



apalight

SUN CARE & FACE CARE

New physical sunscreen

Physiological

Skin friendly

Anti-age effect

No *blue-white* appearance



Kalichem
Italia s.r.l.

APALIGHT

NEW PHYSICAL SUNSCREEN

>> APALIGHT IS A CALCIUM HYDROXYAPATITE

It is a nutritious element present in body and food as organic and non-organic component. Many tissues are made of these elements, they are found for instance in bone and in teeth and they are essential for the physical and mental well being, in that they constitute the whole tissue structure and fluids of the human body.

Important as they are in the maintenance of all physiological processes, they strengthen the bone structure by catalyzing several biochemical reactions; they play an important role in the production of hormones and antibodies, thus keeping delicate hydric structure in balance. All the minerals considered as necessary for the body must be present in the diet as essential food substances which the body is either unable to synthesize at all or in insufficient quantities.

Such elements are irreplaceable: they in fact set in motion processes and reactions in the body which allow for life and well being. They usually act as a catalyst: they start and allow enzymatic functions - which are the basis of cellular functions - to be fulfilled. It is a naturally occurring form with the formula $[Zn, Mn, Mg] [Ca]_5 [PO_4]_3 [OH]$ [Lactate], to denote that the crystal unit cell comprises more entities. The OH⁻ ion can be replaced by lactate or phosphate. It crystallizes in the hexagonal crystal system.

Apalight has a specific gravity of 3.08 and is 5 on the Mohs hardness scale.

No *blue-white* appearance

Comparison between applications on top of the hand of a cream containing 6% of micronized Titanium Dioxide and of a cream containing 6% of Apalight (active matter).



>> WHY APALIGHT

Actives for skin protection are not always as skin friendly as one could imagine. It is well known that any foreign substances [chemical sunscreen filters] applied to the skin tend to diffuse in depth and to interfere with skin metabolism. Surprisingly enough, this has also been demonstrated for micronized insoluble solids [inorganic filters]. Indeed, skin delivery of substances in depth is more abundant when particle dimensions are very small. Sometimes this leads to problems of skin intolerance and loss of efficacy, mainly when the active ingredients are meant to develop their functions just while staying onto the skin surface.

HYDROXYAPATITE



- Hexagonal structure [P63/m]
- Cell dimensions $a=b=9,42 \text{ \AA}$, $c=6,88 \text{ \AA}$
- $d = 3.19$ hardness 5
- refraction index = 1.636





>> PROPERTIES

This active belongs to the family of hydroxyapatites, ingredients which belong to the body's physiology. Indeed they are basic constituents of the bones and teeth. By means of a new skin-friendly, micro-dispersed solid active, significant sun-protection enhancement has been obtained. Moreover, this family of ingredients performs as antiage and anti-wrinkle ingredients, probably for its possibility of progressive dissolution by the acid mantle of the skin.

>> EFFICACY TESTS AND RESULTS

A set of in-vivo tests has been carried out: SPF evaluations in several types of formulas, and cutaneous parameters related to skin ageing, speed of skin cell renewal, skin moisturization via Corneometer, skin elasticity via Cutometer, Soft-focus effect, and changes in skin wrinkles depth and directionality. The new category of raw materials has been called APALIGHT.

>> TiO₂ COMPARISON SPF IN VIVO TEST

Evaluations show that, when introduced into several types of sunscreen formulas, APALIGHT gave better performances than TiO₂, in values varying from 2 to 18% higher than standard sunscreen grade TiO₂. All tests were carried out using the COLIPA method.

