

PROTECTOL®

PATENT

ANTI-INFLAMMATORY REDNESS



SOOTHING

PROTECTOL®

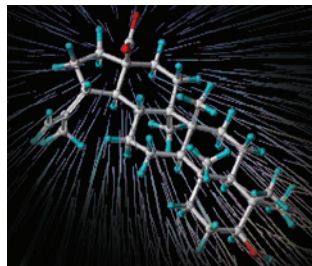
PHYTOBIOACTIVE

> ACTIONS

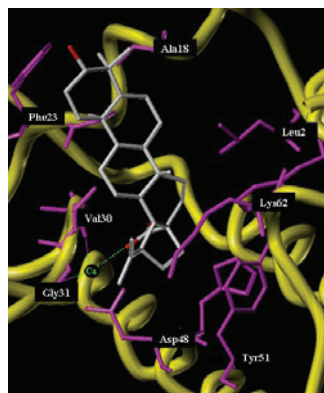
- Reduces the production of inflammation-mediating enzymes
- Reduces UV-induced inflammation
- Soothes the epidermis
- Reduces tingling sensations

COMPOSITION

- **Betulinic acid:** 17-45% / DM*
- **Iridoids:** 4-12% / DM*



* Dry matter



ORIGIN

White birch
Betula alba
(Bark)

Figwort
scrophularia nodosa
(Aerial parts)



> MECHANISM OF ACTION

PROTECTOL® reduces the synthesis and release of pro-inflammatory mediators by providing betulinic acid, betulin and iridoids.

This was discovered thanks to the use of **bioinformatics** (an innovative research technique) that was able to demonstrate the inhibitory action of this new active substance on various enzymes involved in inflammatory metabolism.

> COSMETIC BENEFITS

- The inflammatory reaction of the epidermis, and its inconveniences, are limited and soothed: sensations of heat, tingling, dryness.
- The skin recovers its feeling of well-being.

> COSMETIC USES

- ▶ Soothing care products
- ▶ Sensitive and reactive skin care products
- ▶ Acne-prone skin care products
- ▶ Sun and after-sun care products
- ▶ Irritated scalp care products
- ▶ Soothing, anti-mosquito care products

> **SCIENTIFIC PROCESS**

• **Inflammation**

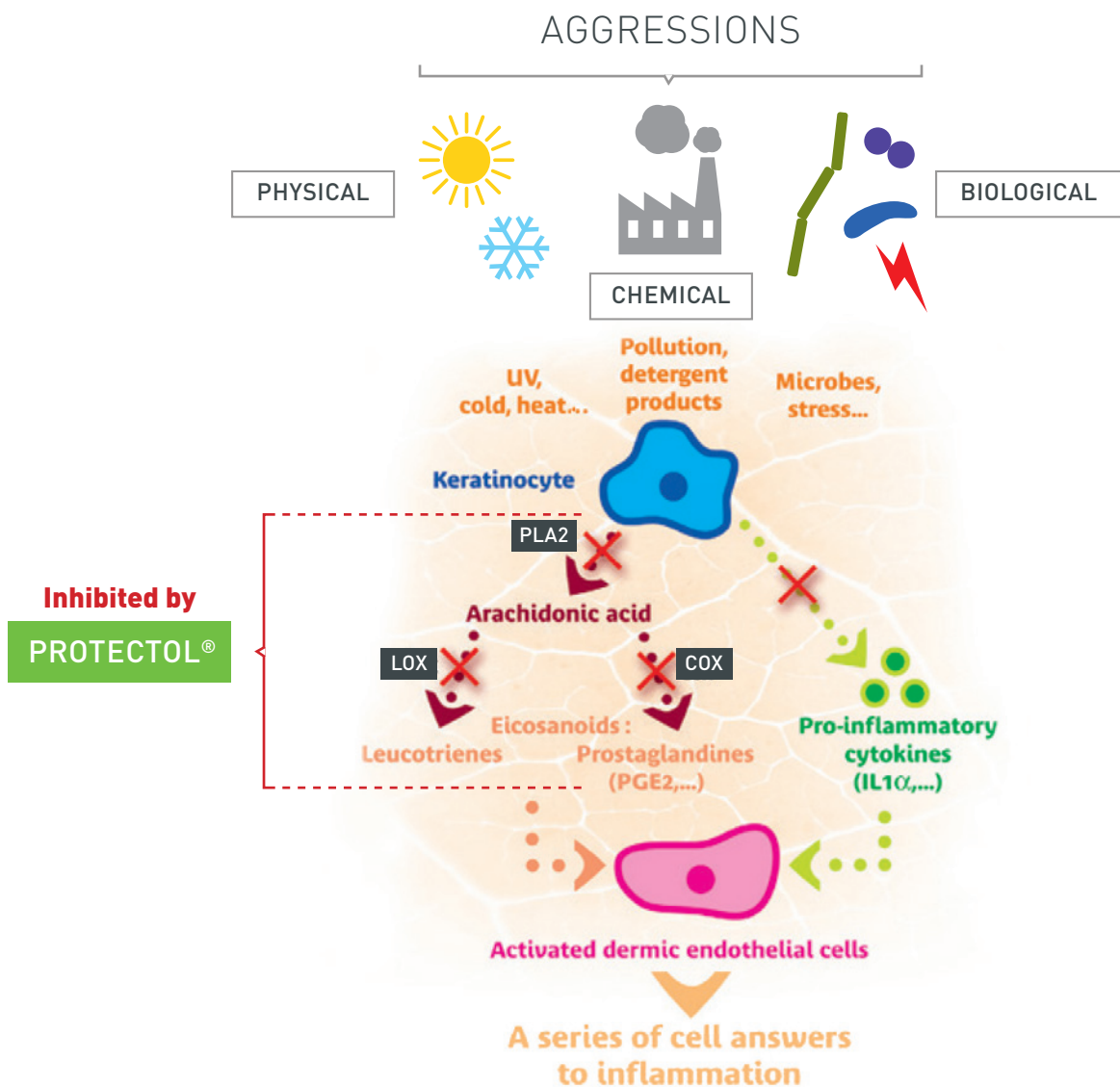
Various factors (hormones, environment, lifestyle, etc.) can impair the skin barrier function, rendering it more vulnerable to external stimuli.

