Summary

News within HelioScreen Labs:

- Helioplate: the hidden agenda of industrial production

Patents review within sun business.

It happened under the sun....

News and gossips

File of the month

- The Nanoparticles
  (G.Holtzinger)

To be found in next files ....

- In vitro methods: a pragmatic approach of the main requirements.
- Is reasonable a single procedure for spreading ?
- « In Vitro tool, how pertinent this process ? »: A manufacturer expresses himself.

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Updated version

Few modifications have been performed (highlighted with *) in order to avoid misleading in comparison with original version in French.

Editorial ...

Helioplate: the hidden agenda of industrial production

After a several years research, HelioScreen Labs proposed a new substratum for the implementation of in vitro evaluation methods of sun products: HELIOPLATE HD. HelioScreen Labs had already been a pioneer by proposing Helioplates to the market, PMMA plates roughened through a sandblasting process. But these plates were (and stay) far from giving full satisfaction in terms of quality and did not allow to reach the necessary reproducibility of measures.

The innovation comes from the fact that HELIOPLATES HD plates were specifically designed, owing to the large experience of the laboratory in this area, to try to answer the problems linked to the existing substrate, often manufactured from existing products used for quite a different application:

1. Guarantee of plate to plate but also batch to batch reproducibility.
2. Perfect definition of the topography based on their real use thanks to the definition of a control map with the official partnership of COTY LANCASTER laboratories.
3. An ergonomics and characteristics optimized for their use (stackable without risk of scratches, low weight for transport costs, low and constant thickness to minimize background noise...).
4. A conformity guarantee through a check at every step of their production and the supply of a conformity certificate with every batch.
5. A production of the highest stringency to bring the product to the level of its promises.

Who could imagine how are produced these plates and which stringency is applied to guarantee the highest quality level ?

In this HelioNews issue, together with Christophe Blondeau, in charge of Quality at LFP, the industrial partner of HelioScreen Labs, we are to show you all the aspects of production and the means set up to guarantee you the everyday quality of the product.

(…Continuation p2)

A distribution in United States...

At the moment when we print, we are just to confirm a very important provisional agreement between HelioScreen Labs and Labsphere Co for a joint distribution of plates, Labsphere keeping the American continent.

The American users thus can be completely reassured about the supply of HELIOPLATES thanks to this link between two experts in in vitro evaluation of sun products, each one in his own area.
**The Helioplate HD story**

LFP, an “ad hoc” partner...

It has to be admitted, when we were to develop the project, to design the product, to work out and test the mould, to adapt it to the constant modifications requested after the laboratory tests, it was not easy to find a partner who accepted such an implication with the perspective of a quite limited market. Plasturgists are more used to think hundreds of thousand units!

LFP came along with us and made possible the industrial realization of this project. Now then, we trust on its capacity to guarantee the quality which we require for our customers.

**Fully qualified ISO 9001:2000, ISO TS 16949,** LFP is not just a supplier but a true partner to HeliSCREEN Labs.

**Manufacturing Process**

Heliplate HD is produced by an injection method. The raw material, a no UV filter containing PMMA grade is specific to this manufacture. The mould presenting 4 imprints (3 HD6 and 1 HD2) is made printed by an injection moulding PMMA grade.

**Injection press in production**

Plates are produced by clusters of 4 which makes it necessary to unite and to classify as production is going along. An antistatic treatment at the exit of the mould avoids the accumulation of electrostatic charges which would retain the ambient dust. A set of very strict visual controls are made as production is going on.

Once the production is finished, the mould is de-installed and stored in stringent conditions. No silicone based removing agent that would distort further measurements was allowed and the full LFP inventiveness was necessary to find solutions assuring the good achievement of the process.

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**.. Some accessible books on Web ...**

In *Cosmetics and Toiletries*, February 2009:

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**.. It happened under the sun**

- The Regulation Meetings organized by Cosmed, the professional Association for small and medium-sized cosmetic companies, and which were held on March 19th in Marseilles, were the opportunity to review the news about the cosmetic world.

