



# Full Energy Budha's hand citron

*Stimulating cellular functions*

## A STORY

The Budha's hand citron | *Citrus medica sarcodactylus*, Rutaceae  
**A fruit like a human face**

*The shape of this fruit is as mysterious as its origin. It grows on a fragrant shrub with hardy foliage, that would come from South East Asia - It is actually well cultivated in China and in Japan for its abundant flowering and fructification. Although it contains very few pulp, that citron is used to cook, most of all as a crystallised fruit. The essential oil is used a lot in the perfume industry when it is thought to have digestive and cough properties in the traditional medicine. In Asia, it is used to perfume closets and as an offering in budhist temples as well.*

## Key points

### An active plant cell

Developed to deliver the highest amount of original active molecules.

### A high tech natural ingredient

Created to preserve and improve the identity and the benefits of a natural product.

### An energizing action

Increases cellular energy production and cell regeneration.

Because skin is tired sometimes, it is necessary to help it to get back its energy and vitality by strenghtening its elementary functions. To get a skin more radiant, more beautiful, more resistant.



## PRODUCT BENEFITS

### Energy

#### Energizing

Improves skin metabolism. Helps to stimulate all cell functions in the epidermis.

#### Regenerating

Increases epidermis cell regeneration and reinforces the protective skin barrier.

*To be used in skincare or make-up products such as cream, fluid, serum, balm, lotion, milk, foundation, concealer, etc. In any cosmetic or skincare product dedicated to relaunching skin cell activity.*

#### Anti-oxidant

Limits the creation of free radicals due to the physiological processes and free radicals induced by UVB.

**NÆOLYS**

Related products | BALANCING ENERGY ASIAN GINSENG | LIGHT & ENERGY GINKGO | FULL ENERGY VANILLA

**HOW IT WORKS**

# Full Energy Budha's hand citron: relaunching elementary cellular processes

Full Energy Budha's hand citron relaunches cell energy in epidermis by increasing cell energetic production, that is creating through respiration in cell mitochondriae. It contributes to boost chemical reactions (oxidations), that supply ATP, the source of elemental energy for cells, by maintaining the global energetic balance respect (energetical homeostasia), meaning that it keeps a balance between degradation processes (catabolism) and synthesis processes (anabolism). Those processes are inclined to unbalance with ageing. Besides, it minimizes the production of free radicals, that lead many cell disorders in short and long term. Indeed they can limit the cellular activity at the level of the mitochondrial respiration.

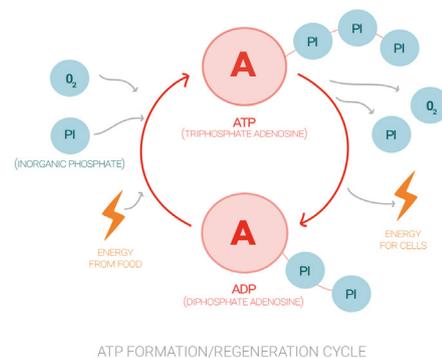
In the same time, it helps to balance the regeneration of epidermis in terms of production of keratinocytes, a process that decreases with ageing.

Thanks to those actions, skin cells can get back a level of activity to fill their functions, including those limited by ageing.

## *in vitro* testing results

### Study of cellular metabolism - epidermis

To study cellular metabolism, Naolys studied cellular respiration in the consumption of oxygen and the synthesis of ATP that takes place at the end of the respiration process, to the ATP/ADP cycle. Cellular respiration is a redox chemical reaction which supplies energy to cells to grow and to function. Cells produce energy with glucides. But the energy released during oxidation of nutrients cannot be used directly by cells. It has to be caught by a transitional element, which is in majority, ATP (adenosine triphosphate), a nucleotide produced by mitochondrions, as its hydrolysis releases a high quantity of energy. But that transitional play and the fact that ATP stocks are not very important induce an intense renewal of that molecule. Therefore a continuous, quick and big production of ATP is needed. But that production decreases with ageing, as well as the ATP formation/regeneration cycle.



