

Bioactives

PEPHA[®]-AGE CB



**COSMOS
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GREENLIFE, conform
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Standard



Stimulates skin's own
defense against blue light



DSM

BRIGHT SCIENCE. BRIGHTER LIVING.

NUTRITION · HEALTH · SUSTAINABLE LIVING

Introducing a UNIQUE micro alga

Scenedesmus rubescens

Algae are the oldest plants, surviving all geological ordeals.

DSM scientists have selected this most potent species *Scenedesmus rubescens* after a screening of several micro-algae. This species is a micro alga, a unicellular organism living in fresh water lakes. **This unique cell has developed self-defense capabilities, with a very strong cell wall protecting against the harsh environment, synthesizing a unique set of active components.**

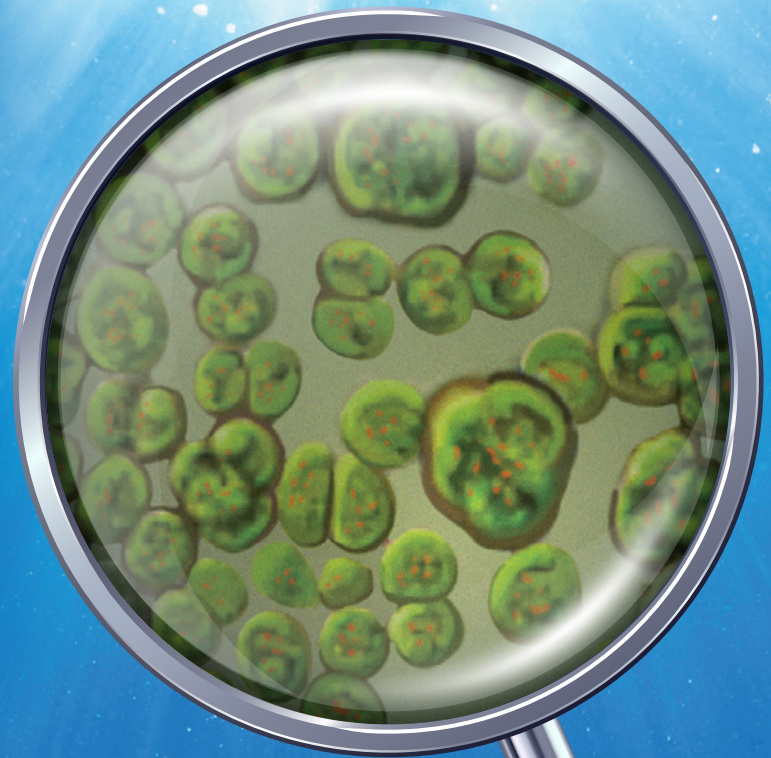
Uniqueness of *Scenedesmus rubescens* with mysterious red dots

The cells of this specific species contain red dots. This is why the species has been called '*rubescens*'; with a Latin meaning of 'becoming' (*escens*) 'red' (*ruber*). **These red dots are rich in carotenoids, which are known to absorb blue light.** Scientifically the red-orange filter blocks the blue light.

Sustainable farming and unique composition

This alga is sustainably farmed in a state-of-the-art photo-bioreactors, guaranteeing constant quality (no risk of contamination, reproducibility of process, fully traceable). The extract is a unique composition of amino acids (rich in proline and alanine, stimulating collagen synthesis), vitamins (B3), algal saccharides and minerals.

PEPHA®-AGE CB is 100% naturally-derived according to ISO 16128. Its proven activity puts the product in focus for brands looking for sustainable, natural new opportunities that help to protect and regenerate from blue light- and UV-induced skin damage.



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Don't worry about the harmful effect of blue light on your skin

Blue light concern

About 70% of the adult population is spending more than 5 hours per day with screens. The consumers and the scientific community are concerned about the established adverse effects on the skin of blue light emitted by electronic devices and sunlight. Recent studies have shown that blue light penetrates deep into the skin. Blue light triggers oxidative stress, damaging the skin functionality and inducing a potent and long-lasting skin hyperpigmentation.

DSM's solution: PEPHA®-AGE CB

Specialized in the development and manufacturing of active ingredient from natural origin, DSM researchers have identified the potential of the freshwater alga *Scenedesmus rubescens*. This algae extract is the strongest solution to upset the negative impact of blue light and UV radiations on your skin. PEPHA®-AGE CB delivers proven performances to stimulate skin's own defense, protecting the skin barrier, boosting the collagen synthesis and restoring even skin tone, against the harmful effect of blue light.

