



# DIGITAL POLLUTION

RAHN-Cosmetic Actives for our modern lifestyle

SWISS EXPERTISE 

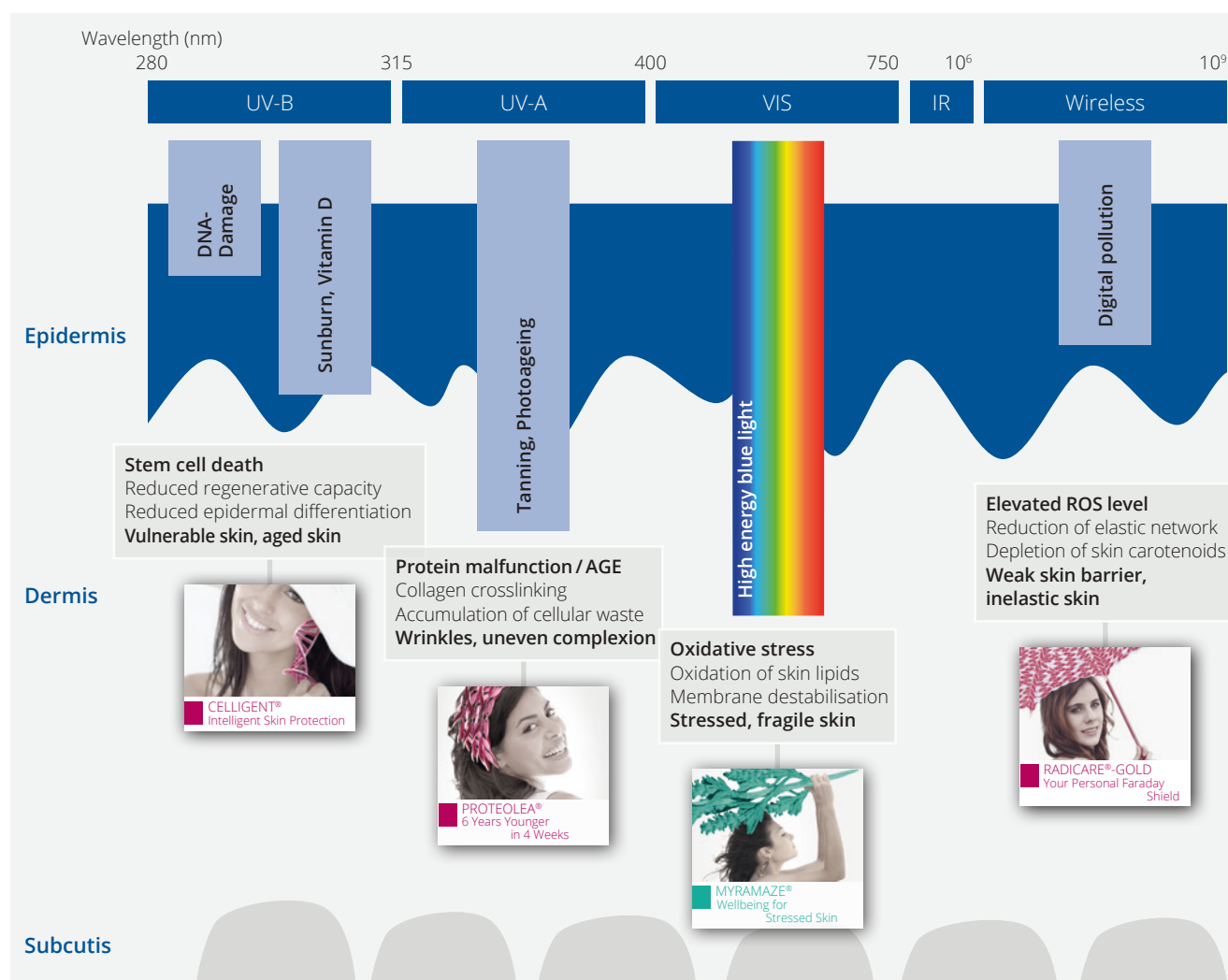
**RAHN**  
Your partner for excellence

# Digital stress harms our skin

It is well understood that we need to protect our skin from the impact of high-energy solar radiation. We all know that UV-B and UV-A radiation can damage DNA and proteins, leading to accelerated skin ageing. More attention is being paid to the contribution visible light makes to skin ageing. The most deleterious fraction of visible light is so-called „high energy visible light“ (HEV) or blue light, flanking the UV spectrum. Although most blue light is contained in daylight, typical artificial emitters of blue light are lamps and the screens of laptops, tablets and smart phones. The irradiation of skin with blue light increases the reactive oxygen species (ROS) load of the cells, resulting in oxidative stress with subsequent damage to the genome, proteome and metabolome. As a consequence, cells lose their

capability to cope with other all-day impacts that drive premature skin ageing, which is associated with symptoms like hyperpigmentation, wrinkle formation and loss of elasticity and firmness. Protection against the consequences of blue light irradiation of skin is therefore essential for a healthy, youthful complexion.

Furthermore, modern technology of wireless data transfer, e.g. WiFi, DECT and others in the microwave or radio frequency band create digital pollution. They can increase the ROS load in skin cells and increase the stress level of the skin. Although it is hard to proof *in-vivo* effects on skin, protective measures should be taken to resist these threats.



In our everyday life, our skin needs a versatile shield against light and digital stress. CELLIGENT®, MYRAMAZE®, PROTEOLEA® and RADICARE®-GOLD act as biological cell protection against blue light and UV light and digital radiation.