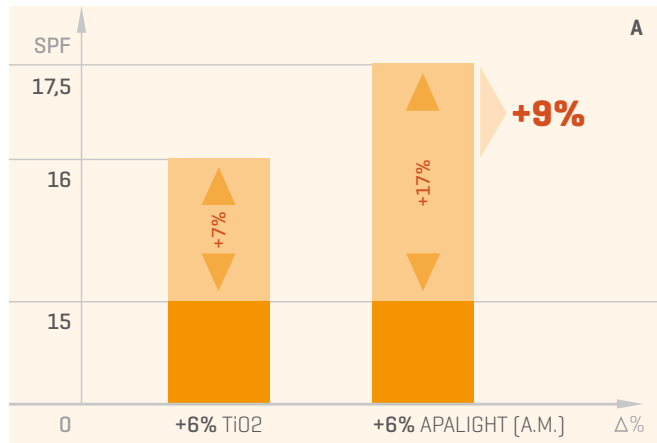
In other words, APALIGHT showed seemingly better or at least comparable sunscreen efficacy as micronized titanium dioxide, with the interesting advantage of the complete physiological compatibility. Moreover, its ions are slowly incorporated into the skin structure, so that no solid residues are left on the surface in the long-term. In the field of anti-age efficacy, the material proved to perform a statistically significant soft-focus effect (by sensory evaluation), a statistical decrease of deep wrinkles and a tendential decrease of average rugosity (by skin replica). Improved biological elasticity and viscoelastic coefficient (measured by Cutometer) were the influenced elasticity parameters. Indeed, abundant dermatological literature reports noticeable skin improvements following applications of calcium ions.



With Apalight it is possible to replace titanium dioxide in

>> IN VIVO SPF TEST

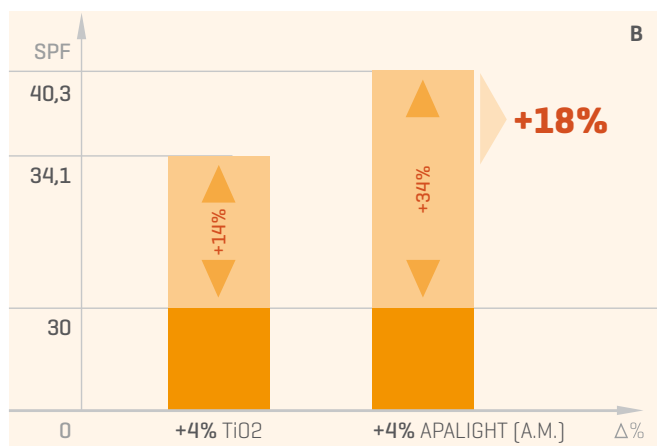
SPF INCREASE USING SAME QUANTITY OF TiO₂ AND APALIGHT



Sunscreen filters

SPF 15

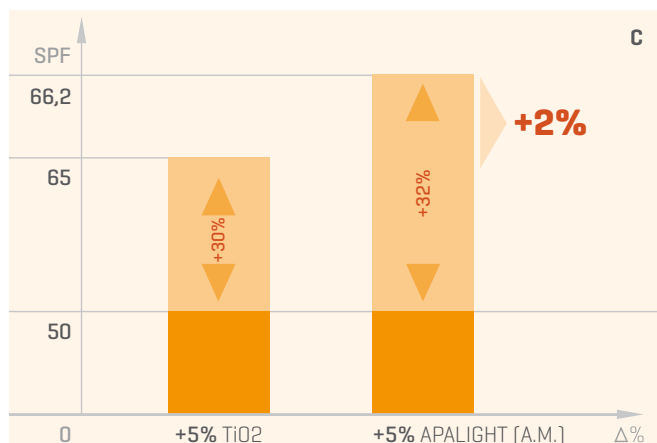
ETHYLHEXYL METHOXYCINNAMATE	3
BUTYL METHOXYDIBENZOYLMETHANE	0.5
ENSULIZOLE	2.78
ETHYLHEXYL SALICYLATE	
DIETHYLAMINO HYDROXYBENZOYL HEXYL BENZOATE	
ETHYLHEXYL TRIAZONE	



Sunscreen filters

SPF 30

ETHYLHEXYL METHOXYCINNAMATE	10
BUTYL METHOXYDIBENZOYLMETHANE	2
ENSULIZOLE	
ETHYLHEXYL SALICYLATE	4
DIETHYLAMINO HYDROXYBENZOYL HEXYL BENZOATE	7
ETHYLHEXYL TRIAZONE	1.5



