

# LightWavesDefense JS + M

*Strengthens natural protection against light damage*



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**A STORY**

**Indian jasmine + Y-mangosteen**

*Naolys created this new complex of Indian jasmine cells enriched with Y-mangosteen to develop a unique biological protection for the skin. Jasmine is a well-known oriental flower, famed for its scent and its sacred status in Asian religions; it opens at the end of the day so as to release its full olfactory power. The Y-mangosteen is the fruit of the mangosteen tree; widely used in traditional Asian medicine, it has come to be recognized in the west for its antioxidant properties. Enriched by the synergy with the Y-mangosteen, the plant cells increase the bioavailability of all the active ingredients that they deliver to the skin.*

Key points

- A biotechnological complex**  
A reinforced assimilation of active molecules.
- Innovative design**  
A universal fragrant flower combined with a new discovered active plant molecule.
- Anti-radiation effect**  
Protects against skin damage caused by different types of solar radiation.

Since the skin is exposed to light rays every day, it is necessary to prevent and reduce the damage they cause to the skin and to provide in-depth protection of the skin cells during exposure. For stronger skin that looks younger for longer.



**PRODUCT BENEFITS**

Radiance & Anti-ageing

- Anti-ageing**  
Reinforces the skin's firmness, suppleness and elasticity by maintaining the level of key components of the dermis.
- Radiance**  
Revives the complexion's radiance, making it brighter and more uniform.
- Firming**  
Maintains the skin's degree of firmness.
- Anti-redness, well-being**  
Reduces redness by stimulating skin microcirculation.
- Protection**  
Protects DNA and reduces damage caused by UV, IR and blue light.

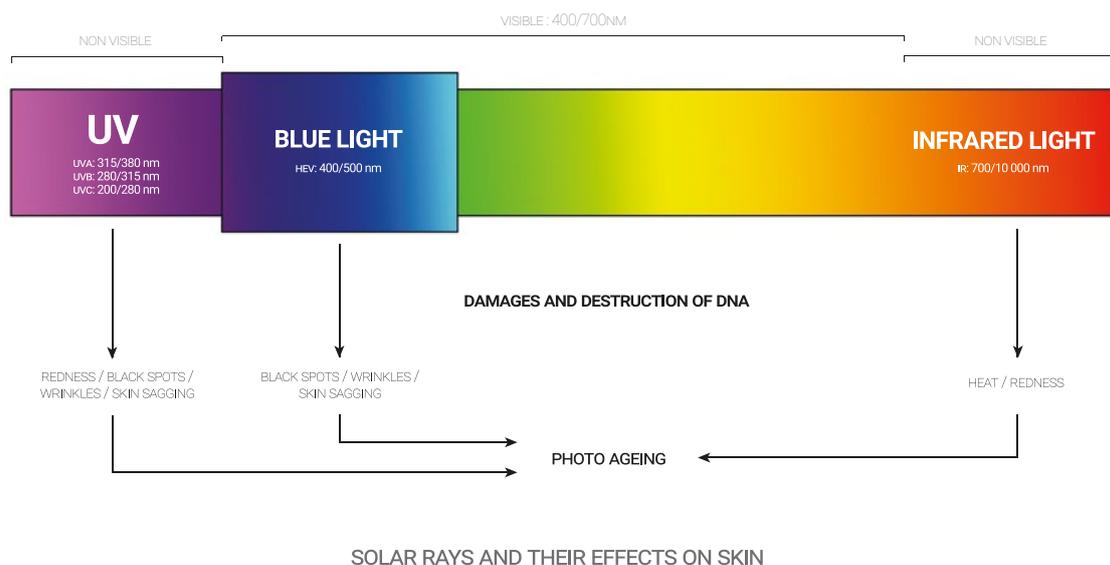
*To be used in skincare or make-up products like cream, fluid, serum, balm, lotion, milk, foundation, concealer, etc. Any skincare or make-up product intended to protect the skin from sun damage.*

**Related products:** GLOBAL PROTECT BLACKBERRY | WHOLE PROTECTION EDELWEISS | FORESEEN SHIELD NOPAL

## HOW IT WORKS

### LightWaves Defense [JS+M]: reinforced biological protection

The sun is essential not only for the synthesis of vitamin D, which enables us to fix the calcium and phosphorus we need for our bones, but also for the prevention of depression, the regulation of our internal clocks, and to improve our ability to learn, among other things. However, while it is important to us, it is also very dangerous in high doses, and several visible and invisible forms of radiation can damage the skin. Until a few years ago, it was thought that only UV rays affected skin cells, but recent studies have shown that unfortunately almost all types of light affect the skin. Depending on their wavelength, they cause various cutaneous malfunctions that accelerate the skin ageing process, thereby changing the skin's external appearance, by producing slackness, redness, spots, lines and wrinkles.



