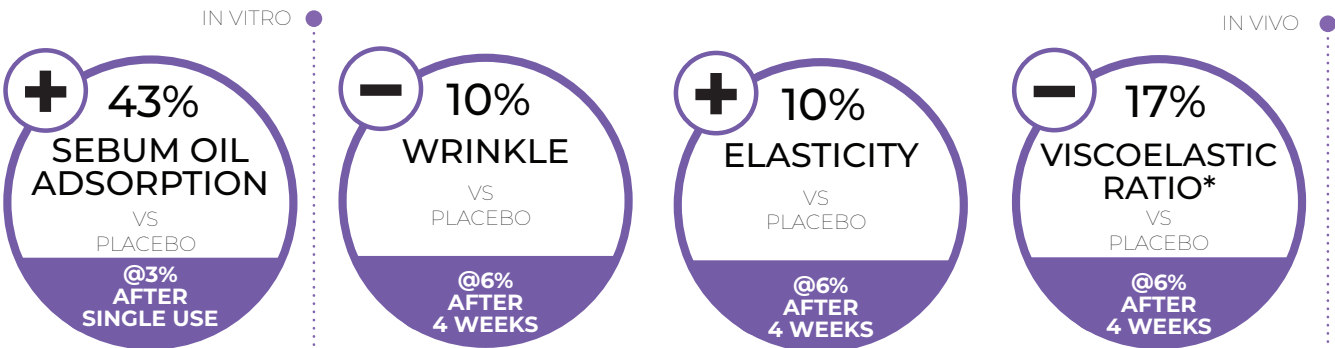
	SPF	SPF % INCREASE
Organic Filters*	50,0	
Organic Filters + Titanium Dioxide @5%	65,0	+30%
Organic filters + Apalight @5%	66,2	+32,4



APALIGHT @5% enables to boost the SPF of an organic filters based W/O formula with a comparable action to Titanium Dioxide.

* (Ethylhexyl methoxycinnamate, Butyl methoxydibenzoylmethane, Ethylhexyl salicylate, Diethyloaminohydroxybenzoyl hexyl benzoate, Ethylhexyl triazone)

BIOMIMETIC HAP FUNCTIONAL FEATURES (IN VIVO & IN VITRO)



*Decrease of viscoelastic ratio means improvement of viscoelastic properties, thus firmer and more toned-looking skin.

pH OF USE	% OF USE	APPLICATIONS	SOURCING	FORMULATION TIPS	PRODUCT FORM
5.5 ÷ 8.0	2.0 ÷ 20.0 (a.m)	All products in cosmetics and make up areas, in emulsion, stick, and powdery form	Mineral	Predisperse in water under stirring and add the dispersion in cold process, or add steadily to the oily phase after solids fusion.	Pure powder and water based suspension @30% versions available

Kalilight

INCI:

Hydroxyapatite, Glutathione, Cysteine

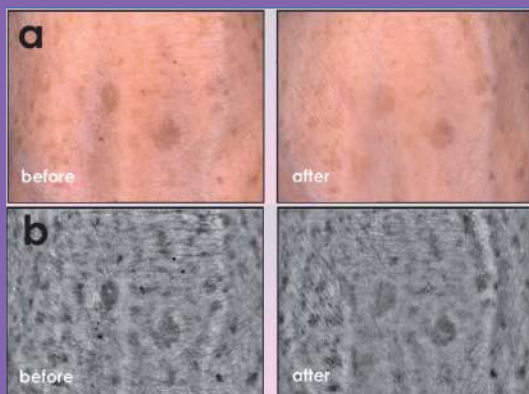
(The above INCI only refers to the product active components)



- ✓ Whitening and brighthtening raw material of the year award at PCHi China
- ✓ Lightening and skin spots reduction
- ✓ Oil control through sebum fatty acids and triglycerides adsorption
- ✓ Soft-focus and MATTE effect
- ✓ Flawless finish
- ✓ Anti-wrinkle and elasticity enhancer, in vivo tested
- ✓ Complex derived from physiological actives, high tolerability, no side effects

SKIN LIGHTENING/SPOT REDUCTION AND OPTICAL FINISH

PHOTOFINDER FINDER AND UV SCAN IMAGES



KALILIGHT INNOVATIVE MECHANISM

Kalilight works with an innovative mechanism implying a **smart and time-controlled release of lightening actives** in the deeper layers of the skin, with multiple synergistic benefits:

- **Smart release of glutathione and cysteine**, to promote dark melanin (eumelanin) production decrease through Tyrosinase inhibition and increased production of bright melanin (phaeomelanin).

- The above leads to **skin spot reduction, skin complexion evening and localized lightening action**, as proven by in vivo tests whose images are shown in the left box (the analytical data

are provided at page 25) where the intensity of skin stains is visibly reduced both through pictures and UV scan analysis.