## SKIN GUARDS AGAINST LIGHT STRESS

Adequate protection against various threats from natural and digital radiation sources should be part of any modern skin care product.

RAHN recommends the use of four active ingredients, which are dedicated to increasing the skin's tolerance to oxidative stress.

- CELLIGENT®  
UV / HEV protection officer for DNA, cell and stem cell
- MYRAMAZE®  
Cell membrane safety guard for stressed, fragile skin
- PROTEOLEA®  
Cellular recycling manager for a 6 years younger skin
- RADICARE®-GOLD  
Digital era skin guardian for improved barrier resistance

## BLUE LIGHT PROTECTION INDEX (*in-vitro* study)

### Method:

HaCaT cells were treated with or without RAHN-Cosmetic Active at the indicated concentration for 2 hours and irradiated with blue light (13J/cm<sup>2</sup>) at 450–470 nm for another 2 hours. For comparison, the UV-dose in spring at sea level varies between 100–180 J/cm<sup>2</sup>. Intracellular ROS production was measured by the generation of a fluorescent dye upon reaction with ROS. Readout was done by flow cytometry. The blue light-protection index corresponds to the reduction of ROS at a certain cosmetic active concentration.

### Result:

Irradiation of keratinocytes with HEV light caused cellular stress and enhanced the ROS burden by 84% as compared to the untreated control. Treatment with the test substances led to a reduction of ROS levels as shown in the table below. CELLIGENT®, MYRAMAZE®, PROTEOLEA® and RADICARE®-GOLD increase the cells' resistance against oxidative stress and effectively protect against blue light.

RAHN-Cosmetic Active	Blue light protection index (%)	
CELLIGENT®	0.05%	–82
MYRAMAZE®	0.01 %	–81
PROTEOLEA®	0.01 %	–93
RADICARE®-GOLD	0.5 %	–42