Many cosmetics contain ingredients reaching nanoparticles size (to a size under 100 nanometers), and specifically sun products the protection of which is assured by mineral screens. We suspect these compounds to lead to a toxicological risk (carcinogenic or genotoxic, in particular) for human health. A large inventory and evaluation work of these nanoparticles was started, complicated by hesitations of some raw materials suppliers to communicate their respective safety data, as well as by the fact that we still have not available really adapted and relevant tools to evaluate them exactly: these raw materials not behaving like other cosmetic ingredients, new tools are necessary for their study. Data on nanomaterials are expected, notably at European level, during the course of year 2009, but already, the new Regulation which is going to replace the Directive which still governs cosmetics today and which is in discussion in the Parliament these 23th and 24th of March, should impose the compulsory labeling of nanomaterials, by means of the prefix "nano" in front of the name of ingredients. Again: to keep an eye on!

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**Patents ...**

**B1** - Patent EP2027847 deposited on 25/02/09 by SHISEIDO CO LTD and concerning ANTISUN PREPARATIONS. The present invention is a sunscreen cosmetic comprising a benzotrizazole derivative represented by the following general formula (I) and metal oxide powder whose surface is treated with an alkylalkoxy silane. The present invention is a sunscreen cosmetic comprising an ultraviolet absorbent having absorption in the UV-A region and metal oxide powder whose surface is treated with an alkylalkoxy silane. The object of the present invention is to provide a sunscreen cosmetic that prevents staining due to secondary adhesion to clothing. General formula (I) (In this formula, $R^\prime = "a"$ straight chain alkyl group of C1-C6 and $R^\prime = "a"$ straight chain alkyl group of C1-C3.)

**B2** - Patent EP2015727 deposited on 21/01/09 by eastman chem co and concerning formulae of sun screen resisting to water, based on sulfopolyesters and phosphate esters surfactants. A sunscreen composition for the absorption of solar radiation that includes the combination of a phosphate surfactant and a sulfopolyester. The sunscreen formulas of the present invention are stable oil-in-water emulsions and require less phosphate surfactant than formulas omitting sulfopolyester. They contain an ultraviolet absorbent having absorption in the UV-A region and metal oxide powder whose surface is treated with an alkylalkoxy silane. The object of the present invention is to provide a sunscreen cosmetic that prevents staining due to secondary adhesion to clothing. General formula (I) (In this formula, $R^\prime = "a"$ straight chain alkyl group of C1-C6 and $R^\prime = "a"$ straight chain alkyl group of C1-C3.)

**B3** - Patent WO2009029931 filed on 5/03/09 by PLAYTEX PRODUCTS CPSC [ US] and concerning a TANNING COMPOSITION WITHOUT SUN WITH PHOTOSTABILIZED SUNSCREEN. According to an aspect, the invention concerns a cosmetic composition including a without sun tanning agent and a sunscreen agent. A photostabilizer is added to stabilize the sun screen agent against the destabilizing effect of the sun tanning agent. In this way, an UV protection is assured to the user when the cosmetic composition is applied to the skin. According to another aspect, a tanning without sun / sun screen composition aqueous based includes a without sun suntanning agent, a sun screen agent and a photostabilizer. The without sun suntanning agent is DHA, and the sun screen is avobenzone. As avobenzone decomposes when it is exposed to UV radiation associated with DHA, the photostabilizer is added to allow avobenzone to keep the major part of its original capacity to absorb UV radiation. The photostabilizer is a low molecular weight copolymer of adipic acid and neopentyl-glycol.

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**The injection mould**

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QUALITY: a major requirement

The quality is a major requirement for the manufacture of plates. Not to describe the whole process assuring the highest stringency, it is necessary to mention the essential steps described in a control range.

This document displayed at the workplace, describes the whole set of production and control operations to be respected throughout the process.

Every operator has been given a specific training for this production and is involved in the quality system. Plates are ejected by the press by clusters of four and are analyzed (visual controls) then sorted out (by N° of mould imprint). They are then placed in the pre-packaging form of 50 units.

Complete traceability for all units

The traceability is an essential element in quality process. Obviously, many information is registered: raw material batch number, control report, production date and hour, team, operator’s name, rejects analysis, packaging hour, adjustments and stops date and hour; from a raw material batch number, it is possible to find out the whole production.

Once the form completed (as a 4 x 50 units batch), the product is "packaged" in plastic bags and immediately marked out with a barcode system. This allows the upward and downward traceability.

So, it is possible from a 50 plates bag (the one that will be received as such by the user) to identify in a very precise way at which moment of production and from which mould imprint the units were extracted.

