

3/04

TYROSILANE®

EXSYMOL

INCI name : METHYLSILANOL ACETYLTYROSINE

Chemical family

TYROSILANE® belongs to the chemical family : *Silanols*.

Silanols are hydrosoluble derivatives of *organic silicon*, obtained by condensation of methylsilanol, an organosilane, with numerous silanols functions, on a specific radical which confers to the *Silanol* obtained, its specific action mode. TYROSILANE® results from the reaction of methylsilanetriol with N-acetyl-tyrosine.

Analytical composition

Methylsilanetriol	0.34%
in which silicon	0.1%
Acetyltyrosine	0.7%
Water sq	100.00%

Technical characteristics

Colorless to slightly colored limpid liquid
pH : about 5.5
Density at 20°C : about 1.0
Miscible with water, alcohols and glycols.

Availability

5, 30 or 60 kg drums

Use

Sun-care :

Tanning activation

Skin-care :

Anti-aging
Anti-free radicals

Hair-care :

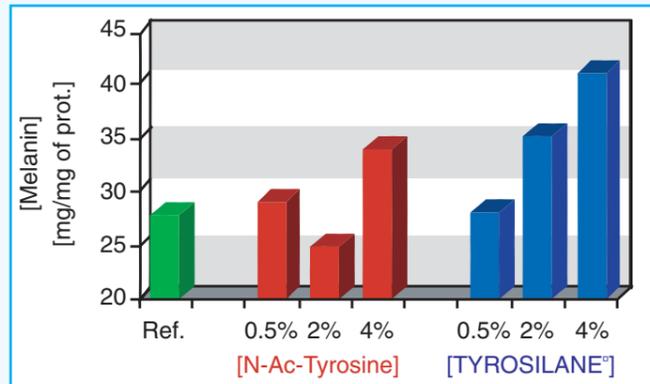
Greying hair

BIOLOGICAL ACTIVITIES

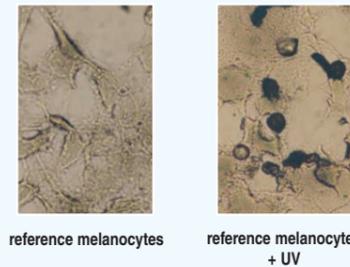
TYROSILANE® : a **SILANOL** designed for its dual property as tanning activator and skin protector.

TANNING ACTIVATION : *IN VITRO* ON MELANOCYTES

When melanocytes are submitted to UV, they spontaneously activate and produce melanin. In this test, various cultures of melanocytes are submitted to different UV and culture media conditions (with or without UV irradiation and with or without **TYROSILANE®** in the culture medium).



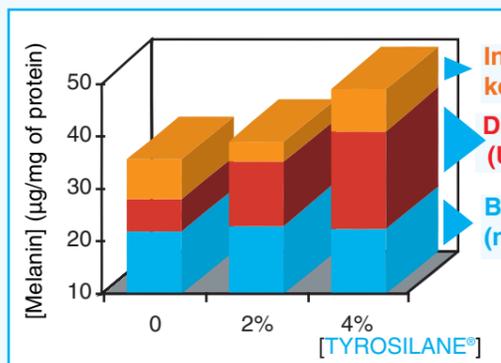
The production of melanin from melanocytes irradiated and cultured with **TYROSILANE®** is highly stimulated. A supply of N-acetyl-tyrosine is less efficient than **TYROSILANE®**.



MECHANISM

Silanols, known for their natural affinity for the cell membranes, are likely to interact with the constituents of these membranes. Therefore, we have considered that **TYROSILANE®** is able to stimulate the adenylate-cyclase (a cell-membrane enzyme) and the related substances like cAMP, which is involved in the melanogenesis regulation.

Besides, we have confirmed the activity of **TYROSILANE®** in a co-culture system involving both keratinocytes and melanocytes in order to mimic the «melano-epidermic» unity. The results on melanogenesis obtained with the melanocytes only or with both keratinocytes and melanocytes confirmed the involvement of **TYROSILANE®** on direct melanogenesis but also evidenced a mechanism where cell communication was involved : more melanin was formed from the melanocytes when they were cultured together with keratinocytes.