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## CELLIGENT®

UV / HEV protection for DNA,  
cell and stem cell

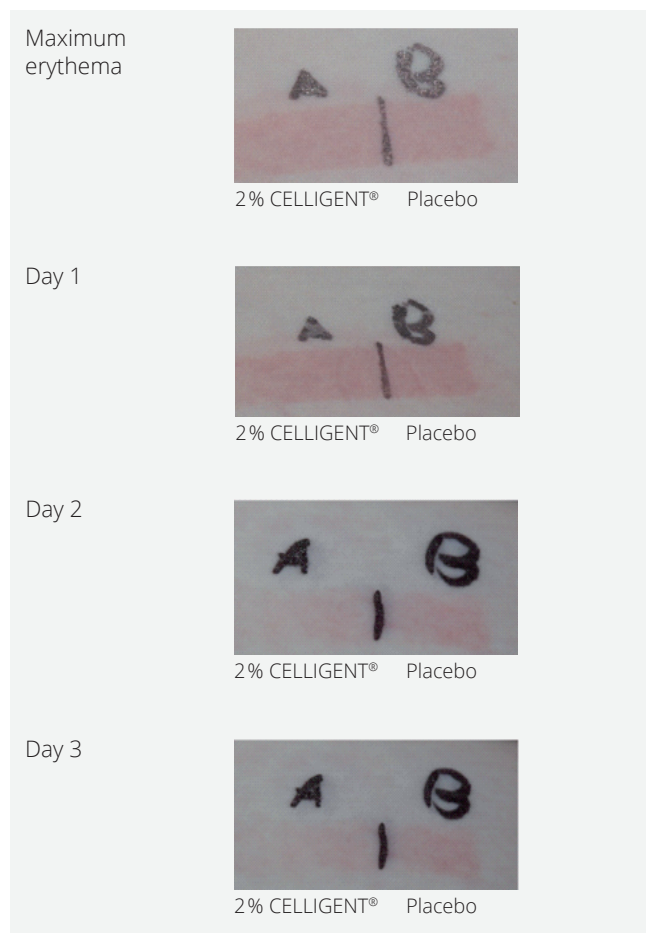
INCI: *Helianthus Annuus* (Sunflower) Seed Oil,  
Ethyl Ferulate, *Rosmarinus Officinalis*  
(Rosemary) Leaf Extract, Tocopherol

The most effective way to prevent UV-VIS induced cell damage. Effective cell and DNA protection with stem cell protection.

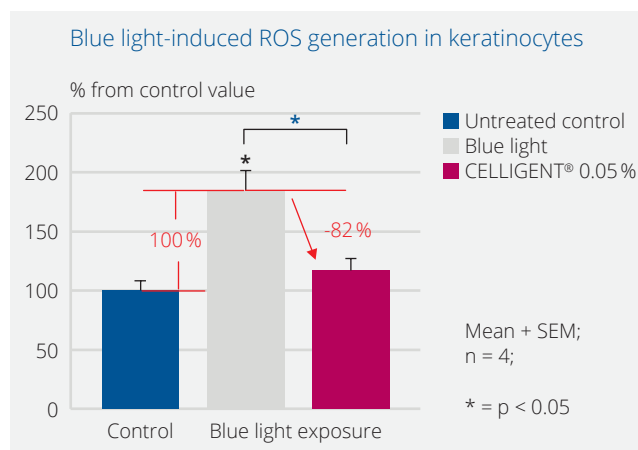
The active ingredient complex has been especially developed to protect skin from the effects of UV irradiation and to support the body's own natural repair process in order to alleviate the symptoms of UV damaged skin. In addition, CELLIGENT® prevents blue light-induced ROS accumulation. CELLIGENT® also maintains the ability of the stem cells' tissue to restore itself when subject to UV-stress. The composition of carnosolic acid from rosemary and ethyl ferulate fights against

free radicals, which damage skin cells, and thus effectively prevents the occurrence of UV and blue light damage.

Blue light from electronic devices perceived by the eyes can disturb the skin's circadian rhythm. Thanks to its powerful antioxidants, CELLIGENT® prevents Epi-dermal Jetlag®, hydrates the skin and strengthens the skin barrier for a care-free life in our modern environment. The recommended usage level is 0.5% – 3%.



**CELLIGENT® effectively reduces erythema provoked by UV-irradiation and promotes the regeneration of UV-damaged skin.**



**CELLIGENT® significantly reduces blue light-induced ROS accumulation in keratinocytes.**

#### Benefits for your products

- UV-protection: Active cell and DNA protection against solar irradiation.
- Skin protection: Rapid regeneration of UV related cell and DNA damage.
- Blue light protection: Significantly reduces ROS generated by irradiation of the skin with HEV/blue light.
- Anti-ageing: Recalibrates the skin's biorhythm.