It then activates its defence mechanism, triggering inflammatory reactions with unpleasant side effects.

• **PROTECTOL®**

Using a new research process, bioinformatics, GREENTECH discovered a plant fraction acting on Phospholipase A2 (PLA2), one of the enzymes involved in initiating inflammatory reactions.

This method combines the spatial representation of known conventional drugs with molecular modelling and the QSAR (Quantitative Structure-Activity Relationship) technique. It has been discovered that betulinic acid and betulin inhibit the enzymatic activity of PLA2, and that the plant source containing these substances in high concentrations, along with iridoids, are white birch bark and the aerial parts of figwort. The active substance extracted from these plants also inhibits Cyclooxygenases 1 and 2 (COX-1, -2), along with Lipoxygenase (LOX).



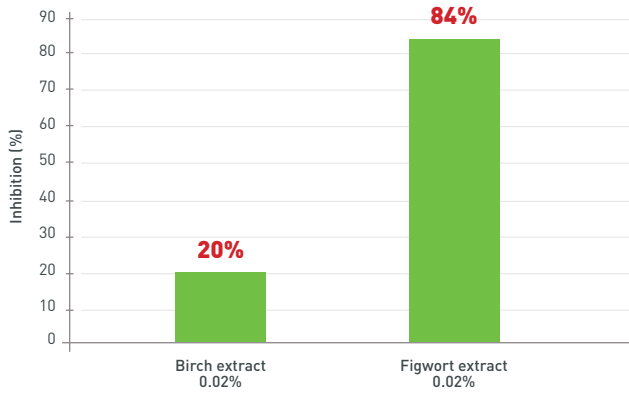
> **PROVEN EFFICACY**



INHIBITION OF INFLAMMATORY ENZYMES

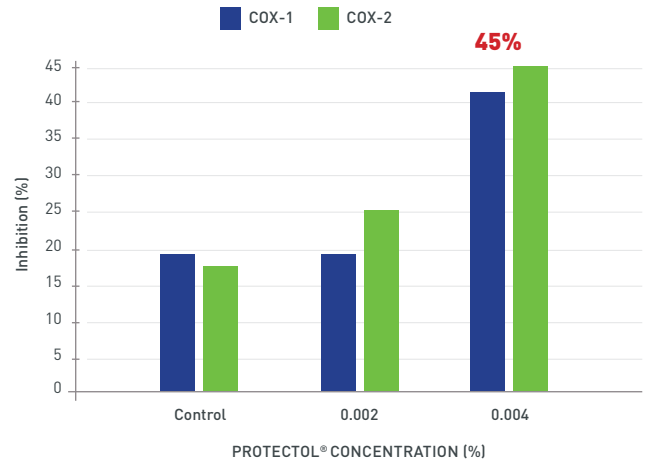
• **Inhibition of LOX (0.02%)**

- > At **84%** by figwort extract
- > At **20%** by birch extract



• **Inhibition of COX-1 and COX-2**

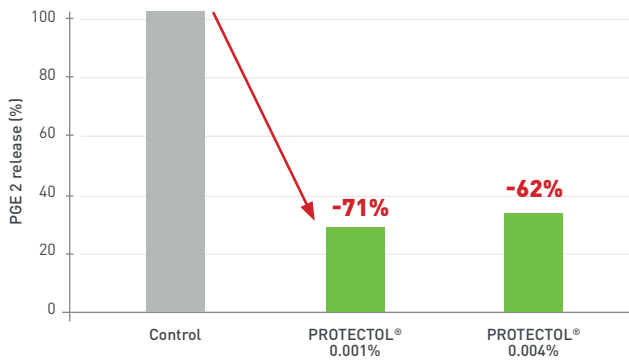
- > At **45%**



INHIBITION OF INFLAMMATORY MARKER PRODUCTION

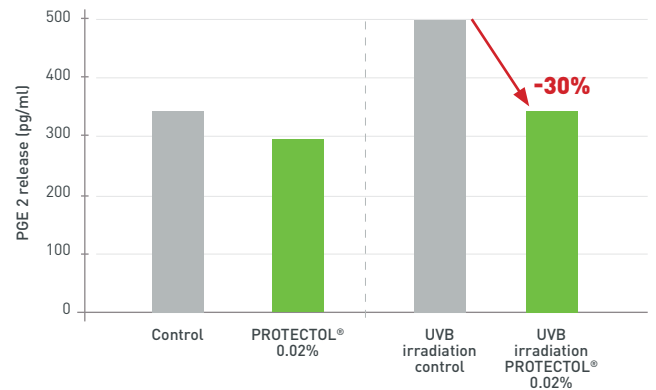
• **Inhibition of PGE2 release by keratinocytes after stimulation with PMA (0.001%)**

- > **-71%**



• **Inhibition of PGE2 release after irradiation with UVB (0.02%)**

- > **-30%**

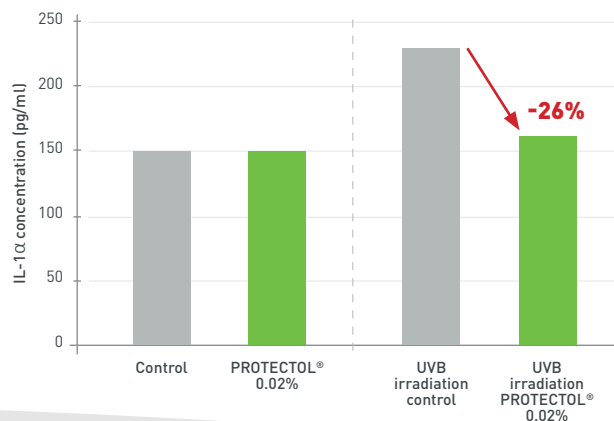


INHIBITION OF PRO-INFLAMMATORY CYTOKINE: interleukin-1α (IL1α)

