

PEPHA[®]-CTIVE CB

*The power of algae for
energized and glowing skin*



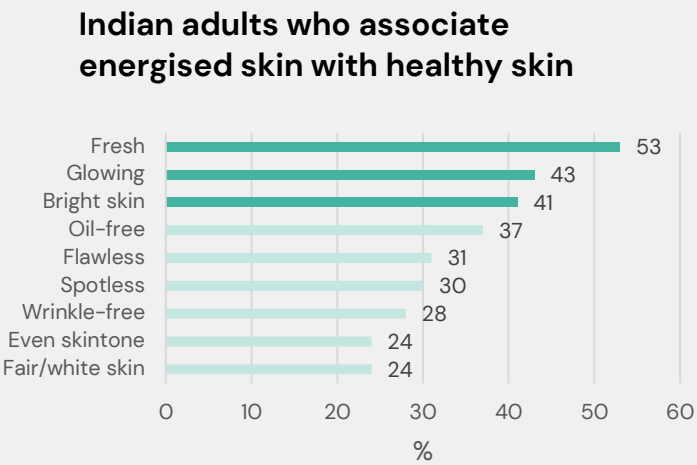
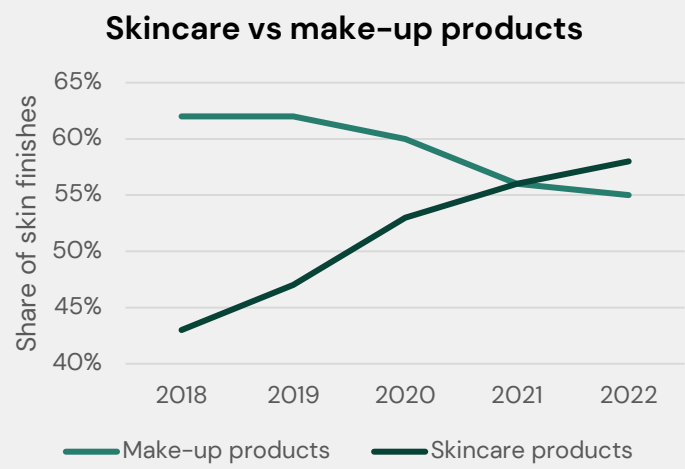
June 2025

Biotech | Nature, enhanced by science

dsm-firmenich 

Healthy skin: A new skincare dialogue

Amplifying the desire for Glowing, Energized, and Rejuvenated skin benefits



Skincare and make-up blurring the lines*

In 2022, skincare products have surpassed makeup products in conversations about skin finishes. Skin finishes refer to the final appearance and texture of the skin after applying makeup or skincare.

In July 2024, 43% of users discussing skin finishes mentioned terms like "glowing," "radiant," or "luminous."

Glowing & Luminous skin

The demand for a "healthy" look is rising across regions. In 2022, social media mentions of "glowy," "radiant," and "luminous" dominated skin finish aesthetics.*

Achieving a glowing skin requires a streamlined skincare routine with effective ingredients.**

Energized and Radiant skin

Energized skin is emerging as a new standard for healthy skin, combining glow, brightness, and rejuvenation. ***

Brands are capitalizing on this trend by introducing products that promise to invigorate and refresh the skin, often using innovative ingredients like ATP for energy boosting. ***

*WGSN TrendCurve: Evolving Skin Finishes
** Glowing Skin Routine: Tips & Product Recommendations | Marie Claire UK
***Mintel: Infegy Atlas/Mintel, November 2023- October 2024; Ipsos Observer/Mintel, September 2024

Algae are becoming a major skincare ingredient...



A story of natural resilience

ALGAE

More than 70% of the earth is covered by water. It provides many unique environments and rich resources.

Oldest plant surviving geological ordeals

Very stable, resistant and resilient organisms

For thousands of years, microalgae has been able to survive under the stress of different environments

Rich in nutrients, like Vitamins & Minerals

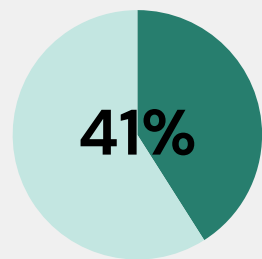
Source of effective Bioactives

for pharmaceuticals, nutraceuticals and skincare

Ticking the box of naturality and sustainability

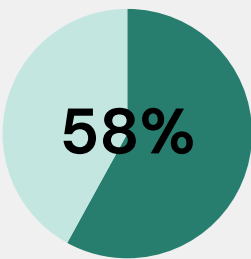
Consumers are seeking natural and ethical ingredients

In the US



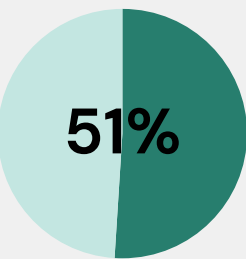
of facial skincare users say it is important for their products to contain natural ingredients

In the UK



of Gen Z beauty users always look for products that are environmentally friendly

In Spain



of adults would be willing to buy BPC made exclusively with lab-grown ingredients if they are better for the planet

Lab-grown is the **next-natural** in sustainability

Algae can be lab-grown, the key to true sustainability as we reassess our relationship with oceans and planet.

Consumers will be accepting of lab-grown alternatives, perceived as natural and sustainable.

Source: Lightspeed/Mintel

PEPHA®-CTIVE CB

ID Card

INCI name:	Dunaliella Salina Extract, Aqua, Citric Acid, Pentylene Glycol		
TECHNOLOGY:	● Sustainably farmed in photo-bioreactors, guaranteeing maximum quality (no risk of contamination, reproducibility of process, fully traceable). Cultivated in controlled conditions, optimally exposed to the right cellular stress: high salinity, high light intensity, nutrient deprivation, and extreme temperatures ● Derived from Dunaliella salina microalgae ● 100% naturally-derived origin (ISO 16128)		
Technical:	Form: Yellowish clear liquid Use level: 1–3%	pH of use: 3.0 – 6.0 Preservative: Free	Solubility: Soluble in water
Benefits:	● Protects the mitochondria against oxidative stress* ● Increases the energy content in keratinocytes* ● Stimulates fibroblasts’ proliferation* ● Induces faster skin renewal by 4 to 5 days, for a Induce faster skin renewal and visibly improves skin’s luminosity***		
Registration certification	 Raw material verified by ECOCERT GREENLIFE, conform to the COSMOS Standard 		

