Abstract
One of the challenges issued by the market to the formulators is to create cosmetics capable of acting at once, synergistically acting on all senses. When the skill of tickling sight, touch, smell and even hearing has a significant impact on the perceived quality and the sensory “memory” of the consumer, then the cosmetic is a winning product. Both the substance and the effect created at once are among the very first key elements to confirm the success of the product, which expresses itself in a “sensory experience” during its application phase. From a technical point of view, formulators can act on virtually endless variables in order to obtain the desired effect: oil blends, gelling agents, texturing agents, fragrances and moisteners skillfully balanced turn into the perfect product from the sensory standpoint. Selecting optically active elements in the formulations is paramount: those elements are able to visibly change the treated area in a wonderful way, thus satisfying the consumer at once. A challenge inside the challenge is to scientifically “evaluate” impressions which are personal by nature to create the knowledge of this type of analysis in the research laboratories. Spreading value as well as picking can be easily measured by means of the consistometer. Blind evaluations of textures with reference to the benchmarks must be included in a multidimensional matrix which will become an essential part of product technical sheet.

FOREWORD
The sensory stimulation of a cosmetic has been deemed to be an ancillary aspect until a few years ago, something that would complete the product - exclusively reserved to high-end products. The functional properties of the cosmetic turned out to be one of the most interesting aspects, as well as the promises – which could be more or less kept, and were actually kept! – made by the product to the consumer. From its formulation to its communication, the cosmetic used to live according to its own functionality, that is its ability to solve or prevent specific blemishes.

That point of view has drastically changed on different levels in just a decade – from mass products to top quality products. Consumers are becoming increasingly expert and disenchanted by the excessive promises and experiences that have not met their expectations. The cosmetic market is cluttered with products that can be hardly distinguished from each other, sometimes supported by an exaggerated, not much sustainable communication. The Internet ensures bottom-up information steered by true opinion leaders of the field (are they really expert or not?), and time and money are both growing inadequate. The great challenge of today’s formulators unfolds in this scenario: they are asked to unavoidably meet the needs of consumers who want to be amazed, although they do not have much time for themselves, who wish to optimise the economic resources and are more and more focussed on the experience lived in the present, longing for multipurpose products included in a “money and time saving” perspective.

The cosmetic must therefore characterise itself as a product capable of meeting the new needs the market communicates to us. This translates into the undisputed ability to satisfy since its very first use, creating an emotional experience that is imprinted on the consumer’s memory(1); to be able to clearly stand out from the undifferentiated mass of the other cosmetic products by showing an exclusive personality; to boast a strong appeal that would drive consumers to use it again, to purchase it again and – why not? – to spread the word.

In order to achieve this challenging goal, two essential aspects must be combined: a strong, satisfying, pleasant sensory stimulation and a highly satisfying functionality capable of ensuring apparent results since the very first application(2). All of this translates for the formulator in designing a product with a charming texture, a long-lasting, pleasant skin feel that would use optical technologies with an immediate effect in combination with the functional active ingredients which actually ensure the results over time.

A true challenge for a high-demanding market.
THE MULTI-SENSORY STIMULATION IN COSMETICS

This is the multi-sensory stimulation of the product (3). Far from being a mere instrument to achieve a desired result (less wrinkles, less cellulite, a reshaped silhouette, etc...), today the cosmetic product becomes an end in itself, ancillary to an emotional experience (4).

This is the reason why during the design stage formulators must also focus their attention on the sensory value with a global view (5).

The first impact with the product takes place through the sight – being a real or a virtual one. Textures play a key role: from their colour to their consistency, the product image recalls suggestions – regardless of its packaging – capable of imprinting themselves on the memory and steering the following perception of the product upon its use (6). The naked product lives with its own consistency as a material art work takes on a three-dimensional aspect that amazes and intrigues, calling to mind emotions and stimulating the consumer to try it. Two significant trends exist from the chromatic point of view: from the overall colour challenge with literally multi-coloured textures and deep colours, even complex ones from the stability standpoint – think of black and blue – to the natural trend which looks for a green component even in the product image, favoring the hues of earth, ochre, sand.

The touch is undoubtedly the most difficult sense to satisfy, so proposals of innovative structures and formulations abound. There are even memory-effect compact gels capable of distorting during picking and then resuming their original position; velvety mousses and butters boasting a typical texture, true gourmards conceived to ensure a long-lasting, intense, enveloping skin feel; moisturising oil-gels especially innovative from the touch standpoint: exfoliating products with microgranules that do not only ensure exfoliation, but also a pleasant, original, emotional touch.

As far as smell is concerned, we are on home ground. We know the prominent role it plays in choosing the product: besides metaphorically expressing its value, the fragrance deeply characterises and accompanies the sensory experience from the first moment to the last one in such a way that it determines the success or failure of the cosmetic.

The unexpected sense is the hearing. The cracking character of cracking mousses acccents their playfulness, the muffled sonority of creams to powders witnesses the transformation that took place of cream into powder, reminding the older chemists of the “song of silica” that used to be heard in the laboratories of qualitative analysis, the crystal fiction of salt scrubs goes with the exfoliating action on skin. A hearing dimension turns into a playful, multi-sensory stimulation experience, thus rendering the encounter with the product even more pleasant and cherished.

Multi-sensory stimulation poses a complex challenge, as the formulator faces the need of combining functionality with pleasure, stability and dermatological safety with emotion (7). For this reason finding the proper instruments for evaluating the sensory properties of the product becomes paramount.