• **After irradiation with UVB (0.02%)**

- > **-26%**

Inhibition of IL1α release by reconstituted epidermises in co-culture with macrophages, stimulated by UVB

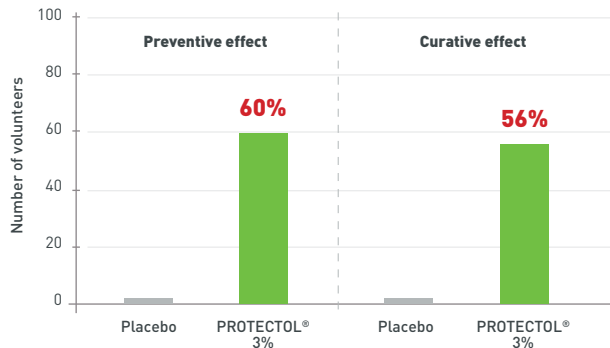


> **PROVEN EFFICACY**



EVALUATION OF PHOTOPROTECTIVE EFFECT

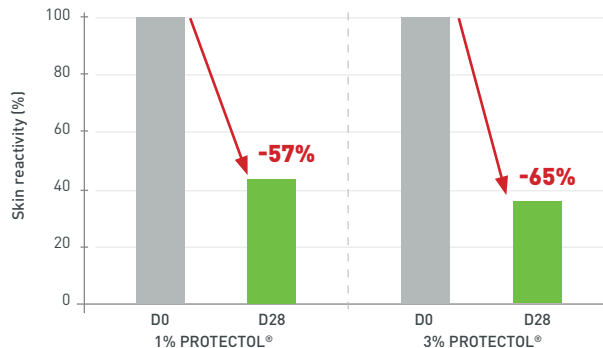
- PROTECTOL® prevents (**60%** of cases) and reduces (**56%** of cases) the intensity of UVB-induced solar erythema



Actinic test on 10 volunteers

EVALUATION OF TINGLING SOOTHING EFFECT

- Skin reactivity reduced by **57%** (at a concentration of 1%) and **65%** (at a concentration of 3%)



Stinging test on 20 volunteers before and after 28 days of twice-daily application

FORMULATION

Concentration for use: 1 to 3%

Caution for use:

Add to emulsions, at the end of the preparation process, either cold or at 35-40 °C, during cooling.

TECHNICAL DATA

Characteristics

Organoleptic Appearance: opaque liquid
 Colour: greenish-yellow to khaki green

Solubility Water: partially soluble

Storage

Keep in a dark place, in the original packaging, at an ambient temperature between 15 and 25 °C. Use rapidly once opened, or transfer to sterile packaging.

Tolerance tests

- Eye irritation: mildly to moderately irritating
- Skin irritation: non-irritant
- Sensitization: very good skin compatibility
- Mutagenicity: non-mutagenic
- Phototoxicity: non-phototoxic

INCI name: Dipropylene Glycol, Betula Alba Bark Extract, Scrophularia nodosa Extract

Preservative: None

Authorized:

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