## MYRAMAZE®

Cell membrane safety guard for stressed, fragile skin

INCI: Propanediol, Water, Myrothamnus Flabellifolia Leaf / Stem Extract, Ascorbic Acid, Citric Acid

Experience superior skin regeneration thanks to the unique metabolic properties of the South African resurrection plant *Myrothamnus flabellifolia*! Despite the extreme environment, in which it grows, it can survive long and hot periods of drought in a completely desiccated state and becomes green again within a few

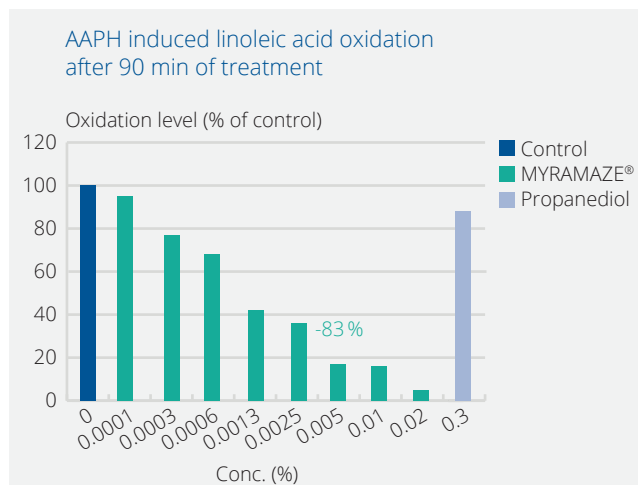
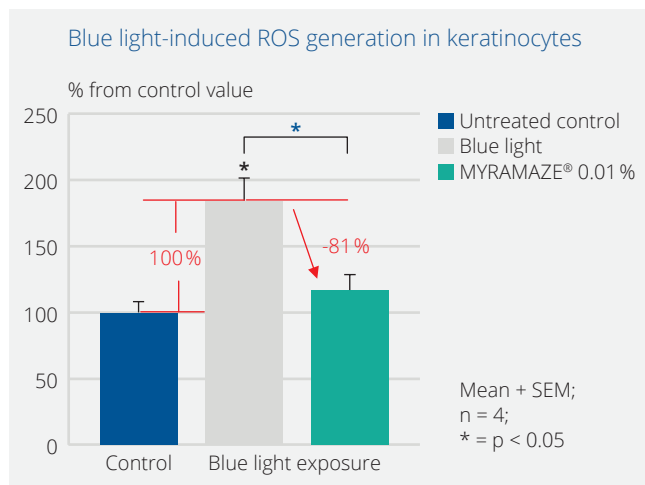
hours of the first drops of rain. A high content of antioxidants helps the plant to survive even extreme UV and VIS radiation in the desert sun. MYRAMAZE®, an extract of *Myrothamnus flabellifolia* protects membrane structures from dehydration and preserves the most important skin lipid, linoleic acid, against oxidation by eliminating reactive oxidative species, which accumulate following exposure to blue light. MYRAMAZE® attenuates rosacea-like skin reddening and provides a luminous appearance. Stressed skin is rapidly regenerated and invigorated – for more than 48 hours after a single application. The recommended usage level is 1 % – 4 %.