* in vitro ** ex vivo *** in vivo

The algae

Dunaliella salina



Dunaliella salina is a very **small unicellular microalga** in the green algae family

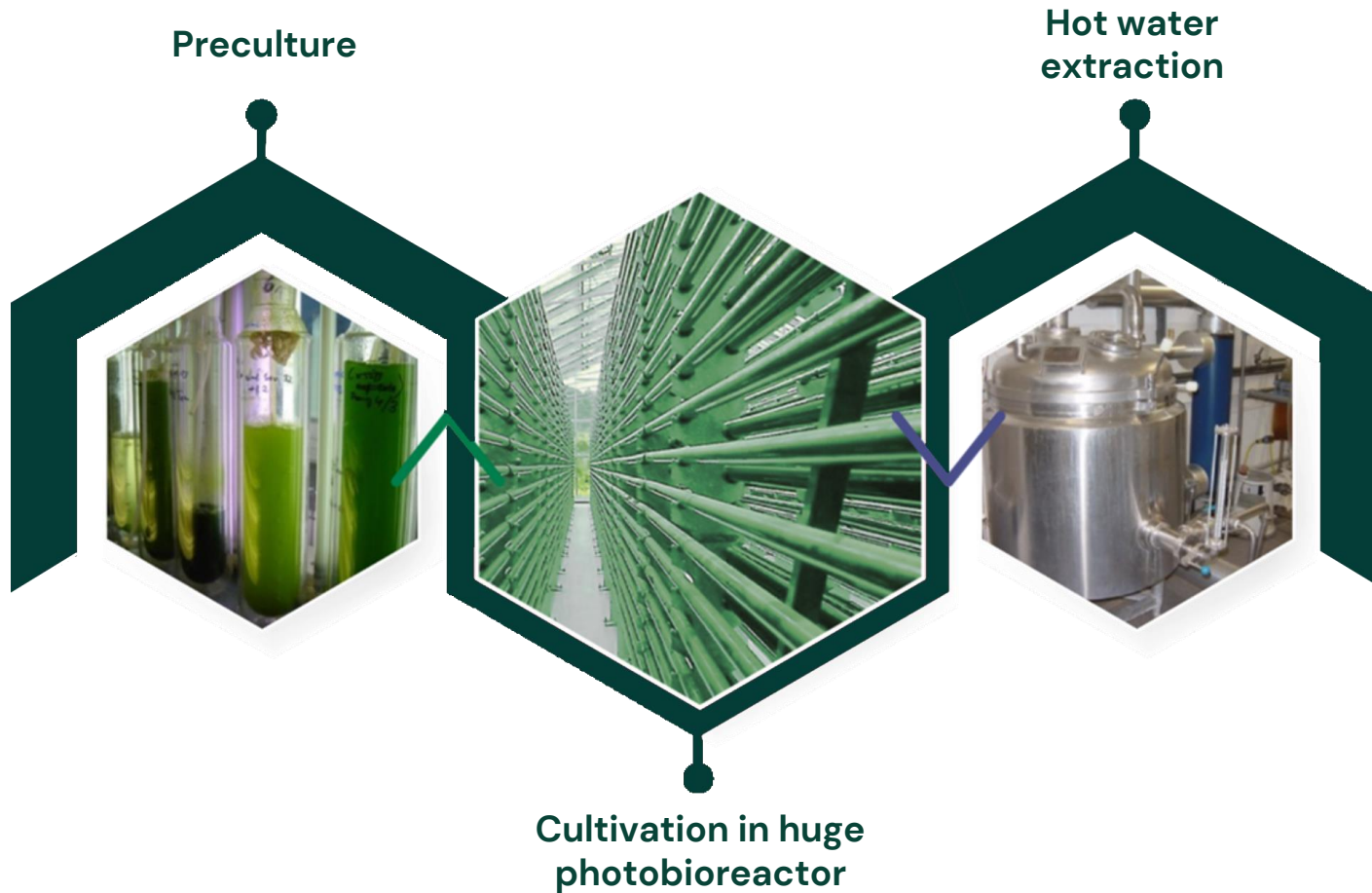
It was first discovered in 1838 by Dunal in the salters of Montpellier, on the Mediterranean coast of France.

Naturally grows in salt lakes with up to 30% salinity (9x higher than regular sea water) and **constantly exposed to harsh environmental conditions** (High osmotic pressure, elevated oxygen levels and high UV irradiation).

To withstand these conditions, the microalgae **produces high levels of energy** through photosynthesis and adapts by generating large amounts of beta-carotene, which gives it (and so the water) a pinkish color

The production process

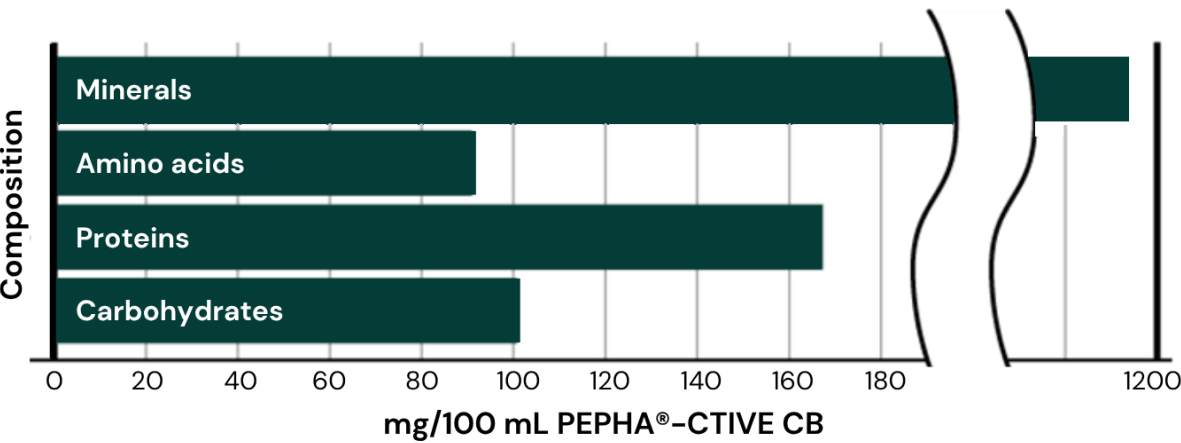
A special growth by photobioreactors, for maximum quality & sustainability