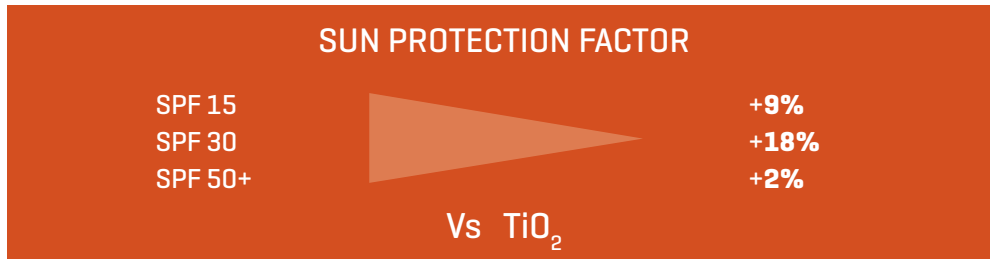
Sunscreen filters

SPF +50

ETHYLHEXYL METHOXYCINNAMATE	10
BUTYL METHOXYDIBENZOYLMETHANE	2
ENSULIZOLE	
ETHYLHEXYL SALICYLATE	4
DIETHYLAMINO HYDROXYBENZOYL HEXYL BENZOATE	10
ETHYLHEXYL TRIAZONE	3

sunscreen formulations.

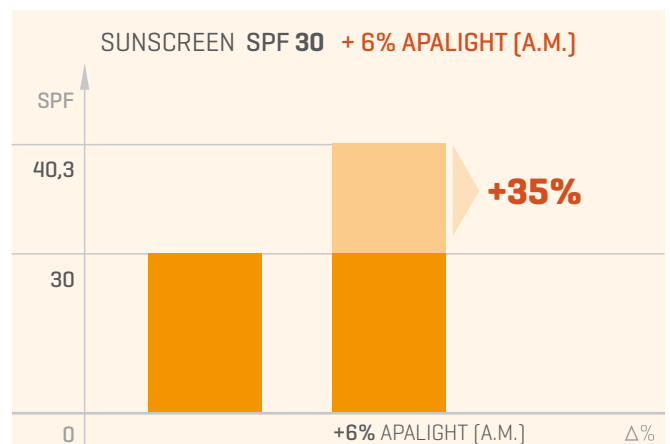
>> SUN SCREEN EFFICACY OF APALIGHT VS TITANIUM DIOXIDE



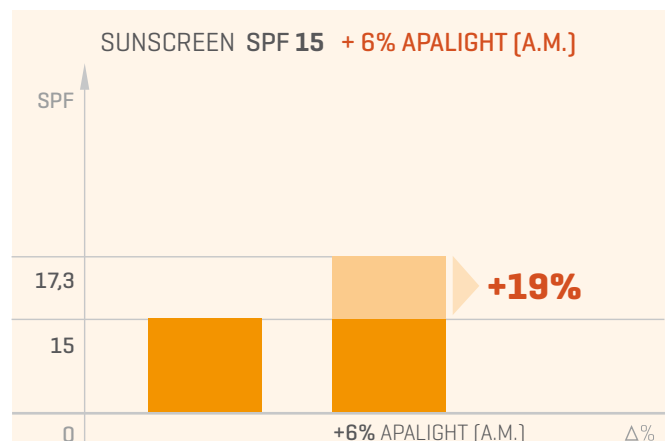
Considering the above reported results, 3 formulas were tested: the Colipa Standard P3 and two W/O emulsions: a Sunscreen product with SPF 30 and a Sunscreen product with SPF 50+. Each of the 3 formulas was realized with the same percentage of APALIGHT (A.M.) and Titanium Dioxide [respectively 6% in the Colipa Standard P3, 4% in the SPF 30 and 5% in the SPF 50+]. In all cases, the evaluations showed an increase in the SPF values. In detail, in the case of Colipa Standard the increase was by approximately 9%, for SPF 30 by approximately 18% and for SPF 50+ by approximately 2%. In the case of UVAPF the differences were negligible. However, the requested UVA/UVB ratio was reached.

>> NEW IN VIVO SPF TEST

Sunscreen filters	SPF 30
ETHYLHEXYL METHOXYCINNAMATE	7.5
BUTYL METHOXYDIBENZOYLMETHANE	3.0
OCTOCRYLENE	2.7
METHYLENE BIS-BENZOTRIAZOLYL TETRAMETHYLBUTYLPHENOL	9.9