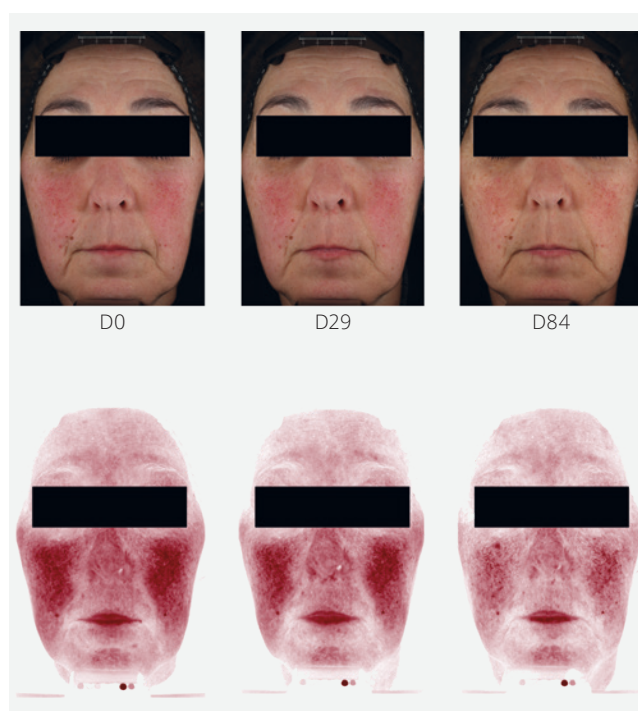
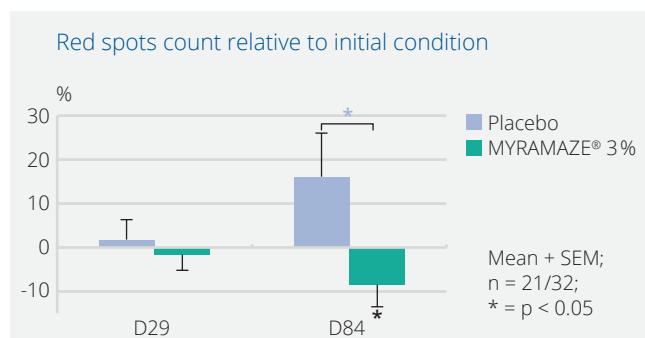
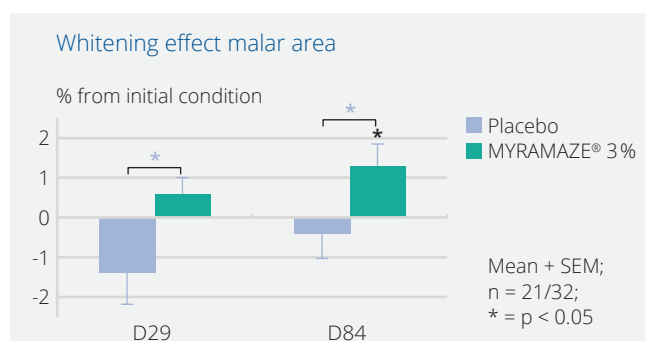
Innovation Prize  
NATURAL  
Products 2014

3. Prize Category Most Innovative Raw Material





MYRAMAZE® significantly reduces blue light-induced ROS accumulation in keratinocytes and minimises linoleic acid oxidation.



MYRAMAZE® significantly lightens the skin and reduces redness in the face, which is the most severely UV/HEV exposed part of the body.

### Benefits for your products

- Cell protection: Protects skin lipids from oxidation.
- Anti-blue light: Significantly reduces ROS generated by irradiation of the skin with HEV/blue light.
- Skin conditioning: Revives the skin for longer than 48 hours after a single application.
- Anti-ageing: Rehydrates dry skin, strengthens the weakened skin barrier, revitalises sensitive and stressed skin, visibly and noticeably improving skin texture.



