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Reference specter: A stake for Calculation of the SPF! Part 2

Editorial ...

Reference spectrum: A stake for calculation of the SPF!

Introduction

We studied in a first part published in HelioNews n°8, the influence of the spectra of the source. The historic choice of the spectrum proposed by B Diffey in his publication of reference (1) which was that of the sun (midway midsummer sunlight for southern Europe (Latitude 40°N zenithal sun Angle 20°, thickness of the ozone layer 0.305 cms), (2) (3) gave values which seemed rather acceptable, very close to the spectra of Albuquerque. Colipa following the principle which the in vitro tests had to feign on best the conditions of in vitro test proposed for the widely recognized and accepted method UVA (4) to spectra “SSR source” close to the lamp of institute for evaluation of the SPF in vivo according to the international method (5).

It was demonstrated with this curve, the same measure could lead to a calculation of different « SPF » which had been called SPF in vivo, SPF in institute, (see part 1)

The stake being to transform the value measured in a final end point and as this one has to be the closest as possible of the end point in Vivo. It had been proposed a pragmatic way for the choice by the observation of the results of correlation in both cases of figure. The result cannot be estimated on a number restricted of products because it was demonstrated on the basis of the calculation of the SPF in vivo, and SPF in institute, of a high number of products than a small but not negligible part number of products gave results which can go from the simple to the double. The choice of a number limited of products would give results which can go from the simple to the double.

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Patents ... 

- Brevet WO2010006854 déposé le 21/01/10 par Unilever sur : SUNSCREEN COMPOSITES PARTICLES AND POROUS PARTICLES IN COSMETIC COMPOSITIONS

The invention concerns an including cosmetic composition:
- Dissimilar particles of an agent of sun protection and a sociable disposition polyamide polymerized by condensation
- A polymer in not hydrosoluble powder in the form of porous particles possessing a value of absorption of oil (castor oil) included between 90 and 500 ml / 100 g
- And a vehicle acceptable for cosmetic. The aforementioned composition possesses an excellent property of effect of vagueness which allows to hide the cutaneous imperfections, and a property of photoprotection relating to...

- Patent EP2153817 published on 17/02/10 by Oreal on: Sunscreen kit

The present invention concerns a kit of photo protection of the Keratinised materials against a brilliance UV in the range above 280 nm covering the UV In and the UV B, understanding at least two packaged different compositions separately, the aforementioned kit containing at least a compound (X), at least a compound (Y), and at least a filter system hydrophobic containing i) at least an organic sun filter hydrophobic (A) capable of absorbing the brilliances UV from 320 to 400 nm and at least an organic sun filter hydrophobic (B) capable of absorbing the brilliances of 280 in 320 nm, and possibly a mineral filter (D); ii) at least an organic sun filter hydrophobic (C) capable of absorbing simultaneously the brilliances UV of 280 in 320 nm and 320 in 400 nm, and possibly a mineral filter (D); or iii) at least an organic sun filter hydrophobic (C) capable of absorbing simultaneously the brilliances UV of 280 in 320 nm and 320 in 400 nm, and possibly a mineral filter (D); or iv) at least an organic sun filter hydrophobic (C) capable of absorbing simultaneously the brilliances UV of 280 in 320 nm and 320 in 400 nm, or a mineral filter (D); the one at least the aforementioned compounds (X)

Patent WO2010026755 published on 11/03/10 by SHISEIDO CO LTD on: COSMETIC PRODUCT OF SUN SCREEN

The invention concerns a cosmetic product of sun screen which can prevent a tint due to the secondary membership(“support”) of this one in a garment. The invention concerns a cosmetic product of sun screen which contain a composition of emulsion of type water-dans

- It happened under the sun

Actuality :
In March, the FDA banished the use of the cabins of sun tanning for the young people of less than 18 years.

A bit in countercurrent of the caution which is granted to the use of the nanotechnologies in cosmetic, a dermatologist of the university of North Carolina, advocate for nanotechnologies in the solar energy and the products anti-age.

Spectra of reference:

Once again, it seems that to study a big number of products at the same moment by \textit{In Vivo} and \textit{In Vitro} methods, then realize the calculation of the \textit{In Vitro} SPF with both curves would allow us to have a good appreciation of what seems to be the appropriate curve in terms of correlation.

