Sun care made easy

While the sun’s heat and light are essential to most forms of life on earth, unprotected exposure to intense ultra-violet radiation can result in skin damage and diseases.

According to Datamonitor, the global sun care market was valued at $8.7 billion in 2013, with sun protection accounting for almost two-thirds (64%) of spending in this category. Strong growth in the sun care market is also expected over the next few years. A decade ago, sunscreen was viewed as a product to support “tanning without sunburn”, but its purpose has now shifted to preventing skin damage, premature aging and skin cancer. In addition, performance standards have become more stringent over the years and specific UVA protection criteria must now be fulfilled, including the European recommendation that the UVA protection factor must be at least one-third or greater of the sun protection factors (SPF) value (UVA-PF ≥ 1/3 SPF). Technology has therefore improved to cover UVA protection and provide higher SPFs.

Consumers are now wary of unprotected exposure to both types and are paying greater attention to the efficacy of sun protection. All this has sparked a high demand for sun protection products that can be applied to wet skin and allowing quick and easy application, these products remove water from the skin’s surface and do not leave the skin feeling greasy. As well as actively contributing to consumers’ wellbeing, products offering pleasant textures and ease of use also encourage frequent application of sunscreen in sufficient amounts.

There is also an ongoing trend towards daily skin care products that incorporate UV protection.

Sun care products nowadays are ideally tailored to specific consumer needs.

Sun care made easy

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The process of designing attractive sunscreen products is becoming increasingly complex. What can be done to simplify this? Uli Osterwalder et al. from BASF show how to incorporate an SPF claim into different application formats even when there is no specific knowledge of sun care.

Additional information can be found at www.health-and-beauty.com/qr00346

Focus: Sun care

Expertise meets creativity

For a sun care product to be successful on the market, it needs to meet strict performance requirements, including a high SPF value and UVA protection, as well as water resistance, photostability and certain sensory properties. For designers and manufacturers of sun care products, four key requirements must be met:

- Efficacy: Choosing the right combination of UV filters and other key ingredients to achieve the desired performance.
- Safety: Be it objective or just the perception of safety by the media and the consumer.
Registration. This is most important if the sunscreen is to be distributed in different regions or even globally.


Designing a sun care product therefore requires clear insight into consumers’ needs and expectations, a strong commitment to innovation, and the ability to be creative when developing new products, as well as in-depth formulation expertise and high-quality ingredients.

Complex challenge

All this means that designing and manufacturing sunscreen has become increasingly complex. BASF’s latest development, the broad-spectrum filter Tinosorb A2B, is an efficient UV filter that enables a high degree of formulation flexibility and offers more balanced UV protection. It protects the skin against UV wavelengths ranging from 290 to 340 nanometers, thereby being the first of a new generation of finely-ground (micronized) UV filters: it complements conventional oil-soluble UV filters by closing the current gap between UVA and UVB absorbers, thus enabling a balanced protection across the entire spectrum of solar UV radiation.

Easy yet effective

To overcome the complex process of formulating sun care products the new sunscreen concentrate Uvinul Easy considerably simplifies the process of designing and manufacturing products: it is a transparent, oil-based concentrate that combines UV filters, emollients and emulsifiers. It can be transformed into an effective sunscreen by simply adding water and a thickener. The easiest way to make a sunscreen is by simply adding water to a sunscreen concentrate, such as Uvinul Easy, which is a transparent, oil-based concentrate. With this concentrate, any sunscreen ranging from SPF 6 to SPF 50 can be readily manufactured.

The technology behind this concentrate is based on phase inversion processes, which can be used for the low-energy formation of fine emulsions. The most common emulsion structures for personal care applications are either oil-in-water emulsions (O/W), which consist of oil droplets in a continuous water phase; or water-in-oil emulsions (W/O), where water droplets are present in a continuous oil phase. The emulsion type depends on many factors including the emulsifier type, temperature, salt concentration and more. An initial estimate of the preferred emulsion structure is defined by the Bancroft rule, which states that the solubility of the emulsifier sets preference for the continuous phase of an emulsion. This rule explains the principle influence of the emulsifier structure, salt concentration and temperature. Phase inversions of emulsions – from O/W to W/O or vice versa – can be enforced by a variation of these parameters. Adding water at a constant temperature, with moderate stirring, spontaneously creates a white O/W emulsion. This emulsion will show creaming on standing due to its low viscosity. Therefore, it is necessary to adjust the rheological profile through the addition of a thickener.

With the new sunscreen concentrate, any sunscreen between SPF 6 and SPF 50 (the range of SPF recommended in Europe) can be readily manufactured. For a desired SPF X, the concentrate must be diluted to X%. For example, to produce an SPF 30 sunscreen, the concentrate must be diluted down to 30%. This automatically ensures the correct amount of UVA protection. Thickeners can be added to achieve the desired rheological properties, e.g. to make various product formats such as lotions, creams, sprays, etc.

From daily use creams to lipsticks

Consumers’ desires to stand out as individuals also calls for sun care products that can be tailored to their specific needs, as well as target either men or women of different ages at different stages in their lives. It is possible to customize the formulation by adding other emollients and sensory-enhancing products. Furthermore, preservatives and fragrances can be added to make the product even more unique. It is even possible to make more complex cosmetic formats such as skin care formulations, e.g. a daily use cream with SPF 15 and a make-up formulation, such as a BB cream or lipstick with SPF 50.

Although manufacturing sunscreens can be very complex, there are now easier ways to go about it. For instance, by using the BASF sunscreen simulator in the design, or to just gain a better understanding of how the performance of sunscreens can be influenced by varying the composition and concentrations of UV filters. The sunscreen concentrate Uvinul Easy is another option for manufacturing sun care products in an easy way and has been created to rapidly incorporate an SPF claim into different application formats without requiring specific knowledge of sun care.


A frame formulation and additional information can be found on the Internet – see Internet panel.

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