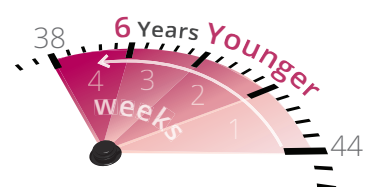
## PROTEOLEA®

Cellular recycling manager for a  
6 years younger skin in just 4 weeks

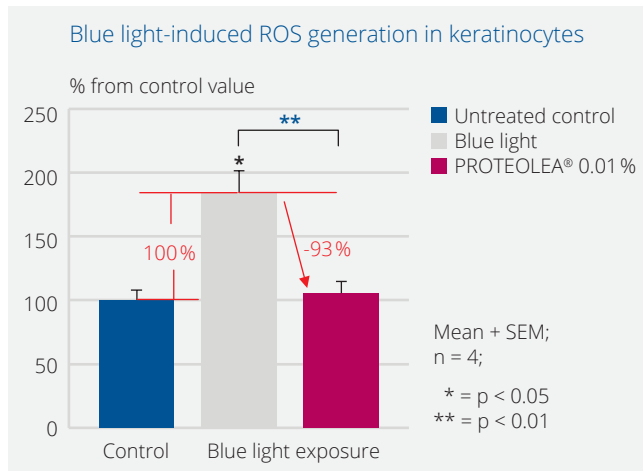
INCI: Glycerin, Water, Fructan, Decyl Glucoside,  
Olea Europaea (Olive) Leaf Extract, Phenethyl  
Alcohol, Ziziphus Jujuba Seed Extract, Citric  
Acid, Ascorbic Acid

Inspired by Nobel Prize winning biology, PROTEOLEA® contains olive leaf extract, jujube extract and levan to rebalance the signs of time. The olive leaf extract works by re-activating the proteasome responsible for the degradation of harmful

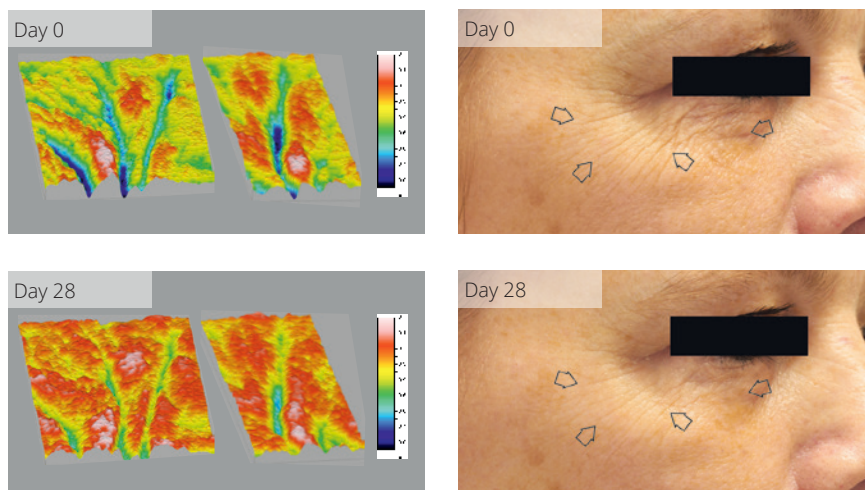
cellular waste, such as the ageing pigment lipofuscin. As with most things, the proteasome slows down with age. Jujube extract from Chinese dates strengthens the skin's own antioxidant defence system, preventing the formation of oxidised cellular waste, even upon HEV exposure, and increasing the skin's stress resistance. Last but not least, the polysaccharide levan creates a firming and moisturising film on the skin. In combination, this powerful blend of materials is suitable for exciting and modern cosmetic applications. The recommended usage level is 1% – 5%.







PROTEOLEA® prevents additional ROS production upon blue light irradiation and promotes the proper functioning of the cellular detoxification machinery.



The application of a gel with 3% PROTEOLEA® leads to significant wrinkle reduction in the eye area and to a calculated rejuvenation effect of 6 years.

#### Benefits for your products

- Anti-blue light: Reduces ROS generated by irradiation of the skin with HEV/ blue light back to the normal level.
- Detoxifying: Activates the proteasome which slows down with age and optimises cellular recycling.
- Anti-glycation: Reduces the accumulation of advanced glycation end products (AGE).
- Anti-pollution: Strengthens the skin's antioxidant defence system and prevents the formation of oxidised cellular waste caused by aerial pollutants, stress or sun.
- Anti-ageing: Rejuvenates the eye area by 6 years in 4 weeks and improves skin roughness, hydration and cell renewal.