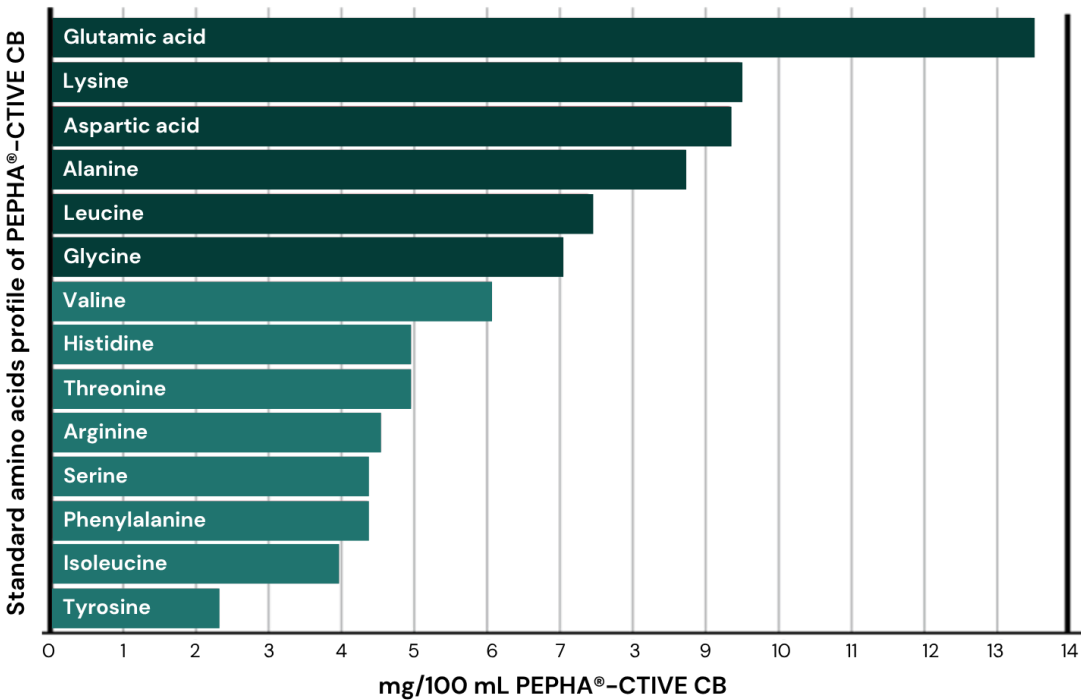
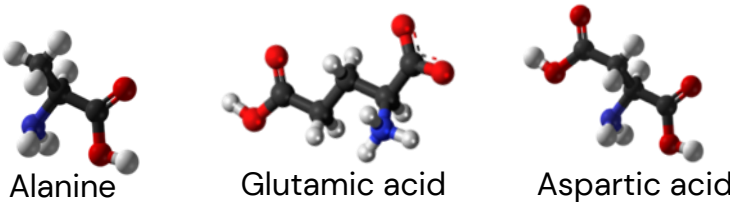
- Maximizes the optimal growth conditions by providing sufficient light and minimizes the contamination risk: **purity, high quality and high content of active substances** are ensured
- Enables standardization
- Respects biodiversity
- High level of renewable sources of energy

Unique Amino Acids composition

PEPHA®-CTIVE CB



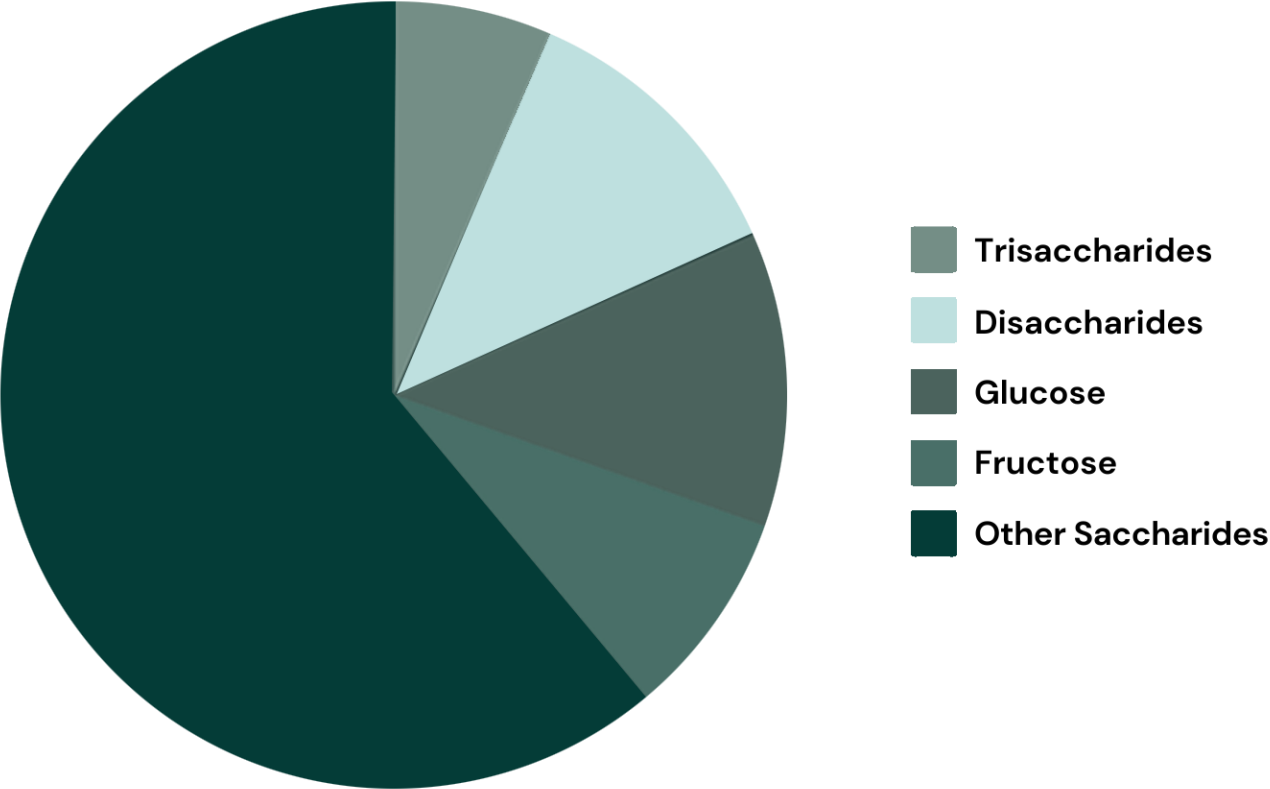
Essential to cell energy production:



Amino acids, proteins, carbohydrates, and minerals are fundamental bio-catalysts and building blocks for the cellular metabolism, e.g. ATP synthesis

PEPHA®-CTIVE CB's Carbohydrates

Source of cellular energy

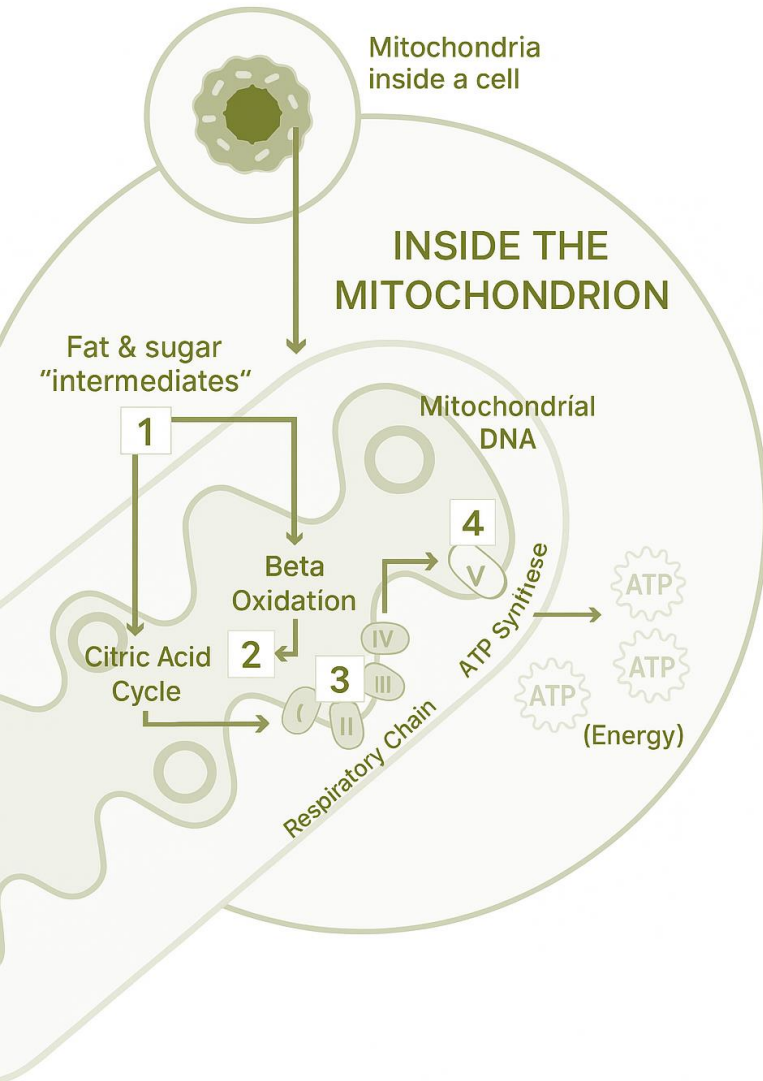


Essential role of carbohydrates for cells metabolism, communication, and structure



Mitochondria

The secret power within cells



Mitochondria are the **power stations of skin cells**, responsible to produce ATP.

ATP is necessary to maintain the functionality of cells.

Over time, the **mitochondria lose their activity**.

The skin cells are not sufficiently supplied with energy anymore, their **functionality is reduced**.

Feeling a power blackout? When skin gets dull & tired

Energized & luminous skin

- ↑ Cell respiration
- ↑ Energy metabolism
- ↑ Cell turnover

**Luminous, Youthful-
looking skin**



Tired & dull Skin

- ↓ Cell respiration
- ↓ Energy metabolism
- ↓ Cell turnover

**Atonic, dull and
stressed-looking skin**



dsm-firmenich solution: PEPHA®-CTIVE CB

The secret of a natural glowing skin

In vitro PEPHA®-CTIVE CB:

- Protects the mitochondria against oxidative stress caused by free radicals
- Increases the ATP content in keratinocytes up to +140%
- Increases the proliferation rate of fibroblasts up to +320%

In vivo PEPHA®-CTIVE CB:

- Induces faster skin renewal by 4 to 5 days, for a fresher looking appearance
- Visibly improves skin's luminosity for more than 4 out of 5 consumers



Cell's battery protection

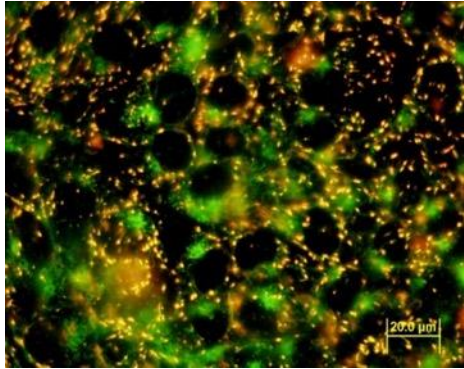
PEPHA[®]-CTIVE CB



in vivo

Protection

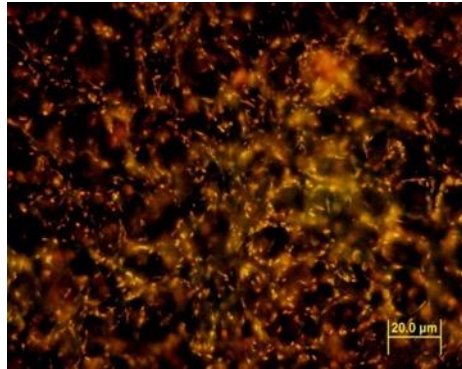
Fluorescence microscopy



Control

Stressed with 500 $\mu\text{mol H}_2\text{O}_2$

↪ **Visible green staining**



1% PEPHA[®]-CTIVE CB

Stressed with 500 $\mu\text{mol H}_2\text{O}_2$

↪ **No visible green staining**

- *in vitro* assay with **human keratinocytes HaCaT**
- Cells treated with PEPHA[®]-CTIVE CB vs. untreated cells
- 24 hours incubation
- **Oxidative stress** with 500 $\mu\text{mol H}_2\text{O}_2$
- Mitochondria polarization indicated by fluorescence
- **Healthy mitochondria appear red**