### LightWaves Defense [JS+M] reduces the damage caused by light

Because some light rays are so powerful that they can penetrate to the heart of skin cells, Naolys decided to study not just the cells' environment, but also their DNA, which is ultimately the radiation's target.

#### Protecting the heart of the cells

Light radiation or free radicals produced by radiation can cause changes in DNA bases or breaks in the strands. Cells with damaged or destroyed DNA can no longer function properly; genetic mutations make the cells unsuitable for their roles or completely change the way they function.

**LightWaves Defense [JS+M] protects the mitochondrial DNA that is responsible for correct skin cell function.**

#### Protection at the heart of the dermis

Various components of the dermis are essential for maintaining the skin's structure, such as proteoglycans (hyaluronic acid), collagen and elastin. They provide the skin with support, firmness, flexibility and elasticity. The production of all of these is affected by light rays that accelerate the effect of enzymes that destroy them.

**LightWaves Defense [JS+M] protects the dermis' essential components that are responsible for the skin's characteristics.**

#### A decrease in vasodilation

Skin microcirculation consists of blood and lymph flow. It enables the supply of nutrients that are essential for correct cell function. However, the blood vessels are also linked to other skin mechanisms, such as inflammation, which increases vasodilation. Sunlight can cause inflammation and redness after just a few hours of exposure.

**LightWaves Defense [JS+M] preserves skin microcirculation, responsible for reddening of the skin.**

With its dual-level targeted protection, LightWaves Defense [JS+M] enhances the skin's radiance and youth aspect.

### CLINICAL TEST RESULTS

## A general rejuvenation effect after 28 days of application

- **75%** of women declare that their complexion is more radiant
- **80%** of women declare that their skin is smoother
- **65%** of women declare that their skin is firmer

*At a concentration of 0.5%*

### IN VITRO TEST RESULTS

## Protective effect

On the mitochondrial DNA of keratinocytes

- Due to a **22%** decrease in AP sites after exposure to UVA/UVB
- Due to a **25%** decrease in AP sites after exposure to blue light
- Due to a **19%** decrease in AP sites after exposure to infrared light

On fibroblastes

- Due to a **18%** increase in collagen after exposure to UVA/UVB, **24%** after exposure to blue light and **20%** after exposure to infrared light
- Due to a **21%** increase in hyaluronic acid after exposure to UVA/UVB, **21%** after exposure to blue light and **19%** after exposure to infrared light
- Due to a **20%** increase in elastin after exposure to UVA/UVB, **25%** after exposure to blue light and **21%** after exposure to infrared light

## Anti-redness effect

- Due to an increase in microcirculation translated by a reduction in nitric oxide of **23%** after exposure to UVA/UVB, **20%** after exposure to blue light and **18%** after exposure to infrared light

*At a concentration of 0.5%*

## Clinical test results

### Decrease in signs of ageing after 28 days - two applications/day



DAY 0



DAY 28

#### Study conditions:

- Tests were carried out for 28 days on a sample of 20 women aged 35 to 55 years-old, with various skin types
- Application twice a day
- Emulsion with 0.5% of LightWaves Defense [JS+M] (dispersion form)

### Technical information on the formulation of LightWaves Defense [JS+M]

#### INCI name

Jasminum sambac (Jasmine) leaf cell extract (China compliant)

#### form

cells (20%) in glycerin or sunflower oil (80%)

#### aspect

liquid

#### concentration

starting at 0.5%

#### dispersible

in any formulation (emulsion, lotion, fluid)

## In vitro tests results

### Protecting the heart of the cells

Exposure of the skin to sunlight accelerates skin ageing through a combination of several changes in the epidermis and dermis, in particular by directly affecting the cells' DNA.