Key facts

UNIQUE PRODUCT FEATURES

- Sustainable *Scenedesmus rubescens* extract with a unique composition
- Reduces blue light induced skin hyperpigmentation and redness
- Stimulates skin's own defense against blue light and sunlight
- Reduces oxidative stress and carbonylated proteins
- Restores and boosts collagen (especially Collagen III)

BENEFITS

- Minimizes the appearance of aging after exposure to blue light and UV
- Delivers even skin tone and overall improved skin appearance
- Reduces skin damage caused by blue light and UV

COSMETIC APPLICATION

- Day care products
- Sun care and after sun formulations
- Regenerative night care
- Anti-aging products

Technical information

Suggested concentration: 1–3% PEPHA®-AGE CB

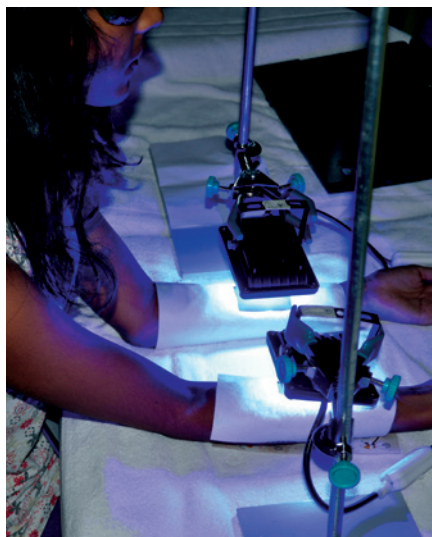
INCI name (active): *Scenedesmus rubescens* Extract

Holistic effect against blue light- and UV-induced skin damage

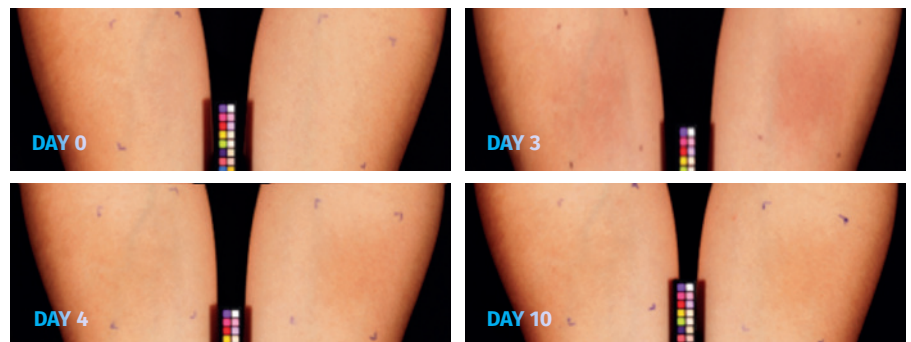
Blue light *in vivo*:

PEPHA®-AGE CB prevents skin darkening and skin irritation

An *in vivo* study was conducted with 33 women, 21-41 years old. Formulations with 3% PEPHA®-AGE CB and a placebo were applied on the forearm once a day for 34 days. After 6 days formulation application, the forearm is irradiated with blue light (450 nm with 60J/cm², this is the natural dose you get from one hour of European midsummer sun) for 4 days consecutively. We measured skin coloration by chromameter and took pictures at D-6 (start of the study), D-0 (when the irradiation starts), D-3 (when the irradiation stops), D-4, D-10 and D-28.

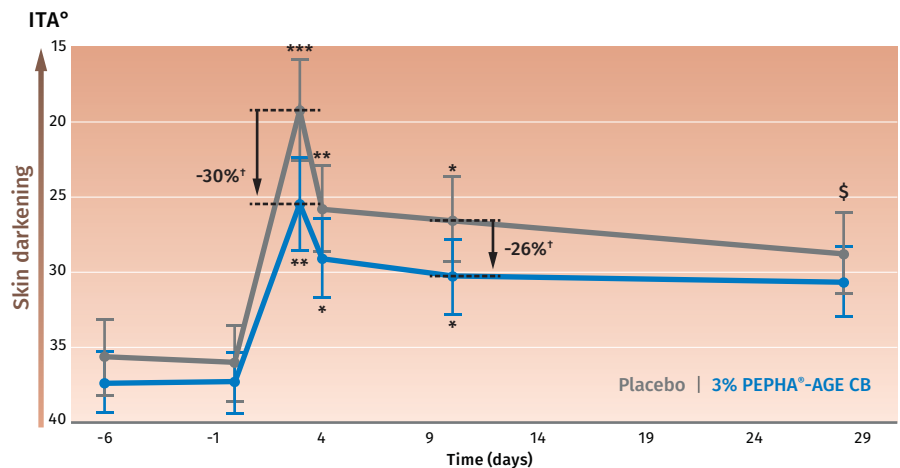


Forearm after blue light irradiation with PEPHA®-AGE CB (left) and Placebo (right)