PEPHA[®]-CTIVE CB visibly protects the mitochondria against oxidative stress caused by free radicals

Cell's battery protection up to 150%

PEPHA®-CTIVE CB

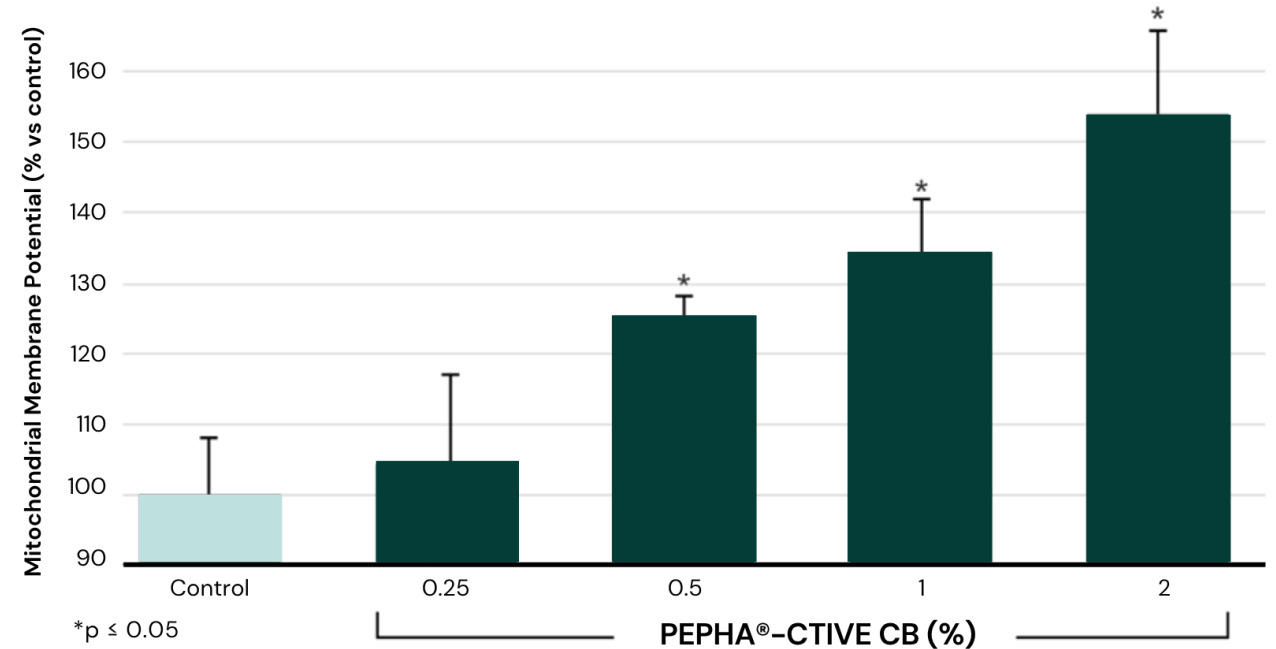


in vivo

Protection

- *in vitro* assay with **human keratinocytes HaCaT**
- Cells treated with PEPHA®-CTIVE CB vs. untreated cells (control)
- 24 hours incubation
- **Oxidative stress** with 2mM H₂O₂
- Mitochondria polarization indicated by fluorescence

Quantitative assay



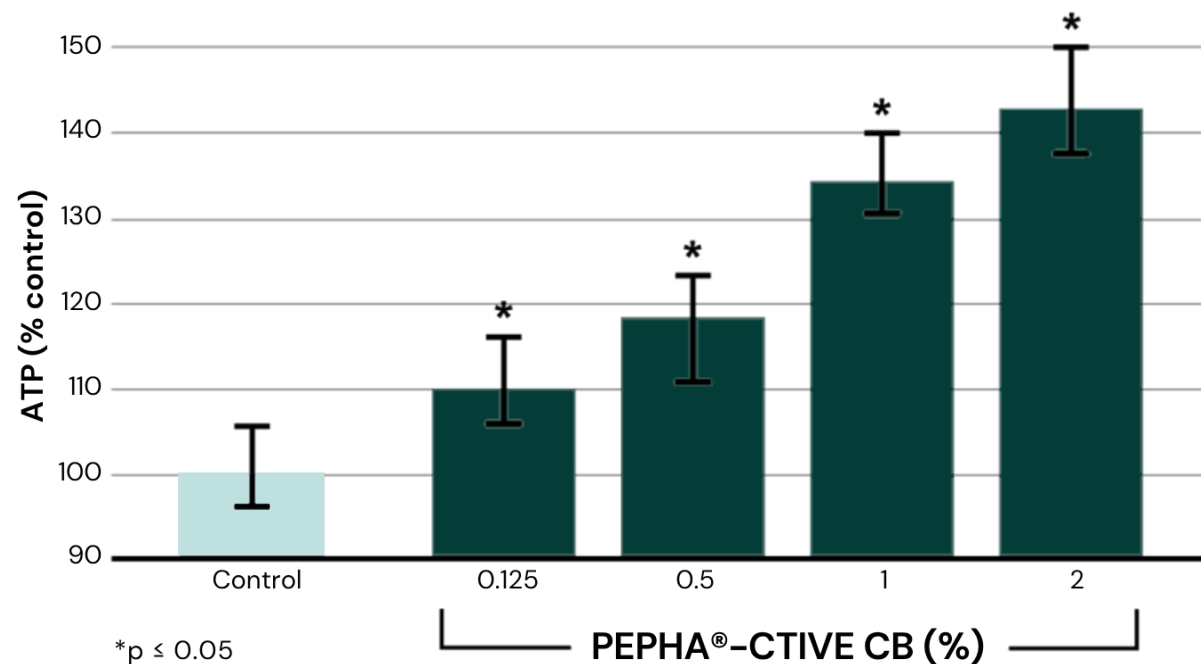
PEPHA®-CTIVE CB dose-dependently protects the mitochondria against oxidative stress caused by free radicals