#### UV rays

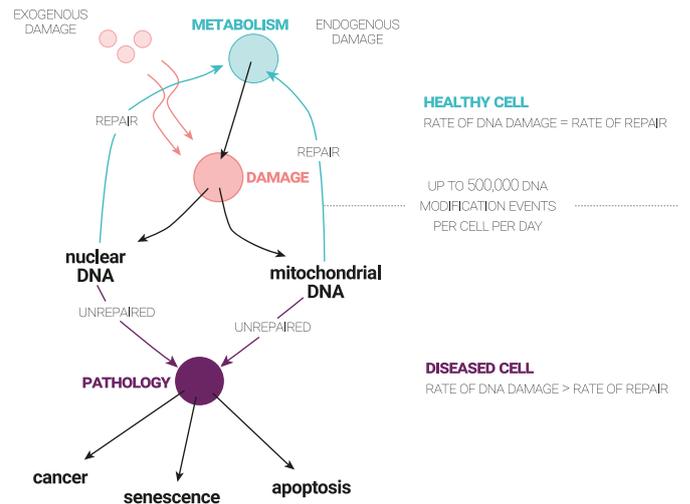
UVB is absorbed mainly by the epidermis and the superficial dermis, while UVA penetrates much more deeply into the skin. UV rays, especially UVB, cause genetic mutations in cellular DNA. UVA rays are only very weakly absorbed by DNA bases, but they can excite cellular groups of atoms or photo-sensitizers, which will result in the formation of free radicals that can also cause DNA damage.

#### Blue light

Penetrating as far as the hypodermis, blue light generates a substantial creation of free radicals, which cause a release of epidermal inflammation mediators and also affect the DNA by damaging its bases.

#### Infrared light

Infrared light rays are responsible for the sensation of heat, but also contribute to the creation of free radicals, which then damage the mitochondria.



DAMAGES ON SKIN CELLS DNA BY UV AND OTHER SOURCES

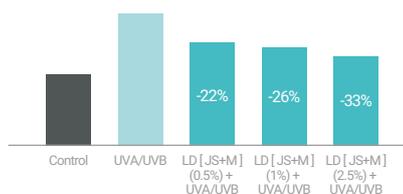
High intensities of light radiation kill most skin cells and those that are not killed are damaged. If they are damaged, cells become fragile and no longer function correctly.

### Study of abasic sites in DNA

To assess the effect of LightWaves Defense [JS+M], Naolys decided to study apurinic/aprimidinic (AP) or abasic sites, in the DNA of keratinocyte mitochondria. AP sites are one of the main DNA lesions formed during base excision repair. It is estimated that about  $2 \times 10^5$  base lesions are generated per cell, per day. These lesions constitute a kind of vacant location in the DNA. The number of AP sites in cells can be a good indicator of DNA damage and of the proportion of repair as opposed to chemical damage. During radiation, clusters of abasic sites appear that are difficult to repair.

### Study of mitochondrial DNA

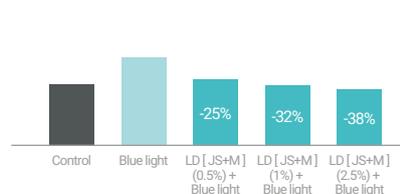
NUMBER OF AP SITES ( $10^5$  base pairs)



#### Decrease of AP sites

→ At concentrations of 0.5%, 1% and 2.5%, decrease of AP sites, after exposure to UVA/UVB respectively of 22%, 26% and 33% (compared to non treated cells: +86%).

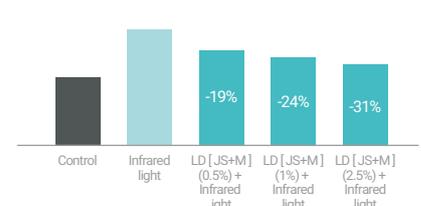
NUMBER OF AP SITES ( $10^5$  base pairs)



#### Decrease of AP sites

→ At concentrations of 0.5%, 1% and 2.5%, decrease of AP sites, after exposure to blue light respectively of 25%, 32% and 38% (compared to non treated cells: +44%).

NUMBER OF AP SITES ( $10^5$  base pairs)



#### Decrease of AP sites

→ At concentrations of 0.5%, 1% and 2.5%, decrease of AP sites, after exposure to infrared light respectively of 19%, 24% and 31% (compared to non treated cells: +73%).