## RADICARE®-GOLD

Digital era skin guardian for improved barrier resistance

INCI: Crambe Abyssinica Seed Oil, Beta-Carotene, Xanthophylls, Tocopherol, Helianthus Annuus (Sunflower) Seed Oil, Rosmarinus Officinalis (Rosemary) Leaf Extract

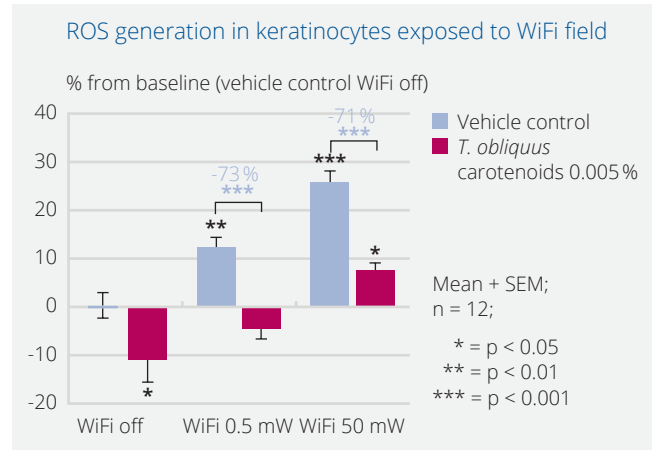
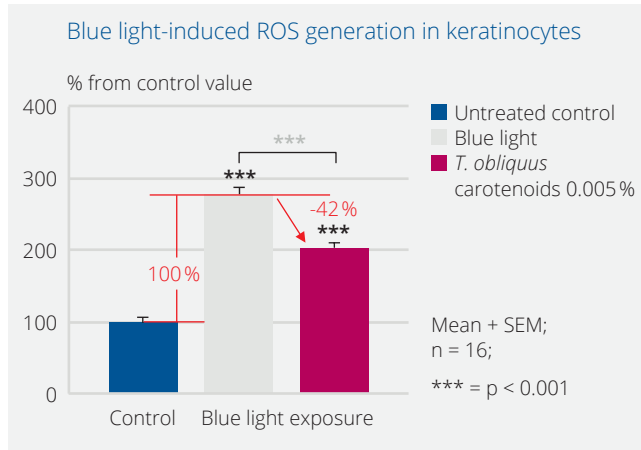
Safeguard your skin by using algae invented protection technology. Since life exists on Earth, radiation is the main threat for beings exposed to sun light.

Algae are specialists in protecting their valuable photosystems from blue light by the synthesis of blue light absorbing carotenoids. Thanks to the special combination of highly anti-oxidant *Tetradasmus obliquus*' carotenoids,  $\beta$ -carotene and lutein, RADICARE®-GOLD is able to protect the skin from blue-light and even WiFi radiation. It refills the skin barrier with natural carotenes to strengthen the lipid protection layer of the skin barrier against sun damage and digital ageing. Experience high-tech skin protection and anti-ageing in just 14 days.