Cellular energy activation up to 140% PEPHA®-CTIVE CB



in vivo

Activation ➡



- *in vitro* assay with **human keratinocytes HaCaT**
- Cells treated with PEPHA®-CTIVE CB vs. untreated cells (control)
- 48 hours incubation
- Measurement of cellular ATP content

PEPHA®-CTIVE CB significantly and dose-dependently increases the ATP content up to 140%

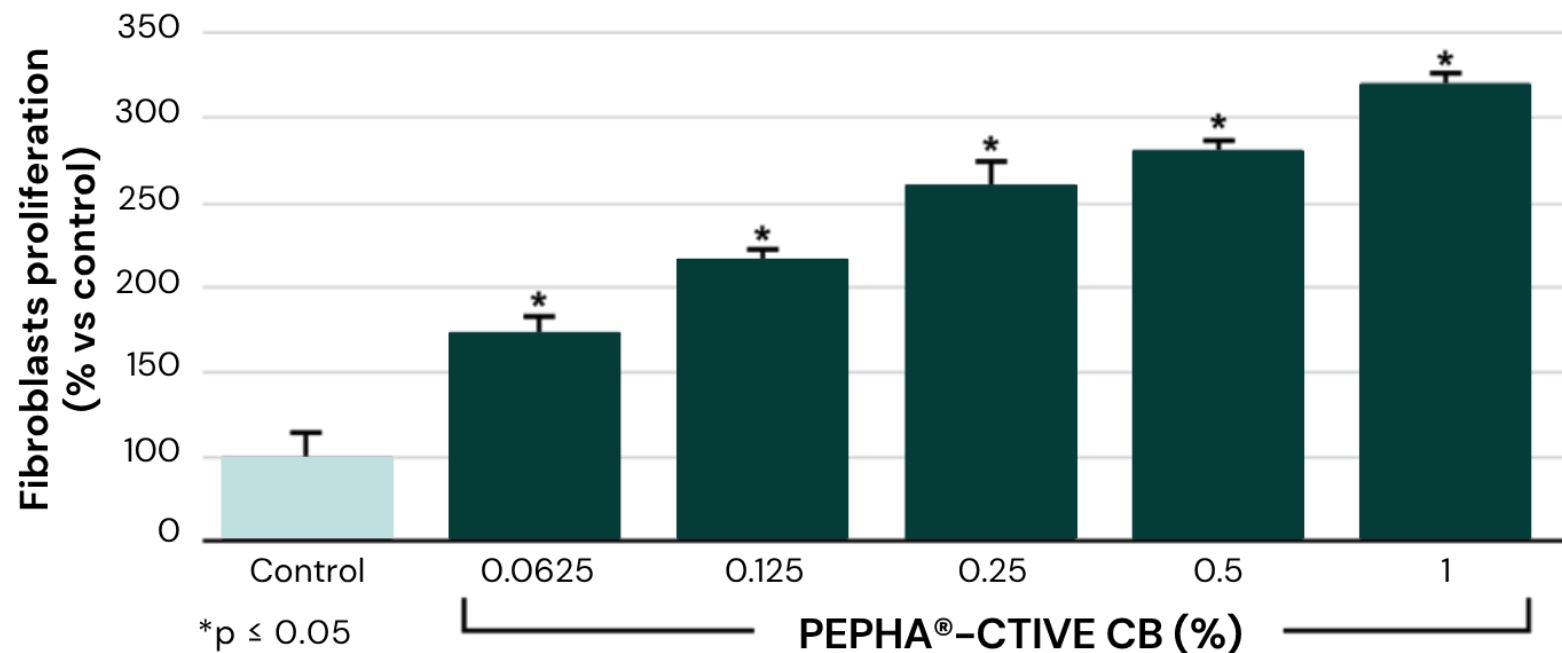
Cellular proliferation up to 320%

PEPHA®-CTIVE CB



in vivo

- *in vitro* assay with **normal human fibroblasts from skin**
- Cells treated with PEPHA®-CTIVE CB vs. untreated cells (control)
- 24 hours incubation
- Fibroblasts quantification by ELISA



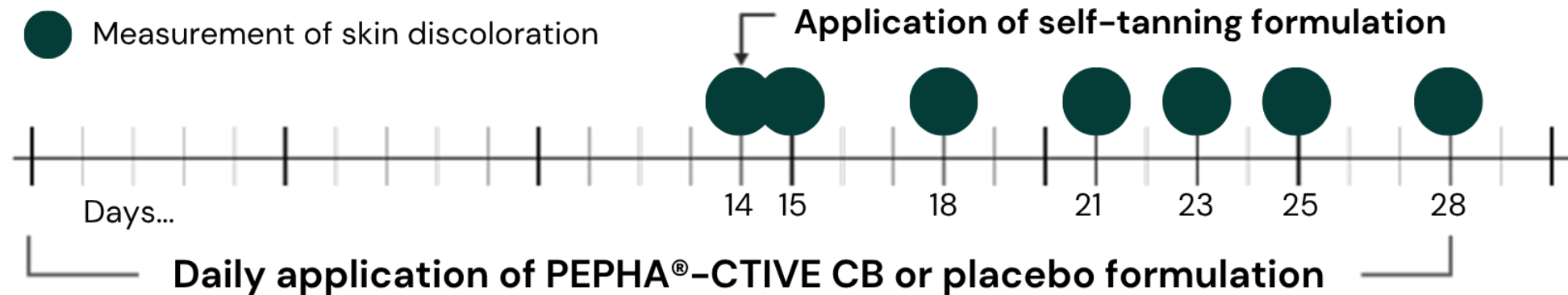
PEPHA®-CTIVE CB significantly increases the fibroblast proliferation up to 320%