Volunteer 12

PEPHA®-AGE CB reduces blue light-induced hyperpigmentation by 30%



*** p<0.001, ** p<0.01, * p<0.05, \$ p<0.1 All vs baseline D0. † p<0.05 vs placebo (delta ITA vs D0).

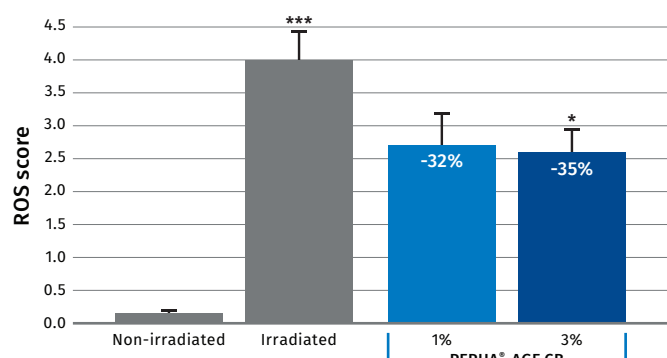
PEPHA®-AGE CB proves to be highly effective against hyper pigmentation

- Immediate reduction of skin pigment darkening (-30% at D3)
- Immediate reduction of skin redness (-25% at D3)
- Rebalance faster to skin normal pigmentation
- Provides even skin tone

Blue light *ex vivo*: PEPHA®-AGE CB prevents skin premature aging

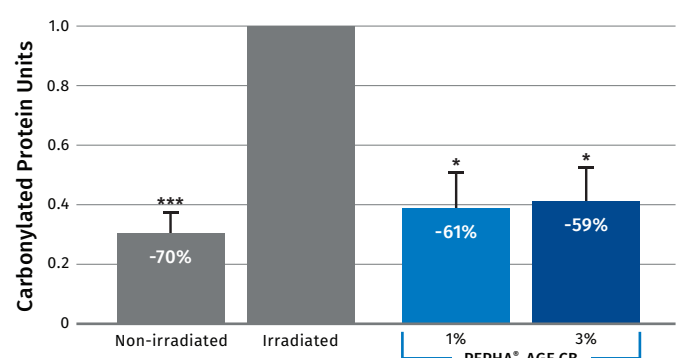
Skin biopsies in culture. Donor: 65 year old female. Topical treatment with products before and after blue light irradiation 380–470nm (100J/cm²).

PEPHA®-AGE CB significantly reduces blue light-induced free radicals (ros) up to -35%