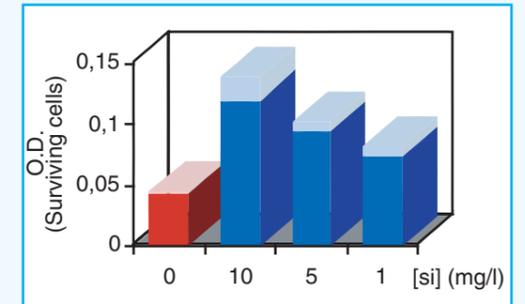


Indirect melanogenesis (UV on keratinocytes/melanocytes)
 Direct melanogenesis (UV on melanocytes)
 Basal melanogenesis (no UV)

The tanning activation efficacy of **TYROSILANE®** is due to its direct effect on melanocytes (activation of cAMP) and to its contribution to the keratinocytes-melanocytes communication.

SKIN PROTECTION : ANTI-FREE RADICAL ACTIVITY

Silanols are known for their property of cell-membrane restructuring and the subsequent free-radical protection. In order to evidence this property, various cultures of fibroblasts, with different concentrations in **TYROSILANE®**, are submitted for 2.5 hours to free-radicals, generated by a mixture consisting of hypoxanthine and xanthine oxidase. The quantity of surviving cells is measured by UV optical density using the MTT test.

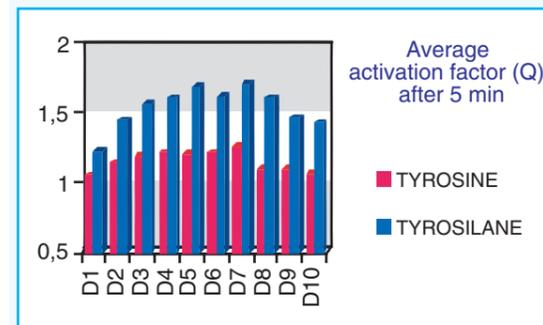


PANEL TEST : TANNING ACTIVATION AND SKIN PROTECTION

A panel of 10 volunteers was selected to carry out a study during which each of them was applied 3 different preparations, twice on each forearm. The preparations are applied by the means of a cotton pad, maintained 5 minutes on the skin.

- Preparation A : placebo (distilled water)
- Preparation B : Tyrosine at 5% in water
- Preparation C : **TYROSILANE®** at 3% in water

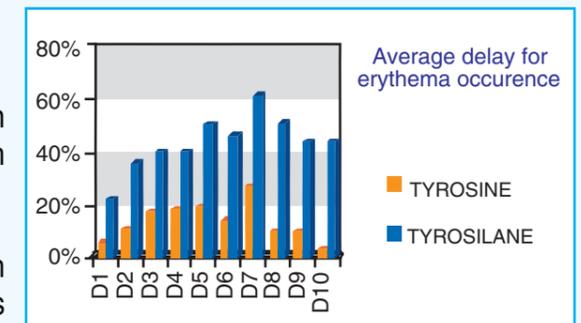
These applications are realized every day, three days in a row. On the fourth day, a final application is made 30 minutes before the exposure to U.V.



Then, during 10 days after the irradiation, the intensities of the colors of each rectangle is evaluated and an activation factor Q is defined as the ratio between the intensity of treated rectangle (preparation B or C) compared with that of placebo (solution A).

In the case of a 5 minute UV exposure, the average activation factor is always largely higher with **TYROSILANE®** than with tyrosine.

The occurrence of the erythema is delayed of up to 60% with **TYROSILANE®**, while only 20% with tyrosine. **TYROSILANE®** is able to boost the tanning while protecting the skin from erythema.



Tolerance study

The tests performed showed that the product is neither toxic nor irritant. The tolerance has been studied *in vitro* by alternative methods. The phototoxicity is evaluated on fibroblasts.

The results show that :

- **TYROSILANE®** is **not irritant**,
- **TYROSILANE®** is **not phototoxic**.

Formulation

The suggested concentration for an optimum activity is from 3 to 6 %.

Important remark : **TYROSILANE®** must not be stored at temperature inferior to 0°C otherwise an irreversible polymerization might occur.

Existing Studies

(available upon request)

Technical Document

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Tanning activation : *in vitro* melanin synthesis

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Tanning activation : *in vivo* patch test

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Melanogenesis activation by keratinocytes-melanocytes cell communication

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Anti-free radical activity