Helioplastes Control:

A previous HelioNews issue described the further control of plates before use. A control map was strictly defined by retaining more specifically 10 control parameters.

A collaboration with Coty Lancaster laboratories allowed this development as HelioScreen laboratory was not equipped. Moreover, this laboratory had worked a lot and published on the subject and the collaboration was obvious at the time of the design of the product.

A publication being due to be given by Coty Lancaster to the next London congress, some results cannot be revealed now.

All these elements are protected from any imitation but all guarantees are given for a secured supply essential to the normal development of these plates.

Risks and drifts

The whole traceability and control system is absolutely necessary because if the mould guarantees a perfect reproducibility of the units, it is still needed to make sure that adjustments are stringent. Every stop or restart can be source of problem. The mould is protected during its storage and must be frequently cleaned: one should realize that the needed precision is of the order of the micron.

It is completely clear that professional skill and precision were necessary for the design of the product and the adjustment of moulds and that if such a stringency had not been applied, the production of the HELIO-PLATES without a drifting risk could not be guaranteed.

The manufacture of this type of plates is indeed far from the sandblasting technique of the old plates, in which nothing was fully under control. "Sandblasters" offer this service to plasturgists but cannot adapt themselves to such requirements. We did experience this and it is one of the reasons that convinced us to work with a new approach.

As a company fulfilling ISO 9001 requirements, HelioScreen Labs systematically audits the conditions of production and keep up with all the operations. It is the price to pay to be able to commit on a conformity certificate for every supply.

What would happen if the factory of « Louvigne de Bais » could not produce any more Helioplate HD?

Nobody is sheltered against a serious accident, a fire (LFP is "sprinkled", this type of installation protects the persons and the possessions against the risk of fire) or any other event which could provoke an out of stock situation and be harmful to the supply of plates.

In the case of a problem, another factory of the Pigeon group, LVP, located in Jaudonniere is equipped with an identical press and prepared to replace the present production unit.

The mould, the essential element of the equipment and the fruit of an intense tuning work, is being duplicated now and one mould will be stored on each production site.

Finally, a distributor in the United States, will be the agent for a buffer stock maintained at a level high enough for responding to the needs of a quarter in the world if necessary.

So, with the same stringency which was applied to guarantee a maximum quality level, everything was thus planned for a maximal safety and a practical impossibility of an out of stock situation.
What is a nanoparticle?
What defines a nanoparticle is its size, we can consider that a nanoparticle possesses a size under 100nm. Nanoparticles are essentially inorganic (except carbon) but can also include organic sites.

What are the specific characteristics of nanoparticles?
Except their size, there are two main elements:
• Their strong ability to react linked to the fact that the number of molecules at the surface of a classic powder is low (< 0,1 %), while for a nanoparticle, it frequently exceeds 10%.
• The high specific surface which rarely exceeds 10m2 / g in macropowders can easily go over 100m2 / g in nanopowders.

Where do we find nanoparticles?
We can say almost everywhere in nature but these particles are then associated for example in shells envelope (abalone) with proteins or in butterflies wings where these nanoparticles will give a variable colored effect according to the observation angle.

What is the first synthetic nanoparticle?
It was developed more than a quarter of century ago and serves as catalyst in chemical industry: titanium oxide. The size of such particles is small ~ (10nm) and can only be maintained in solution.

How do we synthesize nanoparticles?
From a general point of view, we can say by a synthesis in liquid phase (microemulsions, inverted micelles) and more particularly by the sol-gel technique. This technique is so called because the synthesis starts by a dissolution of the reagent (liquid phase = solution), a catalyst is added (generally an acid or a base) which activates the passage to a thick and transparent phase (the gel).

There is also a technique said "template" by which a substrate is used to synthesize nanoparticles, we can so make nanoshells for example. This mode of synthesis allows to modify the shape of nanoparticles.

Generally, the mode of synthesis to obtain macropowders or nanopowders is different. To obtain white titanium oxide (= macropowder) the synthesis is done as a vapor phase: titanium chloride (liquid) is sprayed in an anhydrous solution (ethanol, isopropanol) and this is hydrolysed (generally water + acid) under strong agita-
tion. Procedure variations (temperature, agitation, rate of reagent addition, types of ester) allow to play on the size of particles.