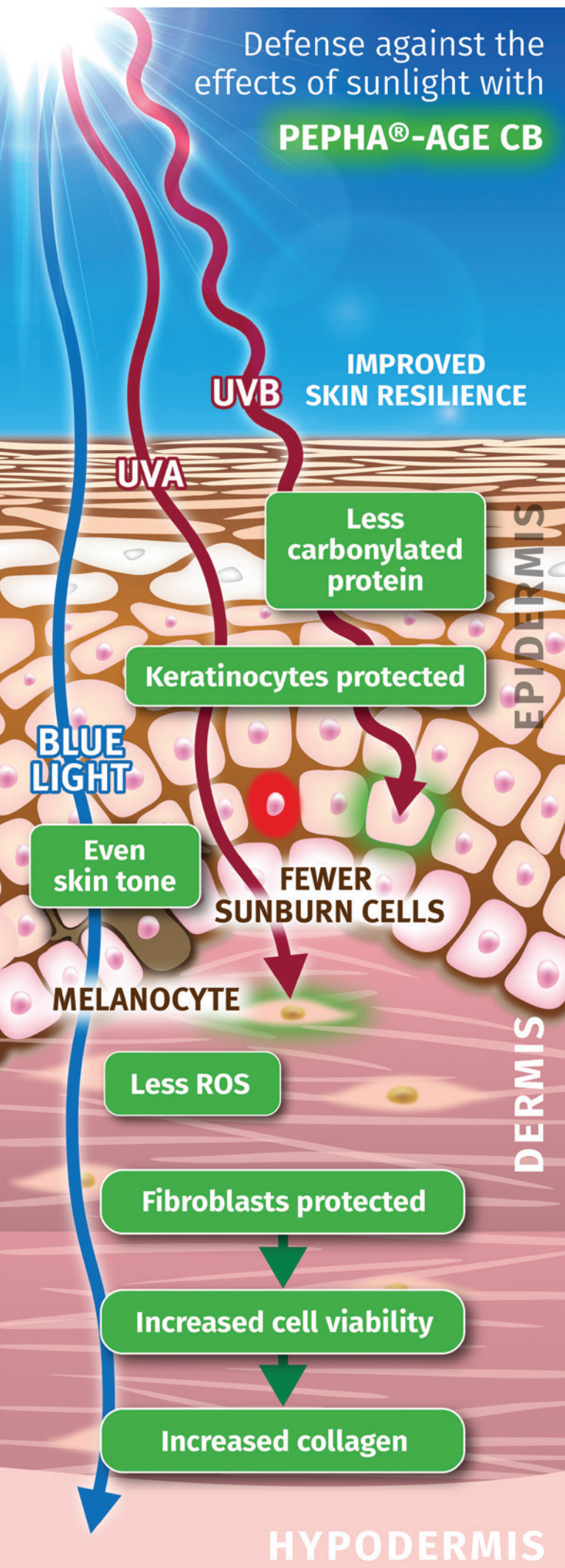


*** p<0.001 vs non irradiated, * p<0.05 vs irradiated blue light.

PEPHA®-AGE CB significantly reduces blue light-induced carbonylated proteins up to -61%



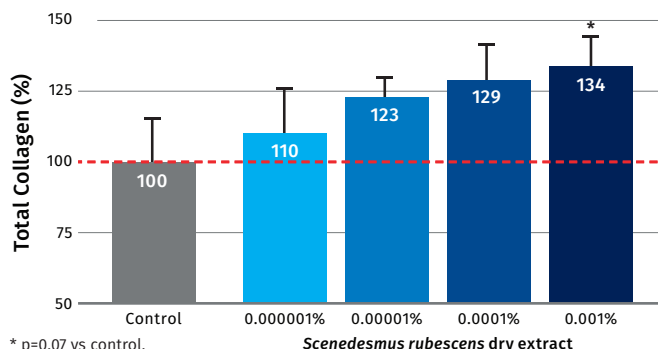
***p<0.001 vs irradiated blue light; *p<0.05 vs irradiated blue light.



PEPHA®-AGE CB stimulates skin's own defense

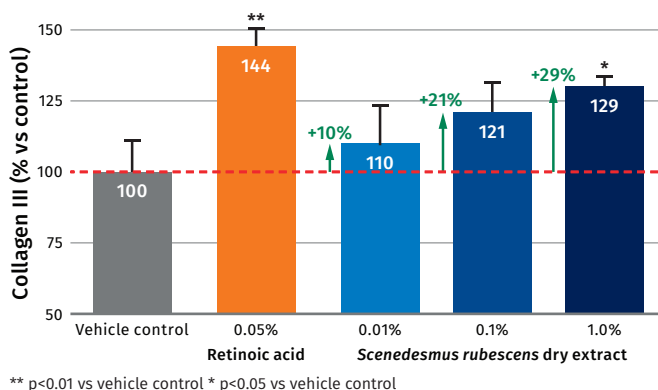
PEPHA®-AGE CB boosts fibroblasts viability and enhances collagen **by 34% in vitro**

Total collagen content was quantified by Sirius Red staining after 48 h treatment.



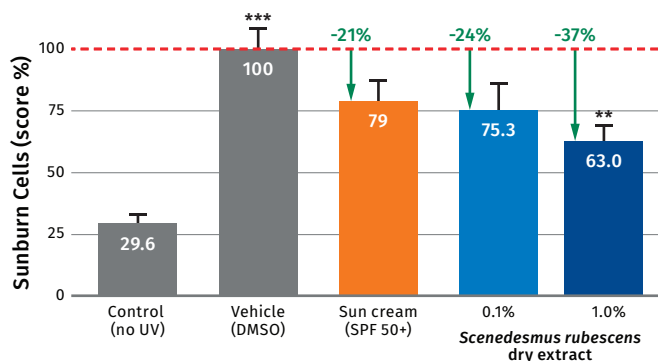
Collagen III (youth collagen) stimulated **by 29% with PEPHA®-AGE CB ex vivo**

Test samples and control were topically applied on skin biopsies for 6 days, nor: 43 years, by donor: 43 years.



Protects the skin barrier against UVB

Skin barrier repair, PEPHA®-AGE CB reduces the number of sunburn cells **by 63% against UVB**



Sunburn Cell: a sign of sunlight-induced cellular damage

Sunburn cells are keratinocytes undergoing programmed cell death (apoptosis) after they have received a UVB dose that irreversibly and severely damaged their DNA.

An increasing number is a key indicator for ongoing damage in the epidermis.

For more information, please visit www.dsm.com/personal-care

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