### Technical information to formulate Full Energy Budha's hand citron

**INCI name of cells**

citrus sarcodactylus callus extract

**form**

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

**aspect**

liquid

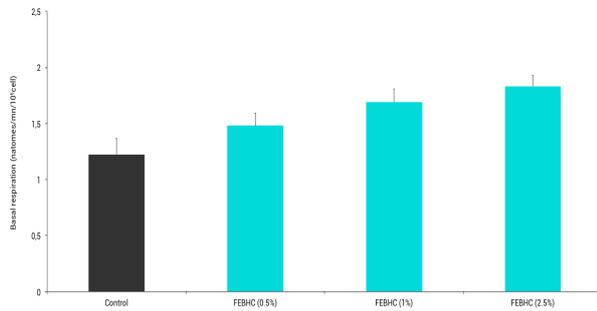
**concentration**

starting at 0.5%

**dispersible**

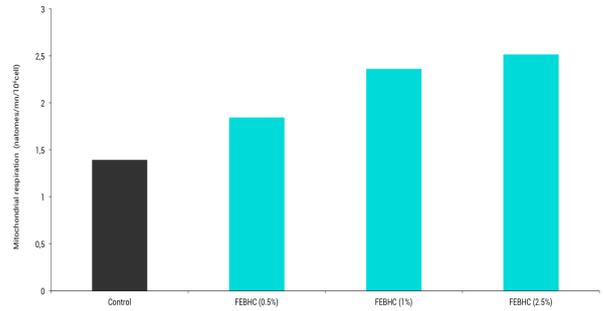
in any type of formulation

### Respiration speed - oxygen consumption



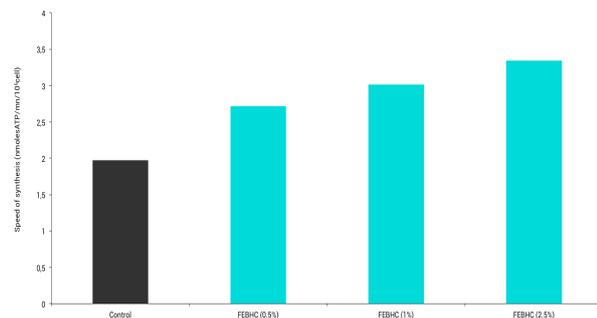
Increase of the speed of cell basal respiration

### Respiration speed - oxygen consumption



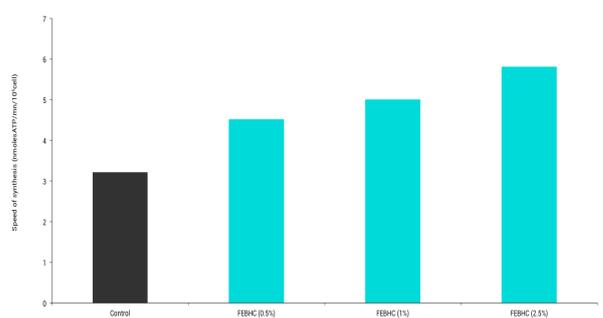
Increase of the speed of mitochondrial respiration

### Speed of synthesis of ATP - basal cellular synthesis rate



Increase of the speed of the synthesis of ATP

### Speed of synthesis of mitochondrial ATP



Increase of the speed of the synthesis of ATP

→ **At 0.5% concentration:**

- increase of the speed of cell basal respiration
- increase of the speed of mitochondrial respiration
- increase of the speed of the synthesis of ATP (basal cellular and mitochondrial synthesis)
- simultaneous increase of ATP, ADP and AMP concentrations

Stable energetic balance (stable EC)

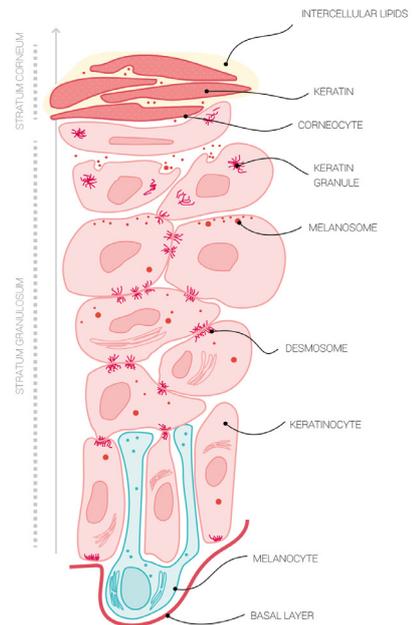
## Study of cell renewal - epidermis level

The epidermis, the superficial layer of skin is first made of cells called keratinocytes which renew non stop according to a 21 days cycle That renewal of the epidermis is made thanks to the cell proliferation and the differentiation that keep the balance of adult tissues, therefore keratinocytes, divide at the level of the basal layer of the epidermis, which is mainly made of non differentiated cells and migrate to the surface changing their form: they lose their nuclei and load hard filaments of keratine. When they reach the cornified layer, they become corneocytes, dead cells that create a solid membran (thanks to keratine) impermeable and protective: the protective natural barrier of the epidermis. Those built up corneocytes will naturally break away and be shed. The alteration of that balance, essential to the good of tissues called homeostasis is responsible for physical changings linked to ageing: skin wilting because of the decrease of cell proliferation, lack of healing in case of wounds, loss of hair...