## Protecting the fibers and the polysaccharides in the dermis

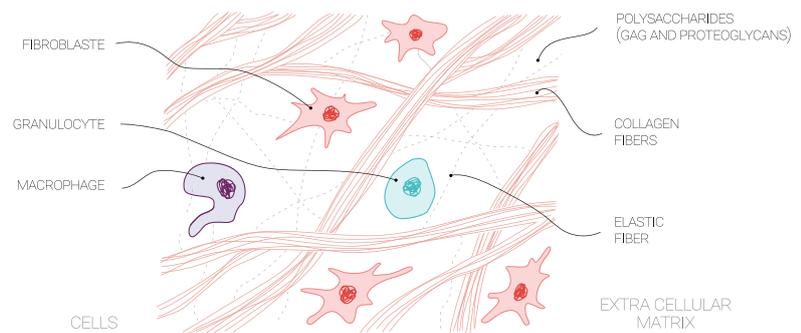
### The extra-cellular matrix

In the dermis, the extra-cellular matrix (ECM) is made up of various non-cellular components, and provides not only physical structure for the cellular components but also initiates the biomechanical and biochemical signals necessary for morphogenesis, differentiation and tissue homeostasis.

The extracellular matrix is composed of water, polysaccharides and proteins; the two main types of macromolecules are the proteoglycans and fibrous proteins, such as collagens, elastin, fibronectins and laminin synthesized by fibroblasts, cells in the dermis. In fact, the ECM is a highly dynamic structure that is constantly remodelling itself, both enzymatically and non-enzymatically.

The ECM is responsible for the skin's biochemical and mechanical properties, such as resistance to stretching and compression and elasticity; it is also responsible for its protection through a buffering effect, that maintains extracellular homeostasis and water retention.

We know that UVA light affects the extracellular matrix and breaks the fibres: the skin loses its firmness and elasticity. The formation of free radicals due to UVA light and blue light (or visible light), causes an increase in MMP activity (the enzymes responsible for breaking down components in the ECM). According to recent studies, infrared light also causes collagen to breakdown.



COMPONENTS OF THE DERMIS

### Study of key components in the extracellular matrix

Study of key components in the extracellular matrix: collagen, hyaluronic acid and elastin with regard to their role in the skin's firmness, flexibility and elasticity. Their breakdown and depletion cause slackening and wrinkles. These various studies of ECM components were carried out on a co-culture of fibroblasts and keratinocytes.

#### Hyaluronic acid

They are glucosaminoglycans (long chains of polysaccharides), a component of a very large proteoglycan in the ECM. Their role is to attract water molecules (1g of hyaluronic acid can retain up to 6 litres of water). They contribute to tissue flexibility.

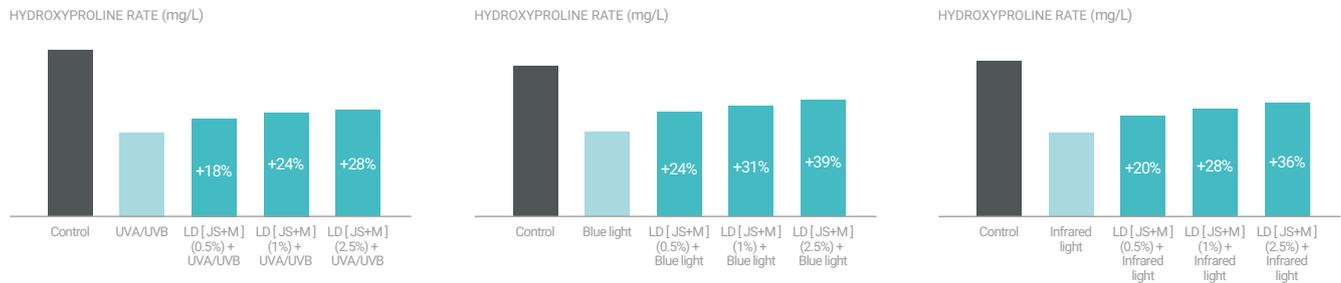
#### Collagens

These are the most abundant fibrous proteins in the interstitial ECM and constitute the ECM's main structural component. Collagens provide resistance to stretching, regulate cell adhesion, support chemotaxis and cellular migration, and help to direct tissue growth.

#### Elastin

Another fibrous protein, elastin is rich in hydrophobic amino acids and is intertwined with collagen fibres. Its mechanical solidity and elasticity are due to a cross-linking agent called desmosine.