Skin renewal

Study design

in vivo

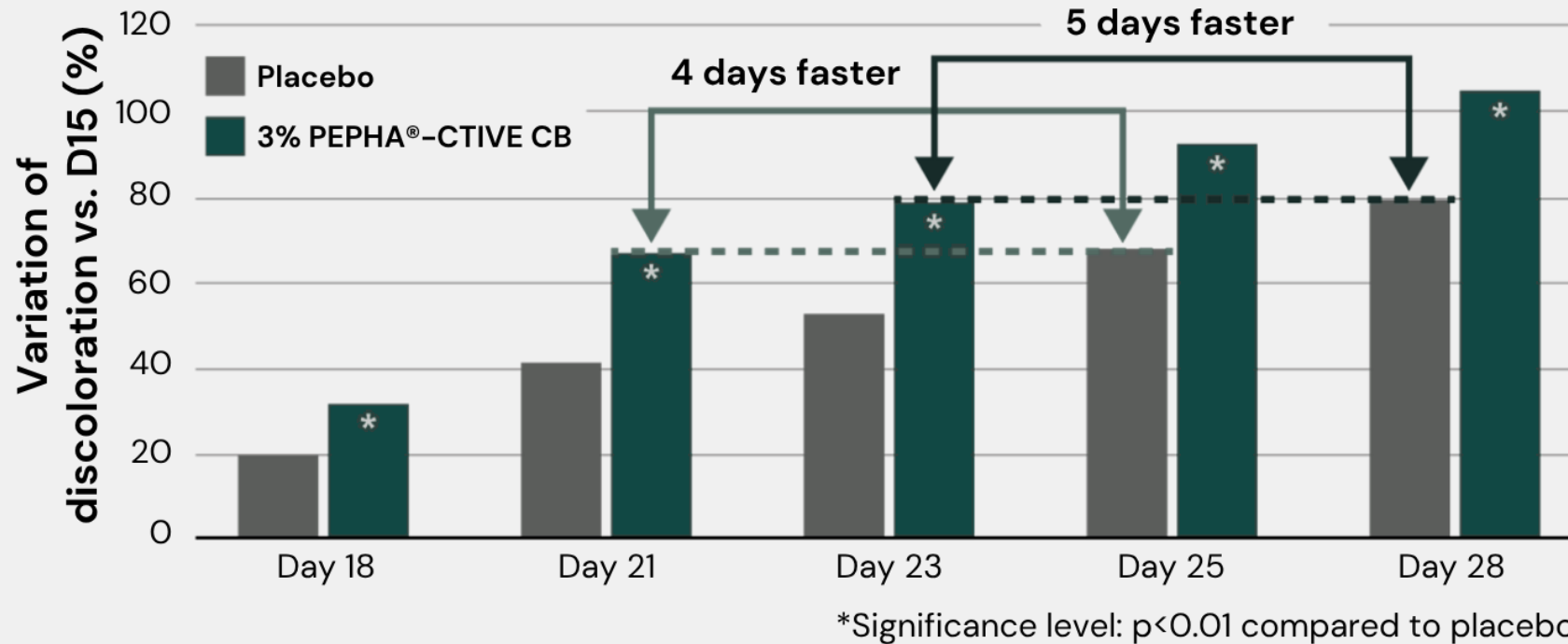
- 20 female volunteers, 22 – 65 years old
- Placebo controlled study; 3% PEPHA[®]-CTIVE CB in a cosmetic formulation
- Application:
 1. **Day 0 – Day 28:** across 4 weeks, randomized daily application of the PEPHA[®]-CTIVE CB formulation on one forearm, and of the placebo on the second forearm;
 2. **Day 14:** after the first 2 weeks, tanning of the skin with a unique application of a DHA formulation (on both forearms);
 3. **Days 15, 18, 21, 23, 25, 28:** measurement of skin discoloration, correlated to the skin renewal
- Parameters: Skin coloration (Chromameter)



5 days faster skin renewal for luminous looking skin

PEPHA®-CTIVE CB

in vivo



- PEPHA®-CTIVE CB visibly increased the skin renewal, inducing a faster skin renewal by 4 to 5 days.
- Result is a luminous looking appearance.

Skin complexion

PEPHA®-CTIVE CB

Volunteers

- 30 female volunteers, 35 – 60 years old
- Presenting a dull skin complexion
- Phototype I to III

Formulation

- 3% PEPHA®-CTIVE CB in a cosmetic formulation

Application

- Randomized half-face application
- Twice daily
- 28 days

Parameters

- Evaluation of the CLBT-Parameters (Colour, Luminosity, Brightness, Transparency) by trained professionals
- Self-evaluation questionnaire