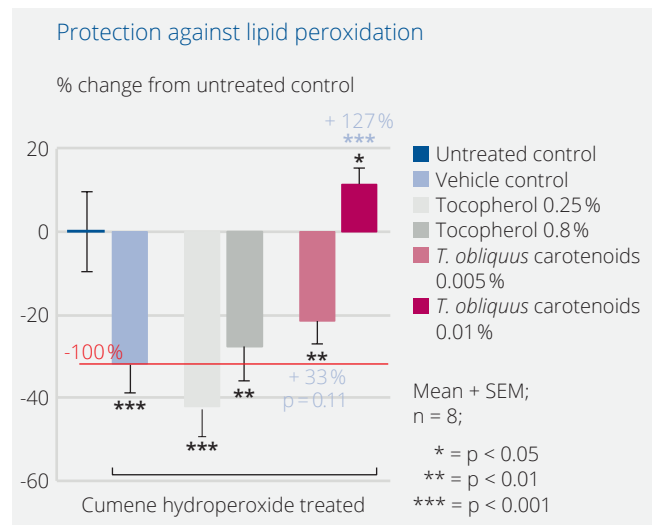
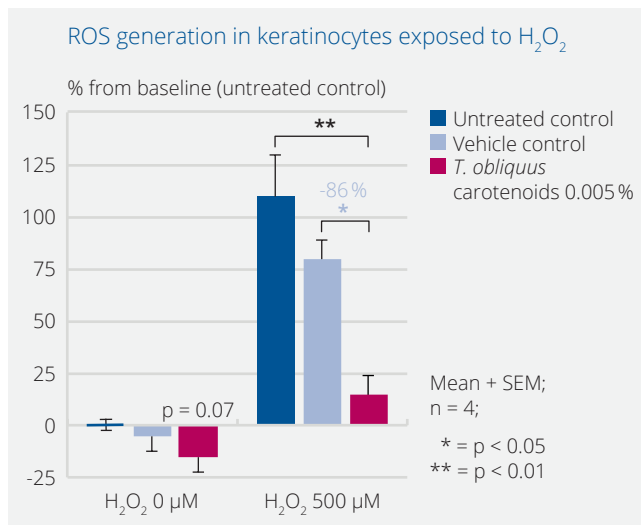
The recommended usage level is 1 % – 5 %.



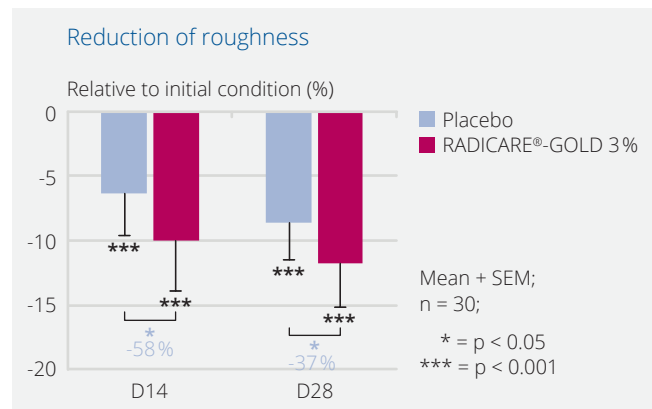
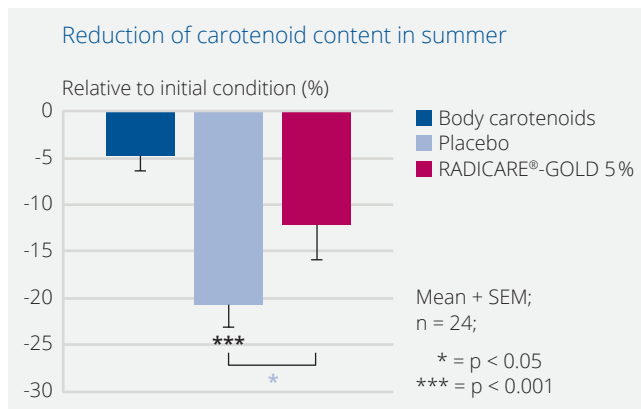
BSB  Innovation Award®  
NATURAL Products 2019  
3. Prize Category Most Innovative Raw Material



**RADICARE®-GOLD significantly reduces ROS accumulation induced by blue light or WiFi.**



**RADICARE®-GOLD is a powerful anti-oxidant and protects stressed cells from lipid peroxidation, unlike tocopherol.**



**RADICARE®-GOLD refills the skin barrier with carotenoids and quickly smoothes the skin.**

### Benefits for your products

- Cell protection: Protects skin lipids and cell membranes from oxidation.
- Anti-blue light: Significantly reduces ROS generated by irradiation of the skin with HEV/blue light.
- Anti-WiFi: Significantly reduces ROS generated by irradiation of the skin with WiFi radiation.
- Anti-pollution: Reduces the impact of digital pollution (wireless connections, blue light-emitting screens)
- Skin conditioning: strengthens the weakened skin barrier, skin roughness, improves elasticity and skin hydration.



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