The main difficulty is not to synthesize these nanoparticles but to maintain their size, knowing that a drying will inevitably provoke a conglomeration of the produced primary particles. For example, titanium oxide nanopowders on the market have sizes between 1 and 10μ (they are flocculates).

What can we synthesize?
Concerning products which could (or have) a cosmetic application, studies were mainly made on:
• Oxides: TiO2, ZnO, ZrO2, SiO2
• Metals and some derivatives: gold, silver, sulphides …
• Clays

One of the most important advantages of this mode of synthesis is that it allows to include organic chains inside materials which are originally of fully mineral composition; we can, for example, make a hydrophilic or lipophilic organic chains containing silica. Experiences of this kind were already successfully made.

What are the means of analysis?
Relatively classic now: laser (for size of particles), granulometry, scanning electronic microscopy (for the shape, but some granulometers also analyze the shape of particles but without showing it), specific surface (BET), zeta potential (to measure the surface charge), density, volatile materials content, IR …

What are the limits of nanoparticles?
• The first one is the price, compared to a macropowder synthesis. Reagents used are industrial thus at affordable prices (rarely over 15€ / kg except when we deal with precious metals) but the synthesis process often requires a succession of operations and therefore a higher price.

To give an idea, it will double or triple compared to a classical synthesis.

• The second one is innocuity which is quite discussed at the moment (see 2006 July report, published by AFSSET (French agency for sanitary safety of environment and occupation)) where what is questioned is the use of nanoparticles as powders, knowing that they will quickly penetrate into lungs. What is aimed at is especially the manufacturer who makes these products and the protection of the workers in contact with these substances. The major inconvenience is however that the papers seized the subject and that cosmetic applications of these products will probably be limited.

G. Holtzinger

Nanoparticles for sun protection..

Strange allusion
• Sunny Men of Nivea, duets of nice and sexy young men, are going to cover the French beaches of the Atlantic Ocean and the Mediterranean Sea this summer to offer women a free sun application with four hands. This ultra glamour concept will allow all women to take advantage of services "customized" from professionals of the sun. The operation takes place between July 15th and August 15th. To take advantage of it, it is just needed to signal to Sunny Men and they will be at disposal of every one to spread the sun protection over the back with the new Invisible Spray of Nivea Sun. Dates and places of the tour will be known in May and revealed on the Internet site Niveasun.fr.

Companies information
• For Christian Dior, the group announces 4 % rising sales, carried partially by its Flavors and Cosmetics department. In its communiqué, this brand clarifies that its current income from operations reaches 3621 million euro, at 0,3 % progression. In the current economic context, it adds, this performance is all the more remarkable as it compares to a 2007 fiscal year in strong progress. Year 2008, he pursued, was marked by the continuation of growth of the biggest brands, of new market shares gains, the two digit organic growth of Louis Vuitton’s sales which continues to register an exceptional profitability level, an excellent performance of the Flavors and Cosmetics and of Sephora.

Scientific articles

Photodermatology, Photoimmunology & Photomedicine, Volume 25 Issue 2, Pages 106 – 108 - p53 protein expression in skin with different levels of photoaging - Inês Alencar de Castro, Larissa Schütz, Edison Capp, André Cartell, Luise Meurer & Lucio Bakos. The measure of p53 in a normal skin at various photoaging levels does not show significant differences.

In non-melanoma skin cancer, keratinocytes show marked p53 protein expression. Considering photoaging as a background for skin cancer, p53 protein expression by immunohistochemistry was evaluated in normal skin with different levels of photoaging. The difference in p53 expression between mild and severe levels of photoaging was not statistically significant (P=0.169). When dermal sides were exposed to UVA irradiation, both mouse and human skin biopsies demonstrated significantly higher chemiluminescence levels than when epidermal sides were exposed to UVA. The amount of collagen cross-links then decreases slightly.

In Cosmetics and Toiletries, February 2009:
• The Quest for Avobenzone Stabilizers and Sunscreen Photostability -Christine Mendrok-Edinger, Kimberly Smith, Anne Janssen and Jürgen Vollhardt, DSM Nutritional Products US 2008 193,395,

Cosmetic preparation with vinylpyrrolidone/acrylic acid copolymer, Beiersdorf AG, Germany (Aug 14, 2008).