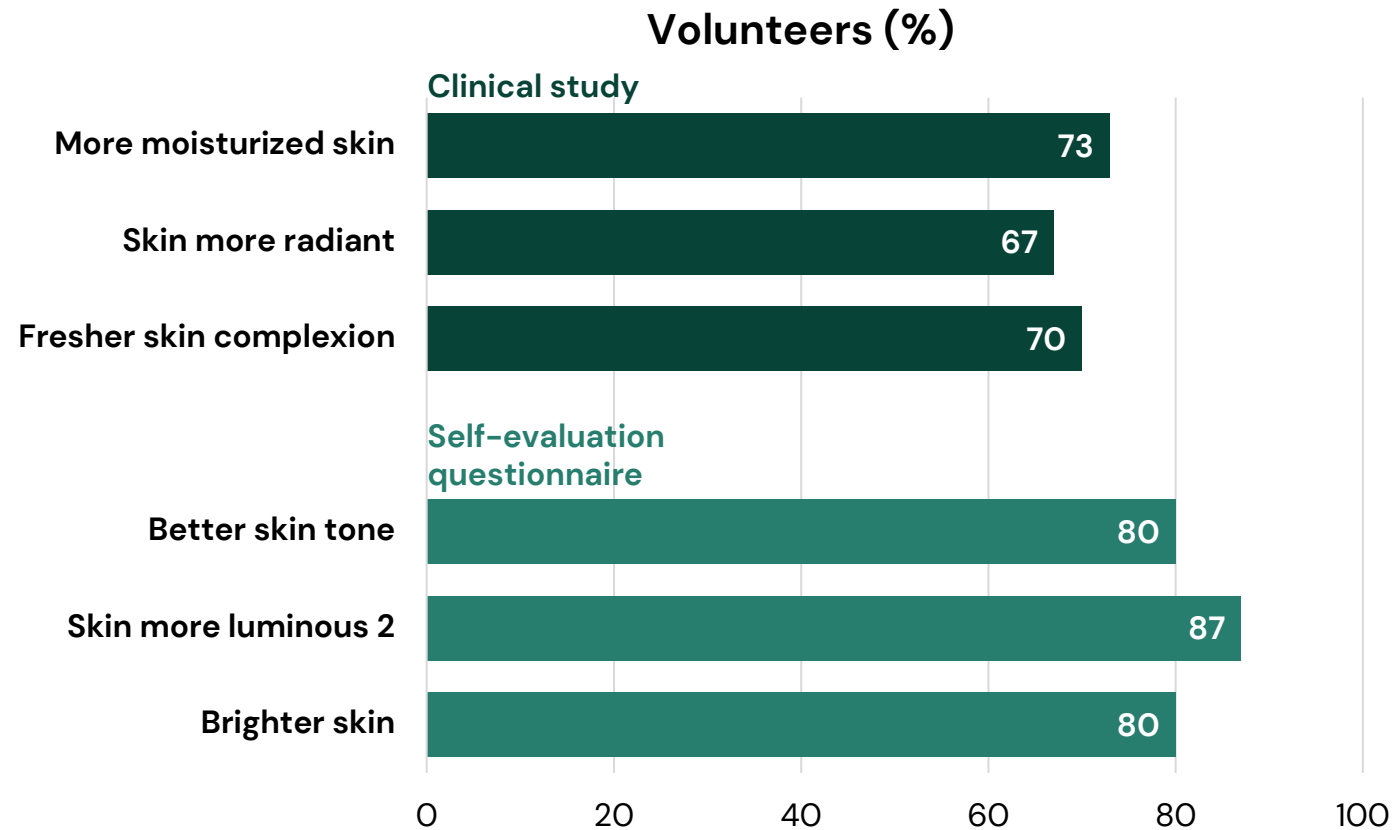
in vivo



Perfect luminous skin with the microalgae power

PEPHA®-CTIVE CB

in vivo



- PEPHA®-CTIVE CB visibly improves skin's luminosity for more than 4 out of 5 consumers.
- Excellent acceptance among users, with a significant improvement in skin complexion.

Formulation Guidelines

PEPHA[®]-CTIVE CB

INCI name (active): Dunaliella Salina Extract

- Clear, yellowish liquid
- Stable at pH ranges from 3.0 to 6.0
- Should be processed below 50°C
- Suggested concentration: 1–3 %

Cosmetic application

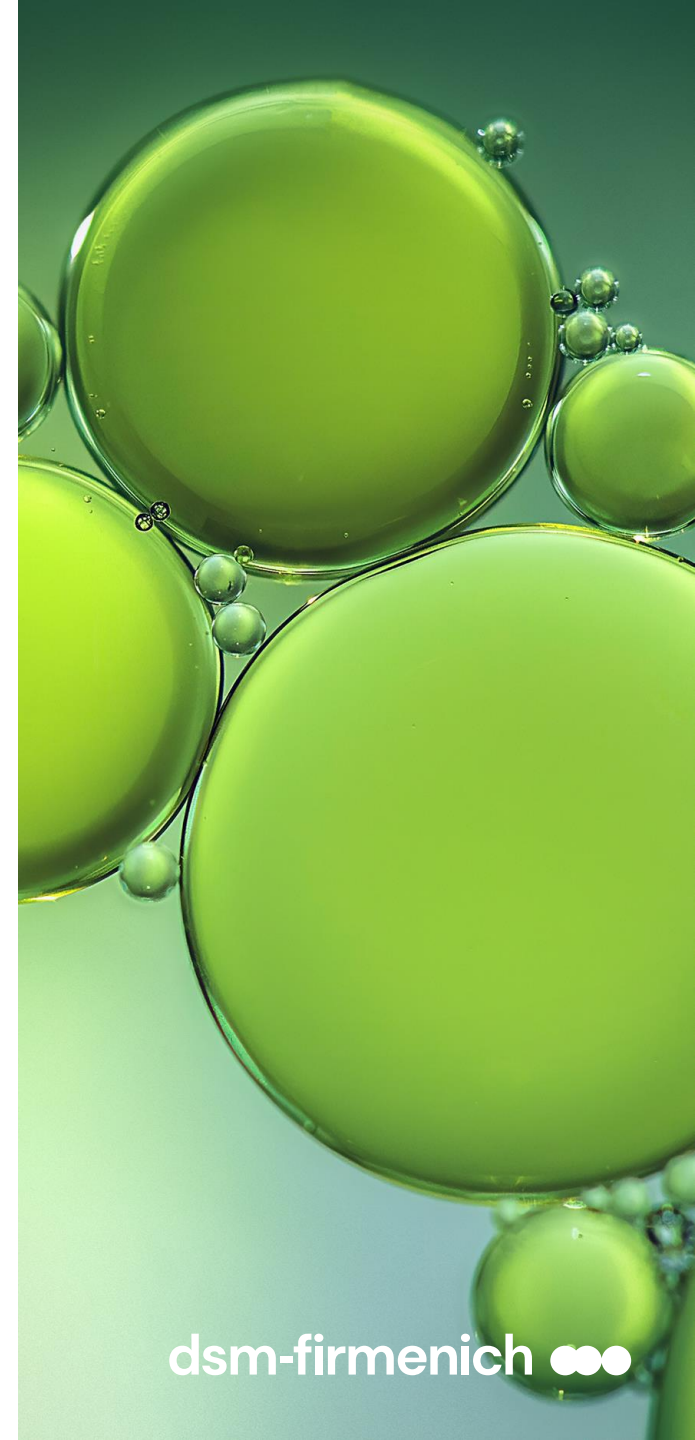
- Skin energizing facial product
- Glow, radiance enhancer
- Protective day care for fresher and radiant looking skin



PEPHA[®]-CTIVE

Supported marketing claims

- Clinically proven to improve skin glow on 9 users out of 10
- It accelerates skin cell turnover for fresher looking skin... faster!
- 80% of users showed a visible improvement in skin brightness in Clinical Study
- Excellent acceptance among users, with a significant perceived improvement in skin complexion



Energy & Luminosity

Key market claims

Claims examples*

- Helps renew skin's youthful radiance
- Truly vital skin radiates with energy and light
- Helps restore skin's natural radiance and vital appearance
- Skin's inner light energy
- Promotes skin's natural cellular energy for truly luminous, radiant beauty
- Energy recharge
- Energie de vie

Main ingredients*

- Antioxidants from plants
- Vitamins
- Sugars
- Amino acids
- Algae extracts
- ATP or adenosine

*Source: GNPD



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