MARINE SPECIES SUSTAINABILITY



KALILIGHT SOFT FOCUS AND FLAWLESS FINISH

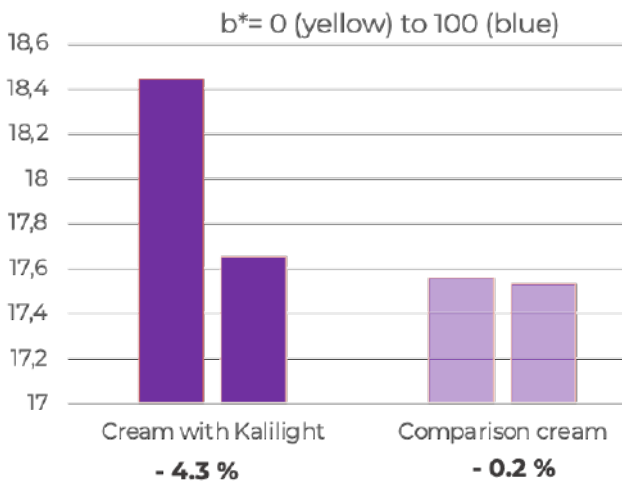
Biomimetic hydroxyapatite boasts a refraction index of 1.6 and a surface porous structure that **promotes an immediately visible MATTE EFFECT** given by an efficient **SOFT FOCUS** action that smoothes the skin with a *flawless finish* effect.

In detail, biomimetic hydroxyapatite scatters visible and UV light and adsorbs skin excess of sebum, to provide:

- **Flaws opacifying**
- **Oil adsorption**
- **Immediate cosmetics and make-up consumer perception** of anti-ageing and skin spot reduction effects

The image in the left box refers to the effect of a 6% concentrated biomimetic hydroxyapatite base emulsion.

SKIN LIGHTENING TEST (b* parameter)

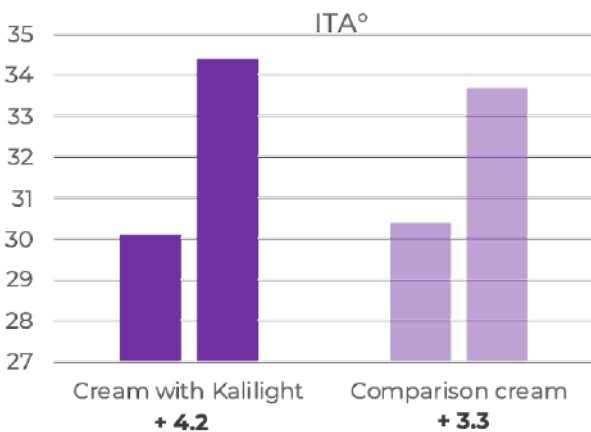


The test was performed on 24 volunteers (from 30 to 70 years old) with 2 times/day application for 6 weeks. The subjects applied 2 different products (base emulsion with 3% Kalilight vs base emulsion with 3% benchmark lightening actives combination).

The skin lightening action is measured through L* and b* Hunter color change values. Lightened skin turns to whiter values in L* and yellower in b*.

Kalilight cream gave comparable result in L* value and significantly better in b* value vs the comparison cream.

SKIN LIGHTENING TEST (ITA° parameter)



Individual typology angle (ITA°) is a mathematic function that is obtained putting in relationship the L* and b* parameters, and that allows to express the efficiency of the lightening action.

$$ITA^{\circ} = \{ \text{Arc.tang.} [(L^*-50) / b^*] \} \times 180 / \pi$$

Kalilight cream gave a higher lightening activity score than the comparison cream (+27.3%).

BIOMIMETIC HAP FUNCTIONAL FEATURES (IN VIVO & IN VITRO)

IN VITRO

+

43%

SEBUM OIL ADSORPTION

VS PLACEBO

@3% AFTER SINGLE USE

-

10%

WRINKLE

VS PLACEBO

@6% AFTER 4 WEEKS

IN VIVO

+

10%

ELASTICITY

VS PLACEBO

@6% AFTER 4 WEEKS

-

17%

VISCOELASTIC RATIO*

VS PLACEBO

@6% AFTER 4 WEEKS

*Decrease of viscoelastic ratio means improvement of viscoelastic properties, thus **firmer and more toned-looking** skin.

pH OF USE	% OF USE	APPLICATIONS	SOURCING	FORMULATION TIPS	PRODUCT FORM
6.0 ÷ 8.0	2.0 ÷ 5.0	All products in skin care and make up areas (emulsion, stick and powdery form)	Mineral, biotechnology, synthetic	Predisperse in water by slow addition under stirring and add the dispersion in cold process to the emulsion made.	Powder

Thank You

for exploring the contents of our brochure.



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