### Study of the proliferation of epidermis cells

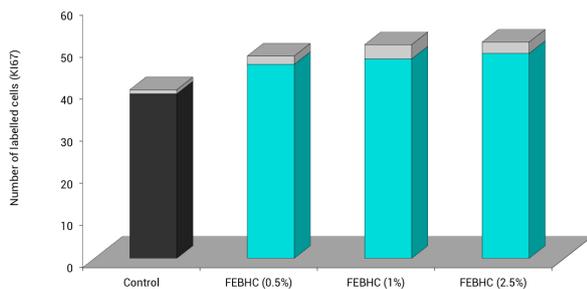
To study the proliferation of epidermis cell, Naolys uses KI67, an anti-gene to mark cell proliferation.

Studies have been made on reconstructed epidermis.



THE EPIDERMIS AND KERATINISATION PROCESS

## Study of epidermis cell proliferation



### Increase of KI 67

→ At concentrations of 0.5%, 1% and 2.5%, stimulation of the proliferation of keratinocytes in the basal layer for treated epidermis respectively by 18%, 21% and 25%

## Study of lipid peroxidation

Because it is a reaction indicating oxidative stress, Naolys chose to study the release of MDA during physiological lipid peroxidation and lipid peroxidation induced by UVB.

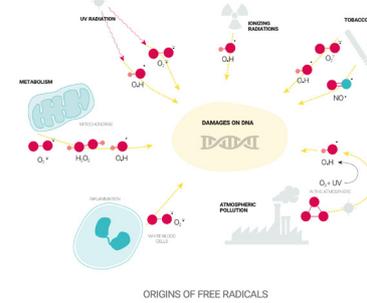
When we measure the MDA (malondialdehyde), one of the chemical products created by the chemical chain reaction induced by the free radicals, indicating of cytotoxicity by oxidative processes, then we have a good information about the anti-oxidant activity of a substance.

Normally, the endogenous production of free radicals (physiological lipid peroxydation) is counterbalanced by various defense mechanisms.

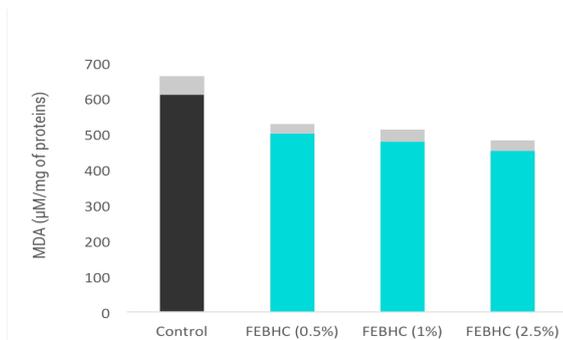
However, many situations can induce the appearance of an excess of free radicals (induced lipid peroxidation) such as intense exposition to sun, intoxication by certain chemical products, contamination by toxins, intense inflammatory reactions, etc.

These oxygenated free radicals attack phospholipid membranes, thereby altering the properties of the cell membrane.

They also induce the formation of lipid derived cytotoxic mediators which react with proteins. The consequences are numerous and can lead to several pathologies (inflammation, arteriosclerosis, etc.)



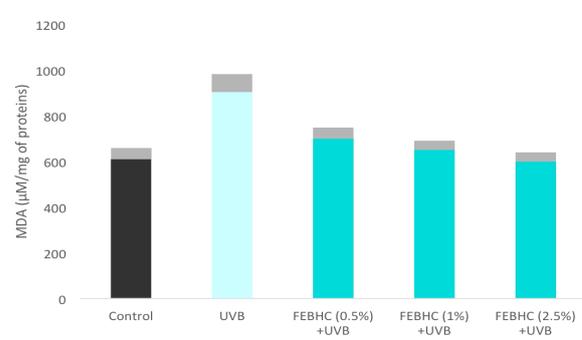
### Lipid peroxidation in the physiological conditions



#### Decrease of MDA rate

→ At concentrations of 0.5%, 1% and 2.5%, decrease of the physiological lipid peroxidation, which was translated by a decrease of the MDA rate respectively by 18%, 22% and 26%

### Lipid peroxidation induced by UVB



#### Decrease of MDA rate

→ At concentrations of 0.5%, 1% and 2.5%, decrease of the lipid peroxidation induced by UVB (150mJ/cm<sup>2</sup>) which was translated by a decrease of the MDA rate respectively by 23%, 28% and 34%.