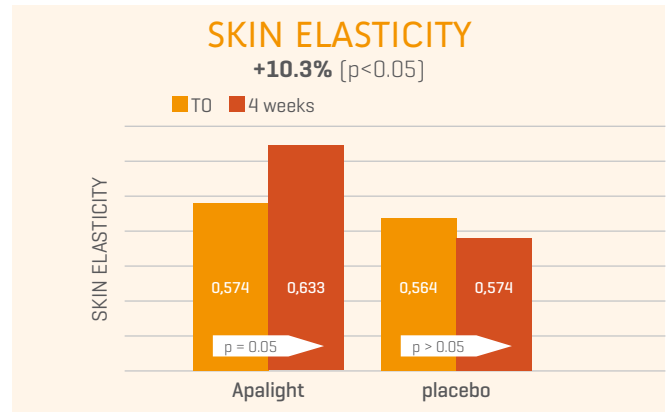
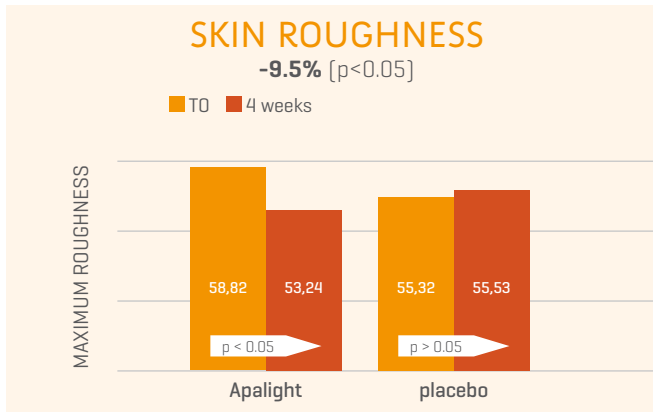


Sunscreen filters	SPF 15
ETHYLHEXYL METHOXYCINNAMATE	7.0
BUTYL METHOXYDIBENZOYLMETHANE	3.0
OCTOCRYLENE	2.7

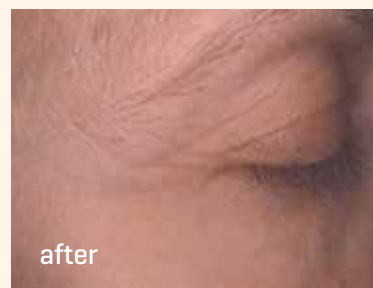


>> ROUGHNESS, ELASTICITY, ANTI-AGE AND SOFT FOCUS EFFECT

Remarkable results were found, instead, in the case of skin roughness, where there is a variation of -9,5% [$p < 0,05$]. Also the skin elasticity results were significant, especially the "Biologic elasticity": +10,3%, $p < 0,05$ and the "visco-elasticity coefficient": -17,1%, $p < 0,01$. Interesting results show where the soft-focus effect of APALIGHT is evident. Particularly, 6 volunteers out of 10 showed a decrease in the fine lines, while 3 volunteers out of 10 showed a decrease in the deep wrinkles volume.



SOFT-FOCUS EFFECT



>> CONCLUSIONS - SUN CARE APPLICATIONS

- It is able to enhance UV protection
- Its performances are comparable or even better than Titanium dioxide
- No *blue-white* appearance
- Better texture than TiO₂
- Anti-age effect: Elasticity, Wrinkle, Roughness

Ideal for sunscreen with remarkable antiage effects

>> CONCLUSIONS - SKIN CARE APPLICATIONS

- Decreases skin roughness
- Increases skin elasticity
- Decreases visco-elasticity ratio
- Soft focus effect

Perfect for day cream with added sun protection

>> PRODUCT SPECIFICATIONS

INCI NAME and COMPOSITION:	CAS No	EINECS / ELINCS	RANGE %
HYDROXYAPATITE	1306-06-5	215-145-7	<50>=25
AQUA	7732-18-5	231-791-2	<75>=50

PHYSICO - CHEMICAL ANALYSIS	METHOD	LIMITS
APPEARANCE	Visual	VISCOUSE SUSPENSION
COLOUR	Visual	WHITE
ODOUR	Olfactory	SLIGHT CHARACTERISTIC
pH DIRECT	Potentiometric	6.5 - 8.0
DRY RESIDUE	2 hours 105°C	28 - 30%
ZINC, MANGANESE, MAGNESIUM, LACTATE AND HYDROXIDE CONTENTS	Internal	TRACE
TOTAL MICROBE COUNT	by inclusion Ph. Eur. 7.0	< 100 UFC/g

SHELF LIFE: 18 months in the original containers.

STORAGE CONDITIONS: Keep in original containers, well closed, in a cool [minimum suggested temperature 14° C. max 30° C.], dry, well ventilated and clean site.



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