Not only must the formulator have a highly level chemical competence, but also the ability to objectively evaluate the conceived product through specific parameters and by subjectively “tasting” it (8).

In a few words, that is the squaring of the circle.

OPTICAL EFFECTS FOR AN IMMEDIATE SATISFACTION

We touched on the need perceived by the market of having at its disposal products capable of meeting the requirement they were first conceived for “here and now”, the need of visibly improving our skin. It goes without saying that radically intervening in such a short time is not possible, therefore nowadays the up-to-date cosmetic technologies make available optically active, texturing ingredients with an immediate effect. Those elements are becoming an increasingly necessary condition to make a product a true “best-seller”.

The formulator currently has soft-focus optical particles capable of reflecting the light from the furrow of wrinkle, boosting it and optically attenuating its visibility. But there is more: the combined use of spherical, fat micro-pears that reflect, absorb or scatter the light may ensure an evening out natural effect, which minimizes blemishes and offers a radiant look to the skin. The cutting edge technology went beyond that, combining this special three-dimensional play of light with a skillful use of colour. So formulations containing transparent texturing agents covered with colours for a highly natural looking foundation effect appear on the market.

If luminosity is one of the key words of the market, the strobing ensured by lightening pearls for a brand new concept contouring, which conceals blemishes and accents the best parts, is the response that is obtaining the best results in this time.

When chemistry meets the optical physics, the quest for a correct balance point with a natural look - the face must be glowing, but not shiny, hair luminous, but not oily, body aglow, but not weighed down by too fat textures – is the true critical point, made even more complex by the need for a multietnic variety. Therefore targeted tests are required with reference to the optical properties of the product, which include the use of accurate evaluation instruments that go beyond any subjectivity.

THE SCIENCE OF THE SUBJECTIVE

Having set those ground rules, a path of awareness and consciousness raising in the formulators must be included in order to dedicate the due attention to the sensory aspects of the product and their measuring (9).
Measuring pH, viscosity and typical chemical and physical parameters is a settled practice in every field, which simply calls for adequate equipment. Both the evaluation and fine tuning of parameters, which are very subjective by their nature, differ a lot and are much more complex.

They are parameters that cannot be measured, but absolutely cardinal. Has the product got the proper fluidity? Does it conceal the blemishes, yet living a natural looking effect? Is it pleasant to use? Has it got a fragrance enhancing it?

Answering those questions is not simple. Pleasantness tests are expensive both in terms of time and money, therefore formulators must find simpler, more immediate solutions to be carried out within the formula development.

**Plasticity and consistency.** Especially as far as creams are concerned, their three-dimensional character and body are key aspects capable of conveying a sensation of richness, density and effectiveness [10]. To that end a first instrument to evaluate and measure the sensory properties is the “consistometer” – a piece of equipment that measures product consistency through its resistance during picking. This method allows giving an answer to the requests provided during the briefing with a precise value, as well as clearly classifying the various formulations, assigning an objective value to each one. A distinction among butter, mousse or cream based on the individual perception will not be used any longer; on the contrary, the structure can be clearly classified and indexed.

**Texture.** An effective method to measure texture pleasantness lies in the blind trial with a reference [11]. To that end the special evaluation coordinates must be defined with the marketing department. In fact, whilst some of the measurable parameters will be notable, therefore identical for each product – e.g. pleasantness of fluidity, skin feel after the application, comfort on skin, greasiness, etc... other ones will be pinpointed and classified ad hoc for every single product according to the requirements of the marketing department. The formulators shall test the formulas subject of the blind study with reference to the benchmark, writing down number scores and creating a Kiviat chart, or radar chart (Figure 3), to be enclosed to the formulation. In that way the product can be effectively classified and its strengths and weak points are known. Moreover, the chart provides useful information in case of any changes in the formulation.

Formula references:

**Luminosity and optical properties.** The level of luminosity and coverage of the product with regard to the reference sample can be assessed, therefore classified by distributing it over a suitable black photo paper. This allows displaying the luminous, evening out effect of the product at once. This evaluation instrument can be stored with the formula and can undergo any following evaluations.

**Spreading.** Spreading can be promptly measured on skin-coloured natural hide. The product is to be applied as instructed and the assessor can in that way measure its diffusion and spreadability, assigning a numerical parameter.

**Greasiness and filler effect.** Machines capable of taking pictures and measuring skin parameters at the same time are available at reasonable prices. The greasiness level can be measured on skin by means of this specific equipment which includes a digital camera and a software, assigning a precise parameter to it. Moreover, the filler effect can be precisely measured directly on wrinkles.

**CONCLUSIONS**

In light of that which has been said until now, redefining the reference glossary [12] becomes an instrumental aspect with reference to the sensory evaluation of the
product, that is the sharing of some specific terms (13) such as spreadability, greasiness, skin feel, texture density, etc... Writing a suitable glossary to be shared between the marketing department and laboratory (14) is the first remarkable conceptual passage to carry on a univocal, targeted, accurate evaluation.

Even the formulator’s training and education plays a key role in this field. Therefore targeted training sessions shall be scheduled, which can be completed by true internal seminars of “tasting” of the best-seller products and “sommelier” paths where nomenclature can be improved and shared, sensory characteristics can be recognised and proposals can be compared.

In that way the formulator figure can become a highly qualified, clear benchmark for the marketing department during the design stage. That means a more modern, versatile, winning professional figure.

REFERENCES AND NOTES