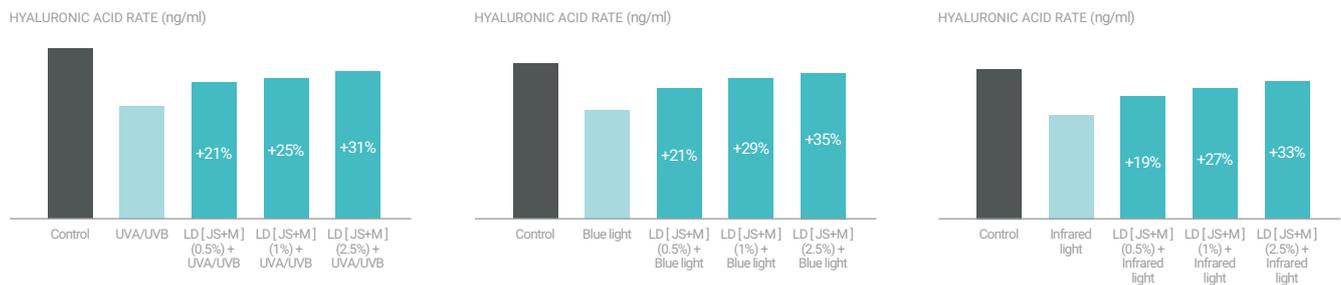
## Study of collagens



### Increase of collagens

→ At concentrations of 0.5%, 1% and 2.5%, increase of total collagens rate at the level of fibroblasts exposed to UVA/UVB respectively of 18%, 24% and 28%; exposed to blue light respectively of 24%, 31% and 39%; exposed to infrared light respectively of 20%, 28% and 36%.

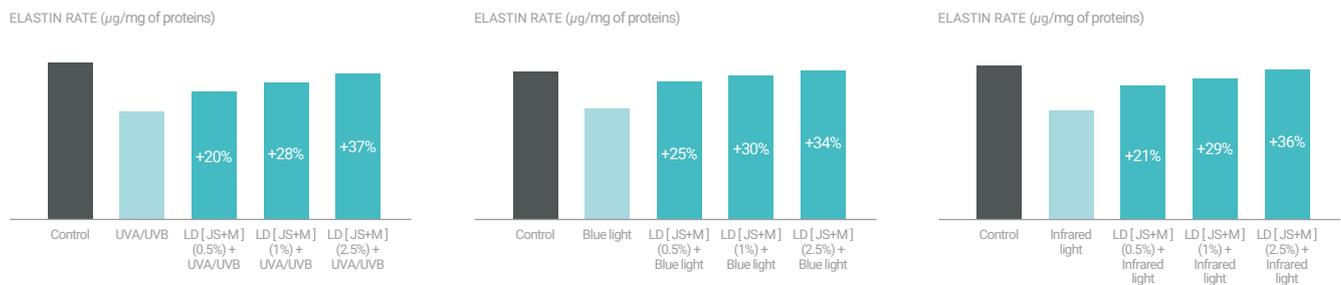
## Study of hyaluronic acid



### Increase of hyaluronic acid

→ At concentrations of 0.5%, 1% and 2.5%, increase of hyaluronic acid rate at the level of fibroblasts exposed to UVA/UVB respectively of 21%, 25% and 31%; exposed to blue light respectively of 21%, 29% and 35%; exposed to infrared light respectively of 19%, 27% and 33%.

## Study of the elastin



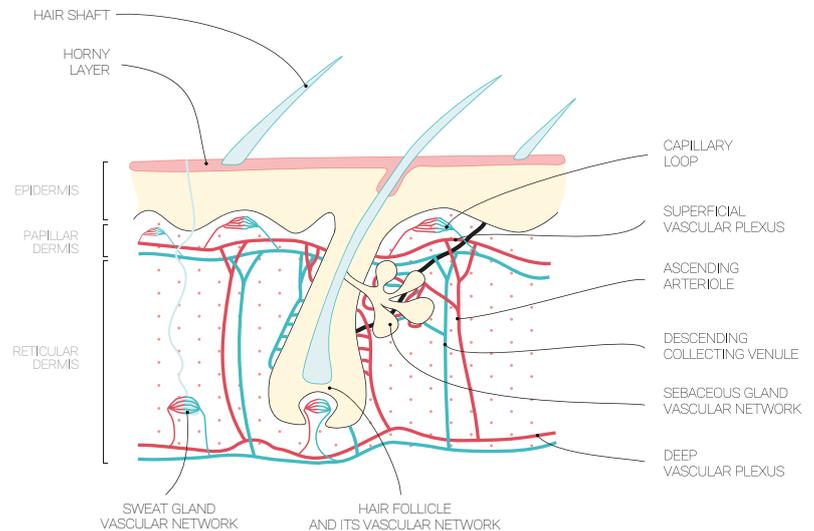
### Increase of the elastin

→ At concentrations of 0.5%, 1% and 2.5%, increase of elastin rate at the level of fibroblasts exposed to UVA/UVB respectively of 20%, 28% and 37%; exposed to blue light respectively of 25%, 30% and 34%; exposed to infrared light respectively of 21%, 29% and 36%.