Methodology:
Grace in a long-time partnership with the group DERMSCAN, we had the opportunity to be in a very rare configuration, that to be able to compare a big quantity of products measured either \textit{In vivo} and \textit{in vitro} in respectively identical conditions and to compare so the curves of correlation.

It is noticeable that too many studies of correlation seem from one point of view, to have been led on a number restricted by product or with \textit{In Vivo} values determined in too different conditions to give significant results. A first part of the study was led without pre irradiation and without knowing the level of photo stability of considered products We may suppose it will have had an influence on the final correlation.

This problem of the degradation due to the photo stability of certain products is problematic because except if we pre irradiate, hypothesis on which we do not allow to give a clear-cut opinion), it is always risky to measure at the same time products photo stable and products photo unstable when it is a question of establishing a correlation.

We wanted to estimate the influence of this parameter but however without pre irradiation before the measure. We did not thus apply a dose of irradiation which would have been subject to discussion, we preferred to estimate SPF \textit{In Vitro} and SPF \textit{in vivo} at a first step and then, we irradiated arbitrarily products in the only purpose to classify them in products photostable or not.

We state photostable when the residual efficiency was superior to 85% in the total UV. The dose of irradiance being fixed at one hour in the Sun test which correspond approximately to 4 MED.

Conditions of measurement:

- \textit{In Vitro} (HeloScreen labs) according to the describe Diffey derivate method (Determination of the in vitro SPF (Cosmt. 118 (2003))(6)

- \textit{In Vivo} (Dermscan group) according to international method.

- Substrate PMMA 6 microns (helioplates HD 6) (7)
- Quantity 1.3mg/cm²
- 121 Products from several suppliers (before in vitro testing) and then measured in vivo.

This procedure avoids us going into the perennial debate of the aptness of such or such dose, unique or variable etc. which allows to feign the conditions of the test in vivo and which affects the \textit{in vitro} result which becomes variable. We thus observed results on the initial, not degraded products, then we compared the results obtained for the products which degrade and those who do not degrade.

It has been then determined the linear regression with the origin of the curve, the slope and the coefficient of correlation.
A stake for the calculation of the SPF (following page 1)

1st study on products without knowing their possible photo instability

This first test was led on 121 products which were measured by according to the international method by laboratories Dermscan between 1/01/2008 and the 31/08/2008. They were sent to our laboratory without the other indication than the value found in vivo and we measured them within less than 2 months according to the method described in the publication of Pissavini and Co (6), to which we had contributed. Nevertheless, we used the HELIOPlate HD6 proposed by our company. It was not possible to verify afterwards the photo stability on these products because the workload would have been too important but we decided to continue the study with the following products by determining on a new group of products which were or not photo unstable as described previously.

2nd: study on products by estimating their photo instability

A second study has been realized in very similar conditions on 64 new products in the second half of the year 2008. A 4 MED irradiation was applied on all the samples, after testing, just to classify the photos table products or not on the basis of the method and criteria indicated previously.

Results

The results were classified by increasing values SPF in vivo estimated from 5 to 60 according to the white curve of figure 1 to 5. The results of the in vitro evaluation was put back on the purple curve for each results found by in vivo evaluation. A curve of tendency in yellow was established from 5 to 60 according to the white curve of figure 1 to 5. The results of this part of the study.

In the first study (fig 1 and 2), or he cannot be distinguished products stable photo or not, the coefficient of correlation unless globally satisfactory considering the number of products observed was relatively weak (around 0.8). Certain individual values remain however unacceptable. We cannot state if the photo instability is the cause. We notice however a light improvement of the correlation with the curve of the "SUN". During the second study, was estimated at first all the products then these were separated according to their photo stability. On 64 products, 40 were finally considered photo stable and 24 photo unstable. They were distributed in two groups and compared with the results In vivo. Between the products which did not degrade later and those which have been degraded influences the level of correlation. is strongly affected Without foreseeing the dose of irradiation, there is demonstration that this can influence in a very significant way the final results and must be taken into account.

The level of correlation for the products which did not degrade later is completely satisfactory. Even if we note some products with great different results In vivo and In Vitro the correlation seems completely acceptable in that case. For all the products but paradoxically in a way more marked for products unstable photo, the correlation is better with the curve « SUN ». We observe that this difference is especially due to some products very over estimated with the curve "institute" rather than to all the products. This observation is completely in agreement with the difference of spectres led in the first part of the study.