## Reducing vasodilation

### The cutaneous microcirculation

Cutaneous microcirculation is not very well understood, however, due to numerous skin arterioles and its substantial volume (1800 cm<sup>3</sup>), it plays a vital role in maintaining blood flow, even in the event of a heart attack. Its arterioles prevent blood reflux through vasoconstrictor tone, effectively maintaining continuous vasoconstriction. However as there are more venules, the blood generally flows more slowly on the inside; this helps parietal exchanges, but also leads to stagnation of the blood and vasodilation. Numerous vasodilations can be observed in the skin, these may be triggered by emotions or facial reflexes - due to an irritation of the stomach or mouth, or by the secretion of EDRF (nitric oxide) released in reaction to certain substances, in particular during the occurrence of inflammatory phenomena (including sunburn), due to the effect of the sun.



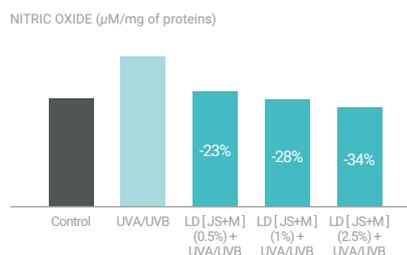
CUTANEOUS MICROCIRCULATION

Radiation such as UVA/UVB, blue and infrared light, increase vasodilation by increasing the presence of nitric oxide and redness may then develop. Naolys therefore studied the effect of LightWaves Defense [JS+M] on this vasodilator. The nitric oxide released after exposure of cells to light can react with superoxide anions (O<sub>2</sub><sup>-</sup>), to form peroxynitrites (ONOO<sup>-</sup>); these unstable anions can damage endothelial cells and consequently impair skin microcirculation.

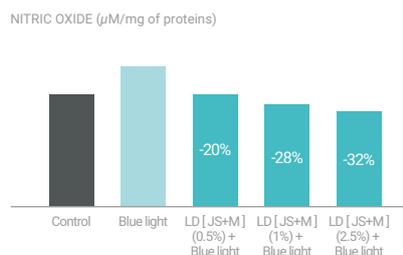
### Study of nitric oxide, the primary EDRF

Blood vessels are made of several layers of fibrous cells and one is directly in touch with blood: endothelium. Made of flattened cells, it plays many parts, from hemostasis to vascular tonus, for which it releases vasodilator and vasoconstrictor factors. Among vasodilators is the nitric oxide (NO), that has been identified as the essential EDRF (Endothelium Derived Relaxing Factor). It is a liposoluble gas that activates a chemical reaction, leading to the relaxing of blood vessels or vasodilation.

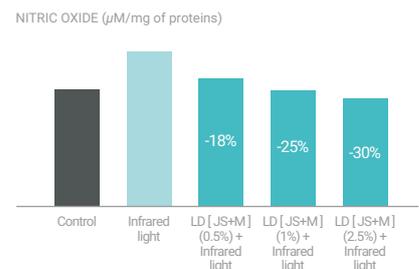
### Study of nitric oxide exposed to three key types of solar radiation



**Decrease of the release of the nitric oxide**  
 → At concentrations of 0.5%, 1% and 2.5%, significant decrease of the release of nitric oxide at the level of endothelial cells in culture exposed to UVA/UVB respectively of 23%, 28% and 34% (compared to non treated cells: +38%).



**Decrease of the release of the nitric oxide**  
 → At concentrations of 0.5%, 1% and 2.5%, significant decrease of the release of nitric oxide at the level of endothelial cells in culture exposed to blue light respectively of 20%, 28% and 32% (compared to non treated cells: +24%).



**Decrease of the release of the nitric oxide**  
 → At concentrations of 0.5%, 1% and 2.5%, significant decrease of the release of nitric oxide at the level of endothelial cells in culture exposed to infrared light respectively of 18%, 25% and 30% (compared to non treated cells: +32%).



## See also

Global Protect Common juniper  
Global Protect Blackberry  
OxyRelax California poppy  
OxyRelax Cherry tree  
Smooth Lightening Pomegranate  
Smooth Lightening White rose  
Sun Protect Commiphora  
Sun Protect Date palm  
Whole Protection Edelweiss  
Whole Protection Red-flowered silk cotton tree