Conditions of measurement: 2nd study

- In Vitro (Heloscreen labs) determination according to the describe Diffey derivate method (Determination of the in vitro SPF (Cosm tol. I/8 (2003)(6))
- In Vivo (Dermscan group) determination according to International method
- Substrate PMMA 6 microns (helioplates HD 6) (7)
  - Quantity 1.3mg/cm²
  - 64 products (composition unknown) (from different suppliers)
  - 40 photo stable + 24 unstable (evaluation of the photo instability after testing.)

Fig 1 Curve of correlation between the evaluations In Vivo and in Vitro with the curve « Soleil »

Fig 2 Curve of correlation between the evaluations In Vivo and in Vitro with the curve « Institut »

Fig 3 Curve of correlation between the evaluations In Vivo and in Vitro of photo unstable products with the curve « INSTITUT »

Fig 4 Curve of correlation between the evaluations In Vivo and in Vitro of photo unstable products with the curve « SUN »
Conclusions
The results of both studies were obtained on products of the market and the number of studied products can lead to a good representativeness of this one although it is not possible by the nature the study to identify them. The galenic forms seemed however very varied.
In spite of the presence of photos table and photo unstable products in the first study, the correlation stays any acceptable fact for the majority of products but it is noticed by the unacceptable differences notably with the reference curve institute. For all the products but paradoxically in a way more important for products photo unstable, the correlation is better with the curve « sun ». We observe that this difference is especially due to some products very over estimated with the curve institute rather than to all the products. This observation is completely in agreement with the difference of spectrum led in the first part of the study.

Strange allusion
After its boxer shorts for firm up and its refreshing knee socks, the French laboratory of cosmeto-textile Skin’ Up proposes this time, capital terry towels / care: packaging of the cosmetic micro-capsules

Companies information
According to a publication of cosmeticnews.com of 22/02/10, the profits of L’Oreal fell down of 8 % in 1,79 billions € in 2009, sales having fallen of 4 %.

Scientific articles
International Journal of Dermatology, Volume 49 Issue 4, Pages 362-376
Defining the patient at high risk for melanoma - Estee L. Psaty, BA, Alon Scope, MD, Allan C. Halpern, MD, and Asifaq A. Marghoob, MD
The authors propose a questionnaire allowing the practitioner to identify the patients risking to develop a melanoma.

Filter designation | Reference | USA % maxi | Canada % maxi
--- | --- | --- | ---
Ethyl Dihydroxypropyl PABA | 5 | |
Padimate O | 21 | 8 | 8
Octyl methoxycinnamate (Octinoxate) | 12 | 7.5 | 8.5
Octyl Salicylate (Octisalate) | 20 | 5 | 6
Glyceryl PABA | | 3 |
Homosalate | 3 | 15 | 15
Menthol antranilate | 5 | 5 |
Octocrylene | 10 | 10 | 12
Aminobenzoic Acid | 1 | 15 | 15
Phenylenbenzimidazole Sulfonic Acid (Ensituzole) | 6 | 4 | 8
Terephthalydene Diacamphor Sulfonic Acid | 7 | 10 |
Titanium dioxide | 27 | 25 | 25
Trolamine Salicylate | 12 | 12 |
Zinc oxide | 25 | 20 |
4-Methylbenzylidene camphor | 6 | |
DEA Methoxycinnamate | 10 | |

Use of the sun filters in the world

.. Guide Line:
Use of the sun filters in the world

- Ethyl Dihydroxypropyl PABA
- Padimate O
- Octyl methoxycinnamate (Octinoxate)
- Octyl Salicylate (Octisalate)
- Glyceryl PABA
- Homosalate
- Menthol antranilate
- Octocrylene
- Aminobenzoic Acid
- Phenylenbenzimidazole Sulfonic Acid (Ensituzole)
- Terephthalydene Diacamphor Sulfonic Acid
- Titanium dioxide
- Trolamine Salicylate
- Zinc oxide
- 4-Methylbenzylidene camphor
- DEA Methoxycinnamate

This study indicates that some demographic and histopathologic features of CM in this population differ from those in the literature. More studies including cohort studies are needed to fully describe the nature and survival rate of CM in this area.